TISSUE-SPECIFIC ANTIGENS FOR CANCER IMMUNOTHERAPY

CROSS REFERENCE

[0001] This application claims the benefit of U.S. Provisional Application No. 63/125,269, filed on December 14, 2020, which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] Personalized immunotherapy using tumor-specific peptides has been described (Ott et al., Hematol. Oncol. Clin. N. Am. 28 (2014) 559-569). Prior to the present disclosure, cancer immunotherapies have mostly focused on epitopes thought to exhibit "tumor-specific" or "tumor-associated" expression patterns. Examples of such epitopes include MAGEA3, NY-ESO-1, and MSLN. Typically, these genes either suffer from low expression in tumors or non-negligible expression in essential normal tissues. These problems likely interfere with efficacy. However, focusing on tissue-specific antigens can change the scope of possible targets.

SUMMARY

[0003] Provided herein are methods and compositions, including tissue-specific antigens not previously considered, such as tissue-specific antigens specific to non-essential tissues, that solve these problems. The tissue-specific epitope sequence can be expected to be presented on tumor cells or non-essential normal cells from a non-essential tissue of the same lineage and can be expected to have zero or a low expression level in essential tissues. The epitope sequence information of the tissue-specific antigens, e.g., antigens specific to a tumor from a particular tissue, can therefore be translated into therapeutic methods and compositions for diseases or conditions, e.g., cancer. In some embodiments the tissue-specific antigens are tumor antigens.

[0004] Provided herein is a composition comprising a tissue-specific antigen peptide comprising an epitope sequence of a protein encoded by a gene selected from the group consisting of *ANKRD30A, COL10A1, CTCFL, PPIAL4G, POTEE, DLL3, MMP13, SSX1, DCAF4L2, MAGEA4, MAGEA11, MAGEC2, MAGEA12, PRAME, CLDN6, EPYC, KLK3, KLK2, KLK4, TGM4, POTEG, RLN1, POTEH, SLC45A2, TSPAN10, PAGE5, CSAG1, PRDM7, TG, TSHR, RSPH6A, SCXB, HIST1H4K, ALPPL2, PRM2, PRM1, TNP1, LELP1, HMGB4, AKAP4, CETN1, UBQLN3, ACTL7A, ACTL9, ACTRT2, PGK2, C2orf53, KIF2B, ADAD1, SPATA8, CCDC70, TPD52L3, ACTL7B, DMRTB1, SYCN, CELA2A, CELA2B, PNLIPRP1, CTRC, AMY2A, SERPINI2, RBPJL, AQP12A, IAPP, KIRREL2, G6PC2, AQP12B, CYP11B1, CYP11B2, STAR, CYP11A1,* and *MC2R*, wherein the protein is expressed by a cancer; a polynucleotide encoding the tissue-specific antigen peptide; one or more antigen presenting cells (APCs) comprising the tissue-specific antigen peptide; a T cell receptor (TCR) or an antibody, or a functional part thereof that is specific to an MHC:peptide complex, wherein the MHC:peptide complex comprises

the tissue-specific antigen peptide; or a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR.

[0005] In some embodiments, the tumor antigen epitope may comprise an epitope from any one of the proteins TSHR, TG, RSPH6A, SCXB, SSX1, or any combination thereof, and wherein the cancer comprises thyroid cancer.

[0006] Also provided herein is a population of T cells for cancer therapy for a human subject in need thereof, wherein the population of T cells comprises T cells that specifically recognize one of the epitope sequence of a protein encoded by a gene selected from the group consisting of *ANKRD30A, COL10A1, CTCFL, PPIAL4G, POTEE, DLL3, MMP13, SSX1, DCAF4L2, MAGEA4, MAGEA11, MAGEC2, MAGEA12, PRAME, CLDN6, EPYC, KLK3, KLK2, KLK4, TGM4, POTEG, RLN1, POTEH, SLC45A2, TSPAN10, PAGE5, CSAG1, PRDM7, TG, TSHR, RSPH6A, SCXB, HIST1H4K, ALPPL2, PRM2, PRM1, TNP1, LELP1, HMGB4, AKAP4, CETN1, UBQLN3, ACTL7A, ACTL9, ACTRT2, PGK2, C2orf53, KIF2B, ADAD1, SPATA8, CCDC70, TPD52L3, ACTL7B, DMRTB1, SYCN, CELA2A, CELA2B, PNLIPRP1, CTRC, AMY2A, SERPINI2, RBPJL, AQP12A, IAPP, KIRREL2, G6PC2, AQP12B, CYP11B1, CYP11B2, STAR, CYP11A1,* and *MC2R*, wherein the epitope is expressed by a cancer cell of a human subject.

[0007] Provided herein is an improved ex vivo method for preparing tumor antigen-specific T cells, the method comprising: depleting CD14+ cells and/or CD25+ cells from a population of immune cells comprising antigen presenting cells (APCs) and T cells, thereby forming a CD14 and/or CD25 depleted population of immune cells comprising a first population of APCs and T cells, wherein the population of immune cells is from a biological sample from a human subject; and incubating the CD14 and/or CD25 depleted population of immune cells comprising a first population of APCs and T cells for a first time period in the presence of: FMS-like tyrosine kinase 3 receptor ligand (FLT3L), and (A) a polypeptide comprising at least one tumor antigen epitope sequence expressed by cancer cells of a human subject with cancer, or (B) a polynucleotide encoding the polypeptide; thereby forming a population of cells comprising stimulated T cells; expanding the population of cells comprising stimulated T cells, thereby forming an expanded population of cells comprising tumor antigen-specific T cells, wherein the tumor antigen-specific T cells comprise T cells that are specific to a complex comprising (i) the at least one tumor antigen epitope sequence and (ii) an MHC protein expressed by the cancer cells or APCs of the human subject of (b)(ii); and administering the expanded population of cells comprising tumor antigen-specific T cells to the human subject, wherein the tumor antigen epitope may be one or more of: *ANKRD30A, COL10A1, CTCFL, PPIAL4G, POTEE, DLL3, MMP13, SSX1, DCAF4L2, MAGEA4, MAGEA11, MAGEC2, MAGEA12, PRAME, CLDN6, EPYC, KLK3, KLK2, KLK4, TGM4, POTEG, RLN1, POTEH, SLC45A2, TSPAN10, PAGE5, CSAG1, PRDM7, TG, TSHR, RSPH6A, SCXB, HIST1H4K, ALPPL2, PRM2, PRM1, TNP1, LELP1, HMGB4, AKAP4, CETN1, UBQLN3, ACTL7A, ACTL9, ACTRT2, PGK2, C2orf53, KIF2B,*

ADAD1, SPATA8, CCDC70, TPD52L3, ACTL7B, DMRTB1, SYCN, CELA2A, CELA2B, PNLIPRP1, CTRC, AMY2A, SERPINI2, RBPJL, AQP12A, IAPP, KIRREL2, G6PC2, AQP12B, CYP11B1, CYP11B2, STAR, CYP11A1, and *MC2R*, wherein the epitope is expressed by a cancer cell of a human subject. In some embodiments, the tumor antigen epitope may comprise an epitope from any one of the proteins TSHR, TG, RSPH6A, SCXB, SSX1, or any combination thereof, and wherein the cancer comprises thyroid cancer.

[0008] Provided herein is a composition comprising a tissue-specific antigen peptide comprising an epitope sequence of a protein, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1-8962, wherein the protein is expressed by a cancer; a polynucleotide encoding the tissue-specific antigen peptide; one or more antigen presenting cells (APCs) presenting the tissue-specific antigen peptide; a T cell receptor (TCR) or an antibody, or a functional part thereof that is specific to an MHC:peptide complex, wherein the MHC:peptide complex comprises the tissue-specific antigen peptide; or a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR.

[0009] Provided herein is a composition comprising: a tissue-specific antigen peptide comprising an epitope sequence of a protein, wherein the protein is expressed by a tumor of a target tissue; a polynucleotide encoding the tissue-specific antigen peptide; one or more antigen presenting cells (APCs) presenting the tissue-specific antigen peptide; a T cell receptor (TCR) or an antibody, or a functional part thereof that is specific to an MHC:peptide complex, wherein the MHC:peptide complex comprises the tissue-specific antigen peptide; or a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR; wherein the epitope sequence binds to or is predicted to bind to a protein encoded by a MHC allele expressed by a human subject, and wherein the protein is encoded by a tissue-specific antigen epitope gene that has an expression level in the target tissue that is at least 2 fold more than an expression level of the tissue-specific antigen gene in each tissue of a plurality of non-target tissues that are different than the target tissue.

[0010] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 6846 7061, 7359-7448, 7629-8099, and 8619-8744, and wherein the cancer comprises thyroid cancer.

[0011] In some embodiments, the protein comprises RBPJL, AQP12A, AQP12B, IAPP, CELA2A, CELA2B, AMY2A, CTRC, G6PC2, KIRREL2, PNLIPRP1, SERPINI2, SYNC, or any combination thereof, and wherein the cancer comprises pancreatic cancer.

[0012] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 720-814, 989-1182, 1373-1565, 2120-2211, 2920-3009, 3101-3196, 3320-3440, 5193-5284, 6487-6579, 7062-7150, and 7539-7628, and wherein the cancer comprises pancreatic cancer.

[0013] In some embodiments, the protein comprises CYP11A1, CYP11B1, CYP11B2, MC2R, STAR, or any combination thereof, and wherein the cancer comprises adrenal cancer.

[0014] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 22122523, 4817-4915, and 7449-7538, and wherein the cancer comprises adrenal cancer.

[0015] In some embodiments, the protein comprises ALPPL2, POTEE, PRAME, or any combination thereof, and wherein the cancer comprises uterine cancer.

[0016] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 627-719, 5285-5431, and 6085-6183, and wherein the cancer comprises uterine cancer.

[0017] In some embodiments, the protein comprises KLK2, KLK3, KLK4, POTEH, POTEG, TGM4, RLN1, POTEE, PPIAL4G or any combination thereof, and wherein the cancer comprises prostate cancer.

[0018] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 3441-4274, 5285-6084, 6580-6845, and 8100-8434, and wherein the cancer comprises prostate cancer.

[0019] In some embodiments, the protein comprises ANKRD30A, COL10A1, or a combination thereof and wherein the cancer comprises breast cancer.

[0020] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 815-988, and 1749-1867, and wherein the cancer comprises breast cancer.

[0021] In some embodiments, the protein comprises CTCFL, PRAME, CLDN6, EPYC, or any combination thereof, and wherein the cancer comprises ovarian cancer.

[0022] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1659-1748, 1964-2119, 2827-2919, and 6085-6183, and wherein the cancer comprises ovarian cancer.

[0023] In some embodiments, the protein comprises CTCFL, and wherein the cancer comprises cervical cancer.

[0024] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1964-2119, and wherein the cancer comprises cervical cancer.

[0025] In some embodiments, the protein comprises POTEE, PPIAL4G, or a combination thereof, and wherein the cancer comprises colorectal cancer.

[0026] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 5285-5431, and 5996-6084, and wherein the cancer comprises colorectal cancer.

[0027] In some embodiments, the protein comprises DLL3, and wherein the cancer comprises glioma.

[0028] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 2619-2736, and wherein the cancer comprises glioma.

[0029] In some embodiments, the protein comprises MMP13, and wherein the cancer comprises head and neck cancer.

[0030] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 4916-5010, and wherein the cancer comprises head and neck cancer.

[0031] In some embodiments, the protein comprises DCAF4L2, SSX1, or a combination thereof, and wherein the cancer comprises liver cancer.

[0032] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 2524-2618, and 7359-7448, and wherein the cancer comprises liver cancer.

[0033] In some embodiments, the protein comprises SSX1, MAGEA4, PRAME, CSAG1, MAGEA12, MAGEA2, MAGEC2, PAGE5, PRDM7, SLC45A2, TSPAN10, or any combination thereof, and wherein the cancer comprises melanoma.

[0034] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 1868-1963, 4458-4550, 4551-4637, 4638-4728, 4729-4816, 5011-5100, 6085-6183, 6184-6307, 7151-7264, 7359-7448, and 8745-8835, and wherein the cancer comprises melanoma.

[0035] In some embodiments, the protein comprises MAGEA11, MAGEA4, PRAME, or any combination thereof, and wherein the cancer comprises lung squamous cell carcinoma.

[0036] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 4368-4457, 4638-4728, and 6085-6183, and wherein the cancer comprises lung squamous cell carcinoma.

[0037] In some embodiments, the protein comprises ACTL7A, ACTL7B, ACTL9, ACTRT2, ADAD1, AKAP4, C2orf53, CCDC70, CETN1, DMRTB1, HMGB4, KIF2B, LELP1, PGK2, PRM1, PRM2, SPATA8, TNP1, TPD52L3, UBQLN3, or any combination thereof, and wherein the cancer comprises testicular cancer.

[0038] In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 1-626, 1183-1372, 1566-1658, 2737-2826, 3010-3100, 3197-3319, 4275-4367, 5101-5192, 6308-6486, 7265-7358, 8435-8618, and 8836-8962, and wherein the cancer comprises testis cancer.

[0039] In some embodiments, the protein comprises KLK2, KLK3, KLK4, ANKRD30A, PRAME, MAGE4, or a combination thereof.

[0040] In some embodiments, the protein comprises KLK2, KLK3 or KLK4; and wherein the cancer comprises prostate cancer. In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of AYSEKVTEF (SEQ ID NO: 3534), GLWTGGKDTCGV (SEQ ID NO: 3468), HPEDTGQVF (SEQ ID NO: 3988), HPEYNRPLL (SEQ ID NO: 4143), QRVPVSHSF (SEQ ID NO: 3544), SESDTIRSI (SEQ ID NO: 4176), SLFHPEDTGQV (SEQ ID NO: 3775), SLQCVSLHL (SEQ ID NO: 3456), VILLGRHSL (SEQ ID NO: 3891), VLVHPQWVL (SEQ ID NO: 3757), LFHPEDTGQVF (SEQ ID NO: 3827), RPRSLQCVSL (SEQ ID NO: 3578), GYLQGLVSF (SEQ ID NO: 4094), IRNKSVILL (SEQ ID NO: 3974), KLQCVDLHV (SEQ ID NO: 3740), LLANGRMPTV (SEQ ID NO: 4029), LRPGDDSTL (SEQ ID NO: 3767), MPALPMVL (SEQ ID NO: 3874), NRPLLANDL (SEQ ID NO: 4216), SLQCVSLHL (SEQ ID NO: 3456), TWIAPPLQV (SEQ ID NO: 3784), VFQVSHSF (SEQ ID NO: 3828) and YSEKVTEFML (SEQ ID NO: 3454). In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of AYSEKVTEF (SEQ ID NO: 3534), HPEDTGQVF (SEQ ID NO: 3988), HPEYNRPLL (SEQ ID NO: 4143), QRVPVSHSF (SEQ ID NO: 3544), LFHPEDTGQVF (SEQ ID NO: 3827), GYLQGLVSF (SEQ ID NO: 4094), IRNKSVILL (SEQ ID NO: 3974), KLQCVDLHV (SEQ ID NO: 3740), LLANGRMPTV (SEQ ID NO: 4029), LRPGDDSTL (SEQ ID NO: 3767), MPALPMVL (SEQ ID NO: 3874), NRPLLANDL (SEQ ID NO: 4216), SLQCVSLHL (SEQ ID NO: 3456), TWIAPPLQV (SEQ ID NO: 3784), VFQVSHSF (SEQ ID NO: 3828) and YSEKVTEFML (SEQ ID NO: 3454).

[0041] In some embodiments, the protein comprises ANKRD30A; and wherein the cancer comprises breast cancer. In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of LLSHGAVIEV (SEQ ID NO: 831), SIPTKALEL (SEQ ID NO: 942), SQYSGQLKV (SEQ ID NO: 927), SVPNKALEL (SEQ ID NO: 941), SLSKILDTV (SEQ ID NO: 826) and SLDQKLFQL (SEQ ID NO: 827). In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of LLSHGAVIEV (SEQ ID NO: 831), SIPTKALEL (SEQ ID NO: 942), SVPNKALEL (SEQ ID NO: 941), SLSKILDTV (SEQ ID NO: 826) and SLDQKLFQL (SEQ ID NO: 827).

[0042] In some embodiments, the protein comprises PRAME; and wherein the cancer comprises squamous cell lung cancer; melanoma; ovarian cancer, uterine cancer, or any combination thereof. In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of DSLFFLRGR (SEQ ID NO: 6132), ELFSYLIEK (SEQ ID NO: 6108), FYDPEPILC (SEQ ID NO: 6166), ISISALQSL (SEQ ID NO: 6161), ITDDQLLAL (SEQ ID NO: 6158), KRKKNVLRL (SEQ ID NO: 6173), LQSLLQHLI (SEQ ID NO: 6146), LSHIHASSY (SEQ ID NO: 6152), PYLGQMINL (SEQ ID NO: 6120), QLLALLPSL (SEQ ID NO: 6093), SFYGNSISI (SEQ ID NO:

6174), SLLQHLIGL (SEQ ID NO: 6095), SPSVSQLSVL (SEQ ID NO: 6139), SPYLGQMINL (SEQ ID NO: 6138), TSPRRLVEL (SEQ ID NO: 6159), VLYPVPLESY (SEQ ID NO: 6154), VSPEPLQAL (SEQ ID NO: 6156), YLHARLREL (SEQ ID NO:6157) and RLDQLLRHV (SEQ ID NO:6104). In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence of SLLQHLIGL (SEQ ID NO: 6095).

[0043] In some embodiments, the protein comprises MAGE4; and wherein the cancer comprises squamous cell lung cancer. In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of EVDPASNTY (SEQ ID NO: 4638), GVYDGREHTV (SEQ ID NO: 4653), KEVDPASNTY (SEQ ID NO: 4640), KVDELAHFL (SEQ ID NO: 4648), QIFPKTGL (SEQ ID NO: 4692), QSPQGASAL (SEQ ID NO: 4707), SALPTTISF (SEQ ID NO: 4699),, TVYGEPRKL (SEQ ID NO: 4722), VYGEPRKL (SEQ ID NO: 4727), YPSLREAAL (SEQ ID NO: 4689), ALLEEEEGV (SEQ ID NO: 4698) and KVLEHVVRV (SEQ ID NO: 4697). In some embodiments, the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of EVDPASNTY (SEQ ID NO: 4638), GVYDGREHTV (SEQ ID NO: 4653), KVDELAHFL (SEQ ID NO: 4648) and KVLEHVVRV (SEQ ID NO: 4697).

[0044] In some embodiments, the target tissue is a non-essential tissue.

[0045] In some embodiments, each non-target tissue is an essential tissue.

[0046] In some embodiments, tissue-specific antigen peptide is an isolated, purified, and/or synthetic peptide.

[0047] In some embodiments, the tissue-specific antigen peptide further comprises an accessory sequence flanking the epitope sequence.

[0048] In some embodiments, the polynucleotide comprises deoxyribonucleic acid (DNA).

[0049] In some embodiments, the polynucleotide comprises ribonucleic acid (RNA).

[0050] In some embodiments, the composition comprises a viral vector containing the polynucleotide.

[0051] In some embodiments, the viral vector is an adenovirus viral vector, an adeno-associated virus (AAV) viral vector, a Herpes Simplex virus (HSV) viral vector, a Semliki Forest Virus (SFV) viral vector, a lentivirus viral vector, a retrovirus viral vector, a poxvirus viral vector, an alpha virus viral vector, a vaccinia virus viral vector, a hepatitis B virus (HBV) viral vector, a human papillomavirus viral vector, or a pseudotype thereof, or any combination thereof.

[0052] In some embodiments, the tissue-specific antigen peptide activates CD8+ T cells, CD4+ T cells, or both.

[0053] Provided herein is a composition for autologous T cell therapy for a cancer in a subject in need thereof, wherein the composition comprises a population of T cells expressing an antigen specific TCR, wherein the antigen is a cancer antigen as disclosed herein. Contemplated is a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR; wherein the

epitope sequence binds to or is predicted to bind to a protein encoded by a MHC allele expressed by the human subject in need of the autologous T cell therapy, and the TCR binds to the epitope when presented in a complex by the protein encoded by a MHC allele expressed by the human subject, wherein the epitope is a tissue specific epitope that is encoded by a tissue-specific antigen epitope gene that has an expression level in the target tissue that is at least 2 fold more than an expression level of the tissue-specific antigen gene in each tissue of a plurality of non-target tissues that are different than the target tissue. In some embodiments, the T cell is a non-engineered cell. In some embodiments, the T cell is autologous to the subject. In some embodiments, the T cell is modified ex vivo.

[0054] In some embodiments, the TCR is specific to the tissue-specific antigen peptide in a complex with a class I MHC protein or a class II MHC protein.

[0055] In some embodiments, the at least one antigen specific T cell expresses CD8 or CD4.

[0056] In some embodiments, the at least one antigen specific T cell comprise an exogenous polynucleotide encoding the TCR.

[0057] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 6846-7061, 7359-7448, 7629-8099, and 8619-8744, and wherein the cancer comprises thyroid cancer.

[0058] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein RBPJL, AQP12A, AQP12B, IAPP, CELA2A, CELA2B, AMY2A, CTRC, G6PC2, KIRREL2, PNLIPRP1, SERPINI2, SYNC, or any combination thereof, and wherein the cancer comprises pancreatic cancer.

[0059] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 720-814, 989-1182, 1373-1565, 2120-2211, 2920-3009, 3101-3196, 3320-3440, 5193-5284, 6487-6579, 7062-7150, and 7539-7628, and wherein the cancer comprises pancreatic cancer.

[0060] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: CYP11A1, CYP11B1, CYP11B2, MC2R, STAR, or any combination thereof, and wherein the cancer comprises adrenal cancer.

[0061] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 22122523, 4817-4915, and 7449-7538, and wherein the cancer comprises adrenal cancer.

[0062] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: ALPPL2, POTEE, PRAME, or any combination thereof, and wherein the cancer comprises uterine cancer.

[0063] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 627-719, 5285-5431, and 6085-6183, and wherein the cancer comprises uterine cancer.

[0064] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: KLK2, KLK3, KLK4, POTEH, POTEG, TGM4, RLN1, POTEE, PPIAL4G or any combination thereof, and wherein the cancer comprises prostate cancer.

[0065] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 3441-4274, 5285-6084, 6580-6845, and 8100-8434, and wherein the cancer comprises prostate cancer.

[0066] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: ANKRD30A, COL10A1, or a combination thereof and wherein the cancer comprises breast cancer.

[0067] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 815-988, and 1749-1867, and wherein the cancer comprises breast cancer.

[0068] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: CTCFL, PRAME, CLDN6, EPYC, or any combination thereof, and wherein the cancer comprises ovarian cancer.

[0069] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1659-1748, 1964-2119, 2827-2919, and 6085-6183, and wherein the cancer comprises ovarian cancer.

[0070] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: CTCFL, and wherein the cancer comprises cervical cancer.

[0071] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1964-2119, and wherein the cancer comprises cervical cancer.

[0072] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: POTEE, PPIAL4G, or a combination thereof, and wherein the cancer comprises colorectal cancer.

[0073] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 5285-5431, and 5996-6084, and wherein the cancer comprises colorectal cancer.

[0074] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein, DLL3, and wherein the cancer comprises glioma.

[0075] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 2619-2736, and wherein the cancer comprises glioma.

[0076] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein, MMP13, and wherein the cancer comprises head and neck cancer.

[0077] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 4916-5010, and wherein the cancer comprises head and neck cancer.

[0078] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein, DCAF4L2, or SSX1, or a combination thereof, and wherein the cancer comprises liver cancer.

[0079] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 2524-2618, and 7359-7448, and wherein the cancer comprises liver cancer.

[0080] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: SSX1, MAGEA4, PRAME, CSAG1, MAGEA12, MAGEA2, MAGEC2, PAGE5, PRDM7, SLC45A2, TSPAN10, or any combination thereof, and wherein the cancer comprises melanoma.

[0081] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 1868-1963, 4458-4550, 4551-4637, 4638-4728, 4729-4816, 5011-5100, 6085-6183, 6184-6307, 7151-7264, 7359-7448, and 8745-8835, and wherein the cancer comprises melanoma.

[0082] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: MAGEA11, MAGEA4, PRAME, or any combination thereof, and wherein the cancer comprises lung squamous cell carcinoma.

[0083] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the

group consisting of SEQ ID Nos 4368-4457, 4638-4728, and 6085-6183, and wherein the cancer comprises lung squamous cell carcinoma.

[0084] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence from the protein: ACTL7A, ACTL7B, ACTL9, ACTRT2, ADAD1, AKAP4, C2orf53, CCDC70, CETN1, DMRTB1, HMGB4, KIF2B, LELP1, PGK2, PRM1, PRM2, SPATA8, TNP1, TPD52L3, UBQLN3, or any combination thereof, and wherein the cancer comprises testicular cancer.

[0085] In some embodiments, the at least one antigen specific T cell comprises a TCR that is specific for an epitope sequence that has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 1-626, 1183-1372, 1566-1658, 2737-2826, 3010-3100, 3197-3319, 4275-4367, 5101-5192, 6308-6486, 7265-7358, 8435-8618, and 8836-8962, and wherein the cancer comprises testis cancer.

[0086] In some embodiments, the composition comprises the at least one antigen specific T cell, and wherein the tissue-specific antigen peptide comprises an epitope sequence of a protein encoded by a gene selected from the group consisting of: ANKRD30A, DLL3, PRAME, CLDN6, EPYC, SLC45A2, TSPAN10, TSHR, LELP1, AQP12A, KIRREL2, G6PC2, AQP12B, and MC2R.

[0087] In some embodiments, the biological sample is from a subject with the cancer or a donor other than a subject with the cancer.

[0088] In some embodiments, the donor has a natural immune response to the tissue-specific antigen peptide.

[0089] In some embodiments, the cancer comprises prostate cancer, and wherein the donor is female.

[0090] In some embodiments, the cancer comprises breast cancer or ovarian cancer, and wherein the donor is male.

[0091] In some embodiments, the protein is encoded by a tissue-specific antigen epitope gene that has an mRNA expression level in each non-target tissue of a plurality of non-target tissues that are different than a target tissue of the tumor that is at most about 5 mRNA transcripts per one million total mRNA transcripts in each respective non-target tissue.

[0092] In some embodiments, the protein is encoded by a tissue-specific antigen epitope gene that has an mRNA expression level in a target tissue that is at least about 100 mRNA transcripts per one million total mRNA transcripts in the target tissue.

[0093] Provided herein is a pharmaceutical composition comprising a composition described herein, and a pharmaceutically acceptable carrier.

[0094] Provided herein is a method comprising identifying an epitope sequence, wherein the epitope sequence binds to or is predicted to bind to a protein encoded by a MHC allele expressed by a human subject, and is encoded by a tissue-specific antigen epitope gene that has an expression level in a tumor

from a target tissue that is at least 2 fold greater than an expression level of the tissue-specific antigen epitope gene in each tissue of a plurality of non-target tissues that are different than the target tissue.

[0095] Provided herein is a method of preparing T cells comprising a T cell receptor (TCR) specific to a complex of (i) a epitope sequence of a tissue specific antigen peptide of a protein and (ii) a protein encoded by an HLA allele of a human subject, the method comprising: incubating T cells in the presence of antigen presenting cells (APCs) comprising the epitope sequence, wherein the APCs express the protein encoded by an HLA allele of a human subject.

[0096] In some embodiments, the APCs comprise a polypeptide comprising the epitope sequence or a polynucleotide encoding a polypeptide comprising the epitope sequence. In some embodiments, the APCs are APCs from a human subject. In some embodiments, the T cells are T cells from a human subject. In some embodiments, the method further comprises administering the T cells to a human subject in need thereof.

[0097] Provided herein is a method of treatment, comprising: administering a composition to a human subject in need thereof, wherein the composition comprises: a tissue-specific antigen peptide comprising an epitope sequence of a protein, wherein the epitope sequence is expressed by the tumor; a polynucleotide encoding the tissue-specific antigen peptide; one or more antigen presenting cells (APCs) presenting the tissue-specific antigen peptide; a T cell receptor (TCR) specific to the tissue-specific antigen peptide; or a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR. wherein the epitope sequence binds to or is predicted to bind to a protein encoded by a MHC allele expressed by the human subject, and wherein the protein is encoded by a tissue-specific antigen epitope gene that has an expression level in the tumor that is at least 2 fold more than an expression level of the tissue-specific antigen gene in each tissue of a plurality of non-target tissues that are different than the target tissue.

[0098] In some embodiments, each tissue of the plurality of tissues is an essential tissue.

[0099] In some embodiments, the plurality of tissues comprise skeletal muscle, coronary artery, heart, adipose, uterus, vagina, skin, salivary gland, brain, lung, esophagus, stomach, colon, small intestine, nerve, or any combination thereof.

[00100] In some embodiments, each non-target tissue of the plurality of non-target tissues is a non-essential tissue.

[00101] In some embodiments, the MHC allele is a class I MHC allele or a class II MHC allele.

[00102] Provided herein is a method of treating a cancer, comprising: administering a composition described herein to a subject in need thereof.

[00103] In some embodiments, the cancer comprises adrenal gland cancer, breast cancer, cervical cancer, colorectal cancer, fallopian tube cancer, glioma, head and neck cancer, liver cancer, squamous cell lung

cancer, melanoma, ovarian cancer, pancreatic cancer, prostate cancer, testicular cancer, thyroid cancer, uterine cancer, or any combination thereof.

[00104] In some embodiments, the protein comprises KLK2, KLK3, KLK4, ANKRD30A, PRAME, MAGE4, or a combination thereof. In some embodiments, the protein comprises KLK2, KLK3 or KLK4; and wherein the cancer comprises prostate cancer. In some embodiments, the epitope sequence is AYSEKVTEF (SEQ ID NO: 3534) and the human subject expresses a protein encoded by an HLA-C06:02 or HLA-A24:02 allele, the epitope sequence is GLWTGGKDTCGV (SEQ ID NO: 3468) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is HPEDTGQVF (SEQ ID NO: 3988) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-C07:01 allele, the epitope sequence is HPEYNRPLL (SEQ ID NO: 4143) and the human subject expresses a protein encoded by an HLA-C*07:01 or HLA-B07:02 allele, the epitope sequence is QRVPVSHSF (SEQ ID NO: 3544) and the human subject expresses a protein encoded by an HLA-C*07:01, HLA-C*07:02 or HLA-A24:02 allele, the epitope sequence is SESDTIRSI (SEQ ID NO: 4176) and the human subject expresses a protein encoded by an HLA-B13:02 allele, the epitope sequence is SLFHPEDTGQV (SEQ ID NO: 3775) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is SLQCVSLHL (SEQ ID NO: 3456) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is VILLGRHSL (SEQ ID NO: 3891) and the human subject expresses a protein encoded by an HLA-B08:01 allele, the epitope sequence is VLVHPQWVL (SEQ ID NO: 3757) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is LFHPEDTGQVF (SEQ ID NO: 3827) and the human subject expresses a protein encoded by an HLA-A24:02 allele, the epitope sequence is RPRSLQCVSL (SEQ ID NO: 3578) and the human subject expresses a protein encoded by an HLA-B07:02 allele, the epitope sequence is GYLQGLVSF (SEQ ID NO: 4094) and the human subject expresses a protein encoded by an HLA-A24:02 allele, the epitope sequence is IRNKSVILL (SEQ ID NO: 3974) and the human subject expresses a protein encoded by an HLA-C*06:02, HLA-C*07:02 or HLA-C07:01 allele, the epitope sequence is KLQCVDLHV (SEQ ID NO: 3740) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is LLANGRMPTV (SEQ ID NO: 4029) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is LRPGDDSTL (SEQ ID NO: 3767) and the human subject expresses a protein encoded by an HLA-C07:02 allele, the epitope sequence is MPALPMVL (SEQ ID NO: 3874) and the human subject expresses a protein encoded by an HLA-B07:02 allele, the epitope sequence is NRPLLANDL (SEQ ID NO: 4216) and the human subject expresses a protein encoded by an HLA-C*06:02, HLA-C*07:02 or HLA-C01:02 allele, the epitope sequence is SLQCVSLHL (SEQ ID NO: 3456) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is TWIAPPLQV (SEQ ID NO: 3784) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-A02:01 allele, the epitope sequence is VFQVSHSF (SEQ ID NO: 3828) and the human

subject expresses a protein encoded by an HLA-C*07:02 or HLA-A24:02 allele, or the epitope sequence is YSEKVTEFML (SEQ ID NO: 3454) and the human subject expresses a protein encoded by an HLA-A01:01 allele.

[00105] In some embodiments, the protein comprises ANKRD30A; and wherein the cancer comprises breast cancer. In some embodiments, the epitope sequence is LLSHGAVIEV (SEQ ID NO: 831) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is SQYSGQLKV (SEQ ID NO: 927) and the human subject expresses a protein encoded by an HLA-B13:02 allele, the epitope sequence is SVPNKALEL (SEQ ID NO: 941) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-C01:02 allele, the epitope sequence is SLSKILDTV (SEQ ID NO: 826) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is SIPTKALEL (SEQ ID NO: 942) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-C01:02 allele, or the epitope sequence is SLDQKLFQL (SEQ ID NO: 827) and the human subject expresses a protein encoded by an HLA-A02:01 allele.

[00106] In some embodiments, the protein comprises PRAME; and wherein the cancer comprises squamous cell lung cancer; melanoma; ovarian cancer, uterine cancer, or any combination thereof. In some embodiments, the epitope sequence is DSLFFLRGR (SEQ ID NO: 6132) and the human subject expresses a protein encoded by an HLA-A33:03 allele, the epitope sequence is ELFSYLIEK (SEQ ID NO: 6108) and the human subject expresses a protein encoded by an HLA-A03:01 allele, the epitope sequence is FYDPEPILC (SEQ ID NO: 6166) and the human subject expresses a protein encoded by an HLA-C04:01 allele, the epitope sequence is ISISALQSL (SEQ ID NO: 6161) and the human subject expresses a protein encoded by an HLA-C03:04 allele, the epitope sequence is ITDDQLLAL (SEQ ID NO: 6158) and the human subject expresses a protein encoded by an HLA-A01:01 allele, the epitope sequence is KRKKNVLRL (SEQ ID NO: 6173) and the human subject expresses a protein encoded by an HLA-C07:01 allele, the epitope sequence is LQSLLQHLI (SEQ ID NO: 6146) and the human subject expresses a protein encoded by an HLA-B13:02 allele, the epitope sequence is LSHIHASSY (SEQ ID NO: 6152) and the human subject expresses a protein encoded by an HLA-B46:01 allele, the epitope sequence is PYLGQMINL (SEQ ID NO: 6120) and the human subject expresses a protein encoded by an HLA-A24:02 allele, the epitope sequence is QLLALLPSL (SEQ ID NO: 6093) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is SFYGNSISI (SEQ ID NO: 6174) and the human subject expresses a protein encoded by an HLA-C07:01 allele, the epitope sequence is SLLQHLIGL (SEQ ID NO: 6095) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is SPSVSQLSVL (SEQ ID NO: 6139) and the human subject expresses a protein encoded by an HLA-B07:02 allele, the epitope sequence is SPYLGQMINL (SEQ ID NO: 6138) and the human subject expresses a protein encoded by an HLA-B07:02 allele, the epitope sequence is TSPRRLVEL (SEQ ID NO: 6159) and the human subject expresses a protein encoded by an HLA-C01:02 allele, the epitope sequence

is VLYPVPLESY (SEQ ID NO: 6154) and the human subject expresses a protein encoded by an HLA-A03:01 allele, the epitope sequence is VSPEPLQAL (SEQ ID NO: 6156) and the human subject expresses a protein encoded by an HLA-C01:02 allele, the epitope sequence is YLHARLREL (SEQ ID NO:6157) and the human subject expresses a protein encoded by an HLA-B08:01 allele, or the epitope sequence is RLDQLLRHV (SEQ ID NO:6104) and the human subject expresses a protein encoded by an HLA-A02:01 allele.

[00107] In some embodiments, the protein comprises MAGE4; and wherein the cancer comprises squamous cell lung cancer. In some embodiments, the epitope sequence is EVDPASNTY (SEQ ID NO: 4638) and the human subject expresses a protein encoded by an HLA-A01:01 allele, the epitope sequence is GVYDGREHTV (SEQ ID NO: 4653) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is KEVDPASNTY (SEQ ID NO: 4640) and the human subject expresses a protein encoded by an HLA-A01:01 allele, the epitope sequence is KVDELAHFL (SEQ ID NO: 4648) and the human subject expresses a protein encoded by an HLA-A02:01 allele, the epitope sequence is QIFPKTGL (SEQ ID NO: 4692) and the human subject expresses a protein encoded by an HLA-B08:01 allele, the epitope sequence is QSPQGASAL (SEQ ID NO: 4707) and the human subject expresses a protein encoded by an HLA-C01:02 allele, the epitope sequence is SALPTTISF (SEQ ID NO: 4699) and the human subject expresses a protein encoded by an HLA-B46:01 allele, the epitope sequence is TVYGEPRKL (SEQ ID NO: 4722) and the human subject expresses a protein encoded by an HLA-C07:01 allele, the epitope sequence is VYGEPRKL (SEQ ID NO: 4727) and the human subject expresses a protein encoded by an HLA-C07:02 allele, the epitope sequence is YPSLREAAL (SEQ ID NO: 4689) and the human subject expresses a protein encoded by an HLA-B07:02 allele, the epitope sequence is ALLEEEEGV (SEQ ID NO: 4698) and the human subject expresses a protein encoded by an HLA-A02:01 allele, or the epitope sequence is KVLEHVVRV (SEQ ID NO: 4697) and the human subject expresses a protein encoded by an HLA-A02:01 allele.

[00108] Provided herein is a method comprising (a) contacting a T cell with an antigen peptide in complex with an HLA of an APC; and (b) determining a sequence of a TCR of the T cell that recognizes the antigen peptide in complex with the HLA, wherein the T cell is suspected to have zero or reduced immune tolerance to a tissue of origin of the antigen peptide. In some embodiments, the T cell is from a female subject, and the antigen peptide is specific to a tissue selected from the group consisting of: Bulbourethral gland, epididymis, penis, prostate, scrotum, seminal vesicle, testicle. In some embodiments, the T cell is from a female subject, and the antigen peptide is specific to prostate. In some embodiments, the T cell is from a male subject, and the antigen peptide is specific to a tissue selected from the group consisting of: Bartholin's gland, fallopian tube, ovary, Skene's gland, uterus, cervix, vagina, and any combination thereof. In some embodiments, the T cell is from a male subject, and the antigen peptide is specific to ovary. In some embodiments, the T cell is from a Type I diabetes patient, and the antigen peptide is specific to pancreas.

In some embodiments, the T cell is from a subject that has auto-immune thyroid condition, and the antigen peptide is specific to thyroid. In some embodiments, the T cell is from a subject that is negative for an allele of the HLA. The In some embodiments, the T cell is from a subject that is negative for an allele of the HLA and the antigen peptide binds to the HLA encoded by the allele of the HLA

INCORPORATION BY REFERENCE

[00109] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

[00110] **FIG. 1** is a boxplot illustrating expression levels of gene ANKRD30A in a number of different normal tissues and tumors.

[00111] **FIG. 2** is a boxplot illustrating expression levels of gene COL10A1 in a number of different normal tissues and tumors.

[00112] **FIG. 3** is a boxplot illustrating expression levels of gene CTCFL in a number of different normal tissues and tumors.

[00113] **FIG. 4** is a boxplot illustrating expression levels of gene PPIAL4G in a number of different normal tissues and tumors.

[00114] **FIG. 5** is a boxplot illustrating expression levels of gene POTEE in a number of different normal tissues and tumors.

[00115] **FIG. 6** is a boxplot illustrating expression levels of gene DLL3 in a number of different normal tissues and tumors.

[00116] **FIG. 7** is a boxplot illustrating expression levels of gene MMP13 in a number of different normal tissues and tumors.

[00117] **FIG. 8** is a boxplot illustrating expression levels of gene SSX1 in a number of different normal tissues and tumors.

[00118] **FIG. 9** is a boxplot illustrating expression levels of gene DCAF4L2 in a number of different normal tissues and tumors.

[00119] **FIG. 10** is a boxplot illustrating expression levels of gene MAGEA4 in a number of different normal tissues and tumors.

[00120] **FIG. 11** is a boxplot illustrating expression levels of gene MAGEA11 in a number of different normal tissues and tumors.

[00121] **FIG. 12** is a boxplot illustrating expression levels of gene MAGEC2 in a number of different normal tissues and tumors.

[00122] **FIG. 13** is a boxplot illustrating expression levels of gene MAGEA12 in a number of different normal tissues and tumors.

[00123] **FIG. 14** is a boxplot illustrating expression levels of gene PRAME in a number of different normal tissues and tumors.

[00124] **FIG. 15** is a boxplot illustrating expression levels of gene CLDN6 in a number of different normal tissues and tumors.

[00125] **FIG. 16** is a boxplot illustrating expression levels of gene EPYC in a number of different normal tissues and tumors.

[00126] **FIG. 17** is a boxplot illustrating expression levels of gene KLK3 in a number of different normal tissues and tumors.

[00127] **FIG. 18** is a boxplot illustrating expression levels of gene KLK2 in a number of different normal tissues and tumors.

[00128] **FIG. 19** is a boxplot illustrating expression levels of gene KLK4 in a number of different normal tissues and tumors.

[00129] **FIG. 20** is a boxplot illustrating expression levels of gene TGM4 in a number of different normal tissues and tumors.

[00130] **FIG. 21** is a boxplot illustrating expression levels of gene POTEG in a number of different normal tissues and tumors.

[00131] **FIG. 22** is a boxplot illustrating expression levels of gene RLN1 in a number of different normal tissues and tumors.

[00132] **FIG. 23** is a boxplot illustrating expression levels of gene POTEH in a number of different normal tissues and tumors.

[00133] **FIG. 24** is a boxplot illustrating expression levels of gene SLC45A2 in a number of different normal tissues and tumors.

[00134] **FIG. 25** is a boxplot illustrating expression levels of gene TSPAN10 in a number of different normal tissues and tumors.

[00135] **FIG. 26** is a boxplot illustrating expression levels of gene PAGE5 in a number of different normal tissues and tumors.

[00136] **FIG. 27** is a boxplot illustrating expression levels of gene CSAG1 in a number of different normal tissues and tumors.

[00137] **FIG. 28** is a boxplot illustrating expression levels of gene PRDM7 in a number of different normal tissues and tumors.

[00138] **FIG. 29** is a boxplot illustrating expression levels of gene TG in a number of different normal tissues and tumors.

[00139] **FIG. 30** is a boxplot illustrating expression levels of gene TSHR in a number of different normal tissues and tumors.

[00140] FIG. 31 is a boxplot illustrating expression levels of gene RSPH6A in a number of different normal tissues and tumors.

[00141] FIG. 32 is a boxplot illustrating expression levels of gene SCXB in a number of different normal tissues and tumors.

[00142] FIG. 33 is a boxplot illustrating expression levels of gene HIST1H4K in a number of different normal tissues and tumors.

[00143] FIG. 34 is a boxplot illustrating expression levels of gene ALPPL2 in a number of different normal tissues and tumors.

[00144] FIG. 35 is a boxplot illustrating expression levels of gene PRM2 in a number of different normal tissues and tumors.

[00145] FIG. 36 is a boxplot illustrating expression levels of gene PRM1 in a number of different normal tissues and tumors.

[00146] FIG. 37 is a boxplot illustrating expression levels of gene TNP1 in a number of different normal tissues and tumors.

[00147] FIG. 38 is a boxplot illustrating expression levels of gene LELP1 in a number of different normal tissues and tumors.

[00148] FIG. 39 is a boxplot illustrating expression levels of gene HMGB4 in a number of different normal tissues and tumors.

[00149] FIG. 40 is a boxplot illustrating expression levels of gene AKAP4 in a number of different normal tissues and tumors.

[00150] FIG. 41 is a boxplot illustrating expression levels of gene CETN1 in a number of different normal tissues and tumors.

[00151] FIG. 42 is a boxplot illustrating expression levels of gene UBQLN3 in a number of different normal tissues and tumors.

[00152] FIG. 43 is a boxplot illustrating expression levels of gene ACTL7A in a number of different normal tissues and tumors.

[00153] FIG. 44 is a boxplot illustrating expression levels of gene ACTL9 in a number of different normal tissues and tumors.

[00154] FIG. 45 is a boxplot illustrating expression levels of gene ACTRT2 in a number of different normal tissues and tumors.

[00155] FIG. 46 is a boxplot illustrating expression levels of gene PGK2 in a number of different normal tissues and tumors.

[00156] FIG. 47 is a boxplot illustrating expression levels of gene C2orf53 in a number of different normal tissues and tumors.

[00157] **FIG. 48** is a boxplot illustrating expression levels of gene KIF2B in a number of different normal tissues and tumors.

[00158] **FIG. 49** is a boxplot illustrating expression levels of gene ADAD1 in a number of different normal tissues and tumors.

[00159] **FIG. 50** is a boxplot illustrating expression levels of gene SPATA8 in a number of different normal tissues and tumors.

[00160] **FIG. 51** is a boxplot illustrating expression levels of gene CCDC70 in a number of different normal tissues and tumors.

[00161] **FIG. 52** is a boxplot illustrating expression levels of gene TPD52L3 in a number of different normal tissues and tumors.

[00162] **FIG. 53** is a boxplot illustrating expression levels of gene ACTL7B in a number of different normal tissues and tumors.

[00163] **FIG. 54** is a boxplot illustrating expression levels of gene DMRTB1 in a number of different normal tissues and tumors.

[00164] **FIG. 55** is a boxplot illustrating expression levels of gene SYCN in a number of different normal tissues and tumors.

[00165] **FIG. 56** is a boxplot illustrating expression levels of gene CELA2A in a number of different normal tissues and tumors.

[00166] **FIG. 57** is a boxplot illustrating expression levels of gene CELA2B in a number of different normal tissues and tumors.

[00167] **FIG. 58** is a boxplot illustrating expression levels of gene PNLIPRP1 in a number of different normal tissues and tumors.

[00168] **FIG. 59** is a boxplot illustrating expression levels of gene CTRC in a number of different normal tissues and tumors.

[00169] **FIG. 60** is a boxplot illustrating expression levels of gene AMY2A in a number of different normal tissues and tumors.

[00170] **FIG. 61** is a boxplot illustrating expression levels of gene SERPINI2 in a number of different normal tissues and tumors.

[00171] **FIG. 62** is a boxplot illustrating expression levels of gene RBPJL in a number of different normal tissues and tumors.

[00172] **FIG. 63** is a boxplot illustrating expression levels of gene AQP12A in a number of different normal tissues and tumors.

[00173] **FIG. 64** is a boxplot illustrating expression levels of gene IAPP in a number of different normal tissues and tumors.

[00174] FIG. 65 is a boxplot illustrating expression levels of gene KIRREL2 in a number of different normal tissues and tumors.

[00175] FIG. 66 is a boxplot illustrating expression levels of gene G6PC2 in a number of different normal tissues and tumors.

[00176] FIG. 67 is a boxplot illustrating expression levels of gene AQP12B in a number of different normal tissues and tumors.

[00177] FIG. 68 is a boxplot illustrating expression levels of gene CYP11B1 in a number of different normal tissues and tumors.

[00178] FIG. 69 is a boxplot illustrating expression levels of gene CYP11B2 in a number of different normal tissues and tumors.

[00179] FIG. 70 is a boxplot illustrating expression levels of gene STAR in a number of different normal tissues and tumors.

[00180] FIG. 71 is a boxplot illustrating expression levels of gene CYP11A1 in a number of different normal tissues and tumors.

[00181] FIG. 72 is a boxplot illustrating expression levels of gene MC2R in a number of different normal tissues and tumors.

[00182] FIG. 73 shows a schematic of an exemplary workflow for epitope mapping using targeted proteomics.

[00183] FIG. 74 depicts exemplary graphs demonstrating spectral validation of class I HLA epitopes by mass spectrometry of endogenous peptides using targeted proteomics. Chromatographs of 6 characteristic fragment ions for the light (endogenous) and heavy isotope-labeled synthetic peptide sequence "HPEYNRPLL" derived from KLK4 (HLA*B-07:02, where the endogenous peptide was identified in a human prostate specimen) are shown. Matched chromatography retention times and a high dot product similarity score (0.992, calculated using Skyline software) of peptide fragment ions provide validation that this epitope is processed and presented on the HLA-B*07:02 molecule.

[00184] FIG. 75 depicts two exemplary spectrums showing spectral validation of endogenous peptides using targeted proteomics. Spectrum for the light (endogenous) HPEYNRPLL epitope identified on a human prostate specimen (left) and the corresponding heavy isotope-labeled synthetic peptide (right) are shown. B and Y fragment ions are shown, and display high spectral similarity, confirming detection of the endogenous epitope. For each peptide, the top 200 more intense ions were plotted, and corresponding mass error of highlighted b and y ions are plotted below spectrum plots.

[00185] FIG. 76 depicts exemplary flow cytometry plots of peptide-MHC multimer staining of target epitopes after naive T cell inductions in healthy donors with the indicated HLA-I molecules. Multimer positive populations and the percentage of multimer positive cells is shown. The top panel displays positive sample identifications using a combinatorial multimer analysis. The bottom panel displays results from a

confirmation combinatorial analysis performed on frozen samples following the initial identification from the top panel. Multimer positive cells from analyses in the bottom panel are sorted for downstream TCR identification.

[00186] FIG. 77 depicts graphs showing exemplary TCR clonotypes identified from the 10X genomics pipeline. Each graph originated from a single sorted, multimer positive, population. The samples in this case all contained two unique TCR clonotypes, identified by a paired alpha and beta sequence. In the case where the 10X genomics pipeline identified a clonotype that contained multiple of either alpha or beta sequences, all possible combinations were synthesized for antigen specificity and avidity.

[00187] FIG. 78 depicts exemplary plots showing avidity of exemplary TCRs. The plots reflect the CD69 expression on transduced Jurkat cells (identified by the co-expression of murine TCR, CD8, and CD3) following an overnight coculture with a target cell line presenting the HLA and loaded with a variable amount of peptide. Of the seven TCRs tested, five of them show increased expression of CD69 in a peptide dependent manner. The concentration required to achieve a 50% activation (EC50) is calculated from these plots and the results are shown on the plot. Target cells were previously transduced to overexpress the allele of interest. A375s were plated at 50K / well 2-5 hours prior to pulsing with peptide for 1 hour prior to the addition of effector cells. T2s were plated at 10K / well prior to pulsing with peptide for 1 hour prior to the addition of effector cells. Peptide was pulsed with a final concentration between 10e3 and 10e-1 nM. The cells were co-cultured overnight before harvest and staining for CD69 expression via flow using a CD8, CD3, and murine TCR constant antibodies as lineage markers for effector cells.

[00188] FIG. 79 depicts exemplary plots showing endogenous activity of two different exemplary TCRs. avidity of exemplary TCRs. the plots here reflect the activation of two different TCR sequences (hereafter named mTCR21-033 and mTCR-034) following a coculture with the cell line MDA-PCa-2b which is endogenous for both HLA-B07 and KLK4. These plots are showing an increase in activation of mTCR21-033, but not mTCR21-034 following a 24-hour treatment with a cocktail of interferons (IFN). The IFN treatment increases the expression of surface HLA on cell lines, and the increased surface expression of the HLA can provide more expression of HLA-B07 bound to the KLK4 epitope. MDA-PCa-2b cells were plated at 50K / well in F12K media. The next day the cultures were treated with a cocktail of interferon alpha, beta, and gamma all at 1 U/μL final concentration. The next day the cells were washed with RPMI supplemented with 10% FBS and Glutamax. The cultures were then pulsed with peptide at a final concentration of 2 μM for 1 hour before the addition of effector cells. The cells were co-cultured overnight before harvest and staining for CD69 expression via flow using a CD8, CD3, and murine TCR constant antibodies as lineage markers for effector cells and HLA-B07 as a lineage marker for the target cells.

DETAILED DESCRIPTION

Definitions

[00189] The terminology used herein is for the purpose of describing particular cases only and is not intended to be limiting. In this application, the use of the singular includes the plural unless specifically stated otherwise. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[00190] In this application, the use of "or" means "and/or" unless stated otherwise. The terms "and/or" and "any combination thereof" and their grammatical equivalents as used herein, can be used interchangeably. These terms can convey that any combination is specifically contemplated. Solely for illustrative purposes, the following phrases "A, B, and/or C" or "A, B, C, or any combination thereof" can mean "A individually; B individually; C individually; A and B; B and C; A and C; and A, B, and C." The term "or" can be used conjunctively or disjunctively, unless the context specifically refers to a disjunctive use.

[00191] The term "about" or "approximately" can mean within an acceptable error range for the particular value as determined by one of ordinary skill in the art, which will depend in part on how the value is measured or determined, *i.e.*, the limitations of the measurement system. For example, "about" can mean within 1 or more than 1 standard deviation, per the practice in the art. Alternatively, "about" can mean a range of up to 20%, up to 10%, up to 5%, or up to 1% of a given value. Alternatively, particularly with respect to biological systems or processes, the term can mean within an order of magnitude, within 5-fold, and more preferably within 2-fold, of a value. Where particular values are described in the application and claims, unless otherwise stated the term "about" meaning within an acceptable error range for the particular value should be assumed.

[00192] As used in this specification and claim(s), the words "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including, such as "includes" and "include") or "containing" (and any form of containing, such as "contains" and "contain") are inclusive or open-ended and do not exclude additional, unrecited elements or method steps. It is contemplated that any embodiment discussed in this specification can be implemented with respect to any method or composition of the present disclosure, and vice versa. Furthermore, compositions of the present disclosure can be used to achieve methods of the present disclosure.

[00193] Reference in the specification to "some embodiments," "an embodiment," "one embodiment" or "other embodiments" can mean that a particular feature, structure, or characteristic described in connection with the embodiments is included in at least some embodiments, but not necessarily all embodiments, of

the present disclosures. To facilitate an understanding of the present disclosure, a number of terms and phrases are defined below.

[00194] "Major Histocompatibility Complex" or "MHC" can refer to a cluster of genes that plays a role in control of the cellular interactions responsible for physiologic immune responses. In humans, the MHC complex is also known as the human leukocyte antigen (HLA) complex. For a detailed description of the MHC and HLA complexes, see, Paul, Fundamental Immunology, 3rd Ed., Raven Press, New York (1993). "Proteins or molecules of the major histocompatibility complex (MHC)", "MHC molecules", "MHC proteins" or "HLA proteins" are to be understood as meaning proteins capable of binding peptides resulting from the proteolytic cleavage of protein antigens transporting them to the cell surface and presenting them there to specific cells, in particular cytotoxic T-lymphocytes, T-helper cells, or B cells. The major histocompatibility complex in the genome comprises the genetic region whose gene products expressed on the cell surface are important for binding and presenting endogenous and/or foreign antigens and thus for regulating immunological processes. The major histocompatibility complex is classified into two gene groups coding for different proteins, namely molecules of MHC class I and molecules of MHC class II. The cellular biology and the expression patterns of the two MHC classes are adapted to these different roles.

[00195] "Human Leukocyte Antigen" or "HLA" can refer to a human class I or class II Major Histocompatibility Complex (MHC) protein (see, *e.g.*, Stites, et al., Immunology, 8th Ed., Lange Publishing, Los Altos, Calif. (1994).

[00196] "Polypeptide" and "peptide" are used interchangeably and as used herein can refer to a polymer of amino acid residues. A "mature protein" is a protein which is full-length and which, optionally, includes glycosylation or other modifications typical for the protein in a given cellular environment. Polypeptides and proteins disclosed herein (including functional portions and functional variants thereof) can comprise synthetic amino acids in place of one or more naturally-occurring amino acids. Such synthetic amino acids are known in the art, and include, for example, aminocyclohexane carboxylic acid, norleucine, α-amino n-decanoic acid, homoserine, S-acetylaminomethyl-cysteine, trans-3- and trans-4-hydroxyproline, 4-aminophenylalanine, 4-nitrophenylalanine, 4-chlorophenylalanine, 4-carboxyphenylalanine, β-phenylserine β-hydroxyphenylalanine, phenylglycine, α-naphthylalanine, cyclohexylalanine, cyclohexylglycine, indoline-2-carboxylic acid, 1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid, aminomalonic acid, aminomalonic acid monoamide, N'-benzyl-N'-methyl-lysine, N',N'-dibenzyl-lysine, 6-hydroxylysine, ornithine, α-aminocyclopentane carboxylic acid, α-aminocyclohexane carboxylic acid, α-aminocycloheptane carboxylic acid, α-(2-amino-2-norbornane)-carboxylic acid, α,γ-diaminobutyric acid, α,β-diaminopropionic acid, homophenylalanine, and α-tert-butylglycine. The present disclosure further contemplates that expression of polypeptides described herein in an engineered cell can be associated with post-translational modifications of one or more amino acids of the polypeptide constructs. Non-limiting

examples of post-translational modifications include phosphorylation, acylation including acetylation and formylation, glycosylation (including N-linked and O-linked), amidation, hydroxylation, alkylation including methylation and ethylation, ubiquitination, addition of pyrrolidone carboxylic acid, formation of disulfide bridges, sulfation, myristoylation, palmitoylation, isoprenylation, farnesylation, geranylation, glypiation, lipoylation and iodination. The nomenclature used to describe peptides or proteins follows the conventional practice wherein the amino group is presented to the left (the amino- or N-terminus) and the carboxyl group to the right (the carboxy- or C-terminus) of each amino acid residue. When amino acid residue positions are referred to in a peptide epitope they are numbered in an amino to carboxyl direction with position one being the residue located at the amino terminal end of the epitope, or the peptide or protein of which it can be a part. In the formula representing selected specific embodiments of the present disclosure, the amino- and carboxyl-terminal groups, although not specifically shown, are in the form they would assume at physiologic pH values, unless otherwise specified. In the amino acid structure formula, each residue is generally represented by standard three letter or single letter designations. The L-form of an amino acid residue is represented by a capital single letter or a capital first letter of a three-letter symbol, and the D-form for those amino acid residues having D-forms is represented by a lower case single letter or a lower case three letter symbol. However, when three letter symbols or full names are used without capitals, they can refer to L amino acid residues. Glycine has no asymmetric carbon atom and is simply referred to as "Gly" or "G". The amino acid sequences of peptides set forth herein are generally designated using the standard single letter symbol. (A, Alanine; C, Cysteine; D, Aspartic Acid; E, Glutamic Acid; F, Phenylalanine; G, Glycine; H, Histidine; I, Isoleucine; K, Lysine; L, Leucine; M, Methionine; N, Asparagine; P, Proline; Q, Glutamine; R, Arginine; S, Serine; T, Threonine; V, Valine; W, Tryptophan; and Y, Tyrosine.)

[00197] An "immunogenic" peptide or an "immunogenic" epitope can refer to a peptide or a peptide containing an epitope that comprises an allele-specific motif such that the peptide will bind an HLA molecule and induce a cell-mediated or humoral response, for example, cytotoxic T lymphocyte (CTL (*e.g.*, $CD8^+$)), helper T lymphocyte (Th (*e.g.*, $CD4^+$)) and/or B lymphocyte response. Thus, immunogenic peptides described herein are capable of binding to an appropriate HLA molecule and thereafter inducing a CTL (cytotoxic) response, or a HTL (and humoral) response, to the peptide.

[00198] A "reference" can be used to correlate and compare the results obtained in the methods of the present disclosure from a tumor specimen. Typically the "reference" may be obtained on the basis of one or more normal specimens, in particular specimens which are not affected by a cancer disease, either obtained from a patient or one or more different individuals, for example, healthy individuals, in particular individuals of the same species. A "reference" can be determined empirically by testing a sufficiently large number of normal specimens.

[00199] An "epitope" can be the collective features of a molecule, such as primary, secondary and tertiary peptide structure, and charge, that together form a site recognized by, for example, an immunoglobulin, T cell receptor, HLA molecule, or chimeric antigen receptor. Alternatively, an epitope can be defined as a set of amino acid residues which is involved in recognition by a particular immunoglobulin, or in the context of T cells, those residues necessary for recognition by T cell receptor proteins, chimeric antigen receptors, and/or Major Histocompatibility Complex (MHC) receptors. Epitopes can be prepared by isolation from a natural source, or they can be synthesized according to standard protocols in the art. Synthetic epitopes can comprise artificial amino acid residues, "amino acid mimetics," such as D isomers of naturally-occurring L amino acid residues or non-naturally-occurring amino acid residues such as cyclohexylalanine. Throughout this disclosure, epitopes may be referred to in some cases as peptides or peptide epitopes. It is to be appreciated that proteins or peptides that comprise an epitope or an analog described herein as well as additional amino acid(s) are still within the bounds of the present disclosure. In certain embodiments, the peptide comprises a fragment of an antigen. In certain embodiments, there is a limitation on the length of a peptide of the present disclosure. The embodiment that is length-limited occurs when the protein or peptide comprising an epitope described herein comprises a region (*i.e.*, a contiguous series of amino acid residues) having 100% identity with a native sequence. In order to avoid the definition of epitope from reading, *e.g.*, on whole natural molecules, there is a limitation on the length of any region that has 100% identity with a native peptide sequence. Thus, for a peptide comprising an epitope described herein and a region with 100% identity with a native peptide sequence, the region with 100% identity to a native sequence generally has a length of: less than or equal to 600 amino acid residues, less than or equal to 500 amino acid residues, less than or equal to 400 amino acid residues, less than or equal to 250 amino acid residues, less than or equal to 100 amino acid residues, less than or equal to 85 amino acid residues, less than or equal to 75 amino acid residues, less than or equal to 65 amino acid residues, and less than or equal to 50 amino acid residues. In certain embodiments, an "epitope" described herein is comprised by a peptide having a region with less than 51 amino acid residues that has 100% identity to a native peptide sequence, in any increment down to 5 amino acid residues; for example 50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2 or 1 amino acid residues.

[00200] A "T cell epitope" is to be understood as meaning a peptide sequence which can be bound by the MHC molecules of class I or II in the form of a peptide-presenting MHC molecule or MHC complex and then, in this form, be recognized and bound by T cells, such as T-lymphocytes or T-helper cells.

[00201] As used herein, the term "affinity" can refer to a measure of the strength of binding between two members of a binding pair, for example, an HLA-binding peptide and a class I or II HLA. K_D is the dissociation constant and has units of molarity. The affinity constant is the inverse of the dissociation constant. An affinity constant is sometimes used as a generic term to describe this chemical entity. It is a

direct measure of the energy of binding. Affinity may be determined experimentally, for example by surface plasmon resonance (SPR) using commercially available Biacore SPR units. Affinity may also be expressed as the inhibitory concentration 50 (IC_{50}), that concentration at which 50% of the peptide is displaced. Likewise, ln(IC_{50}) refers to the natural log of the IC_{50}. K_{off} refers to the off-rate constant, for example, for dissociation of an HLA-binding peptide and a class I or II HLA. Throughout this disclosure, "binding data" results can be expressed in terms of "IC_{50}." IC_{50} is the concentration of the tested peptide in a binding assay at which 50% inhibition of binding of a labeled reference peptide is observed. Given the conditions in which the assays are run (*i.e.*, limiting HLA protein and labeled reference peptide concentrations), these values approximate K_D values. Assays for determining binding are well known in the art and are described in detail, for example, in PCT publications WO 94/20127 and WO 94/03205, and other publications such Sidney et al., Current Protocols in Immunology 18.3.1 (1998); Sidney, et al., J. Immunol. 154:247 (1995); and Sette, et al., Mol. Immunol. 31:813 (1994). Alternatively, binding can be expressed relative to binding by a reference standard peptide. For example, can be based on its IC_{50}, relative to the IC_{50} of a reference standard peptide. Binding can also be determined using other assay systems including those using: live cells (*e.g.*, Ceppellini et al., Nature 339:392 (1989); Christnick et al., Nature 352:67 (1991); Busch et al., Int. Immunol. 2:443 (1990); Hill et al., J. Immunol. 147:189 (1991); del Guercio et al., J. Immunol. 154:685 (1995)), cell free systems using detergent lysates (*e.g.*, Cerundolo et al., J. Immunol. 21:2069 (1991)), immobilized purified MHC (*e.g.*, Hill et al., J. Immunol. 152, 2890 (1994); Marshall et al., J. Immunol. 152:4946 (1994)), ELISA systems (*e.g.*, Reay et al., EMBO J. 11:2829 (1992)), surface plasmon resonance (*e.g.*, Khilko et al., J. Biol. Chem. 268:15425 (1993)); high flux soluble phase assays (Hammer et al., J. Exp. Med. 180:2353 (1994)), and measurement of class I MHC stabilization or assembly (*e.g.*, Ljunggren et al., Nature 346:476 (1990); Schumacher et al., Cell 62:563 (1990); Townsend et al., Cell 62:285 (1990); Parker et al., J. Immunol. 149:1896 (1992)). "Cross-reactive binding" indicates that a peptide is bound by more than one HLA molecule; a synonym is degenerate binding.

[00202] "Synthetic peptide" can refer to a peptide that is obtained from a non-natural source, *e.g.*, is man-made. Such peptides can be produced using such methods as chemical synthesis or recombinant DNA technology. In some embodiments, "Synthetic peptides" may include "fusion proteins."

[00203] The term "motif" can refer to a pattern of residues in an amino acid sequence of defined length, for example, a peptide of less than about 15 amino acid residues in length, or less than about 13 amino acid residues in length, for example, from about 8 to about 13 amino acid residues (*e.g.*, 8, 9, 10, 11, 12, or 13) for a class I HLA motif and from about 6 to about 25 amino acid residues (*e.g.*, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, or 25) for a class II HLA motif, which is recognized by a particular HLA molecule. Motifs are typically different for each HLA protein encoded by a given human HLA allele. These motifs differ in their pattern of the primary and secondary anchor residues. In some embodiments, an MHC class I motif identifies a peptide of 9, 10, or 11 amino acid residues in length.

[00204] According to the present disclosure, the term "vaccine" can relate to a pharmaceutical preparation (pharmaceutical composition) or product that upon administration induces an immune response, for example, a cellular or humoral immune response, which recognizes and attacks a pathogen or a diseased cell such as a cancer cell. A vaccine may be used for the prevention or treatment of a disease. The term "individualized cancer vaccine" or "personalized cancer vaccine" concerns a particular cancer patient and means that a cancer vaccine is adapted to the needs or special circumstances of an individual cancer patient.

[00205] A "protective immune response" or "therapeutic immune response" can refer to a CTL and/or an HTL response to an antigen derived from an pathogenic antigen (*e.g.*, a tissue-specific antigen), which in some way prevents or at least partially arrests disease symptoms, side effects or progression. The immune response can also include an antibody response which has been facilitated by the stimulation of helper T cells.

[00206] The term "antibody" as used herein, can refer to an immunoglobulin protein comprising two heavy chains, bound to each other, wherein each heavy chain can also be paired with a light chain.

[00207] A "functional part of an antibody" as used herein can refer to a part that has at least one shared property as said antibody in kind, not necessarily in amount. The functional part is capable of binding the same antigen as the antibody, albeit not necessarily to the same extent. A functional part of an antibody preferably comprises at least a heavy chain variable domain (V_H) and a light chain variable domain (V_L). In some embodiments, a functional part of an antibody comprises at least a heavy chain variable domain (V_H). Non-limiting examples of a functional part of an antibody can be a single domain antibody, a single chain antibody, a nanobody, an unibody, a single chain variable fragment (scFv), a bi-specific T-cell engager (BiTE), a Fab fragment and a $F(ab')_2$ fragment.

[00208] "Antigen processing" or "processing" and its grammatical equivalents can refer to the degradation of a polypeptide or antigen into procession products, which are fragments of said polypeptide or antigen (*e.g.*, the degradation of a polypeptide into peptides) and the association of one or more of these fragments (*e.g.*, via binding) with MHC molecules for presentation by cells, for example, antigen presenting cells, to specific T cells.

[00209] "Antigen presenting cells" (APC) can be cells which present peptide fragments of protein antigens in association with MHC molecules on their cell surface. Some APCs may activate antigen specific T cells. Professional antigen-presenting cells are very efficient at internalizing antigen, either by phagocytosis or by receptor-mediated endocytosis, and then displaying a fragment of the antigen, bound to a class II MHC molecule, on their membrane. The T cell recognizes and interacts with the antigen-class II MHC molecule complex on the membrane of the antigen presenting cell. An additional co-stimulatory signal is then produced by the antigen presenting cell, leading to activation of the T cell. The expression of co-stimulatory molecules is a defining feature of professional antigen-presenting cells. The main types of professional antigen-presenting cells are dendritic cells, which have the broadest range of antigen

presentation, and are probably the most important antigen presenting cells, macrophages, B-cells, and certain activated epithelial cells. Dendritic cells (DCs) are leukocyte populations that present antigens captured in peripheral tissues to T cells via both MHC class II and I antigen presentation pathways. It is well known that dendritic cells are potent inducers of immune responses and the activation of these cells is a critical step for the induction of antitumoral immunity. Dendritic cells are conveniently categorized as "immature" and "mature" cells, which can be used as a simple way to discriminate between two well characterized phenotypes. However, this nomenclature should not be construed to exclude all possible intermediate stages of differentiation. Immature dendritic cells are characterized as antigen presenting cells with a high capacity for antigen uptake and processing, which correlates with the high expression of Fc receptor (FcR) and mannose receptor. The mature phenotype is typically characterized by a lower expression of these markers, but a high expression of cell surface molecules responsible for T cell activation such as class I and class II MHC, adhesion molecules (*e.g.*, CD54 and CD11) and costimulatory molecules (*e.g.*, CD40, CD80, CD86 and 4-1 BB).

[00210] The terms "identical" and its grammatical equivalents as used herein or "sequence identity" in the context of two nucleic acid sequences or amino acid sequences of polypeptides can refer to the residues in the two sequences which are the same when aligned for maximum correspondence over a specified comparison window. A "comparison window", as used herein, can refer to a segment of at least about 20 contiguous positions, usually about 50 to about 200, more usually about 100 to about 150 in which a sequence may be compared to a reference sequence of the same number of contiguous positions after the two sequences are aligned optimally. Methods of alignment of sequences for comparison are well-known in the art. Optimal alignment of sequences for comparison may be conducted by the local homology algorithm of Smith and Waterman, Adv. Appl. Math., 2:482 (1981); by the alignment algorithm of Needleman and Wunsch, J. Mol. Biol., 48:443 (1970); by the search for similarity method of Pearson and Lipman, Proc. Nat. Acad. Sci. U.S.A., 85:2444 (1988); by computerized implementations of these algorithms (including, but not limited to CLUSTAL in the PC/Gene program by Intelligentics, Mountain View Calif., GAP, BESTFIT, BLAST, FASTA, and TFASTA in the Wisconsin Genetics Software Package, Genetics Computer Group (GCG), 575 Science Dr., Madison, Wis., U.S.A.); the CLUSTAL program is well described by Higgins and Sharp, Gene, 73:237-244 (1988) and Higgins and Sharp, CABIOS, 5:151-153 (1989); Corpet et al., Nucleic Acids Res., 16:10881-10890 (1988); Huang et al., Computer Applications in the Biosciences, 8:155-165 (1992); and Pearson et al., Methods in Molecular Biology, 24:307-331 (1994). Alignment is also often performed by inspection and manual alignment. In one class of embodiments, the polypeptides herein have at least 60%, 61%, 62%, 63%, 64%, 65%, 66%, 67%, 68%, 69%, 70%, 71%, 72%, 73%, 74%, 75%, 76%, 77%, 78%, 79%, 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or 100% sequence identity to a reference polypeptide, or a fragment thereof, *e.g.*, as measured by BLASTP (or CLUSTAL,

or any other available alignment software) using default parameters. Similarly, nucleic acids can also be described with reference to a starting nucleic acid, *e.g.*, they can have 50%, 60%, 70%, 75%, 80%, 85%, 90%, 98%, 99% or 100% sequence identity to a reference nucleic acid or a fragment thereof, *e.g.*, as measured by BLASTN (or CLUSTAL, or any other available alignment software) using default parameters. When one molecule is said to have certain percentage of sequence identity with a larger molecule, it means that when the two molecules are optimally aligned, said percentage of residues in the smaller molecule finds a match residue in the larger molecule in accordance with the order by which the two molecules are optimally aligned.

[00211] The term "substantially identical" and its grammatical equivalents as applied to nucleic acid or amino acid sequences can mean that a nucleic acid or amino acid sequence comprises a sequence that has at least 90% sequence identity or more, at least 95%, at least 98% and at least 99%, compared to a reference sequence using the programs described above, *e.g.*, BLAST, using standard parameters. For example, the BLASTN program (for nucleotide sequences) uses as defaults a word length (W) of 11, an expectation (E) of 10, M=5, N=-4, and a comparison of both strands. For amino acid sequences, the BLASTP program uses as defaults a word length (W) of 3, an expectation (E) of 10, and the BLOSUM62 scoring matrix (see Henikoff & Henikoff, Proc. Natl. Acad. Sci. USA 89:10915 (1992)). Percentage of sequence identity is determined by comparing two optimally aligned sequences over a comparison window, wherein the portion of the polynucleotide sequence in the comparison window may comprise additions or deletions (*i.e.*, gaps) as compared to the reference sequence (which does not comprise additions or deletions) for optimal alignment of the two sequences. The percentage is calculated by determining the number of positions at which the identical nucleic acid base or amino acid residue occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the window of comparison and multiplying the result by 100 to yield the percentage of sequence identity. In embodiments, the substantial identity exists over a region of the sequences that is at least about 50 residues in length, over a region of at least about 100 residues, and in embodiments, the sequences are substantially identical over at least about 150 residues. In embodiments, the sequences are substantially identical over the entire length of the coding regions.

[00212] The term "vector" as used herein can mean a construct, which is capable of delivering, and usually expressing, one or more gene(s) or sequence(s) of interest in a host cell. Examples of vectors include, but are not limited to, viral vectors, naked DNA or RNA expression vectors, plasmid, cosmid, or phage vectors, DNA or RNA expression vectors associated with cationic condensing agents, and DNA or RNA expression vectors encapsulated in liposomes.

[00213] A polypeptide, antibody, polynucleotide, vector, cell, or composition which is "isolated" can be a polypeptide, antibody, polynucleotide, vector, cell, or composition which is in a form not found in nature. Isolated polypeptides, antibodies, polynucleotides, vectors, cells, or compositions include those which have

been purified to a degree that they are no longer in a form in which they are found in nature. In some embodiments, a polypeptide, antibody, polynucleotide, vector, cell, or composition which is isolated is substantially pure. For example, isolated peptides do not contain some or all of the materials normally associated with the peptides in their in situ environment. For example, a naturally-occurring polynucleotide or peptide present in a living animal is not isolated, but the same polynucleotide or peptide, separated from some or all of the coexisting materials in the natural system, is isolated. Such a polynucleotide could be part of a vector, and/or such a polynucleotide or peptide could be part of a composition, and still be "isolated" in that such vector or composition is not part of its natural environment. Isolated RNA molecules include *in vivo* or *in vitro* RNA transcripts of the DNA molecules described herein, and further include such molecules produced synthetically.

[00214] The terms "polynucleotide", "nucleotide", "nucleic acid", "polynucleic acid" or "oligonucleotide" and their grammatical equivalents are used interchangeably herein and can refer to polymers of nucleotides of any length, and include DNA and RNA, for example, mRNA. Thus, these terms includes double and single stranded DNA, triplex DNA, as well as double and single stranded RNA. It also includes modified, for example, by methylation and/or by capping, and unmodified forms of the polynucleotide. The term is also meant to include molecules that include non-naturally occurring or synthetic nucleotides as well as nucleotide analogs. The nucleic acid sequences and vectors disclosed or contemplated herein may be introduced into a cell by, for example, transfection, transformation, or transduction. The nucleotides can be deoxyribonucleotides, ribonucleotides, modified nucleotides or bases, and/or their analogs, or any substrate that can be incorporated into a polymer by DNA or RNA polymerase. In some embodiments, the polynucleotide and nucleic acid can be *in vitro* transcribed mRNA. In some embodiments, the polynucleotide that is administered using the methods of the present disclosure is mRNA.

[00215] "Transfection," "transformation," or "transduction" as used herein can refer to the introduction of one or more exogenous polynucleotides into a host cell by using physical or chemical methods. Many transfection techniques are known in the art and include, for example, calcium phosphate DNA co-precipitation (see, *e.g.*, Murray E. J. (ed.), Methods in Molecular Biology, Vol. 7, Gene Transfer and Expression Protocols, Humana Press (1991)); DEAE-dextran; electroporation; cationic liposome-mediated transfection; tungsten particle-facilitated microparticle bombardment (Johnston, Nature, 346: 776-777 (1990)); and strontium phosphate DNA co-precipitation (Brash et al., Mol. Cell Biol., 7: 2031-2034 (1987)). Phage or viral vectors can be introduced into host cells, after growth of infectious particles in suitable packaging cells, many of which are commercially available.

[00216] The term "subject" can refer to any animal (*e.g.*, a mammal), including, but not limited to, humans, non-human primates, canines, felines, rodents, and the like, which is to be the recipient of a particular treatment. Typically, the terms "subject" and "patient" are used interchangeably herein in reference to a human subject.

[00217] The terms "effective amount" or "therapeutically effective amount" or "therapeutic effect" can refer to an amount of a therapeutic effective to "treat" a disease or disorder in a subject or mammal. The therapeutically effective amount of a drug has a therapeutic effect and as such can prevent the development of a disease or disorder; slow down the development of a disease or disorder; slow down the progression of a disease or disorder; relieve to some extent one or more of the symptoms associated with a disease or disorder; reduce morbidity and mortality; improve quality of life; or a combination of such effects.

[00218] The terms "treating" or "treatment" or "to treat" or "alleviating" or "to alleviate" can refer to both (1) therapeutic measures that cure, slow down, lessen symptoms of, and/or halt progression of a diagnosed pathologic condition or disorder; and (2) prophylactic or preventative measures that prevent or slow the development of a targeted pathologic condition or disorder. Thus those in need of treatment include those already with the disorder; those prone to have the disorder; and those in whom the disorder is to be prevented.

[00219] "Pharmaceutically acceptable" can refer to a generally non-toxic, inert, and/or physiologically compatible composition or component of a composition.

[00220] A "pharmaceutical excipient" or "excipient" can comprise a material such as an adjuvant, a carrier, pH-adjusting and buffering agents, tonicity adjusting agents, wetting agents, preservatives, and the like. A "pharmaceutical excipient" is an excipient which is pharmaceutically acceptable.

[00221] A "tissue-specific" antigen can refer to an epitope sequence that is encoded by a gene that has a higher expression level in a target tissue than a non-target tissue.

Tissue-specific Antigens

[00222] Tissue-specific antigens can have great potential as targets for immunotherapies. Among others, provided herein are tissue-specific antigens, compositions containing tissue-specific antigens or producing tissue-specific antigens, and methods of identifying tissue-specific antigens. One advantage of targeting tissue-specific antigens for immunotherapies can be that tissue-specific genes are typically expressed very highly in their given tissue, enhancing their likelihood of robust presentation. It is possible such an approach can eliminate both the tumor as well as the corresponding healthy tissue of the same lineage. However, in many cases, this can be an acceptable trade-off. For instance, CAR-T therapies targeting the CD19 surface marker eliminate both healthy B cells and leukemic B cells. While the loss of normal B cells may compromise immune function, patients are able to tolerate B cell ablation.

[00223] In some embodiments, the tissue-specific antigens are specific to non-essential tissues. The tissue-specific epitope sequence can be expected to be presented on tumor cells or non-essential normal cells from a non-essential tissue of the same lineage, and can be expected to have zero or a low expression level in essential tissues. The epitope sequence information of the tissue-specific antigens, e.g., antigens specific to a tumor from a particular tissue, can therefore be translated into therapeutic methods and compositions for diseases or conditions, e.g., cancer. In some embodiments, the tissue-specific antigens

provided herein can be expressed at a high level in a tumor tissue that originates or is at a non-essential tissue. The tissue-specific antigens, in some embodiments, may or may not be expressed in a normal non-essential tissue, while they can be expressed at a relatively very low level in essential tissues.

[00224] As provided herein, a tissue-specific antigen can refer to an epitope sequence that is encoded by a gene that has a higher expression level in a target tissue than a non-target tissue, in which case, the tissue-specific antigen can be referred to as being "specific to the target tissue". In some embodiments, a target tissue-specific antigen is from an epitope gene that has an expression level in the target tissue that is at least 1.1, at least 1.2, at least 1.3, at least 1.4, at least 1.5, at least 1.6, at least 1.7, at least 1.8, at least 1.9, at least 2, at least 2.1, at least 2.3, at least 2.4, at least 2.5, at least 2.6, at least 2.7, at least 2.8, at least 2.9, at least 3, at least 3.2, at least 3.4, at least 3.5, at least 3.6, at least 3.8, at least 4, at least 4.5, at least 5, at least 6, at least 7, at least 8, at least 9, at least 10, at least 11, at least 12, at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 22, at least 24, at least 25, at least 26, at least 28, at least 30, at least 35, at least 40, at least 45, at least 50, at least 55, at least 60, at least 70, at least 80, at least 90, at least 100, at least 120, at least 140, at least 150, at least 160, at least 180, at least 200, at least 250, at least 300, at least 400, at least 500, at least 600, at least 700, at least 800, at least 900, at least 1000, at least 2000, at least 4000, at least 5000, at least 10^4, at least 10^5, or at least 10^6 folds higher than its expression level in a second tissue. In some embodiments, the tissue-specific antigen can be specific to one certain type of tissue, for example, the tissue-specific antigen can be only specific to pancreatic tissue, heart tissue, prostate tissue, or epithelial tissue. In some embodiments, the tissue-specific antigen can be specific to more than one type of tissues, for example, the tissue-specific antigen can be specific to 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more different types of tissues. The criteria for setting "tissue specificity" can vary depending on purposes of application of the subject matter provided herein. As will be discussed in details, the subject matter provided herein can be applied to various situations where different criteria for selecting tissue-specific antigens may be utilized.

[00225] In some embodiments, the tissue-specific antigen is specific to a target tissue other than in an essential tissue. In some embodiments, the target tissue is a non-essential tissue. As provided herein, an essential tissue can refer to a tissue in a living body, whose function in the maintaining the life of the body cannot be substituted by an internal or external support. As provided herein, a non-essential tissue can refer to a tissue in a living body, whose function in the maintaining the life of the body can be substituted (*e.g.*, function of the tissue can be at least partially performed by some other tissue in the body or performed by tissue transplant or an artificial device) or foregone (*e.g.*, function of the tissue is not required for survival of the body). In some embodiments, an essential tissue comprises brain or colon tissue. In some embodiments, an essential tissue comprises bone marrow. In some embodiments, a non-essential tissue comprises thyroid, pancreas, adrenal, fallopian, prostate, breast, ovary, or cervical tissue.

[00226] In some aspects, the present disclosure provides tissue-specific antigens, e.g. tissue-specific antigenic peptides. The tissue-specific antigens provided herein can comprise tumor epitope sequences. The tissue-specific antigens as provided herein can comprise tumor epitope sequences from tumor expressed proteins as provided herein. In some embodiments, a tumor expressed protein as provided herein is specific to a tumor from a certain type of tissue, for example, tumor expressed protein TSHR can be specific to thyroid cancer that is from thyroid tissue.

[00227] In some embodiments, the tumor expressed proteins as provided herein comprise ACTL7A, ACTL7B, ACTL9, ACTRT2, ADAD1, AKAP4, ALPPL2, AMY2A, ANKRD30A, AQP12A, AQP12B, C2orf53, CCDC70, CELA2A, CELA2B, CETN1, CLDN6, COL10A1, CSAG1, CTCFL, CTRC, CYP11A1, CYP11B1, CYP11B2, DCAF4L2, DLL3, DMRTB1, EPYC, G6PC2, HMGB4, IAPP, KIF2B, KIRREL2, KLK2, KLK3, KLK4, LELP1, MAGEA11, MAGEA12, MAGEA2, MAGEA4, MAGEC2, MC2R, MMP13, PAGE5, PGK2, PNLIPRP1, POTEE, POTEG, POTEH, PPIAL4G, PRAME, PRDM7, PRM1, PRM2, RBPJL, RLN1, RSPH6A, SCXB, SERPINI2, SLC45A2, SPATA8, SSX1, STAR, SYCN, TG, TGM4, TNP1, TPD52L3, TSHR, TSPAN10, UBQLN3, or any combination thereof.

[00228] The tumor expressed proteins provided herein can comprise TSHR, TG, RSPH6A, SCXB, SSX1, or any combination thereof, each of which can be specific to thyroid cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 6846-7061, 7359-7448, 7629-8099, and 8619-8744, each of which can be specific to thyroid cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 6846-7061, 7359-7448, 7629-8099, and 8619-8744, each of which can be specific to thyroid cancer.

[00229] The tumor expressed proteins provided herein can comprise RBPJL, AQP12A, AQP12B, IAPP, CELA2A, CELA2B, AMY2A, CTRC, G6PC2, KIRREL2, PNLIPRP1, SERPINI2, SYNC, or any combination thereof, each of which can be specific to pancreatic cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 720-814, 989-1182, 1373-1565, 2120-2211, 2920-3009, 3101-3196, 3320-3440, 5193-5284, 6487-6579, 7062-7150, and 7539-7628, each of which can be specific to pancreatic cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 720-814, 989-1182, 1373-1565, 2120-2211, 2920-3009, 3101-3196, 3320-3440, 5193-5284, 6487-6579, 7062-7150, and 7539-7628, each of which can be specific to pancreatic cancer.

[00230] The tumor expressed proteins provided herein can comprise CYP11A1, CYP11B1, CYP11B2, MC2R, STAR, or any combination thereof, each of which can be specific to adrenal cancer. The epitope

sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 2212-2523, 4817-4915, and 7449-7538, each of which can be specific to adrenal cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 2212-2523, 4817-4915, and 7449-7538, each of which can be specific to adrenal cancer.

[00231] The tumor expressed proteins provided herein can comprise ALPPL2, POTEE, PRAME, or any combination thereof, each of which can be specific to uterine cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 627-719, 5285-5431, and 6085-6183, each of which can be specific to uterine cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 627-719, 5285-5431, and 6085-6183, each of which can be specific to uterine cancer.

[00232] The tumor expressed proteins provided herein can comprise KLK2, KLK3, KLK4, POTEH, POTEG, TGM4, RLN1, POTEE, PPIAL4G or any combination thereof, each of which can be specific to prostate cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 3441-4274, 5285-6084, 6580-6845, and 8100-8434, each of which can be specific to prostate cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 3441-4274, 5285-6084, 6580-6845, and 8100-8434, each of which can be specific to prostate cancer.

[00233] The tumor expressed proteins provided herein can comprise ANKRD30A, COL10A1, or a combination, each of which can be specific to breast cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 815-988, and 1749-1867, each of which can be specific to breast cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 815-988, and 1749-1867, each of which can be specific to breast cancer.

[00234] The tumor expressed proteins provided herein can comprise CTCFL, PRAME, CLDN6, EPYC, or any combination thereof, each of which can be specific to ovarian cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1659-1748, 1964-2119, 2827-2919, and 6085-6183, each of which can be specific to ovarian cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected

from the group consisting of SEQ ID NOS 1659-1748, 1964-2119, 2827-2919, and 6085-6183, each of which can be specific to ovarian cancer.

[00235] The tumor expressed proteins provided herein can comprise CTCFL, each of which can be specific to cervical cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1964-2119, each of which can be specific to cervical cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1964-2119, each of which can be specific to cervical cancer.

[00236] The tumor expressed proteins provided herein can comprise POTEE, PPIAL4G, or a combination thereof, each of which can be specific to colorectal cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 5285-5431, and 5996-6084, each of which can be specific to colorectal cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 5285-5431, and 5996-6084, each of which can be specific to colorectal cancer.

[00237] The tumor expressed proteins provided herein can comprise DLL3, each of which can be specific to glioma. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 2619-2736, each of which can be specific to glioma. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 2619-2736, each of which can be specific to glioma.

[00238] The tumor expressed proteins provided herein can comprise MMP13, each of which can be specific to head and neck cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 4916-5010, each of which can be specific to head and neck cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 4916-5010, each of which can be specific to head and neck cancer.

[00239] The tumor expressed proteins provided herein can comprise DCAF4L2, SSX1, or a combination thereof, each of which can be specific to liver cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 2524-2618, and 7359-7448, each of which can be specific to liver cancer. The epitope sequence provided herein can have

at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 2524-2618, and 7359-7448, each of which can be specific to liver cancer.

[00240] The tumor expressed proteins provided herein can comprise SSX1, MAGEA4, PRAME, CSAG1, MAGEA12, MAGEA2, MAGEC2, PAGE5, PRDM7, SLC45A2, TSPAN10, or any combination thereof, each of which can be specific to melanoma. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1868-1963, 4458-4550, 4551-4637, 4638-4728, 4729-4816, 5011-5100, 6085-6183, 6184-6307, 7151-7264, 7359-7448, and 8745-8835, each of which can be specific to melanoma. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1868-1963, 4458-4550, 4551-4637, 4638-4728, 4729-4816, 5011-5100, 6085-6183, 6184-6307, 7151-7264, 7359-7448, and 8745-8835, each of which can be specific to melanoma.

[00241] The tumor expressed proteins provided herein can comprise MAGEA11, MAGEA4, PRAME, or any combination thereof, each of which can be specific to lung squamous cell carcinoma. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 4368-4457, 4638-4728, and 6085-6183, each of which can be specific to lung squamous cell carcinoma. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 4368-4457, 4638-4728, and 6085-6183, each of which can be specific to lung squamous cell carcinoma.

[00242] The tumor expressed proteins provided herein can comprise ACTL7A, ACTL7B, ACTL9, ACTRT2, ADAD1, AKAP4, C2orf53, CCDC70, CETN1, DMRTB1, HMGB4, KIF2B, LELP1, PGK2, PRM1, PRM2, SPATA8, TNP1, TPD52L3, UBQLN3, or any combination thereof, each of which can be specific to testis cancer. The epitope sequence provided herein can have at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95%, or 100% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1-626, 1183-1372, 1566-1658, 2737-2826, 3010-3100, 3197-3319, 4275-4367, 5101-5192, 6308-6486, 7265-7358, 8435-8618, and 8836-8962, each of which can be specific to testis cancer. The epitope sequence provided herein can have at least 70% sequence identity to peptide sequence selected from the group consisting of SEQ ID NOS 1-626, 1183-1372, 1566-1658, 2737-2826, 3010-3100, 3197-3319, 4275-4367, 5101-5192, 6308-6486, 7265-7358, 8435-8618, and 8836-8962, each of which can be specific to testis cancer.

[00243] **Table 1A** provides a summary of numerous peptide sequences that can be tissue-specific antigens, also listed are the HLA alleles that are predicted to bind to the peptide sequences, respectively, as well as the types of cancers that the peptide sequences are specific to, respectively.

[00244] **Table 1B** provides a summary of exemplary peptide sequences that can be tissue-specific antigens, also listed are the HLA alleles that are predicted to bind to the peptide sequences, respectively, as well as the types of cancers that the peptide sequences are specific to, respectively.

[00245] **Table 1C** provides a summary of exemplary peptide sequences from **Table 1B** that were validated from mass spectrometry as being presented by antigen presenting cells.

Table 1A - Tumor Epitope Sequences

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FNTPAMHIAY	HLA-A01:01	ACTL7A	Testis	1	STLPTTINY	HLA-A03:01	MAGEA12	Melanoma	4482
WDTVQDIWEY	HLA-A01:01	ACTL7A	Testis	2	TSFQVALSRK	HLA-A11:01	MAGEA12	Melanoma	4483
NTPAMHIAY	HLA-A01:01	ACTL7A	Testis	3	STLPTTINY	HLA-A11:01	MAGEA12	Melanoma	4484
TVQDIWEYLF	HLA-A01:01	ACTL7A	Testis	4	ALVETSYVK	HLA-A11:01	MAGEA12	Melanoma	4485
LSEHTIRY	HLA-A01:01	ACTL7A	Testis	5	AELVHFLLLK	HLA-A11:01	MAGEA12	Melanoma	4486
VVEVGHGVSY	HLA-A01:01	ACTL7A	Testis	6	STLVEVTLR	HLA-A11:01	MAGEA12	Melanoma	4487
YEEHGPFFLY	HLA-A01:01	ACTL7A	Testis	7	TSFQVALSR	HLA-A11:01	MAGEA12	Melanoma	4488
YLLGLLNSA	HLA-A02:01	ACTL7A	Testis	8	SYPPLHEWAF	HLA-A24:02	MAGEA12	Melanoma	4489
MLFEAFNTPA	HLA-A02:01	ACTL7A	Testis	9	SYVKVLHHL	HLA-A24:02	MAGEA12	Melanoma	4490
YLFRQEMKI	HLA-A02:01	ACTL7A	Testis	10	SYVKVLHHLL	HLA-A24:02	MAGEA12	Melanoma	4491
MLSGFPNRL	HLA-A02:01	ACTL7A	Testis	11	RAREPFTKA	HLA-A30:01	MAGEA12	Melanoma	4492
SLQGFQPLWV	HLA-A02:01	ACTL7A	Testis	12	KYRAREPFTK	HLA-A30:01	MAGEA12	Melanoma	4493
FLCSEMFFKPSL	HLA-A02:01	ACTL7A	Testis	13	VVRIGHLYI	HLA-A30:01	MAGEA12	Melanoma	4494
AYLLGLLNSA	HLA-A02:01	ACTL7A	Testis	14	STLPTTINY	HLA-A30:01	MAGEA12	Melanoma	4495
SDLTAYLLGL	HLA-A02:01	ACTL7A	Testis	15	SVFAHPRKL	HLA-A30:01	MAGEA2; MAGEA12	Melanoma	4496
ILLCGGSTML	HLA-A02:01	ACTL7A	Testis	16	HFLLLKYRAR	HLA-A33:03	MAGEA2; MAGEA12	Melanoma	4497
KIAPEEHAV	HLA-A02:01	ACTL7A	Testis	17	DFFPVIFSK	HLA-A33:03	MAGEA2; MAGEA12	Melanoma	4498
VLPDGKEIQL	HLA-A02:01	ACTL7A	Testis	18	LVHFLLLKYR	HLA-A33:03	MAGEA2; MAGEA12	Melanoma	4499
ALDPIEEKKV	HLA-A02:01	ACTL7A	Testis	19	STLVEVTLR	HLA-A33:03	MAGEA12	Melanoma	4500
YVLPDGKEIQL	HLA-A02:01	ACTL7A	Testis	20	TSFQVALSR	HLA-A33:03	MAGEA12	Melanoma	4501
VLPERDSAV	HLA-A02:01	ACTL7A	Testis	21	HPRKLLTQDL	HLA-B07:02	MAGEA12	Melanoma	4502
RTSGLVVEV	HLA-A02:01	ACTL7A	Testis	22	GPHISYPPL	HLA-B07:02	MAGEA12	Melanoma	4503
MLSGFPNRLQK	HLA-A03:01	ACTL7A	Testis	23	LPTTINYTL	HLA-B07:02	MAGEA12	Melanoma	4504
MFFKPSLIK	HLA-A03:01	ACTL7A	Testis	24	SPQGASTL	HLA-B07:02	MAGEA12	Melanoma	4505
RFLCSEMFFK	HLA-A03:01	ACTL7A	Testis	25	SPSPPHSPQ	HLA-B07:02	MAGEA2; MAGEA12	Melanoma	4506
AIMGDGPTKK	HLA-A03:01	ACTL7A	Testis	26	LLKYRAREPF	HLA-B08:01	MAGEA12	Melanoma	4507
AIMGDGPTK	HLA-A03:01	ACTL7A	Testis	27	YVKVLHHLL	HLA-B08:01	MAGEA12	Melanoma	4508
SGFPNRLQK	HLA-A03:01	ACTL7A	Testis	28	FLLLKYRAREPF	HLA-B08:01	MAGEA12	Melanoma	4509
STMLSGFPNR	HLA-A11:01	ACTL7A	Testis	29	EPFTKAEML	HLA-B08:01	MAGEA12	Melanoma	4510
FLCSEMFFK	HLA-A11:01	ACTL7A	Testis	30	EEKIWEEL	HLA-B08:01	MAGEA2; MAGEA12	Melanoma	4511
HTIRYVLPDGK	HLA-A11:01	ACTL7A	Testis	31	YVKVLHHL	HLA-B08:01	MAGEA12	Melanoma	4512
AIMGDGPTKK	HLA-A11:01	ACTL7A	Testis	32	SEYLQLVFGI	HLA-B13:02	MAGEA2; MAGEA12	Melanoma	4513
AIMGDGPTK	HLA-A11:01	ACTL7A	Testis	33	RNFQDFFPV	HLA-B13:02	MAGEA12	Melanoma	4514
KYAEMLFEAF	HLA-A24:02	ACTL7A	Testis	34	YEFLWGPRALV	HLA-B13:02	MAGEA12	Melanoma	4515
RFLCSEMFF	HLA-A24:02	ACTL7A	Testis	35	GLLIIVLAI	HLA-B13:02	MAGEA2; MAGEA12	Melanoma	4516
GFQPLWVHRF	HLA-A24:02	ACTL7A	Testis	36	KVLHHLLKI	HLA-B13:02	MAGEA12	Melanoma	4517
EYEEHGPFF	HLA-A24:02	ACTL7A	Testis	37	GLLGDNQIV	HLA-B13:02	MAGEA12	Melanoma	4518
SGFPNRLQK	HLA-A30:01	ACTL7A	Testis	38	LVQENYLEY	HLA-B46:01	MAGEA2; MAGEA12	Melanoma	4519
MFFKPSLIK	HLA-A30:01	ACTL7A	Testis	39	SVIRNFQDF	HLA-B46:01	MAGEA12	Melanoma	4520
QSRLSMYSY	HLA-A30:01	ACTL7A	Testis	40	FQVALSRKM	HLA-B46:01	MAGEA12	Melanoma	4521
RTSGLVVEV	HLA-A30:01	ACTL7A	Testis	41	ISYPPLHEW	HLA-B46:01	MAGEA12	Melanoma	4522

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
HTQTVSCLNK	HLA-A30:01	ACTL7A	Testis	42	VIFSKASEY	HLA-B46:01	MAGEA2; MAGEA12	Melanoma	4523
HLKLVNPLR	HLA-A33:03	ACTL7A	Testis	43	ISGGPHISY	HLA-B46:01	MAGEA12	Melanoma	4524
STMLSGFPNR	HLA-A33:03	ACTL7A	Testis	44	KMAELVHFL	HLA-C01:02	MAGEA12	Melanoma	4525
TMLSGFPNR	HLA-A33:03	ACTL7A	Testis	45	HSPQGASTL	HLA-C01:02	MAGEA12	Melanoma	4526
ETAKTGDNR	HLA-A33:03	ACTL7A	Testis	46	IVPKTGLLI	HLA-C01:02	MAGEA12	Melanoma	4527
EHGPFFLYR	HLA-A33:03	ACTL7A	Testis	47	TLPTTINYTL	HLA-C01:02	MAGEA12	Melanoma	4528
VPIYEGYPL	HLA-B07:02	ACTL7A	Testis	48	EGPSTFPDL	HLA-C01:02	MAGEA12	Melanoma	4529
RPKQEVTKAV	HLA-B07:02	ACTL7A	Testis	49	SVFAHPRKL	HLA-C03:04	MAGEA2; MAGEA12	Melanoma	4530
FPNRLQKEL	HLA-B07:02	ACTL7A	Testis	50	FQVALSRKM	HLA-C03:04	MAGEA12	Melanoma	4531
APLQTQAL	HLA-B07:02	ACTL7A	Testis	51	HSPQGASTL	HLA-C03:04	MAGEA12	Melanoma	4532
LPDGKEIQL	HLA-B07:02	ACTL7A	Testis	52	ISYPPLHEW	HLA-C03:04	MAGEA12	Melanoma	4533
NVHLKLVNPL	HLA-B08:01	ACTL7A	Testis	53	FAHPRKLL	HLA-C03:04	MAGEA2; MAGEA12	Melanoma	4534
HLKLVNPL	HLA-B08:01	ACTL7A	Testis	54	KASEYLQL	HLA-C03:04	MAGEA2; MAGEA12	Melanoma	4535
TNREKYAEM	HLA-B08:01	ACTL7A	Testis	55	FQDFFPVIF	HLA-C04:01	MAGEA12	Melanoma	4536
DIKKKCCF	HLA-B08:01	ACTL7A	Testis	56	IFSKASEYL	HLA-C04:01	MAGEA2; MAGEA12	Melanoma	4537
DIKKKCCFV	HLA-B08:01	ACTL7A	Testis	57	TFPDLETSF	HLA-C04:01	MAGEA12	Melanoma	4538
DIALKRDL	HLA-B08:01	ACTL7A	Testis	58	KMAELVHFL	HLA-C04:01	MAGEA12	Melanoma	4539
SEMFFKPSLI	HLA-B13:02	ACTL7A	Testis	59	IWEELSVL	HLA-C04:01	MAGEA12	Melanoma	4540
YEGYPLPSI	HLA-B13:02	ACTL7A	Testis	60	VRIGHLYIL	HLA-C07:01	MAGEA12	Melanoma	4541
SEMFFKPSL	HLA-B13:02	ACTL7A	Testis	61	SVFAHPRKL	HLA-C07:01	MAGEA2; MAGEA12	Melanoma	4542
FEYEEHGPFFL	HLA-B13:02	ACTL7A	Testis	62	SVFAHPRKLL	HLA-C07:01	MAGEA2; MAGEA12	Melanoma	4543
GLPRPTHKI	HLA-B13:02	ACTL7A	Testis	63	KMAELVHFL	HLA-C07:01	MAGEA12	Melanoma	4544
YLFRQEMKI	HLA-B13:02	ACTL7A	Testis	64	KIWEELSVL	HLA-C07:01	MAGEA12	Melanoma	4545
RTSGLVVEV	HLA-B13:02	ACTL7A	Testis	65	SGGPHISYP	HLA-C07:01	MAGEA12	Melanoma	4546
YAGSDLTAY	HLA-B46:01	ACTL7A	Testis	66	VRIGHLYIL	HLA-C07:02	MAGEA12	Melanoma	4547
LAYQSRLSM	HLA-B46:01	ACTL7A	Testis	67	SVFAHPRKL	HLA-C07:02	MAGEA2; MAGEA12	Melanoma	4548
YSYGRTSGL	HLA-B46:01	ACTL7A	Testis	68	SYVKVLHHL	HLA-C07:02	MAGEA12	Melanoma	4549
YVVPIYEGY	HLA-B46:01	ACTL7A	Testis	69	SYPPLHEWAF	HLA-C07:02	MAGEA12	Melanoma	4550
VEVGHGVSY	HLA-B46:01	ACTL7A	Testis	70	LMQDLVQENY	HLA-A01:01	MAGEA2	Melanoma	4551
YSYGRTSGL	HLA-C01:02	ACTL7A	Testis	71	MQDLVQENY	HLA-A01:01	MAGEA2	Melanoma	4552
LAPEEHAVL	HLA-C01:02	ACTL7A	Testis	72	ASSFSTTINY	HLA-A01:01	MAGEA2	Melanoma	4553
LAYQSRLSM	HLA-C01:02	ACTL7A	Testis	73	VVEVVPISHLY	HLA-A01:01	MAGEA2	Melanoma	4554
VLPERDSAV	HLA-C01:02	ACTL7A	Testis	74	MVELVHFLLLKY	HLA-A01:01	MAGEA2	Melanoma	4555
QAPLQTQAL	HLA-C01:02	ACTL7A	Testis	75	KMVELVHFL	HLA-A02:01	MAGEA2	Melanoma	4556
YSYGRTSGL	HLA-C03:04	ACTL7A	Testis	76	KMVELVHFLL	HLA-A02:01	MAGEA2	Melanoma	4557
LAYQSRLSM	HLA-C03:04	ACTL7A	Testis	77	RKMVELVHFL	HLA-A02:01	MAGEA2	Melanoma	4558
SAVWTGGSI	HLA-C03:04	ACTL7A	Testis	78	KIWEELSML	HLA-A02:01	MAGEA2	Melanoma	4559
ASLQGFQPL	HLA-C03:04	ACTL7A	Testis	79	FLWGPRALI	HLA-A02:01	MAGEA2	Melanoma	4560
LAPEEHAVL	HLA-C03:04	ACTL7A	Testis	80	ALIETSYVKV	HLA-A02:01	MAGEA2	Melanoma	4561
FEYEEHGPFF	HLA-C04:01	ACTL7A	Testis	81	TLVEVTLGEV	HLA-A02:01	MAGEA2	Melanoma	4562
MWAPPAAIM	HLA-C04:01	ACTL7A	Testis	82	KMVELVHFLLL	HLA-A02:01	MAGEA2	Melanoma	4563
YEEHGPFFL	HLA-C04:01	ACTL7A	Testis	83	LLMQDLVQENYL	HLA-A02:01	MAGEA2	Melanoma	4564
VQDIWEYLF	HLA-C04:01	ACTL7A	Testis	84	ALIETSYV	HLA-A02:01	MAGEA2	Melanoma	4565

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
EYEEHGPFF	HLA-C04:01	ACTL7A	Testis	85	GLLGDNQV	HLA-A02:01	MAGEA2	Melanoma	4566
VQDIWEYL	HLA-C04:01	ACTL7A	Testis	86	GLLGDNQVM	HLA-A02:01	MAGEA2	Melanoma	4567
YSYGRTSGL	HLA-C07:01	ACTL7A	Testis	87	TLGEVPAA	HLA-A02:01	MAGEA2	Melanoma	4568
MHIAYQSRL	HLA-C07:01	ACTL7A	Testis	88	VELVHFLLLK	HLA-A03:01	MAGEA2	Melanoma	4569
YSYGRTSGLV	HLA-C07:01	ACTL7A	Testis	89	KMVELVHFLLLK	HLA-A03:01	MAGEA2	Melanoma	4570
LRHGIIVD	HLA-C07:01	ACTL7A	Testis	90	LLGDNQVMPK	HLA-A03:01	MAGEA2	Melanoma	4571
TVQDIWEY	HLA-C07:01	ACTL7A	Testis	91	GLLGDNQVMPK	HLA-A03:01	MAGEA2	Melanoma	4572
HRFEYEEHG	HLA-C07:01	ACTL7A	Testis	92	SSFSTTINY	HLA-A03:01	MAGEA2	Melanoma	4573
YSYGRTSGL	HLA-C07:02	ACTL7A	Testis	93	TTINYTLWR	HLA-A11:01	MAGEA2	Melanoma	4574
MHIAYQSRL	HLA-C07:02	ACTL7A	Testis	94	STTINYTLWR	HLA-A11:01	MAGEA2	Melanoma	4575
FKPSLIKSM	HLA-C07:02	ACTL7A	Testis	95	ALIETSYVK	HLA-A11:01	MAGEA2	Melanoma	4576
LAPEEHAVL	HLA-C07:02	ACTL7A	Testis	96	SSFSTTINY	HLA-A11:01	MAGEA2	Melanoma	4577
SRLSMYSY	HLA-C07:02	ACTL7A	Testis	97	SYVKVLHHTL	HLA-A24:02	MAGEA2	Melanoma	4578
VTSQSLLSIY	HLA-A01:01	ACTL7B	Testis	98	IWEELSMLEVF	HLA-A24:02	MAGEA2	Melanoma	4579
FTDDHLHII	HLA-A01:01	ACTL7B	Testis	99	SYVKVLHHTLKI	HLA-A24:02	MAGEA2	Melanoma	4580
TSQSLLLSIY	HLA-A01:01	ACTL7B	Testis	100	MFPDLESEF	HLA-A24:02	MAGEA2	Melanoma	4581
IIDLGSQY	HLA-A01:01	ACTL7B	Testis	101	VMPKTGLLI	HLA-A24:02	MAGEA2	Melanoma	4582
FTDDHLHI	HLA-A01:01	ACTL7B	Testis	102	KYRARREPVTK	HLA-A30:01	MAGEA2	Melanoma	4583
YLMQLLNEA	HLA-A02:01	ACTL7B	Testis	103	RAREPVTKA	HLA-A30:01	MAGEA2	Melanoma	4584
LMFETFGIPA	HLA-A02:01	ACTL7B	Testis	104	RAREPVTK	HLA-A30:01	MAGEA2	Melanoma	4585
YAELMFETFGI	HLA-A02:01	ACTL7B	Testis	105	SSFSTTINY	HLA-A30:01	MAGEA2	Melanoma	4586
FLPEEELGL	HLA-A02:01	ACTL7B	Testis	106	TTINYTLWR	HLA-A33:03	MAGEA2	Melanoma	4587
AELMFETFGI	HLA-A02:01	ACTL7B	Testis	107	HISYPPLIHER	HLA-A33:03	MAGEA2	Melanoma	4588
ELMFETFGI	HLA-A02:01	ACTL7B	Testis	108	SMLEVFEGR	HLA-A33:03	MAGEA2	Melanoma	4589
FLPEEELGLV	HLA-A02:01	ACTL7B	Testis	109	ISYPPLIHER	HLA-A33:03	MAGEA2	Melanoma	4590
LMFETFGI	HLA-A02:01	ACTL7B	Testis	110	EFQAAISR	HLA-A33:03	MAGEA2	Melanoma	4591
NYLMQLLNEA	HLA-A02:01	ACTL7B	Testis	111	HPRKLLMQDL	HLA-B07:02	MAGEA2	Melanoma	4592
KILPEEHAV	HLA-A02:01	ACTL7B	Testis	112	VPISHLYIL	HLA-B07:02	MAGEA2	Melanoma	4593
GLVPEELRV	HLA-A02:01	ACTL7B	Testis	113	MPKTGLLII	HLA-B07:02	MAGEA2	Melanoma	4594
ILPEEHAVLV	HLA-A02:01	ACTL7B	Testis	114	SPQGASSF	HLA-B07:02	MAGEA2	Melanoma	4595
ILPEEHAVL	HLA-A02:01	ACTL7B	Testis	115	YPPLIHERAL	HLA-B07:02	MAGEA2	Melanoma	4596
SLAGSTQPGL	HLA-A02:01	ACTL7B	Testis	116	YVKVLHHTL	HLA-B08:01	MAGEA2	Melanoma	4597
LLCPGDSPAV	HLA-A02:01	ACTL7B	Testis	117	LLKYRAREPV	HLA-B08:01	MAGEA2	Melanoma	4598
SLLSIYSYGK	HLA-A03:01	ACTL7B	Testis	118	FAHPRKLLM	HLA-B08:01	MAGEA2	Melanoma	4599
KMKPRKVHK	HLA-A03:01	ACTL7B	Testis	119	AISRKMVEL	HLA-B08:01	MAGEA2	Melanoma	4600
LLSIYSYGK	HLA-A03:01	ACTL7B	Testis	120	YEFLWGPRALI	HLA-B13:02	MAGEA2	Melanoma	4601
AVAAAPERK	HLA-A03:01	ACTL7B	Testis	121	CYEFLWGPRALI	HLA-B13:02	MAGEA2	Melanoma	4602
HIIEHIKKK	HLA-A03:01	ACTL7B	Testis	122	IEVVEVVPI	HLA-B13:02	MAGEA2	Melanoma	4603
SLLSIYSYGK	HLA-A11:01	ACTL7B	Testis	123	KVLHHTLKI	HLA-B13:02	MAGEA2	Melanoma	4604
AVAAAPERK	HLA-A11:01	ACTL7B	Testis	124	RQSDEGSSN	HLA-B13:02	MAGEA2	Melanoma	4605
LLSIYSYGK	HLA-A11:01	ACTL7B	Testis	125	VLHHTLKI	HLA-B13:02	MAGEA2	Melanoma	4606
VIIDLGSQYCK	HLA-A11:01	ACTL7B	Testis	126	FAHPRKLLM	HLA-B46:01	MAGEA2	Melanoma	4607
AFQQLWVSK	HLA-A11:01	ACTL7B	Testis	127	FQAAISRKM	HLA-B46:01	MAGEA2	Melanoma	4608

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KYAELMFETF	HLA-A24:02	ACTL7B	Testis	128	SSFSTTINY	HLA-B46:01	MAGEA2	Melanoma	4609
RFRCSEMLF	HLA-A24:02	ACTL7B	Testis	129	ISYPPLIHER	HLA-B46:01	MAGEA2	Melanoma	4610
EKYAELMFETF	HLA-A24:02	ACTL7B	Testis	130	ICGEPHISY	HLA-B46:01	MAGEA2	Melanoma	4611
GYAGEPRPTYF	HLA-A24:02	ACTL7B	Testis	131	FSTTINYTL	HLA-C01:02	MAGEA2	Melanoma	4612
AFTDDHLHI	HLA-A24:02	ACTL7B	Testis	132	FAHPRKLLM	HLA-C01:02	MAGEA2	Melanoma	4613
KMKPRKVHK	HLA-A30:01	ACTL7B	Testis	133	VMPKTGLLI	HLA-C01:02	MAGEA2	Melanoma	4614
ATRNSPMPL	HLA-A30:01	ACTL7B	Testis	134	HSPQGASSF	HLA-C01:02	MAGEA2	Melanoma	4615
MATRNSPMPL	HLA-A30:01	ACTL7B	Testis	135	YPPLHERAL	HLA-C01:02	MAGEA2	Melanoma	4616
KIKAVIIDL	HLA-A30:01	ACTL7B	Testis	136	VVPISHLYI	HLA-C01:02	MAGEA2	Melanoma	4617
HIIEHIKKK	HLA-A30:01	ACTL7B	Testis	137	FAHPRKLLM	HLA-C03:04	MAGEA2	Melanoma	4618
TMLDGFPER	HLA-A33:03	ACTL7B	Testis	138	FSTTINYTL	HLA-C03:04	MAGEA2	Melanoma	4619
DVLPGLTSR	HLA-A33:03	ACTL7B	Testis	139	FQAAISRKM	HLA-C03:04	MAGEA2	Melanoma	4620
CTMLDGFPER	HLA-A33:03	ACTL7B	Testis	140	AAISRKMVEL	HLA-C03:04	MAGEA2	Melanoma	4621
EAADAGDTR	HLA-A33:03	ACTL7B	Testis	141	MFPDLESEF	HLA-C04:01	MAGEA2	Melanoma	4622
APLKLVNPL	HLA-B07:02	ACTL7B	Testis	142	CQDFFPVIF	HLA-C04:01	MAGEA2	Melanoma	4623
RPTYFISSTV	HLA-B07:02	ACTL7B	Testis	143	FAHPRKLLM	HLA-C04:01	MAGEA2	Melanoma	4624
FPERFQREL	HLA-B07:02	ACTL7B	Testis	144	IWEELSML	HLA-C04:01	MAGEA2	Melanoma	4625
SPMPLGTAQ	HLA-B07:02	ACTL7B	Testis	145	FAHPRKLLM	HLA-C07:01	MAGEA2	Melanoma	4626
VPISEGDVL	HLA-B07:02	ACTL7B	Testis	146	FQAAISRKM	HLA-C07:01	MAGEA2	Melanoma	4627
SNREKYAEL	HLA-B08:01	ACTL7B	Testis	147	FSTTINYTL	HLA-C07:01	MAGEA2	Melanoma	4628
HIKKKCCYA	HLA-B08:01	ACTL7B	Testis	148	SSFSTTINY	HLA-C07:01	MAGEA2	Melanoma	4629
HIKKKCCYAAF	HLA-B08:01	ACTL7B	Testis	149	ARGEALGL	HLA-C07:01	MAGEA2	Melanoma	4630
AGDTRKWTL	HLA-B08:01	ACTL7B	Testis	150	LEVFEGRED	HLA-C07:01	MAGEA2	Melanoma	4631
AAPERKTSV	HLA-B08:01	ACTL7B	Testis	151	FAHPRKLLM	HLA-C07:02	MAGEA2	Melanoma	4632
ERFQRELSL	HLA-B08:01	ACTL7B	Testis	152	MFPDLESEF	HLA-C07:02	MAGEA2	Melanoma	4633
AELMFETFGI	HLA-B13:02	ACTL7B	Testis	153	FQAAISRKM	HLA-C07:02	MAGEA2	Melanoma	4634
SEMLFQPSL	HLA-B13:02	ACTL7B	Testis	154	SYPPLHERAL	HLA-C07:02	MAGEA2	Melanoma	4635
WEYIFRTAMKI	HLA-B13:02	ACTL7B	Testis	155	ARGEALGL	HLA-C07:02	MAGEA2	Melanoma	4636
GLVPEELRV	HLA-B13:02	ACTL7B	Testis	156	SYPPLHER	HLA-C07:02	MAGEA2	Melanoma	4637
YIFRTAMKI	HLA-B13:02	ACTL7B	Testis	157	EVDPASNTY	HLA-A01:01	MAGEA4	Lung squam.	4638
HLHIIEHI	HLA-B13:02	ACTL7B	Testis	158	YTLVTCLGLSY	HLA-A01:01	MAGEA4	Lung squam.	4639
YSYGKTSGL	HLA-B46:01	ACTL7B	Testis	159	KEVDPASNTY	HLA-A01:01	MAGEA4	Lung squam.	4640
LLNEAGHAF	HLA-B46:01	ACTL7B	Testis	160	VTCLGLSY	HLA-A01:01	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4641
SILASLQAF	HLA-B46:01	ACTL7B	Testis	161	MLERVIKNY	HLA-A01:01	MAGEA4	Lung squam.	4642
VIIDLGSQY	HLA-B46:01	ACTL7B	Testis	162	KVLEHVVRV	HLA-A02:01	MAGEA4	Lung squam.	4643
YAGEPRPTY	HLA-B46:01	ACTL7B	Testis	163	ALLEEEEGV	HLA-A02:01	MAGEA4	Lung squam.	4644
AMHVTSQSL	HLA-B46:01	ACTL7B	Testis	164	FLWGPRALA	HLA-A02:01	MAGEA4	Lung squam.	4645
YSYGKTSGL	HLA-C01:02	ACTL7B	Testis	165	MIFGIDVKEV	HLA-A02:01	MAGEA4	Lung squam.	4646
ILPEEHAVL	HLA-C01:02	ACTL7B	Testis	166	ALAETSYVKV	HLA-A02:01	MAGEA4	Lung squam.	4647
FTDDHLHII	HLA-C01:02	ACTL7B	Testis	167	KVDELAHFL	HLA-A02:01	MAGEA4	Lung squam.	4648
AAPERKTSV	HLA-C01:02	ACTL7B	Testis	168	FLWGPRALAET	HLA-A02:01	MAGEA4	Lung squam.	4649
FLPEEELGL	HLA-C01:02	ACTL7B	Testis	169	ALAETSYV	HLA-A02:01	MAGEA4	Lung squam.	4650

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YSYGKTSGL	HLA-C03:04	ACTL7B	Testis	170	SLKMIFGIDV	HLA-A02:01	MAGEA4	Lung squam.	4651
MATRNSPMPL	HLA-C03:04	ACTL7B	Testis	171	ALSNKVDEL	HLA-A02:01	MAGEA4	Lung squam.	4652
SVWTGGSIL	HLA-C03:04	ACTL7B	Testis	172	GVYDGREHTV	HLA-A02:01	MAGEA4	Lung squam.	4653
STQPGLPEL	HLA-C03:04	ACTL7B	Testis	173	PLVPGTLEEV	HLA-A02:01	MAGEA4	Lung squam.	4654
AAFLPEEEL	HLA-C03:04	ACTL7B	Testis	174	FLWGPRAL	HLA-A02:01	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4655
FTDDHLHII	HLA-C04:01	ACTL7B	Testis	175	SLFREALSNK	HLA-A03:01	MAGEA4	Lung squam.	4656
MLDGFPERF	HLA-C04:01	ACTL7B	Testis	176	KVDELAHFLLRK	HLA-A03:01	MAGEA4	Lung squam.	4657
RFRCSEMLF	HLA-C04:01	ACTL7B	Testis	177	MLERVIKNYK	HLA-A03:01	MAGEA4	Lung squam.	4658
VQDIWEYIF	HLA-C04:01	ACTL7B	Testis	178	RCFPVIFGK	HLA-A03:01	MAGEA4	Lung squam.	4659
ERFQRELSL	HLA-C07:01	ACTL7B	Testis	179	GLLGNNQIFPK	HLA-A03:01	MAGEA4	Lung squam.	4660
YSYGKTSGL	HLA-C07:01	ACTL7B	Testis	180	ELAHFLLRK	HLA-A03:01	MAGEA4	Lung squam.	4661
ERFRCSEML	HLA-C07:01	ACTL7B	Testis	181	TTISFTCWR	HLA-A11:01	MAGEA4	Lung squam.	4662
TRPGPDASL	HLA-C07:01	ACTL7B	Testis	182	SLFREALSNK	HLA-A11:01	MAGEA4	Lung squam.	4663
LRVDYELPD	HLA-C07:01	ACTL7B	Testis	183	ALAETSYVK	HLA-A11:01	MAGEA4	Lung squam.	4664
YSYGKTSGL	HLA-C07:02	ACTL7B	Testis	184	RCFPVIFGK	HLA-A11:01	MAGEA4	Lung squam.	4665
ERFQRELSL	HLA-C07:02	ACTL7B	Testis	185	GVMGVYDGR	HLA-A11:01	MAGEA4	Lung squam.	4666
RFRCSEMLF	HLA-C07:02	ACTL7B	Testis	186	NYKRCFPVI	HLA-A24:02	MAGEA4	Lung squam.	4667
TRPGPDASL	HLA-C07:02	ACTL7B	Testis	187	NYKRCFPVIF	HLA-A24:02	MAGEA4	Lung squam.	4668
ILPEEHAVL	HLA-C07:02	ACTL7B	Testis	188	SYVKVLEHV	HLA-A24:02	MAGEA4	Lung squam.	4669
TRNSPMPL	HLA-C07:02	ACTL7B	Testis	189	VYGEPRKLL	HLA-A24:02	MAGEA4	Lung squam.	4670
VVDTGHGVTY	HLA-A01:01	ACTL9	Testis	190	IFPKTGLLI	HLA-A24:02	MAGEA4	Lung squam.	4671
YTVPVFQGY	HLA-A01:01	ACTL9	Testis	191	RVRIAYPSL	HLA-A30:01	MAGEA4	Lung squam.	4672
ASQSVLSVY	HLA-A01:01	ACTL9	Testis	192	KYRAKELVTK	HLA-A30:01	MAGEA4	Lung squam.	4673
LVENIKHHY	HLA-A01:01	ACTL9	Testis	193	RVRIAYPSLREA	HLA-A30:01	MAGEA4	Lung squam.	4674
FLAEMLLQA	HLA-A02:01	ACTL9	Testis	194	RCFPVIFGK	HLA-A30:01	MAGEA4	Lung squam.	4675
HLLEHDLRV	HLA-A02:01	ACTL9	Testis	195	KVLEHVVRV	HLA-A30:01	MAGEA4	Lung squam.	4676
FLAEMLLQAGL	HLA-A02:01	ACTL9	Testis	196	TTISFTCWR	HLA-A33:03	MAGEA4	Lung squam.	4677
KLVEVAFESL	HLA-A02:01	ACTL9	Testis	197	LAHFLLRKYR	HLA-A33:03	MAGEA4	Lung squam.	4678
MLLQAGLPL	HLA-A02:01	ACTL9	Testis	198	PTTISFTCWR	HLA-A33:03	MAGEA4	Lung squam.	4679
AMYVASQSV	HLA-A02:01	ACTL9	Testis	199	ELAHFLLR	HLA-A33:03	MAGEA4	Lung squam.	4680
AFLAEMLLQA	HLA-A02:01	ACTL9	Testis	200	DELAHFLLR	HLA-A33:03	MAGEA4	Lung squam.	4681
RVLPELTLV	HLA-A02:01	ACTL9	Testis	201	YPSLREAAL	HLA-B07:02	MAGEA4	Lung squam.	4682
AFLAEMLLQAGL	HLA-A02:01	ACTL9	Testis	202	RVRIAYPSL	HLA-B07:02	MAGEA4	Lung squam.	4683
KLPDGRTVTL	HLA-A02:01	ACTL9	Testis	203	YPSLREAALL	HLA-B07:02	MAGEA4	Lung squam.	4684
ELLFNPPEV	HLA-A02:01	ACTL9	Testis	204	SPQGASAL	HLA-B07:02	MAGEA4	Lung squam.	4685
ALPAETHVV	HLA-A02:01	ACTL9	Testis	205	SPLVPGTL	HLA-B07:02	MAGEA4	Lung squam.	4686
LLFNPPEV	HLA-A02:01	ACTL9	Testis	206	FLLRKYRAKEL	HLA-B08:01	MAGEA4	Lung squam.	4687
STMAKQSLRK	HLA-A03:01	ACTL9	Testis	207	LLRKYRAKEL	HLA-B08:01	MAGEA4	Lung squam.	4688
TMAKQSLRK	HLA-A03:01	ACTL9	Testis	208	YPSLREAAL	HLA-B08:01	MAGEA4	Lung squam.	4689
GMVADRLPPK	HLA-A03:01	ACTL9	Testis	209	ELVTKAEML	HLA-B08:01	MAGEA4	Lung squam.	4690
MVADRLPPK	HLA-A03:01	ACTL9	Testis	210	TGLLIIVL	HLA-B08:01	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4691

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
VVIDMGTGTCK	HLA-A03:01	ACTL9	Testis	211	QIFPKTGL	HLA-B08:01	MAGEA4	Lung squam.	4692
STMAKQSLRK	HLA-A11:01	ACTL9	Testis	212	SESLKMIFGI	HLA-B13:02	MAGEA4	Lung squam.	4693
MVADRLPPK	HLA-A11:01	ACTL9	Testis	213	YEFLWGPRAL	HLA-B13:02	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4694
ATILGCQPK	HLA-A11:01	ACTL9	Testis	214	YEFLWGPRALA	HLA-B13:02	MAGEA4	Lung squam.	4695
VVIDMGTGTCK	HLA-A11:01	ACTL9	Testis	215	GVYDGREHTV	HLA-B13:02	MAGEA4	Lung squam.	4696
ATILGCQPKK	HLA-A11:01	ACTL9	Testis	216	KVLEHVVRV	HLA-B13:02	MAGEA4	Lung squam.	4697
LFQCPELLF	HLA-A24:02	ACTL9	Testis	217	ALLEEEEGV	HLA-B13:02	MAGEA4	Lung squam.	4698
HYCYVASDF	HLA-A24:02	ACTL9	Testis	218	SALPTTISF	HLA-B46:01	MAGEA4	Lung squam.	4699
MYVASQSVL	HLA-A24:02	ACTL9	Testis	219	AAVSSSSSPL	HLA-B46:01	MAGEA4	Lung squam.	4700
HHYCYVASDF	HLA-A24:02	ACTL9	Testis	220	LVTCLGLSY	HLA-B46:01	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4701
QYEEQGPYI	HLA-A24:02	ACTL9	Testis	221	VIKNYKRCF	HLA-B46:01	MAGEA4	Lung squam.	4702
RFRAELLRA	HLA-A30:01	ACTL9	Testis	222	TSYVKVLEH	HLA-B46:01	MAGEA4	Lung squam.	4703
SLRSPAMYV	HLA-A30:01	ACTL9	Testis	223	KVDELAIHFL	HLA-C01:02	MAGEA4	Lung squam.	4704
MVADRLPPK	HLA-A30:01	ACTL9	Testis	224	SSPLVPGTL	HLA-C01:02	MAGEA4	Lung squam.	4705
ASRPKSSES	HLA-A30:01	ACTL9	Testis	225	SALPTTISF	HLA-C01:02	MAGEA4	Lung squam.	4706
ATILGCQPK	HLA-A30:01	ACTL9	Testis	226	QSPQGASAL	HLA-C01:02	MAGEA4	Lung squam.	4707
NIKHHYCYV	HLA-A30:01	ACTL9	Testis	227	TSPDAESL	HLA-C01:02	MAGEA4	Lung squam.	4708
STMAKQSLR	HLA-A33:03	ACTL9	Testis	228	AAVSSSSSPL	HLA-C03:04	MAGEA4	Lung squam.	4709
QTFIGEAAR	HLA-A33:03	ACTL9	Testis	229	SALPTTISF	HLA-C03:04	MAGEA4	Lung squam.	4710
SVLSVYAHGR	HLA-A33:03	ACTL9	Testis	230	RALAETSYV	HLA-C03:04	MAGEA4	Lung squam.	4711
EEQGPYIVYR	HLA-A33:03	ACTL9	Testis	231	FLWGPRAL	HLA-C03:04	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4712
EQGPYIVYR	HLA-A33:03	ACTL9	Testis	232	KVDELAIHFL	HLA-C04:01	MAGEA4	Lung squam.	4713
NVVNKPLQR	HLA-A33:03	ACTL9	Testis	233	IFPKTGLLI	HLA-C04:01	MAGEA4	Lung squam.	4714
SPNVVNKPL	HLA-B07:02	ACTL9	Testis	234	VYDGREHTV	HLA-C04:01	MAGEA4	Lung squam.	4715
KPATSGQSGL	HLA-B07:02	ACTL9	Testis	235	KVDELAIIF	HLA-C04:01	MAGEA4	Lung squam.	4716
RPEQEYKRTL	HLA-B07:02	ACTL9	Testis	236	LRKYRAKEL	HLA-C07:01	MAGEA4	Lung squam.	4717
LPDGRTVTL	HLA-B07:02	ACTL9	Testis	237	VRVNARVRI	HLA-C07:01	MAGEA4	Lung squam.	4718
SPATNREKL	HLA-B07:02	ACTL9	Testis	238	FREALSNKV	HLA-C07:01	MAGEA4	Lung squam.	4719
MAKQSLRKLSL	HLA-B08:01	ACTL9	Testis	239	KTGLLIIVL	HLA-C07:01	MAGEA2; MAGEA12; MAGEA4	Lung squam.;Melanoma	4720
NIKHHYCYV	HLA-B08:01	ACTL9	Testis	240	RCFPVIFGK	HLA-C07:01	MAGEA4	Lung squam.	4721
TMAKQSLRKLSL	HLA-B08:01	ACTL9	Testis	241	TVYGEPRKL	HLA-C07:01	MAGEA4	Lung squam.	4722
KQSLRKLSL	HLA-B08:01	ACTL9	Testis	242	YKRCFPVIF	HLA-C07:02	MAGEA4	Lung squam.	4723
ELIWRHLL	HLA-B08:01	ACTL9	Testis	243	LRKYRAKEL	HLA-C07:02	MAGEA4	Lung squam.	4724
EQEYKRTL	HLA-B08:01	ACTL9	Testis	244	VRVNARVRI	HLA-C07:02	MAGEA4	Lung squam.	4725
VDWDAAELI	HLA-B13:02	ACTL9	Testis	245	IFPKTGLLI	HLA-C07:02	MAGEA4	Lung squam.	4726
VVDWDAAELI	HLA-B13:02	ACTL9	Testis	246	VYGEPRKL	HLA-C07:02	MAGEA4	Lung squam.	4727
AELIWRHLL	HLA-B13:02	ACTL9	Testis	247	VRIAYPSL	HLA-C07:02	MAGEA4	Lung squam.	4728
GQSGLQTFI	HLA-B13:02	ACTL9	Testis	248	ASSASSTLY	HLA-A01:01	MAGEC2	Melanoma	4729
GQASPTYTV	HLA-B13:02	ACTL9	Testis	249	LVEFLLLKY	HLA-A01:01	MAGEC2	Melanoma	4730
RVLPELTLV	HLA-B13:02	ACTL9	Testis	250	EASSASSTLY	HLA-A01:01	MAGEC2	Melanoma	4731

peptide	allele	gene	cancer	SEQ
YTVPVFQGY	HLA-B46:01	ACTL9	Testis	251
FAGQASPTY	HLA-B46:01	ACTL9	Testis	252
FSVWIGGSI	HLA-B46:01	ACTL9	Testis	253
VAAQPTRNF	HLA-B46:01	ACTL9	Testis	254
VLREQYEEQ	HLA-B46:01	ACTL9	Testis	255
ASRPKSSES	HLA-B46:01	ACTL9	Testis	256
MLLQAGLPL	HLA-C01:02	ACTL9	Testis	257
LSPVGLSTM	HLA-C01:02	ACTL9	Testis	258
FIGEAARVL	HLA-C01:02	ACTL9	Testis	259
KLPDGRTVTL	HLA-C01:02	ACTL9	Testis	260
FSPATNREK	HLA-C01:02	ACTL9	Testis	261
YAHIGRVSGL	HLA-C03:04	ACTL9	Testis	262
MLLQAGLPL	HLA-C03:04	ACTL9	Testis	263
FSVWIGGSI	HLA-C03:04	ACTL9	Testis	264
FIGEAARVL	HLA-C03:04	ACTL9	Testis	265
FSDPPFSPA	HLA-C03:04	ACTL9	Testis	266
LFQCPELLF	HLA-C04:01	ACTL9	Testis	267
FSDPPFSPA	HLA-C04:01	ACTL9	Testis	268
RLDLAGNHL	HLA-C04:01	ACTL9	Testis	269
VVDWDAAEL	HLA-C04:01	ACTL9	Testis	270
HYCYVASDF	HLA-C04:01	ACTL9	Testis	271
FRAELLRAL	HLA-C07:01	ACTL9	Testis	272
MRADLAQNV	HLA-C07:01	ACTL9	Testis	273
MRADLAQNVL	HLA-C07:01	ACTL9	Testis	274
LRSGIVVD	HLA-C07:01	ACTL9	Testis	275
RAFQSCWVL	HLA-C07:01	ACTL9	Testis	276
RSGIVVDWD	HLA-C07:01	ACTL9	Testis	277
FRAELLRAL	HLA-C07:02	ACTL9	Testis	278
ATHDHPLLF	HLA-C07:02	ACTL9	Testis	279
MYVASQSVL	HLA-C07:02	ACTL9	Testis	280
ARVLPELTL	HLA-C07:02	ACTL9	Testis	281
FNPPEVPGL	HLA-C07:02	ACTL9	Testis	282
LSDQAVLALY	HLA-A01:01	ACTRT2	Testis	283
YLSDQAVLALY	HLA-A01:01	ACTRT2	Testis	284
FYLSDQAVLALY	HLA-A01:01	ACTRT2	Testis	285
DTDIQKILF	HLA-A01:01	ACTRT2	Testis	286
LSDQAVLAL	HLA-A01:01	ACTRT2	Testis	287
HLFEWELGV	HLA-A02:01	ACTRT2	Testis	288
KHLFEWELGV	HLA-A02:01	ACTRT2	Testis	289
KMAEVMFENFGV	HLA-A02:01	ACTRT2	Testis	290
YLSDQAVLAL	HLA-A02:01	ACTRT2	Testis	291
YLSDQAVLA	HLA-A02:01	ACTRT2	Testis	292
WKHLFEWELGV	HLA-A02:01	ACTRT2	Testis	293
VAELVEFLLLKY	HLA-A01:01	MAGEC2	Melanoma	4732
FLAKLNNTV	HLA-A02:01	MAGEC2	Melanoma	4733
VIWEVLNAV	HLA-A02:01	MAGEC2	Melanoma	4734
LLFGLALIEV	HLA-A02:01	MAGEC2	Melanoma	4735
FMELLFGL	HLA-A02:01	MAGEC2	Melanoma	4736
FLLLKYEAEEPV	HLA-A02:01	MAGEC2	Melanoma	4737
YTLDEKVAEL	HLA-A02:01	MAGEC2	Melanoma	4738
VMASESLSV	HLA-A02:01	MAGEC2	Melanoma	4739
KVLEFLAKL	HLA-A02:01	MAGEC2	Melanoma	4740
KVAELVEFL	HLA-A02:01	MAGEC2	Melanoma	4741
TLDEKVAEL	HLA-A02:01	MAGEC2	Melanoma	4742
SLLIIILSV	HLA-A02:01	MAGEC2	Melanoma	4743
ALKDVEERV	HLA-A02:01	MAGEC2	Melanoma	4744
TLDEKVAELV	HLA-A02:01	MAGEC2	Melanoma	4745
ILGGPEEEEV	HLA-A02:01	MAGEC2	Melanoma	4746
MLMIVIKYK	HLA-A03:01	MAGEC2	Melanoma	4747
SSFTYTLDEK	HLA-A03:01	MAGEC2	Melanoma	4748
EMLMIVIKYK	HLA-A03:01	MAGEC2	Melanoma	4749
KDYFPVILK	HLA-A03:01	MAGEC2	Melanoma	4750
IILSVIFIK	HLA-A03:01	MAGEC2	Melanoma	4751
SSFTYTLDEK	HLA-A11:01	MAGEC2	Melanoma	4752
VPSSFPSWYK	HLA-A11:01	MAGEC2	Melanoma	4753
IILSVIFIK	HLA-A11:01	MAGEC2	Melanoma	4754
SSFSEESSSQK	HLA-A11:01	MAGEC2	Melanoma	4755
LYLVFSPSSF	HLA-A24:02	MAGEC2	Melanoma	4756
KYKDYFPVI	HLA-A24:02	MAGEC2	Melanoma	4757
KYKDYFPVIL	HLA-A24:02	MAGEC2	Melanoma	4758
VYGEPRELL	HLA-A24:02	MAGEC2	Melanoma	4759
RAHSESIKK	HLA-A30:01	MAGEC2	Melanoma	4760
KYKDYFPVI	HLA-A30:01	MAGEC2	Melanoma	4761
KYKDYFPVILK	HLA-A30:01	MAGEC2	Melanoma	4762
KDYFPVILK	HLA-A30:01	MAGEC2	Melanoma	4763
NAVGVYAGR	HLA-A33:03	MAGEC2	Melanoma	4764
DYFPVILKR	HLA-A33:03	MAGEC2	Melanoma	4765
WVQGHYLEYR	HLA-A33:03	MAGEC2	Melanoma	4766
DYFPVILKRAR	HLA-A33:03	MAGEC2	Melanoma	4767
GPRAHSESI	HLA-B07:02	MAGEC2	Melanoma	4768
FPSWYKDAL	HLA-B07:02	MAGEC2	Melanoma	4769
WGPRAHSESI	HLA-B07:02	MAGEC2	Melanoma	4770
SPSSFSTSSSL	HLA-B07:02	MAGEC2	Melanoma	4771
VPSGVIPNL	HLA-B07:02	MAGEC2	Melanoma	4772
MPPVPGVPF	HLA-B07:02	MAGEC2	Melanoma	4773
SIKKKVLEF	HLA-B08:01	MAGEC2	Melanoma	4774

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SLSSFKQMWV	HLA-A02:01	ACTRT2	Testis	294	LKRAREFMEL	HLA-B08:01	MAGEC2	Melanoma	4775
VMFENFGVPA	HLA-A02:01	ACTRT2	Testis	295	SIKKKVLEFL	HLA-B08:01	MAGEC2	Melanoma	4776
LWKHLFEWELGV	HLA-A02:01	ACTRT2	Testis	296	ESIKKKVL	HLA-B08:01	MAGEC2	Melanoma	4777
KLPDGNIISL	HLA-A02:01	ACTRT2	Testis	297	TLDEKVAEL	HLA-B08:01	MAGEC2	Melanoma	4778
SLGDPLHQA	HLA-A02:01	ACTRT2	Testis	298	MELLFGLALI	HLA-B13:02	MAGEC2	Melanoma	4779
RLLKELEQL	HLA-A02:01	ACTRT2	Testis	299	REFMELLFGL	HLA-B13:02	MAGEC2	Melanoma	4780
GLDDRLLKEL	HLA-A02:01	ACTRT2	Testis	300	MPENSLLLIII	HLA-B13:02	MAGEC2	Melanoma	4781
SLPHAVTKL	HLA-A02:01	ACTRT2	Testis	301	SLLIIILSV	HLA-B13:02	MAGEC2	Melanoma	4782
GLDDRLLKE	HLA-A02:01	ACTRT2	Testis	302	ALKDVEERV	HLA-B13:02	MAGEC2	Melanoma	4783
IVTSLSSFK	HLA-A03:01	ACTRT2	Testis	303	ASEEVIWEV	HLA-B13:02	MAGEC2	Melanoma	4784
SIVTSLSSFK	HLA-A03:01	ACTRT2	Testis	304	MASESLSVM	HLA-B46:01	MAGEC2	Melanoma	4785
TLFHGLDDRLLK	HLA-A03:01	ACTRT2	Testis	305	YLVFSPSSF	HLA-B46:01	MAGEC2	Melanoma	4786
VIFDNGSGFCK	HLA-A03:01	ACTRT2	Testis	306	FVYGEPREL	HLA-B46:01	MAGEC2	Melanoma	4787
HTFPCQLDK	HLA-A03:01	ACTRT2	Testis	307	FSTSSSLIL	HLA-B46:01	MAGEC2	Melanoma	4788
HLFEWELGVK	HLA-A03:01	ACTRT2	Testis	308	HSSPPYYEF	HLA-B46:01	MAGEC2	Melanoma	4789
SIVTSLSSFK	HLA-A11:01	ACTRT2	Testis	309	SIKKKVLEF	HLA-B46:01	MAGEC2	Melanoma	4790
IVTSLSSFK	HLA-A11:01	ACTRT2	Testis	310	SVMSSNVSF	HLA-B46:01	MAGEC2	Melanoma	4791
HTFPCQLDK	HLA-A11:01	ACTRT2	Testis	311	FSTSSSLIL	HLA-C01:02	MAGEC2	Melanoma	4792
VIFDNGSGFCK	HLA-A11:01	ACTRT2	Testis	312	SSPPYYEFL	HLA-C01:02	MAGEC2	Melanoma	4793
YSLPHAVTK	HLA-A11:01	ACTRT2	Testis	313	SSASSTLYL	HLA-C01:02	MAGEC2	Melanoma	4794
KMAEVMFENF	HLA-A24:02	ACTRT2	Testis	314	FSPSSFSTS	HLA-C01:02	MAGEC2	Melanoma	4795
RLWKHLFEW	HLA-A24:02	ACTRT2	Testis	315	VGPDHFCVF	HLA-C01:02	MAGEC2	Melanoma	4796
LYASACVTGL	HLA-A24:02	ACTRT2	Testis	316	MASESLSVM	HLA-C03:04	MAGEC2	Melanoma	4797
FYLSDQAVL	HLA-A24:02	ACTRT2	Testis	317	FSTSSSLIL	HLA-C03:04	MAGEC2	Melanoma	4798
VLSGGTTLF	HLA-A24:02	ACTRT2	Testis	318	FVYGEPREL	HLA-C03:04	MAGEC2	Melanoma	4799
RWFSTWIGA	HLA-A30:01	ACTRT2	Testis	319	FANTVGLTD	HLA-C03:04	MAGEC2	Melanoma	4800
YSLPHAVTK	HLA-A30:01	ACTRT2	Testis	320	YKDYFPVIL	HLA-C04:01	MAGEC2	Melanoma	4801
HTFPCQLDK	HLA-A30:01	ACTRT2	Testis	321	FSTSSSLIL	HLA-C04:01	MAGEC2	Melanoma	4802
ITKCDTDIQK	HLA-A30:01	ACTRT2	Testis	322	HSSPPYYEF	HLA-C04:01	MAGEC2	Melanoma	4803
GLVDDIKKK	HLA-A30:01	ACTRT2	Testis	323	TLDEKVAEL	HLA-C04:01	MAGEC2	Melanoma	4804
VTKLHVAGR	HLA-A33:03	ACTRT2	Testis	324	HFCVFANTV	HLA-C04:01	MAGEC2	Melanoma	4805
EFGTSVVQR	HLA-A33:03	ACTRT2	Testis	325	FVYGEPREL	HLA-C07:01	MAGEC2	Melanoma	4806
EFGTSVVQRR	HLA-A33:03	ACTRT2	Testis	326	KRAREFMEL	HLA-C07:01	MAGEC2	Melanoma	4807
AVTKLHVAGR	HLA-A33:03	ACTRT2	Testis	327	YKDYFPVIL	HLA-C07:01	MAGEC2	Melanoma	4808
DFKEFGTSVVQR	HLA-A33:03	ACTRT2	Testis	328	HSSPPYYEF	HLA-C07:01	MAGEC2	Melanoma	4809
GPRHMVSSI	HLA-B07:02	ACTRT2	Testis	329	SSPPYYEF	HLA-C07:01	MAGEC2	Melanoma	4810
FGPRHMVSSI	HLA-B07:02	ACTRT2	Testis	330	KRAREFMEL	HLA-C07:02	MAGEC2	Melanoma	4811
VPIFEGYSL	HLA-B07:02	ACTRT2	Testis	331	KYKDYFPVI	HLA-C07:02	MAGEC2	Melanoma	4812
LPDGNIISL	HLA-B07:02	ACTRT2	Testis	332	FVYGEPREL	HLA-C07:02	MAGEC2	Melanoma	4813
QPLLATEPSL	HLA-B07:02	ACTRT2	Testis	333	VYGEPREL	HLA-C07:02	MAGEC2	Melanoma	4814
DIKKKLCYV	HLA-B08:01	ACTRT2	Testis	334	YKDYFPVIL	HLA-C07:02	MAGEC2	Melanoma	4815
FGPRHMVSSI	HLA-B08:01	ACTRT2	Testis	335	HSSPPYYEF	HLA-C07:02	MAGEC2	Melanoma	4816
DIKKKLCYVAL	HLA-B08:01	ACTRT2	Testis	336	ISDMLGSLY	HLA-A01:01	MC2R	Adrenal Gland	4817

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
EANQKKYFV	HLA-B08:01	ACTRT2	Testis	337	AISDMLGSLY	HLA-A01:01	MC2R	Adrenal Gland	4818
EALYKQEAL	HLA-B08:01	ACTRT2	Testis	338	LAISDMLGSLY	HLA-A01:01	MC2R	Adrenal Gland	4819
ADFKEFGTSV	HLA-B13:02	ACTRT2	Testis	339	ITIFHALRY	HLA-A01:01	MC2R	Adrenal Gland	4820
AEVMFENFGV	HLA-B13:02	ACTRT2	Testis	340	ISDMLGSLYK	HLA-A01:01	MC2R	Adrenal Gland	4821
FEGYSLPHAV	HLA-B13:02	ACTRT2	Testis	341	FIFCWAPFV	HLA-A02:01	MC2R	Adrenal Gland	4822
HQAPEALFV	HLA-B13:02	ACTRT2	Testis	342	SLLGSIFSL	HLA-A02:01	MC2R	Adrenal Gland	4823
HLFEWELGV	HLA-B13:02	ACTRT2	Testis	343	FIFCWAPFVL	HLA-A02:01	MC2R	Adrenal Gland	4824
KCDTDIQKI	HLA-B13:02	ACTRT2	Testis	344	FVLSLLGSIFSL	HLA-A02:01	MC2R	Adrenal Gland	4825
SIVTSLSSF	HLA-B46:01	ACTRT2	Testis	345	VFIFCWAPFV	HLA-A02:01	MC2R	Adrenal Gland	4826
FSTWIGASI	HLA-B46:01	ACTRT2	Testis	346	SLFPLMLVFI	HLA-A02:01	MC2R	Adrenal Gland	4827
YASACVTGL	HLA-B46:01	ACTRT2	Testis	347	LSLLGSIFSL	HLA-A02:01	MC2R	Adrenal Gland	4828
VIFDNGSGF	HLA-B46:01	ACTRT2	Testis	348	FIYAFRSPEL	HLA-A02:01	MC2R	Adrenal Gland	4829
SSIVGHLKF	HLA-B46:01	ACTRT2	Testis	349	LQAPMYFFI	HLA-A02:01	MC2R	Adrenal Gland	4830
ASIVTSLSSF	HLA-B46:01	ACTRT2	Testis	350	SLFPLMLV	HLA-A02:01	MC2R	Adrenal Gland	4831
LSDQAVLAL	HLA-C01:02	ACTRT2	Testis	351	GVLENLIVL	HLA-A02:01	MC2R	Adrenal Gland	4832
YASACVTGL	HLA-C01:02	ACTRT2	Testis	352	VLENLIVLL	HLA-A02:01	MC2R	Adrenal Gland	4833
FSTWIGASI	HLA-C01:02	ACTRT2	Testis	353	SLYKILENI	HLA-A02:01	MC2R	Adrenal Gland	4834
KLPDGNIISL	HLA-C01:02	ACTRT2	Testis	354	SLFQVNGML	HLA-A02:01	MC2R	Adrenal Gland	4835
SLPHAVTKL	HLA-C01:02	ACTRT2	Testis	355	VLPEEIFFT	HLA-A02:01	MC2R	Adrenal Gland	4836
FGPRHMVSSI	HLA-C01:02	ACTRT2	Testis	356	ILRNMGYLK	HLA-A03:01	MC2R	Adrenal Gland	4837
YASACVTGL	HLA-C03:04	ACTRT2	Testis	357	IILRNMGYLK	HLA-A03:01	MC2R	Adrenal Gland	4838
FSTWIGASI	HLA-C03:04	ACTRT2	Testis	358	ISDMLGSLYK	HLA-A03:01	MC2R	Adrenal Gland	4839
IVLSGGTTL	HLA-C03:04	ACTRT2	Testis	359	AISDMLGSLYK	HLA-A03:01	MC2R	Adrenal Gland	4840
HALDSPAVI	HLA-C03:04	ACTRT2	Testis	360	AVIDPFIYA	HLA-A03:01	MC2R	Adrenal Gland	4841
VALEPEKEL	HLA-C03:04	ACTRT2	Testis	361	VLLAVFKNK	HLA-A03:01	MC2R	Adrenal Gland	4842
LSDQAVLAL	HLA-C03:04	ACTRT2	Testis	362	ISDMLGSLYK	HLA-A11:01	MC2R	Adrenal Gland	4843
FYLSDQAVLAL	HLA-C04:01	ACTRT2	Testis	363	STLPRANMK	HLA-A11:01	MC2R	Adrenal Gland	4844
LHQAPEALF	HLA-C04:01	ACTRT2	Testis	364	AISDMLGSLYK	HLA-A11:01	MC2R	Adrenal Gland	4845
ALDSPAVIF	HLA-C04:01	ACTRT2	Testis	365	AVIDPFIYAFR	HLA-A11:01	MC2R	Adrenal Gland	4846
IFDNGSGF	HLA-C04:01	ACTRT2	Testis	366	AVIDPFIYA	HLA-A11:01	MC2R	Adrenal Gland	4847
IFDNGSGFC	HLA-C04:01	ACTRT2	Testis	367	RYITIFHAL	HLA-A24:02	MC2R	Adrenal Gland	4848
FSTWIGASI	HLA-C07:01	ACTRT2	Testis	368	VFIFCWAPF	HLA-A24:02	MC2R	Adrenal Gland	4849
NREKMAEVM	HLA-C07:01	ACTRT2	Testis	369	PYCACYMSLF	HLA-A24:02	MC2R	Adrenal Gland	4850
FYLSDQAVL	HLA-C07:01	ACTRT2	Testis	370	IYAFRSPEL	HLA-A24:02	MC2R	Adrenal Gland	4851
RRPEEVLRE	HLA-C07:01	ACTRT2	Testis	371	VVLTVIWTF	HLA-A24:02	MC2R	Adrenal Gland	4852
RRPEEVLREY	HLA-C07:01	ACTRT2	Testis	372	ILRNMGYLK	HLA-A30:01	MC2R	Adrenal Gland	4853
SRRPEEVL	HLA-C07:01	ACTRT2	Testis	373	RSHTRKIST	HLA-A30:01	MC2R	Adrenal Gland	4854
FYLSDQAVL	HLA-C07:02	ACTRT2	Testis	374	HTRKISTLP	HLA-A30:01	MC2R	Adrenal Gland	4855
LYKQEALQL	HLA-C07:02	ACTRT2	Testis	375	AVIDPFIYA	HLA-A30:01	MC2R	Adrenal Gland	4856
KYFVGEEAL	HLA-C07:02	ACTRT2	Testis	376	VLLAVFKNK	HLA-A30:01	MC2R	Adrenal Gland	4857
RRPEEVLREY	HLA-C07:02	ACTRT2	Testis	377	RYITIFHAL	HLA-A30:01	MC2R	Adrenal Gland	4858
SRRPEEVL	HLA-C07:02	ACTRT2	Testis	378	YITIFHALR	HLA-A33:03	MC2R	Adrenal Gland	4859
LTSKLPMFY	HLA-A01:01	ADAD1	Testis	379	MFLLARSHTR	HLA-A33:03	MC2R	Adrenal Gland	4860

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ALTSKLPMFY	HLA-A01:01	ADAD1	Testis	380	RYITIFHALR	HLA-A33:03	MC2R	Adrenal Gland	4861
VTARRSLLRY	HLA-A01:01	ADAD1	Testis	381	HTRKISTLPR	HLA-A33:03	MC2R	Adrenal Gland	4862
LSELAYYSKVHY	HLA-A01:01	ADAD1	Testis	382	DAFKKMIFCSR	HLA-A33:03	MC2R	Adrenal Gland	4863
LLSHFIQPV	HLA-A02:01	ADAD1	Testis	383	RYHSIVTMR	HLA-A33:03	MC2R	Adrenal Gland	4864
ALLSHFIQPV	HLA-A02:01	ADAD1	Testis	384	ENILIILR	HLA-A33:03	MC2R	Adrenal Gland	4865
VVLSELAYV	HLA-A02:01	ADAD1	Testis	385	LPRANMKGAI	HLA-B07:02	MC2R	Adrenal Gland	4866
KMASKVTQV	HLA-A02:01	ADAD1	Testis	386	APMYFFICSL	HLA-B07:02	MC2R	Adrenal Gland	4867
SLVPSAYPL	HLA-A02:01	ADAD1	Testis	387	LPRANMKGAITL	HLA-B07:02	MC2R	Adrenal Gland	4868
KLALDELLQL	HLA-A02:01	ADAD1	Testis	388	VPTVITFTSL	HLA-B07:02	MC2R	Adrenal Gland	4869
NLSSISNPV	HLA-A02:01	ADAD1	Testis	389	APFVLHVLL	HLA-B07:02	MC2R	Adrenal Gland	4870
SLLRYFYRQL	HLA-A02:01	ADAD1	Testis	390	YLKPRGSF	HLA-B08:01	MC2R	Adrenal Gland	4871
MLSRFNLLA	HLA-A02:01	ADAD1	Testis	391	TMRRTVVVL	HLA-B08:01	MC2R	Adrenal Gland	4872
AMLSRFNLL	HLA-A02:01	ADAD1	Testis	392	HALRYHSI	HLA-B08:01	MC2R	Adrenal Gland	4873
AMMEKSIFCT	HLA-A02:01	ADAD1	Testis	393	YITIFHAL	HLA-B08:01	MC2R	Adrenal Gland	4874
ALDELLQL	HLA-A02:01	ADAD1	Testis	394	DAFKKMIF	HLA-B08:01	MC2R	Adrenal Gland	4875
FIIERAGQHEV	HLA-A02:01	ADAD1	Testis	395	TVITFTSL	HLA-B08:01	MC2R	Adrenal Gland	4876
VLHDTHAVV	HLA-A02:01	ADAD1	Testis	396	LQAPMYFFI	HLA-B13:02	MC2R	Adrenal Gland	4877
VLSELAYV	HLA-A02:01	ADAD1	Testis	397	EEIFFTISI	HLA-B13:02	MC2R	Adrenal Gland	4878
QLDEPEPRI	HLA-A02:01	ADAD1	Testis	398	SDMLGSLYKI	HLA-B13:02	MC2R	Adrenal Gland	4879
ALDELLQLD	HLA-A02:01	ADAD1	Testis	399	SLYKILENI	HLA-B13:02	MC2R	Adrenal Gland	4880
MLSRFNLLAK	HLA-A03:01	ADAD1	Testis	400	RRTVVVLTV	HLA-B13:02	MC2R	Adrenal Gland	4881
CLYMNQLPK	HLA-A03:01	ADAD1	Testis	401	FTISIVGVL	HLA-B46:01	MC2R	Adrenal Gland	4882
GMSMASRLCK	HLA-A03:01	ADAD1	Testis	402	FQVNGMLIM	HLA-B46:01	MC2R	Adrenal Gland	4883
RVDDALTSK	HLA-A03:01	ADAD1	Testis	403	MTFCPSNPY	HLA-B46:01	MC2R	Adrenal Gland	4884
AVVDGIQYK	HLA-A03:01	ADAD1	Testis	404	VIDPFIYAF	HLA-B46:01	MC2R	Adrenal Gland	4885
MSMASRLCK	HLA-A11:01	ADAD1	Testis	405	VLHVLLMTF	HLA-B46:01	MC2R	Adrenal Gland	4886
SISNPVLPPK	HLA-A11:01	ADAD1	Testis	406	YLKPRGSF	HLA-B46:01	MC2R	Adrenal Gland	4887
AVVDGIQYK	HLA-A11:01	ADAD1	Testis	407	IAADRYITI	HLA-C01:02	MC2R	Adrenal Gland	4888
SSLAAFIER	HLA-A11:01	ADAD1	Testis	408	WAPFVLHVL	HLA-C01:02	MC2R	Adrenal Gland	4889
VVLSELAYVSK	HLA-A11:01	ADAD1	Testis	409	ITFTSLFPL	HLA-C01:02	MC2R	Adrenal Gland	4890
RYFYRQLLLF	HLA-A24:02	ADAD1	Testis	410	FTSLFPLML	HLA-C01:02	MC2R	Adrenal Gland	4891
RYFYRQLLL	HLA-A24:02	ADAD1	Testis	411	RSPELRDAF	HLA-C01:02	MC2R	Adrenal Gland	4892
YFYRQLLLF	HLA-A24:02	ADAD1	Testis	412	FCPSNPYCAC	HLA-C01:02	MC2R	Adrenal Gland	4893
KYSSSLAAF	HLA-A24:02	ADAD1	Testis	413	FTISIVGVL	HLA-C03:04	MC2R	Adrenal Gland	4894
MSMASRLCK	HLA-A30:01	ADAD1	Testis	414	FSHHVPTVI	HLA-C03:04	MC2R	Adrenal Gland	4895
LSRFNLLAK	HLA-A30:01	ADAD1	Testis	415	IAADRYITI	HLA-C03:04	MC2R	Adrenal Gland	4896
TARRSLLSK	HLA-A30:01	ADAD1	Testis	416	YAFRSPEL	HLA-C03:04	MC2R	Adrenal Gland	4897
AVVDGIQYK	HLA-A30:01	ADAD1	Testis	417	FIYAFRSPEL	HLA-C03:04	MC2R	Adrenal Gland	4898
KIPKEFIMK	HLA-A30:01	ADAD1	Testis	418	ISDMLGSLY	HLA-C04:01	MC2R	Adrenal Gland	4899
RQLLLFYSK	HLA-A30:01	ADAD1	Testis	419	LFQVNGMLI	HLA-C04:01	MC2R	Adrenal Gland	4900
DTHAVVTAR	HLA-A33:03	ADAD1	Testis	420	TFTSLFPLM	HLA-C04:01	MC2R	Adrenal Gland	4901
YVSKVHYEGR	HLA-A33:03	ADAD1	Testis	421	LFPLMLVFI	HLA-C04:01	MC2R	Adrenal Gland	4902
RSLLRYFYR	HLA-A33:03	ADAD1	Testis	422	VIDPFIYAF	HLA-C04:01	MC2R	Adrenal Gland	4903

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RFNQLISNR	HLA-A33:03	ADAD1	Testis	423	IFCWAPFVL	HLA-C04:01	MC2R	Adrenal Gland	4904
ERFNQLISNR	HLA-A33:03	ADAD1	Testis	424	LRYHSIVTM	HLA-C07:01	MC2R	Adrenal Gland	4905
SPFKSGMSM	HLA-B07:02	ADAD1	Testis	425	RRTVVVLTV	HLA-C07:01	MC2R	Adrenal Gland	4906
SSPFKSGMSM	HLA-B07:02	ADAD1	Testis	426	FHALRYHSI	HLA-C07:01	MC2R	Adrenal Gland	4907
QPVYISSIL	HLA-B07:02	ADAD1	Testis	427	MRRTVVVL	HLA-C07:01	MC2R	Adrenal Gland	4908
GPYFAFCAV	HLA-B07:02	ADAD1	Testis	428	HHVPTVITF	HLA-C07:01	MC2R	Adrenal Gland	4909
FPAEPVVL	HLA-B07:02	ADAD1	Testis	429	DRYITIFHA	HLA-C07:01	MC2R	Adrenal Gland	4910
IVKERFNQL	HLA-B08:01	ADAD1	Testis	430	LRYHSIVTM	HLA-C07:02	MC2R	Adrenal Gland	4911
NLEYKFLSL	HLA-B08:01	ADAD1	Testis	431	IYAFRSPEL	HLA-C07:02	MC2R	Adrenal Gland	4912
AMLSRFNLL	HLA-B08:01	ADAD1	Testis	432	FHALRYHSI	HLA-C07:02	MC2R	Adrenal Gland	4913
DIKPDGRVL	HLA-B08:01	ADAD1	Testis	433	HHVPTVITF	HLA-C07:02	MC2R	Adrenal Gland	4914
SELAYVSKV	HLA-B13:02	ADAD1	Testis	434	MRRTVVVL	HLA-C07:02	MC2R	Adrenal Gland	4915
VEGKIYLTV	HLA-B13:02	ADAD1	Testis	435	FSGNQVWRY	HLA-A01:01	MMP13	Head&neck	4916
FAFCAVVDGI	HLA-B13:02	ADAD1	Testis	436	WSDVTPLNF	HLA-A01:01	MMP13	Head&neck	4917
AQGDVSLEI	HLA-B13:02	ADAD1	Testis	437	FAERYLRSYY	HLA-A01:01	MMP13	Head&neck	4918
HQFAQMQRV	HLA-B13:02	ADAD1	Testis	438	LSEEDLQFAERY	HLA-A01:01	MMP13	Head&neck	4919
QQHGYGSWI	HLA-B13:02	ADAD1	Testis	439	FLTKSFWPEL	HLA-A02:01	MMP13	Head&neck	4920
FQSSQVPSF	HLA-B46:01	ADAD1	Testis	440	YLFFQRTHTV	HLA-A02:01	MMP13	Head&neck	4921
LTSKLPMFY	HLA-B46:01	ADAD1	Testis	441	RLIEEDFPGI	HLA-A02:01	MMP13	Head&neck	4922
LSHFIQPVY	HLA-B46:01	ADAD1	Testis	442	SLWSSWDYRL	HLA-A02:01	MMP13	Head&neck	4923
AAKCMSASY	HLA-B46:01	ADAD1	Testis	443	SLSLDAITSL	HLA-A02:01	MMP13	Head&neck	4924
IPKEFIMKY	HLA-B46:01	ADAD1	Testis	444	MQSFFGLEV	HLA-A02:01	MMP13	Head&neck	4925
EAKCKLKSY	HLA-B46:01	ADAD1	Testis	445	LMFPIYTYT	HLA-A02:01	MMP13	Head&neck	4926
SAYPLQMNL	HLA-C01:02	ADAD1	Testis	446	KLDDNTLDV	HLA-A02:01	MMP13	Head&neck	4927
YSSSLAAFI	HLA-C01:02	ADAD1	Testis	447	SLWSSWDYRLYL	HLA-A02:01	MMP13	Head&neck	4928
SLVPSAYPL	HLA-C01:02	ADAD1	Testis	448	FKVWSDVTPL	HLA-A02:01	MMP13	Head&neck	4929
QVPSFAQML	HLA-C01:02	ADAD1	Testis	449	TLLFSGNQV	HLA-A02:01	MMP13	Head&neck	4930
SSPFKSGMSM	HLA-C01:02	ADAD1	Testis	450	RLHIDGIADI	HLA-A02:01	MMP13	Head&neck	4931
AEPVVLSEL	HLA-C01:02	ADAD1	Testis	451	SIWSNRIVRV	HLA-A02:01	MMP13	Head&neck	4932
SAYPLQMNL	HLA-C03:04	ADAD1	Testis	452	GIGDKVDAV	HLA-A02:01	MMP13	Head&neck	4933
SAFEANEEL	HLA-C03:04	ADAD1	Testis	453	SLRGETMIFK	HLA-A03:01	MMP13	Head&neck	4934
VAVEGKIYL	HLA-C03:04	ADAD1	Testis	454	LMFPIYTYTGK	HLA-A03:01	MMP13	Head&neck	4935
FAQMQRVQL	HLA-C03:04	ADAD1	Testis	455	LIFIFRGRK	HLA-A03:01	MMP13	Head&neck	4936
FYSKNPAMM	HLA-C04:01	ADAD1	Testis	456	KISELGLPK	HLA-A03:01	MMP13	Head&neck	4937
RYFYRQLLL	HLA-C04:01	ADAD1	Testis	457	RVMPANSILWC	HLA-A03:01	MMP13	Head&neck	4938
YSSSLAAFI	HLA-C04:01	ADAD1	Testis	458	KISELGLPK	HLA-A11:01	MMP13	Head&neck	4939
PFPAEPVVL	HLA-C04:01	ADAD1	Testis	459	MIFKDRFFWR	HLA-A11:01	MMP13	Head&neck	4940
ALDELLQL	HLA-C04:01	ADAD1	Testis	460	KSFWPELPNR	HLA-A11:01	MMP13	Head&neck	4941
LRYFYRQLL	HLA-C07:01	ADAD1	Testis	461	SIWSNRIVR	HLA-A11:01	MMP13	Head&neck	4942
LRYFYRQLLL	HLA-C07:01	ADAD1	Testis	462	NVFPRTLKWSK	HLA-A11:01	MMP13	Head&neck	4943
RYFYRQLLL	HLA-C07:01	ADAD1	Testis	463	IYFFNGPIQF	HLA-A24:02	MMP13	Head&neck	4944
TRWEVLGVQ	HLA-C07:01	ADAD1	Testis	464	YFFNGPIQF	HLA-A24:02	MMP13	Head&neck	4945
LRYFYRQL	HLA-C07:01	ADAD1	Testis	465	SWDYRLYLF	HLA-A24:02	MMP13	Head&neck	4946

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RRSLLRYF	HLA-C07:01	ADAD1	Testis	466	VWSDVTPLNF	HLA-A24:02	MMP13	Head&neck	4947
LRYFYRQLL	HLA-C07:02	ADAD1	Testis	467	RSYYHPTNLA	HLA-A30:01	MMP13	Head&neck	4948
RYFYRQLLL	HLA-C07:02	ADAD1	Testis	468	RSYYHPTNL	HLA-A30:01	MMP13	Head&neck	4949
FYSKNPAMM	HLA-C07:02	ADAD1	Testis	469	RGRKFWALN	HLA-A30:01	MMP13	Head&neck	4950
IKPDGRVL	HLA-C07:02	ADAD1	Testis	470	LTKSFWPEL	HLA-A30:01	MMP13	Head&neck	4951
HYEGRHIQY	HLA-C07:02	ADAD1	Testis	471	HAFPPGPNY	HLA-A30:01	MMP13	Head&neck	4952
YADQVNIDY	HLA-A01:01	AKAP4	Testis	472	SLRGETMIFK	HLA-A30:01	MMP13	Head&neck	4953
FADSISKGLMVY	HLA-A01:01	AKAP4	Testis	473	MIFKDRFFWR	HLA-A33:03	MMP13	Head&neck	4954
YSVYADQVNIDY	HLA-A01:01	AKAP4	Testis	474	HIMDKDYPR	HLA-A33:03	MMP13	Head&neck	4955
SSENCYSVY	HLA-A01:01	AKAP4	Testis	475	IFKDRFFWR	HLA-A33:03	MMP13	Head&neck	4956
CSIDDLSFY	HLA-A01:01	AKAP4	Testis	476	DLIFIFRGR	HLA-A33:03	MMP13	Head&neck	4957
YSDTTMMSD	HLA-A01:01	AKAP4	Testis	477	DYRLYLFFQR	HLA-A33:03	MMP13	Head&neck	4958
ASQFNVPMLY	HLA-A01:01	AKAP4	Testis	478	EYSIWSNRIVR	HLA-A33:03	MMP13	Head&neck	4959
SIDDLSFYV	HLA-A02:01	AKAP4	Testis	479	FPRTLKWSKM	HLA-B07:02	MMP13	Head&neck	4960
VLMTDSDFV	HLA-A02:01	AKAP4	Testis	480	HPTNLAGIL	HLA-B07:02	MMP13	Head&neck	4961
MMSDDIDWL	HLA-A02:01	AKAP4	Testis	481	RVMPANSIL	HLA-B07:02	MMP13	Head&neck	4962
GQLEKLPQV	HLA-A02:01	AKAP4	Testis	482	YPFDGPSGL	HLA-B07:02	MMP13	Head&neck	4963
YLMNRPQNL	HLA-A02:01	AKAP4	Testis	483	YPFDGPSGLL	HLA-B07:02	MMP13	Head&neck	4964
LLDWLLANL	HLA-A02:01	AKAP4	Testis	484	HPQQVDAEL	HLA-B07:02	MMP13	Head&neck	4965
FIDKLVESV	HLA-A02:01	AKAP4	Testis	485	FRGRKFWAL	HLA-B08:01	MMP13	Head&neck	4966
GLMVYANQV	HLA-A02:01	AKAP4	Testis	486	FIFRGRKFWAL	HLA-B08:01	MMP13	Head&neck	4967
KLVESVMKL	HLA-A02:01	AKAP4	Testis	487	WTHCRALPL	HLA-B08:01	MMP13	Head&neck	4968
QLLDWLLANL	HLA-A02:01	AKAP4	Testis	488	YPKKISEL	HLA-B08:01	MMP13	Head&neck	4969
VLMTDSDFVSAV	HLA-A02:01	AKAP4	Testis	489	TLKWSKMNL	HLA-B08:01	MMP13	Head&neck	4970
MDMSNIVLML	HLA-A02:01	AKAP4	Testis	490	EGYPKKISE	HLA-B08:01	MMP13	Head&neck	4971
WIAASQFNV	HLA-A02:01	AKAP4	Testis	491	REMQSFFGL	HLA-B13:02	MMP13	Head&neck	4972
ALAELEEQA	HLA-A02:01	AKAP4	Testis	492	ADIMISFGI	HLA-B13:02	MMP13	Head&neck	4973
SLEEKEIIV	HLA-A02:01	AKAP4	Testis	493	FEYSIWSNRI	HLA-B13:02	MMP13	Head&neck	4974
SLQKQLQAV	HLA-A02:01	AKAP4	Testis	494	RLHDGIADI	HLA-B13:02	MMP13	Head&neck	4975
ALAELEEQAA	HLA-A02:01	AKAP4	Testis	495	GLPKEVKKI	HLA-B13:02	MMP13	Head&neck	4976
YQDSLGHEV	HLA-A02:01	AKAP4	Testis	496	MQSFFGLEV	HLA-B13:02	MMP13	Head&neck	4977
RISPRTPASK	HLA-A03:01	AKAP4	Testis	497	YTYTGKSHF	HLA-B46:01	MMP13	Head&neck	4978
MMVSLMKTLK	HLA-A03:01	AKAP4	Testis	498	YFFNGPIQF	HLA-B46:01	MMP13	Head&neck	4979
FLYSELSNK	HLA-A03:01	AKAP4	Testis	499	WTHCRALPL	HLA-B46:01	MMP13	Head&neck	4980
SFLYSELSNK	HLA-A03:01	AKAP4	Testis	500	HAFPPGPNY	HLA-B46:01	MMP13	Head&neck	4981
VMKLCLIMAK	HLA-A03:01	AKAP4	Testis	501	GIADIMISF	HLA-B46:01	MMP13	Head&neck	4982
KLLNENPFK	HLA-A03:01	AKAP4	Testis	502	ALMFPIYTY	HLA-B46:01	MMP13	Head&neck	4983
ALSPSTSTCK	HLA-A03:01	AKAP4	Testis	503	SSWDYRLYL	HLA-C01:02	MMP13	Head&neck	4984
SQFNVPMLY	HLA-A03:01	AKAP4	Testis	504	RVMPANSIL	HLA-C01:02	MMP13	Head&neck	4985
ASDMMVSLMK	HLA-A11:01	AKAP4	Testis	505	RSYYHPTNL	HLA-C01:02	MMP13	Head&neck	4986
SQSLSYASLK	HLA-A11:01	AKAP4	Testis	506	VTPLNFTRL	HLA-C01:02	MMP13	Head&neck	4987
ATDIMEAMLK	HLA-A11:01	AKAP4	Testis	507	YTPDMTHSEV	HLA-C01:02	MMP13	Head&neck	4988
QSLSYASLK	HLA-A11:01	AKAP4	Testis	508	VMPANSIL	HLA-C01:02	MMP13	Head&neck	4989

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SSLVIQMAHJK	HLA-A11:01	AKAP4	Testis	509	LSLDAITSL	HLA-C03:04	MMP13	Head&neck	4990
SVMKLCLIMAK	HLA-A11:01	AKAP4	Testis	510	RVMPANSIL	HLA-C03:04	MMP13	Head&neck	4991
SICPSPGNK	HLA-A11:01	AKAP4	Testis	511	WTHCRALPL	HLA-C03:04	MMP13	Head&neck	4992
ASANKPNFR	HLA-A11:01	AKAP4	Testis	512	AAYEHPSHDL	HLA-C03:04	MMP13	Head&neck	4993
VVLKRVLLR	HLA-A11:01	AKAP4	Testis	513	LSWTHCRAL	HLA-C03:04	MMP13	Head&neck	4994
SVLNWLLSDLQK	HLA-A11:01	AKAP4	Testis	514	RYDDTNHIM	HLA-C04:01	MMP13	Head&neck	4995
FYVNRLSSL	HLA-A24:02	AKAP4	Testis	515	WRYDDTNHIM	HLA-C04:01	MMP13	Head&neck	4996
KYALGFQHAL	HLA-A24:02	AKAP4	Testis	516	YPFDGPSGLL	HLA-C04:01	MMP13	Head&neck	4997
SQFNVPMLYF	HLA-A24:02	AKAP4	Testis	517	SWDYRLYLF	HLA-C04:01	MMP13	Head&neck	4998
SFYVNRLSSL	HLA-A24:02	AKAP4	Testis	518	FFNGPIQF	HLA-C04:01	MMP13	Head&neck	4999
FYVNRLSSLV	HLA-A24:02	AKAP4	Testis	519	WRYDDTNHI	HLA-C07:01	MMP13	Head&neck	5000
VYADQVNIDYL	HLA-A24:02	AKAP4	Testis	520	FRGRKFWAL	HLA-C07:01	MMP13	Head&neck	5001
KYSNDGAAL	HLA-A24:02	AKAP4	Testis	521	YFFNGPIQF	HLA-C07:01	MMP13	Head&neck	5002
QFNVPMLYF	HLA-A24:02	AKAP4	Testis	522	RSYYHPTNL	HLA-C07:01	MMP13	Head&neck	5003
NYQDSLGHEVI	HLA-A24:02	AKAP4	Testis	523	SSWDYRLYL	HLA-C07:01	MMP13	Head&neck	5004
VYADQVNI	HLA-A24:02	AKAP4	Testis	524	FNGPIQFEY	HLA-C07:01	MMP13	Head&neck	5005
KSKCLHHSI	HLA-A30:01	AKAP4	Testis	525	YFFNGPIQF	HLA-C07:02	MMP13	Head&neck	5006
RGTRCIHSGA	HLA-A30:01	AKAP4	Testis	526	FRGRKFWAL	HLA-C07:02	MMP13	Head&neck	5007
GTRCIHSGA	HLA-A30:01	AKAP4	Testis	527	LFFQRTHTV	HLA-C07:02	MMP13	Head&neck	5008
KTLKVHSSGK	HLA-A30:01	AKAP4	Testis	528	NRIDAAYEH	HLA-C07:02	MMP13	Head&neck	5009
ASMSNRSDK	HLA-A30:01	AKAP4	Testis	529	GYPKKISEL	HLA-C07:02	MMP13	Head&neck	5010
KERDKGKMK	HLA-A30:01	AKAP4	Testis	530	PTDNQGTDV	HLA-A01:01	PAGE5	Melanoma	5011
GDKDGQLEK	HLA-A30:01	AKAP4	Testis	531	PTDNQGTDVEAF	HLA-A01:01	PAGE5	Melanoma	5012
HTKEIVSDL	HLA-A30:01	AKAP4	Testis	532	GTDVEAFQQELA	HLA-A01:01	PAGE5	Melanoma	5013
RQPDEAVGK	HLA-A30:01	AKAP4	Testis	533	VLEAGEGQL	HLA-A01:01	PAGE5	Melanoma	5014
KEFADSISK	HLA-A30:01	AKAP4	Testis	534	GTDVEAFQQ	HLA-A01:01	PAGE5	Melanoma	5015
EVMKFAKER	HLA-A33:03	AKAP4	Testis	535	FQQELALLKI	HLA-A02:01	PAGE5	Melanoma	5016
MMSDDIDWLR	HLA-A33:03	AKAP4	Testis	536	TLPTFDPTKV	HLA-A02:01	PAGE5	Melanoma	5017
DIDWLRSHR	HLA-A33:03	AKAP4	Testis	537	FQQELALL	HLA-A02:01	PAGE5	Melanoma	5018
SVKQLESHR	HLA-A33:03	AKAP4	Testis	538	VLEAGEGQL	HLA-A02:01	PAGE5	Melanoma	5019
YLMNRPQNLR	HLA-A33:03	AKAP4	Testis	539	GTLPTFDPTKV	HLA-A02:01	PAGE5	Melanoma	5020
DDLSFYVNR	HLA-A33:03	AKAP4	Testis	540	AFQQELALLKI	HLA-A02:01	PAGE5	Melanoma	5021
VNIDYLMNR	HLA-A33:03	AKAP4	Testis	541	KVLEAGEGQL	HLA-A02:01	PAGE5	Melanoma	5022
EAVGKVAR	HLA-A33:03	AKAP4	Testis	542	EAFQQELALLKI	HLA-A02:01	PAGE5	Melanoma	5023
DFVSAVKR	HLA-A33:03	AKAP4	Testis	543	TLPTFDPTKVL	HLA-A02:01	PAGE5	Melanoma	5024
RPQNLRLEM	HLA-B07:02	AKAP4	Testis	544	FQQELALLK	HLA-A02:01	PAGE5	Melanoma	5025
SPRTPASKI	HLA-B07:02	AKAP4	Testis	545	GWAGTREEV	HLA-A02:01	PAGE5	Melanoma	5026
KPTPASVVL	HLA-B07:02	AKAP4	Testis	546	IKNEGAPAV	HLA-A02:01	PAGE5	Melanoma	5027
APSDPVSVL	HLA-B07:02	AKAP4	Testis	547	AVQGTDVEA	HLA-A02:01	PAGE5	Melanoma	5028
NRPQNLRLEM	HLA-B07:02	AKAP4	Testis	548	ALLKIEDA	HLA-A02:01	PAGE5	Melanoma	5029
TPASKIASEM	HLA-B07:02	AKAP4	Testis	549	GTLPTFDPTK	HLA-A03:01	PAGE5	Melanoma	5030
MLKRLVSAL	HLA-B08:01	AKAP4	Testis	550	AFQQELALLK	HLA-A03:01	PAGE5	Melanoma	5031
YLMNRPQNL	HLA-B08:01	AKAP4	Testis	551	GIAPSGEIK	HLA-A03:01	PAGE5	Melanoma	5032

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
AMLKRLVSAL	HLA-B08:01	AKAP4	Testis	552	FQQELALLK	HLA-A03:01	PAGE5	Melanoma	5033
MEAMLKRLVSAL	HLA-B08:01	AKAP4	Testis	553	IVQQPTEEK	HLA-A03:01	PAGE5	Melanoma	5034
YVNRLSSL	HLA-B08:01	AKAP4	Testis	554	GTLPTFDPTK	HLA-A11:01	PAGE5	Melanoma	5035
HDPKCRNQSL	HLA-B08:01	AKAP4	Testis	555	GIAPSGEIK	HLA-A11:01	PAGE5	Melanoma	5036
DPKCRNQSL	HLA-B08:01	AKAP4	Testis	556	IVQQPTEEK	HLA-A11:01	PAGE5	Melanoma	5037
EHILKEGL	HLA-B08:01	AKAP4	Testis	557	FQQELALLK	HLA-A11:01	PAGE5	Melanoma	5038
SDLQKYAL	HLA-B08:01	AKAP4	Testis	558	AFQQELALL	HLA-A24:02	PAGE5	Melanoma	5039
MAYEAVEL	HLA-B08:01	AKAP4	Testis	559	VEAFQQELALL	HLA-A24:02	PAGE5	Melanoma	5040
MDMSNIVLMLI	HLA-B13:02	AKAP4	Testis	560	EAFQQELALL	HLA-A24:02	PAGE5	Melanoma	5041
MDMSNIVLML	HLA-B13:02	AKAP4	Testis	561	VREGTLPTF	HLA-A24:02	PAGE5	Melanoma	5042
MSNIVLMLI	HLA-B13:02	AKAP4	Testis	562	VQGTDVEAF	HLA-A24:02	PAGE5	Melanoma	5043
MDMSNIVLM	HLA-B13:02	AKAP4	Testis	563	GTLPTFDPTK	HLA-A30:01	PAGE5	Melanoma	5044
KMDMSNIVLMLI	HLA-B13:02	AKAP4	Testis	564	VTRSQSSER	HLA-A30:01	PAGE5	Melanoma	5045
HILKEGLTI	HLA-B13:02	AKAP4	Testis	565	SSQPVGPVI	HLA-A30:01	PAGE5	Melanoma	5046
YQDSLGHEV	HLA-B13:02	AKAP4	Testis	566	PTFDPTKVL	HLA-A30:01	PAGE5	Melanoma	5047
GQQDQDRKV	HLA-B13:02	AKAP4	Testis	567	GTREEVRDM	HLA-A30:01	PAGE5	Melanoma	5048
RSHRGVCKV	HLA-B13:02	AKAP4	Testis	568	IVQQPTEEK	HLA-A30:01	PAGE5	Melanoma	5049
GQSAKALSV	HLA-B13:02	AKAP4	Testis	569	VTRSQSSER	HLA-A33:03	PAGE5	Melanoma	5050
MAYSDTTMM	HLA-B46:01	AKAP4	Testis	570	EVRDMSEHVTR	HLA-A33:03	PAGE5	Melanoma	5051
MMAYSDTTM	HLA-B46:01	AKAP4	Testis	571	MQAPWAGNR	HLA-A33:03	PAGE5	Melanoma	5052
YANQVASDM	HLA-B46:01	AKAP4	Testis	572	DMSEHVTR	HLA-A33:03	PAGE5	Melanoma	5053
CSIDDLSFY	HLA-B46:01	AKAP4	Testis	573	APAVQGTDV	HLA-B07:02	PAGE5	Melanoma	5054
YALGFQHAL	HLA-B46:01	AKAP4	Testis	574	LPTFDPTKVL	HLA-B07:02	PAGE5	Melanoma	5055
VASDMMVSL	HLA-B46:01	AKAP4	Testis	575	APWAGNRGWA	HLA-B07:02	PAGE5	Melanoma	5056
LAKDLIVSA	HLA-B46:01	AKAP4	Testis	576	GPDVREGTL	HLA-B07:02	PAGE5	Melanoma	5057
SGKPIPASV	HLA-B46:01	AKAP4	Testis	577	WAGNRGWAG	HLA-B08:01	PAGE5	Melanoma	5058
YSNDGAAL	HLA-B46:01	AKAP4	Testis	578	EAFQQELAL	HLA-B08:01	PAGE5	Melanoma	5059
MMAYSDTTM	HLA-C01:02	AKAP4	Testis	579	WAGNRGWAGT	HLA-B08:01	PAGE5	Melanoma	5060
YALGFQHAL	HLA-C01:02	AKAP4	Testis	580	LALLKIED	HLA-B08:01	PAGE5	Melanoma	5061
YLMNRPQNL	HLA-C01:02	AKAP4	Testis	581	DPTKVLEA	HLA-B08:01	PAGE5	Melanoma	5062
KMDMSNIVL	HLA-C01:02	AKAP4	Testis	582	ELALLKIED	HLA-B08:01	PAGE5	Melanoma	5063
VASDMMVSL	HLA-C01:02	AKAP4	Testis	583	FQQELALLKI	HLA-B13:02	PAGE5	Melanoma	5064
ISPDGECSI	HLA-C01:02	AKAP4	Testis	584	SSQPVGPVI	HLA-B13:02	PAGE5	Melanoma	5065
QAPSDPVSVL	HLA-C01:02	AKAP4	Testis	585	QQELALLKI	HLA-B13:02	PAGE5	Melanoma	5066
QAPSDPVSV	HLA-C01:02	AKAP4	Testis	586	SQPVGPVIV	HLA-B13:02	PAGE5	Melanoma	5067
YSNDGAAL	HLA-C01:02	AKAP4	Testis	587	SSQPVGPVI	HLA-B46:01	PAGE5	Melanoma	5068
AMPQNYQDSL	HLA-C01:02	AKAP4	Testis	588	EAFQQELAL	HLA-B46:01	PAGE5	Melanoma	5069
MAYSDTTMM	HLA-C03:04	AKAP4	Testis	589	GTREEVRDM	HLA-B46:01	PAGE5	Melanoma	5070
YALGFQHAL	HLA-C03:04	AKAP4	Testis	590	DVREGTLPTF	HLA-B46:01	PAGE5	Melanoma	5071
VASDMMVSL	HLA-C03:04	AKAP4	Testis	591	VQGTDVEAF	HLA-B46:01	PAGE5	Melanoma	5072
YANQVASDM	HLA-C03:04	AKAP4	Testis	592	EVRDMSEH	HLA-B46:01	PAGE5	Melanoma	5073
AASQFNVPM	HLA-C03:04	AKAP4	Testis	593	SSQPVGPVI	HLA-C01:02	PAGE5	Melanoma	5074
MAYEAVEL	HLA-C03:04	AKAP4	Testis	594	VLEAGEGQL	HLA-C01:02	PAGE5	Melanoma	5075

peptide	allele	gene	cancer	SEQ
FADSISKGL	HLA-C03:04	AKAP4	Testis	595
YSNDGAAL	HLA-C03:04	AKAP4	Testis	596
YQDSLGHEV	HLA-C04:01	AKAP4	Testis	597
YLMNRPQNL	HLA-C04:01	AKAP4	Testis	598
ASDMMVSLM	HLA-C04:01	AKAP4	Testis	599
FADSISKGL	HLA-C04:01	AKAP4	Testis	600
SIDDLSFYV	HLA-C04:01	AKAP4	Testis	601
KMDMSNIVL	HLA-C04:01	AKAP4	Testis	602
ATDIMEAML	HLA-C04:01	AKAP4	Testis	603
QFNVPMLYF	HLA-C04:01	AKAP4	Testis	604
LLDWLLANL	HLA-C04:01	AKAP4	Testis	605
FVDVSTLNV	HLA-C04:01	AKAP4	Testis	606
KMDMSNIVLM	HLA-C04:01	AKAP4	Testis	607
FYVNRLSSL	HLA-C07:01	AKAP4	Testis	608
YLMNRPQNL	HLA-C07:01	AKAP4	Testis	609
MAYSDTTMM	HLA-C07:01	AKAP4	Testis	610
NRPQNLRLEM	HLA-C07:01	AKAP4	Testis	611
SQFNVPMLY	HLA-C07:01	AKAP4	Testis	612
CRNQSLEF	HLA-C07:01	AKAP4	Testis	613
HRAPGPSTC	HLA-C07:01	AKAP4	Testis	614
SREGGQKSF	HLA-C07:01	AKAP4	Testis	615
HRGVCKVDL	HLA-C07:01	AKAP4	Testis	616
APSDPVSVL	HLA-C07:01	AKAP4	Testis	617
FYVNRLSSL	HLA-C07:02	AKAP4	Testis	618
YLMNRPQNL	HLA-C07:02	AKAP4	Testis	619
SFYVNRLSSL	HLA-C07:02	AKAP4	Testis	620
MAYSDTTMM	HLA-C07:02	AKAP4	Testis	621
NRPQNLRLEM	HLA-C07:02	AKAP4	Testis	622
FYVNRLSSLV	HLA-C07:02	AKAP4	Testis	623
HRAPGPSTC	HLA-C07:02	AKAP4	Testis	624
NRPQNLRL	HLA-C07:02	AKAP4	Testis	625
KYSNDGAAL	HLA-C07:02	AKAP4	Testis	626
MTEAALLLL	HLA-A01:01	ALPPL2	Uterine	627
FLAMDRFPY	HLA-A01:01	ALPPL2	Uterine	628
WLAKHQGARY	HLA-A01:01	ALPPL2	Uterine	629
MTEAALLL	HLA-A01:01	ALPPL2	Uterine	630
RTELLQASL	HLA-A01:01	ALPPL2	Uterine	631
FLAMDRFPYV	HLA-A02:01	ALPPL2	Uterine	632
TFLAMDRFPYV	HLA-A02:01	ALPPL2	Uterine	633
ETFLAMDRFPYV	HLA-A02:01	ALPPL2	Uterine	634
FLAMDRFPYVA	HLA-A02:01	ALPPL2	Uterine	635
FLAMDRFPYVAL	HLA-A02:01	ALPPL2	Uterine	636
TFLAMDRFPYVA	HLA-A02:01	ALPPL2	Uterine	637
AFOQELALL	HLA-C01:02	PAGE5	Melanoma	5076
TLPTFDPTKVL	HLA-C01:02	PAGE5	Melanoma	5077
TLPTFDPTKV	HLA-C01:02	PAGE5	Melanoma	5078
DAPGDGPDV	HLA-C01:02	PAGE5	Melanoma	5079
SSQPVGPVI	HLA-C03:04	PAGE5	Melanoma	5080
EAFQQELAL	HLA-C03:04	PAGE5	Melanoma	5081
VEAFQQELAL	HLA-C03:04	PAGE5	Melanoma	5082
PTFDPTKVL	HLA-C03:04	PAGE5	Melanoma	5083
FQQELALLK	HLA-C04:01	PAGE5	Melanoma	5084
AFQQELALL	HLA-C04:01	PAGE5	Melanoma	5085
VREGTLPTF	HLA-C04:01	PAGE5	Melanoma	5086
TFDPTKVL	HLA-C04:01	PAGE5	Melanoma	5087
TFDPTKVLE	HLA-C04:01	PAGE5	Melanoma	5088
TFDPTKVLEA	HLA-C04:01	PAGE5	Melanoma	5089
VREGTLPTF	HLA-C07:01	PAGE5	Melanoma	5090
SSQPVGPVI	HLA-C07:01	PAGE5	Melanoma	5091
FQQELALLKI	HLA-C07:01	PAGE5	Melanoma	5092
TREEVRDM	HLA-C07:01	PAGE5	Melanoma	5093
KRQEEEPPTD	HLA-C07:01	PAGE5	Melanoma	5094
GDGPPDVREG	HLA-C07:01	PAGE5	Melanoma	5095
VREGTLPTF	HLA-C07:02	PAGE5	Melanoma	5096
AFQQELALL	HLA-C07:02	PAGE5	Melanoma	5097
SSQPVGPVI	HLA-C07:02	PAGE5	Melanoma	5098
TREEVRDM	HLA-C07:02	PAGE5	Melanoma	5099
FQQELALL	HLA-C07:02	PAGE5	Melanoma	5100
FLMKKELDY	HLA-A01:01	PGK2	Testis	5101
MIIGGGMAY	HLA-A01:01	PGK2	Testis	5102
VADKIQLIK	HLA-A01:01	PGK2	Testis	5103
ASIPSIKY	HLA-A01:01	PGK2	Testis	5104
NMEIGASLF	HLA-A01:01	PGK2	Testis	5105
ALMDEIVKA	HLA-A02:01	PGK2	Testis	5106
FLMKKELDYFA	HLA-A02:01	PGK2	Testis	5107
YSLAPVAVEL	HLA-A02:01	PGK2	Testis	5108
SLAPVAVEL	HLA-A02:01	PGK2	Testis	5109
IVWNGPLGV	HLA-A02:01	PGK2	Testis	5110
FLKDCVGAEV	HLA-A02:01	PGK2	Testis	5111
VIMRVDFNV	HLA-A02:01	PGK2	Testis	5112
GFLMKKELDYFA	HLA-A02:01	PGK2	Testis	5113
GMAYTFLKV	HLA-A02:01	PGK2	Testis	5114
KILPGVEAL	HLA-A02:01	PGK2	Testis	5115
CLDNGAKAV	HLA-A02:01	PGK2	Testis	5116
KLDVRGKRV	HLA-A02:01	PGK2	Testis	5117
LLEGKILPGV	HLA-A02:01	PGK2	Testis	5118

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YVWNRTELL	HLA-A02:01	ALPPL2	Uterine	638	ELLEGKILPGV	HLA-A02:01	PGK2	Testis	5119
LLQASLDPSV	HLA-A02:01	ALPPL2	Uterine	639	RVDFNVPMKK	HLA-A03:01	PGK2	Testis	5120
SLMEMTEAALLL	HLA-A02:01	ALPPL2	Uterine	640	IMRVDFNVPMKK	HLA-A03:01	PGK2	Testis	5121
SLMEMTEAALL	HLA-A02:01	ALPPL2	Uterine	641	RIKASIPSIK	HLA-A03:01	PGK2	Testis	5122
KLGPETFLA	HLA-A02:01	ALPPL2	Uterine	642	KVADKIQLIK	HLA-A03:01	PGK2	Testis	5123
LLLLGTATA	HLA-A02:01	ALPPL2	Uterine	643	GVFEWDAFAK	HLA-A03:01	PGK2	Testis	5124
KLGPETFL	HLA-A02:01	ALPPL2	Uterine	644	SLAPVAVELK	HLA-A03:01	PGK2	Testis	5125
ALSKTYSV	HLA-A02:01	ALPPL2	Uterine	645	GVFEWDAFAK	HLA-A11:01	PGK2	Testis	5126
ALSKTYSVDK	HLA-A03:01	ALPPL2	Uterine	646	GGMAYTFLK	HLA-A11:01	PGK2	Testis	5127
GAYAHTVNR	HLA-A03:01	ALPPL2	Uterine	647	KASGFLMKK	HLA-A11:01	PGK2	Testis	5128
AGAYAHTVNR	HLA-A03:01	ALPPL2	Uterine	648	KVADKIQLIK	HLA-A11:01	PGK2	Testis	5129
KLGPETFLAM	HLA-A03:01	ALPPL2	Uterine	649	VWNGPLGVF	HLA-A24:02	PGK2	Testis	5130
ALLLLSRNPR	HLA-A03:01	ALPPL2	Uterine	650	KYSLAPVAV	HLA-A24:02	PGK2	Testis	5131
GAYAHTVNR	HLA-A11:01	ALPPL2	Uterine	651	IGGGMAYTF	HLA-A24:02	PGK2	Testis	5132
AGAYAHTVNR	HLA-A11:01	ALPPL2	Uterine	652	VWNGPLGVFEW	HLA-A24:02	PGK2	Testis	5133
ALSKTYSVDK	HLA-A11:01	ALPPL2	Uterine	653	VRITFPVDF	HLA-A24:02	PGK2	Testis	5134
AALLLLSR	HLA-A11:01	ALPPL2	Uterine	654	RIKASIPSI	HLA-A30:01	PGK2	Testis	5135
EAALLLLSR	HLA-A11:01	ALPPL2	Uterine	655	RIKASIPSIK	HLA-A30:01	PGK2	Testis	5136
RYVWNRTELL	HLA-A24:02	ALPPL2	Uterine	656	KASGFLMKK	HLA-A30:01	PGK2	Testis	5137
AYAHTVNRNW	HLA-A24:02	ALPPL2	Uterine	657	SNKNHAQVV	HLA-A30:01	PGK2	Testis	5138
ARYVWNRTELL	HLA-A24:02	ALPPL2	Uterine	658	KGQDPSGKK	HLA-A30:01	PGK2	Testis	5139
VWNRTELL	HLA-A24:02	ALPPL2	Uterine	659	IVKDIMAK	HLA-A30:01	PGK2	Testis	5140
TFLAMDRF	HLA-A24:02	ALPPL2	Uterine	660	HAQVVAQAR	HLA-A33:03	PGK2	Testis	5141
LSKTYSVDK	HLA-A30:01	ALPPL2	Uterine	661	FAKALENPVR	HLA-A33:03	PGK2	Testis	5142
RVQHASPAGA	HLA-A30:01	ALPPL2	Uterine	662	DVRGKRVIMR	HLA-A33:03	PGK2	Testis	5143
GAYAHTVNR	HLA-A30:01	ALPPL2	Uterine	663	LTLDKLDVR	HLA-A33:03	PGK2	Testis	5144
ALSKTYSVDK	HLA-A30:01	ALPPL2	Uterine	664	LPHKASGFL	HLA-B07:02	PGK2	Testis	5145
KTYSVDKHV	HLA-A30:01	ALPPL2	Uterine	665	NPVRPFLAI	HLA-B07:02	PGK2	Testis	5146
AAHPGPSVV	HLA-A30:01	ALPPL2	Uterine	666	NPVRPFLAIL	HLA-B07:02	PGK2	Testis	5147
YTACDLAPR	HLA-A33:03	ALPPL2	Uterine	667	NPAPGSVIL	HLA-B07:02	PGK2	Testis	5148
LLLLSRNPR	HLA-A33:03	ALPPL2	Uterine	668	NPAPGSVILL	HLA-B07:02	PGK2	Testis	5149
GAYAHTVNR	HLA-A33:03	ALPPL2	Uterine	669	APVAVELKSL	HLA-B07:02	PGK2	Testis	5150
EAALLLLSR	HLA-A33:03	ALPPL2	Uterine	670	MSLSKKLTL	HLA-B08:01	PGK2	Testis	5151
ETFLAMDR	HLA-A33:03	ALPPL2	Uterine	671	FLMKKELDYF	HLA-B08:01	PGK2	Testis	5152
APRAGTTDAA	HLA-B07:02	ALPPL2	Uterine	672	SLSKKLTL	HLA-B08:01	PGK2	Testis	5153
APRAGTTDA	HLA-B07:02	ALPPL2	Uterine	673	SGFLMKKEL	HLA-B08:01	PGK2	Testis	5154
HPGPSVVPAL	HLA-B07:02	ALPPL2	Uterine	674	LENPVRPFLAI	HLA-B13:02	PGK2	Testis	5155
GPSVVPALL	HLA-B07:02	ALPPL2	Uterine	675	LEGKILPGV	HLA-B13:02	PGK2	Testis	5156
FLAMDRFPYV	HLA-B08:01	ALPPL2	Uterine	676	LDYFAKALENPV	HLA-B13:02	PGK2	Testis	5157
FPYVALSKTYSV	HLA-B08:01	ALPPL2	Uterine	677	GQDPSGKKI	HLA-B13:02	PGK2	Testis	5158
VALSKTYSV	HLA-B08:01	ALPPL2	Uterine	678	ALMDEIVKA	HLA-B13:02	PGK2	Testis	5159
YVWNRTELL	HLA-B08:01	ALPPL2	Uterine	679	GMAYTFLKV	HLA-B13:02	PGK2	Testis	5160
TELLQASL	HLA-B08:01	ALPPL2	Uterine	680	MIIGGGMAY	HLA-B46:01	PGK2	Testis	5161

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
MEMTEAALLL	HLA-B13:02	ALPPL2	Uterine	681	MAYTFLKVL	HLA-B46:01	PGK2	Testis	5162
MEMTEAALL	HLA-B13:02	ALPPL2	Uterine	682	FAKGTKALM	HLA-B46:01	PGK2	Testis	5163
MEMTEAALLLL	HLA-B13:02	ALPPL2	Uterine	683	AEPDKIEAF	HLA-B46:01	PGK2	Testis	5164
RQAAEALGA	HLA-B13:02	ALPPL2	Uterine	684	SLAPVAVEL	HLA-B46:01	PGK2	Testis	5165
ALSKTYSV	HLA-B13:02	ALPPL2	Uterine	685	SLAPVAVEL	HLA-C01:02	PGK2	Testis	5166
AAHPGPSVV	HLA-B13:02	ALPPL2	Uterine	686	MAYTFLKVL	HLA-C01:02	PGK2	Testis	5167
FLAMDRFPY	HLA-B46:01	ALPPL2	Uterine	687	YSLAPVAVEL	HLA-C01:02	PGK2	Testis	5168
FLAMDRFPYV	HLA-B46:01	ALPPL2	Uterine	688	ILPGVEAL	HLA-C01:02	PGK2	Testis	5169
YVWNRTELL	HLA-B46:01	ALPPL2	Uterine	689	LAPVAVEL	HLA-C01:02	PGK2	Testis	5170
AAHPGPSVV	HLA-B46:01	ALPPL2	Uterine	690	ISPGWMGL	HLA-C01:02	PGK2	Testis	5171
AAHPGPSV	HLA-B46:01	ALPPL2	Uterine	691	MAYTFLKVL	HLA-C03:04	PGK2	Testis	5172
LAKHQGARY	HLA-B46:01	ALPPL2	Uterine	692	YSLAPVAVEL	HLA-C03:04	PGK2	Testis	5173
YVWNRTELL	HLA-C01:02	ALPPL2	Uterine	693	MSLSKKLTL	HLA-C03:04	PGK2	Testis	5174
LGPETFLAM	HLA-C01:02	ALPPL2	Uterine	694	FAKGTKALM	HLA-C03:04	PGK2	Testis	5175
MTEAALLLL	HLA-C01:02	ALPPL2	Uterine	695	FAKGTKAL	HLA-C03:04	PGK2	Testis	5176
PGPSVVPAL	HLA-C01:02	ALPPL2	Uterine	696	VWNGPLGVF	HLA-C04:01	PGK2	Testis	5177
LAPRAGTTD	HLA-C01:02	ALPPL2	Uterine	697	LENPVRPFL	HLA-C04:01	PGK2	Testis	5178
AAHPGPSVV	HLA-C03:04	ALPPL2	Uterine	698	NMEIGASLF	HLA-C04:01	PGK2	Testis	5179
YVWNRTELL	HLA-C03:04	ALPPL2	Uterine	699	KFDENAQV	HLA-C04:01	PGK2	Testis	5180
FLAMDRFPYV	HLA-C03:04	ALPPL2	Uterine	700	LAPVAVEL	HLA-C04:01	PGK2	Testis	5181
AAHPGPSV	HLA-C03:04	ALPPL2	Uterine	701	VRITFPVDF	HLA-C07:01	PGK2	Testis	5182
DAAHPGPSV	HLA-C03:04	ALPPL2	Uterine	702	MAYTFLKVL	HLA-C07:01	PGK2	Testis	5183
YVWNRTELL	HLA-C04:01	ALPPL2	Uterine	703	VRITFPVDFV	HLA-C07:01	PGK2	Testis	5184
FLAMDRFPYV	HLA-C04:01	ALPPL2	Uterine	704	SLAPVAVEL	HLA-C07:01	PGK2	Testis	5185
MTEAALLLL	HLA-C04:01	ALPPL2	Uterine	705	KRVIMRVD	HLA-C07:01	PGK2	Testis	5186
VWNRTELL	HLA-C04:01	ALPPL2	Uterine	706	LENPVRPF	HLA-C07:01	PGK2	Testis	5187
KLGPETFL	HLA-C04:01	ALPPL2	Uterine	707	VRITFPVDF	HLA-C07:02	PGK2	Testis	5188
YVWNRTELL	HLA-C07:01	ALPPL2	Uterine	708	MAYTFLKVL	HLA-C07:02	PGK2	Testis	5189
FLAMDRFPYV	HLA-C07:01	ALPPL2	Uterine	709	MSLSKKLTL	HLA-C07:02	PGK2	Testis	5190
ARYVWNRTELL	HLA-C07:01	ALPPL2	Uterine	710	VRPFLAIL	HLA-C07:02	PGK2	Testis	5191
HPGPSVVP	HLA-C07:01	ALPPL2	Uterine	711	SLAPVAVEL	HLA-C07:02	PGK2	Testis	5192
YSVDKHVP	HLA-C07:01	ALPPL2	Uterine	712	VTDMCKTEY	HLA-A01:01	PNLIPRP1	Pancreas	5193
HPGPSVVPA	HLA-C07:01	ALPPL2	Uterine	713	WVTDMCKTEY	HLA-A01:01	PNLIPRP1	Pancreas	5194
YVWNRTELL	HLA-C07:02	ALPPL2	Uterine	714	MLDILLTEY	HLA-A01:01	PNLIPRP1	Pancreas	5195
RYVWNRTELL	HLA-C07:02	ALPPL2	Uterine	715	MLDILLVKY	HLA-A01:01	PNLIPRP1	Pancreas	5196
FLAMDRFPYV	HLA-C07:02	ALPPL2	Uterine	716	MLIFWTITL	HLA-A02:01	PNLIPRP1	Pancreas	5197
NRTELLQASL	HLA-C07:02	ALPPL2	Uterine	717	AQMLDILLV	HLA-A02:01	PNLIPRP1	Pancreas	5198
LGPETFLAM	HLA-C07:02	ALPPL2	Uterine	718	GIWAGQVLPV	HLA-A02:01	PNLIPRP1	Pancreas	5199
PGPSVVPAL	HLA-C07:02	ALPPL2	Uterine	719	FLWNNNVINPTL	HLA-A02:01	PNLIPRP1	Pancreas	5200
VSPPNENVAIY	HLA-A01:01	AMY2A	Pancreas	720	LLTEYSYPPSKV	HLA-A02:01	PNLIPRP1	Pancreas	5201
NNDDWSFSL	HLA-A01:01	AMY2A	Pancreas	721	KLFEVEEEV	HLA-A02:01	PNLIPRP1	Pancreas	5202
FNNDDWSFSL	HLA-A01:01	AMY2A	Pancreas	722	QMLDILLV	HLA-A02:01	PNLIPRP1	Pancreas	5203
LTGLLDLAL	HLA-A01:01	AMY2A	Pancreas	723	LIFWTITLFL	HLA-A02:01	PNLIPRP1	Pancreas	5204

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YVDAVINHMC	HLA-A01:01	AMY2A	Pancreas	724	MLIFWTITLFL	HLA-A02:01	PNLIPRP1	Pancreas	5205
RLTGLLDLAL	HLA-A02:01	AMY2A	Pancreas	725	VINPTLPKV	HLA-A02:01	PNLIPRP1	Pancreas	5206
IVFNNDDWSFSL	HLA-A02:01	AMY2A	Pancreas	726	KLDVGTIEKV	HLA-A02:01	PNLIPRP1	Pancreas	5207
RLTGLLDLA	HLA-A02:01	AMY2A	Pancreas	727	KLFEVEEVNC	HLA-A02:01	PNLIPRP1	Pancreas	5208
YLKNWGEGWGFV	HLA-A02:01	AMY2A	Pancreas	728	LLLSDPSTI	HLA-A02:01	PNLIPRP1	Pancreas	5209
FVPSDRALVFV	HLA-A02:01	AMY2A	Pancreas	729	ILNPDGFAA	HLA-A02:01	PNLIPRP1	Pancreas	5210
FVPSDRALV	HLA-A02:01	AMY2A	Pancreas	730	RLDPSDADFV	HLA-A02:01	PNLIPRP1	Pancreas	5211
AVINHMCGNAV	HLA-A02:01	AMY2A	Pancreas	731	GLDPVEASF	HLA-A02:01	PNLIPRP1	Pancreas	5212
AVINHMCGNA	HLA-A02:01	AMY2A	Pancreas	732	AAYPCTSYK	HLA-A03:01	PNLIPRP1	Pancreas	5213
NMYIFRNVV	HLA-A02:01	AMY2A	Pancreas	733	KTEYSYPPSK	HLA-A03:01	PNLIPRP1	Pancreas	5214
HMCGNAVSA	HLA-A02:01	AMY2A	Pancreas	734	LVKYSYPPSK	HLA-A03:01	PNLIPRP1	Pancreas	5215
RLTGLLDL	HLA-A02:01	AMY2A	Pancreas	735	FAAYPCTSYK	HLA-A03:01	PNLIPRP1	Pancreas	5216
VPSDRALVFV	HLA-A02:01	AMY2A	Pancreas	736	NVINPTLPK	HLA-A03:01	PNLIPRP1	Pancreas	5217
FNNDDWSFSL	HLA-A02:01	AMY2A	Pancreas	737	KIGTRFLLY	HLA-A03:01	PNLIPRP1	Pancreas	5218
NNDDWSFSL	HLA-A02:01	AMY2A	Pancreas	738	AAYPCTSYK	HLA-A11:01	PNLIPRP1	Pancreas	5219
NWGEGWGFV	HLA-A02:01	AMY2A	Pancreas	739	NVINPTLPK	HLA-A11:01	PNLIPRP1	Pancreas	5220
RQIRNMVIFR	HLA-A03:01	AMY2A	Pancreas	740	STHSYEFDAK	HLA-A11:01	PNLIPRP1	Pancreas	5221
TGLLDLALEK	HLA-A03:01	AMY2A	Pancreas	741	KILPWSPEK	HLA-A11:01	PNLIPRP1	Pancreas	5222
RLTGLLDLALEK	HLA-A03:01	AMY2A	Pancreas	742	AYPCTSYKSF	HLA-A24:02	PNLIPRP1	Pancreas	5223
AIYNPFRPW	HLA-A03:01	AMY2A	Pancreas	743	SYKYYLESI	HLA-A24:02	PNLIPRP1	Pancreas	5224
QIRNMVIFR	HLA-A03:01	AMY2A	Pancreas	744	SYPPSKVHLI	HLA-A24:02	PNLIPRP1	Pancreas	5225
AIYNPFRPWW	HLA-A03:01	AMY2A	Pancreas	745	SYPPSKVHL	HLA-A24:02	PNLIPRP1	Pancreas	5226
TGLLDLALEK	HLA-A11:01	AMY2A	Pancreas	746	YYLESILNPDGF	HLA-A24:02	PNLIPRP1	Pancreas	5227
RQIRNMVIFR	HLA-A11:01	AMY2A	Pancreas	747	AAYPCTSYK	HLA-A30:01	PNLIPRP1	Pancreas	5228
LTGLLDLALEK	HLA-A11:01	AMY2A	Pancreas	748	RSRMPTDGS	HLA-A30:01	PNLIPRP1	Pancreas	5229
AIYNPFRPWWER	HLA-A11:01	AMY2A	Pancreas	749	KTEYSYPPSK	HLA-A30:01	PNLIPRP1	Pancreas	5230
AIYNPFRPW	HLA-A11:01	AMY2A	Pancreas	750	KVKFLWNNN	HLA-A30:01	PNLIPRP1	Pancreas	5231
QVIDLGGEPIK	HLA-A11:01	AMY2A	Pancreas	751	KILPWSPEK	HLA-A30:01	PNLIPRP1	Pancreas	5232
NVAIYNPFR	HLA-A11:01	AMY2A	Pancreas	752	SYKSFESDK	HLA-A30:01	PNLIPRP1	Pancreas	5233
IYNPFRPWW	HLA-A24:02	AMY2A	Pancreas	753	NTHQYSIFR	HLA-A33:03	PNLIPRP1	Pancreas	5234
VFNNDDWSF	HLA-A24:02	AMY2A	Pancreas	754	HYADKFAGR	HLA-A33:03	PNLIPRP1	Pancreas	5235
RQIRNMVIF	HLA-A24:02	AMY2A	Pancreas	755	DFVACNHLR	HLA-A33:03	PNLIPRP1	Pancreas	5236
NYNDATQVI	HLA-A24:02	AMY2A	Pancreas	756	EASNFARWR	HLA-A33:03	PNLIPRP1	Pancreas	5237
RWRQIRNMVI	HLA-A30:01	AMY2A	Pancreas	757	EPWGGTAIR	HLA-A33:03	PNLIPRP1	Pancreas	5238
RQIRNMVIFR	HLA-A30:01	AMY2A	Pancreas	758	MPGCKKNAL	HLA-B07:02	PNLIPRP1	Pancreas	5239
QVRDCRLTG	HLA-A30:01	AMY2A	Pancreas	759	TPGLSRITGL	HLA-B07:02	PNLIPRP1	Pancreas	5240
RNMVIFRNV	HLA-A30:01	AMY2A	Pancreas	760	SPEKIGTRFL	HLA-B07:02	PNLIPRP1	Pancreas	5241
AIYNPFRPW	HLA-A30:01	AMY2A	Pancreas	761	APLIPFLGF	HLA-B07:02	PNLIPRP1	Pancreas	5242
WSFSLTLQT	HLA-A30:01	AMY2A	Pancreas	762	NPNNFQILL	HLA-B07:02	PNLIPRP1	Pancreas	5243
QIRNMVIFR	HLA-A33:03	AMY2A	Pancreas	763	MPGCKKNAL	HLA-B08:01	PNLIPRP1	Pancreas	5244
NVAIYNPFR	HLA-A33:03	AMY2A	Pancreas	764	HLRSYKYYL	HLA-B08:01	PNLIPRP1	Pancreas	5245
YNPFRPWWER	HLA-A33:03	AMY2A	Pancreas	765	FARWRYGVSI	HLA-B08:01	PNLIPRP1	Pancreas	5246

peptide	allele	gene	cancer	SEQ
TYNPFRPWVER	HLA-A33:03	AMY2A	Pancreas	766
VPSDRALVF	HLA-B07:02	AMY2A	Pancreas	767
FVPSDRALVF	HLA-B07:02	AMY2A	Pancreas	768
QVRDCRLTGL	HLA-B07:02	AMY2A	Pancreas	769
VPSDRALV	HLA-B07:02	AMY2A	Pancreas	770
VPSDRALVFV	HLA-B07:02	AMY2A	Pancreas	771
WRQIRNMVI	HLA-B08:01	AMY2A	Pancreas	772
WRQIRNMVIF	HLA-B08:01	AMY2A	Pancreas	773
QVRDCRLTGL	HLA-B08:01	AMY2A	Pancreas	774
DATQVIDL	HLA-B08:01	AMY2A	Pancreas	775
VPSDRALVF	HLA-B08:01	AMY2A	Pancreas	776
TGLLDLAL	HLA-B08:01	AMY2A	Pancreas	777
RNMVIFRNV	HLA-B13:02	AMY2A	Pancreas	778
FNNDDWSFSLTL	HLA-B13:02	AMY2A	Pancreas	779
NDDWSFSLTL	HLA-B13:02	AMY2A	Pancreas	780
RQIRNMVI	HLA-B13:02	AMY2A	Pancreas	781
RQIRNMVIF	HLA-B13:02	AMY2A	Pancreas	782
RLTGLLDL	HLA-B13:02	AMY2A	Pancreas	783
FVPSDRALVF	HLA-B46:01	AMY2A	Pancreas	784
RQIRNMVIF	HLA-B46:01	AMY2A	Pancreas	785
AIYNPFRPW	HLA-B46:01	AMY2A	Pancreas	786
VFNNDDWSF	HLA-B46:01	AMY2A	Pancreas	787
FNNDDWSF	HLA-B46:01	AMY2A	Pancreas	788
FVPSDRALV	HLA-C01:02	AMY2A	Pancreas	789
FVPSDRALVF	HLA-C01:02	AMY2A	Pancreas	790
LTGLLDLAL	HLA-C01:02	AMY2A	Pancreas	791
FVPSDRAL	HLA-C01:02	AMY2A	Pancreas	792
FVPSDRALVF	HLA-C03:04	AMY2A	Pancreas	793
VPSDRALVF	HLA-C03:04	AMY2A	Pancreas	794
FVPSDRALV	HLA-C03:04	AMY2A	Pancreas	795
AIYNPFRPW	HLA-C03:04	AMY2A	Pancreas	796
FVPSDRAL	HLA-C03:04	AMY2A	Pancreas	797
GFVPSDRAL	HLA-C03:04	AMY2A	Pancreas	798
NYNDATQVI	HLA-C04:01	AMY2A	Pancreas	799
FVPSDRALVF	HLA-C04:01	AMY2A	Pancreas	800
WRQIRNMVI	HLA-C04:01	AMY2A	Pancreas	801
VFNNDDWSF	HLA-C04:01	AMY2A	Pancreas	802
NNDDWSFSL	HLA-C04:01	AMY2A	Pancreas	803
WRQIRNMVI	HLA-C07:01	AMY2A	Pancreas	804
CRLTGLLDL	HLA-C07:01	AMY2A	Pancreas	805
NYNDATQVI	HLA-C07:01	AMY2A	Pancreas	806

peptide	allele	gene	cancer	SEQ
TGQIKVAL	HLA-B08:01	PNLIPRP1	Pancreas	5247
YPPSKVHL	HLA-B08:01	PNLIPRP1	Pancreas	5248
SDADFVDVI	HLA-B13:02	PNLIPRP1	Pancreas	5249
AQMLDILLV	HLA-B13:02	PNLIPRP1	Pancreas	5250
YNFCSEDTV	HLA-B13:02	PNLIPRP1	Pancreas	5251
HQYSIFRGI	HLA-B13:02	PNLIPRP1	Pancreas	5252
TQAANNVRV	HLA-B13:02	PNLIPRP1	Pancreas	5253
FAAYPCTSY	HLA-B46:01	PNLIPRP1	Pancreas	5254
FVACNHLRSY	HLA-B46:01	PNLIPRP1	Pancreas	5255
YSYPPSKVH	HLA-B46:01	PNLIPRP1	Pancreas	5256
ILKPGSTHSY	HLA-B46:01	PNLIPRP1	Pancreas	5257
VACNHLRSY	HLA-B46:01	PNLIPRP1	Pancreas	5258
AAYPCTSY	HLA-B46:01	PNLIPRP1	Pancreas	5259
YSYPPSKVHL	HLA-C01:02	PNLIPRP1	Pancreas	5260
VLPVSRSRM	HLA-C01:02	PNLIPRP1	Pancreas	5261
FFPNGGESM	HLA-C01:02	PNLIPRP1	Pancreas	5262
SMPGCKKNAL	HLA-C01:02	PNLIPRP1	Pancreas	5263
YSYPPSKVHL	HLA-C03:04	PNLIPRP1	Pancreas	5264
HSYEFDAKL	HLA-C03:04	PNLIPRP1	Pancreas	5265
FAAYPCTSY	HLA-C03:04	PNLIPRP1	Pancreas	5266
YSYPPSKVH	HLA-C03:04	PNLIPRP1	Pancreas	5267
TAIRPLKIL	HLA-C03:04	PNLIPRP1	Pancreas	5268
FFPNGGESM	HLA-C04:01	PNLIPRP1	Pancreas	5269
RLDPSDADF	HLA-C04:01	PNLIPRP1	Pancreas	5270
GLDPVEASF	HLA-C04:01	PNLIPRP1	Pancreas	5271
SYPPSKVHL	HLA-C04:01	PNLIPRP1	Pancreas	5272
IFWTITTLFL	HLA-C04:01	PNLIPRP1	Pancreas	5273
SFESTPEEV	HLA-C04:01	PNLIPRP1	Pancreas	5274
WRYGVSITL	HLA-C07:01	PNLIPRP1	Pancreas	5275
VREDTLLTL	HLA-C07:01	PNLIPRP1	Pancreas	5276
ARWRYGVSI	HLA-C07:01	PNLIPRP1	Pancreas	5277
SRMPTDGSL	HLA-C07:01	PNLIPRP1	Pancreas	5278
RSYKYYLES	HLA-C07:01	PNLIPRP1	Pancreas	5279
WRYGVSITL	HLA-C07:02	PNLIPRP1	Pancreas	5280
FFPNGGESM	HLA-C07:02	PNLIPRP1	Pancreas	5281
VREDTLLTL	HLA-C07:02	PNLIPRP1	Pancreas	5282
SYPPSKVHL	HLA-C07:02	PNLIPRP1	Pancreas	5283
SRMPTDGSL	HLA-C07:02	PNLIPRP1	Pancreas	5284
GTDPNIPDEY	HLA-A01:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5285
LMAKALLLY	HLA-A01:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5286
SDVDIRKDLY	HLA-A01:01	POTEE	Colorectal;Uterine	5287

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
IRNMVIFRN	HLA-C07:01	AMY2A	Pancreas	807	LSDYKEKQMPKY	HLA-A01:01	POTEE	Colorectal;Uterine	5288
CRLTGLLD	HLA-C07:01	AMY2A	Pancreas	808	MKSDVDIRKDLY	HLA-A01:01	POTEE	Colorectal;Uterine	5289
NNDDWSFSL	HLA-C07:01	AMY2A	Pancreas	809	KSDVDIRKDLY	HLA-A01:01	POTEE	Colorectal;Uterine	5290
WRQIRNMVI	HLA-C07:02	AMY2A	Pancreas	810	FPDTENEEY	HLA-A01:01	POTEE	Colorectal;Uterine	5291
CRLTGLLDL	HLA-C07:02	AMY2A	Pancreas	811	FPDNESEEY	HLA-A01:01	POTEE	Colorectal;Uterine	5292
NYNDATQVI	HLA-C07:02	AMY2A	Pancreas	812	GLTPLLLGV	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5293
FVPSDRAL	HLA-C07:02	AMY2A	Pancreas	813	LLLEQNIDV	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5294
VPSDRALVF	HLA-C07:02	AMY2A	Pancreas	814	GLLENLTNGV	HLA-A02:01	POTEE	Colorectal;Uterine	5295
MNVDVSSTIY	HLA-A01:01	ANKRD30A	Breast	815	KLMAKALLL	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5296
NVDVSSTIY	HLA-A01:01	ANKRD30A	Breast	816	ALAPSMMKI	HLA-A02:01	POTEE	Colorectal;Uterine	5297
LVDVYGNTALHY	HLA-A01:01	ANKRD30A	Breast	817	YLEDIESV	HLA-A02:01	POTEE	Colorectal;Uterine	5298
KMNVDVSSTIY	HLA-A01:01	ANKRD30A	Breast	818	HGLTPLLLGV	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5299
GADINLVDVY	HLA-A01:01	ANKRD30A	Breast	819	TMDDDTAVL	HLA-A02:01	POTEE	Colorectal;Uterine	5300
RKMNVDVSSTIY	HLA-A01:01	ANKRD30A	Breast	820	FLIKKKANLNAL	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5301
PSESKQKDY	HLA-A01:01	ANKRD30A	Breast	821	ALFQPCFLGM	HLA-A02:01	POTEE	Colorectal;Uterine	5302
TIDIHFLER	HLA-A01:01	ANKRD30A	Breast	822	RMQKEIAAL	HLA-A02:01	POTEE	Colorectal;Uterine	5303
YSCDSRSLF	HLA-A01:01	ANKRD30A	Breast	823	LLENLTNGV	HLA-A02:01	POTEE	Colorectal;Uterine	5304
YLLHENCML	HLA-A02:01	ANKRD30A	Breast	824	TMDDDTAVLV	HLA-A02:01	POTEE	Colorectal;Uterine	5305
AVYSEILSV	HLA-A02:01	ANKRD30A	Breast	825	RELPDYLMKI	HLA-A02:01	POTEE	Colorectal;Uterine	5306
SLSKILDTV	HLA-A02:01	ANKRD30A	Breast	826	LLLDRRCQLNV	HLA-A02:01	POTEE	Colorectal;Uterine	5307
SLDQKLFQL	HLA-A02:01	ANKRD30A	Breast	827	KYLEDIESV	HLA-A02:01	POTEE	Colorectal;Uterine	5308
SLTPLLLSI	HLA-A02:01	ANKRD30A	Breast	828	TLREEIAML	HLA-A02:01	POTEE	Colorectal;Uterine	5309
YAVYSEILSV	HLA-A02:01	ANKRD30A	Breast	829	FLIKKKANL	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5310
NMWLQQQLV	HLA-A02:01	ANKRD30A	Breast	830	ILIHEEKQIEV	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5311
LLSHGAVIEV	HLA-A02:01	ANKRD30A	Breast	831	GLLENLTNG	HLA-A02:01	POTEE	Colorectal;Uterine	5312
SLFESSAKI	HLA-A02:01	ANKRD30A	Breast	832	LLLDRRCQL	HLA-A02:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5313
KLLSHGAVIEV	HLA-A02:01	ANKRD30A	Breast	833	KLMAKALLLY	HLA-A03:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5314
FLKAPCRMKV	HLA-A02:01	ANKRD30A	Breast	834	TMYPGMAHRMQK	HLA-A03:01	POTEE	Colorectal;Uterine	5315
FLLIKNANA	HLA-A02:01	ANKRD30A	Breast	835	AIYNEDKLMAK	HLA-A03:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5316
AVYSEILSVV	HLA-A02:01	ANKRD30A	Breast	836	GMMGGMHQK	HLA-A03:01	POTEE	Colorectal;Uterine	5317
ASLTPLLLSI	HLA-A02:01	ANKRD30A	Breast	837	KTLRSKMGK	HLA-A03:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5318
ILIDSGADINLV	HLA-A02:01	ANKRD30A	Breast	838	RHAPPKRK	HLA-A03:01	POTEE	Colorectal;Uterine	5319
VLIAENTML	HLA-A02:01	ANKRD30A	Breast	839	ILLTEAPLNPK	HLA-A03:01	POTEE	Colorectal;Uterine	5320

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ILIDSGADINL	HLA-A02:01	ANKRD30A	Breast	840	ALFQPCFLGM	HLA-A03:01	POTEE	Colorectal;Uterine	5321
SLFESSAKIQV	HLA-A02:01	ANKRD30A	Breast	841	AALAPSMMK	HLA-A11:01	POTEE	Colorectal;Uterine	5322
ILKEKNAEL	HLA-A02:01	ANKRD30A	Breast	842	SAMKTLRNK	HLA-A11:01	POTEE	Colorectal;Uterine	5323
ILIDSGADI	HLA-A02:01	ANKRD30A	Breast	843	SAMKTLRSK	HLA-A11:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5324
ILNEKIREEL	HLA-A02:01	ANKRD30A	Breast	844	QVVKFLIKK	HLA-A11:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5325
IMEYIRKLSK	HLA-A03:01	ANKRD30A	Breast	845	GMMGGMHQK	HLA-A11:01	POTEE	Colorectal;Uterine	5326
KMQIHILLKEK	HLA-A03:01	ANKRD30A	Breast	846	RSQEPEINK	HLA-A11:01	POTEE	Colorectal;Uterine	5327
RMKVSIPTK	HLA-A03:01	ANKRD30A	Breast	847	AIYNEDKLMAK	HLA-A11:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5328
LELMDMQTFK	HLA-A03:01	ANKRD30A	Breast	848	RYGRTALIL	HLA-A24:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5329
LLHENCMLKK	HLA-A03:01	ANKRD30A	Breast	849	MYPGMAHRM	HLA-A24:02	POTEE	Colorectal;Uterine	5330
KALELMDMQTFK	HLA-A03:01	ANKRD30A	Breast	850	KYLEDIESV	HLA-A24:02	POTEE	Colorectal;Uterine	5331
KVLEKGRSK	HLA-A03:01	ANKRD30A	Breast	851	KYPMFHGII	HLA-A24:02	POTEE	Colorectal;Uterine	5332
ELMDMQTFK	HLA-A03:01	ANKRD30A	Breast	852	EYHRICELL	HLA-A24:02	POTEE	Colorectal;Uterine	5333
SLCETVSQK	HLA-A03:01	ANKRD30A	Breast	853	ILTERGYRF	HLA-A24:02	POTEE	Colorectal;Uterine	5334
RIYQYEKEK	HLA-A03:01	ANKRD30A	Breast	854	KIRIIAPPK	HLA-A30:01	POTEE	Colorectal;Uterine	5335
KLEDSTSLSK	HLA-A03:01	ANKRD30A	Breast	855	KTLRSKMGK	HLA-A30:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5336
AVYSEILSVVAK	HLA-A03:01	ANKRD30A	Breast	856	KTLRNKMGK	HLA-A30:01	POTEE	Colorectal;Uterine	5337
CVARVTSNK	HLA-A11:01	ANKRD30A	Breast	857	RTALHLASA	HLA-A30:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5338
RSLFESSAK	HLA-A11:01	ANKRD30A	Breast	858	RYGRTALILA	HLA-A30:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5339
LELMDMQTFK	HLA-A11:01	ANKRD30A	Breast	859	RSQEPEINK	HLA-A30:01	POTEE	Colorectal;Uterine	5340
SVPNKAFELK	HLA-A11:01	ANKRD30A	Breast	860	VVKFLIKKK	HLA-A30:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5341
ATLKHQYQEK	HLA-A11:01	ANKRD30A	Breast	861	HQKESYYGK	HLA-A30:01	POTEE	Colorectal;Uterine	5342
ITIDIHFLERK	HLA-A11:01	ANKRD30A	Breast	862	MLRDTDVNK	HLA-A30:01	POTEE	Colorectal;Uterine	5343
VCIPESIYQK	HLA-A11:01	ANKRD30A	Breast	863	SVKKPFGLR	HLA-A33:03	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5344
ITIDIHFLER	HLA-A11:01	ANKRD30A	Breast	864	TMYPGMAHR	HLA-A33:03	POTEE	Colorectal;Uterine	5345
AVIEVHNK	HLA-A11:01	ANKRD30A	Breast	865	TTMYPGMAHR	HLA-A33:03	POTEE	Colorectal;Uterine	5346
QVCIPESIYQK	HLA-A11:01	ANKRD30A	Breast	866	AAWWGKVPR	HLA-A33:03	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5347
AVYSEILSVVAK	HLA-A11:01	ANKRD30A	Breast	867	NALPHATLR	HLA-A33:03	POTEE	Colorectal;Uterine	5348
CIPESIYQK	HLA-A11:01	ANKRD30A	Breast	868	NSNPENVSR	HLA-A33:03	POTEE	Colorectal;Uterine	5349
KYKCTALML	HLA-A24:02	ANKRD30A	Breast	869	EVVKLLLDR	HLA-A33:03	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5350
VYSEILSVV	HLA-A24:02	ANKRD30A	Breast	870	ENSNPENVSR	HLA-A33:03	POTEE	Colorectal;Uterine	5351
HYAVYSEIL	HLA-A24:02	ANKRD30A	Breast	871	KPFGLRSKM	HLA-B07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5352

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
IYQKVMEI	HLA-A24:02	ANKRD30A	Breast	872	VPRKDLIVM	HLA-B07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5353
QYSGQLKVLI	HLA-A24:02	ANKRD30A	Breast	873	RPRQQGMM	HLA-B07:02	POTEE	Colorectal;Uterine	5354
HYAVTCGFHHI	HLA-A24:02	ANKRD30A	Breast	874	VPIYEGNAL	HLA-B07:02	POTEE	Colorectal;Uterine	5355
QYQEKENKYF	HLA-A24:02	ANKRD30A	Breast	875	RPRQQGMMGGM	HLA-B07:02	POTEE	Colorectal;Uterine	5356
EYSCDSRSLF	HLA-A24:02	ANKRD30A	Breast	876	IPDEYGNTTL	HLA-B07:02	POTEE	Colorectal;Uterine	5357
QYSGQLKVL	HLA-A24:02	ANKRD30A	Breast	877	APEEHPILL	HLA-B07:02	POTEE	Colorectal;Uterine	5358
RMKVSIPTK	HLA-A30:01	ANKRD30A	Breast	878	VPRKDLIVML	HLA-B07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5359
RSKMIACPTK	HLA-A30:01	ANKRD30A	Breast	879	FLIKKKANL	HLA-B08:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5360
GMKVSIPTK	HLA-A30:01	ANKRD30A	Breast	880	LLLDRRCQL	HLA-B08:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5361
RSKMIACPT	HLA-A30:01	ANKRD30A	Breast	881	MMKIRIIAP	HLA-B08:01	POTEE	Colorectal;Uterine	5362
AQRKSKSLK	HLA-A30:01	ANKRD30A	Breast	882	VLDNKKRTAL	HLA-B08:01	POTEE	Colorectal;Uterine	5363
KSKSLKINL	HLA-A30:01	ANKRD30A	Breast	883	FLIKKKANLNAL	HLA-B08:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5364
KLKEESLTK	HLA-A30:01	ANKRD30A	Breast	884	MMKIRILA	HLA-B08:01	POTEE	Colorectal;Uterine	5365
SQKDVCLPK	HLA-A30:01	ANKRD30A	Breast	885	APPKRKYSV	HLA-B08:01	POTEE	Colorectal;Uterine	5366
SQKDVCVPK	HLA-A30:01	ANKRD30A	Breast	886	DYKEKQML	HLA-B08:01	POTEG; POTEE	Colorectal;Prostate;Uterine	5367
SLRETVSQK	HLA-A30:01	ANKRD30A	Breast	887	ESKNKHGL	HLA-B08:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5368
KVLEKGRSK	HLA-A30:01	ANKRD30A	Breast	888	EEYHRICEL	HLA-B08:01	POTEE	Colorectal;Uterine	5369
ITIDIHFLER	HLA-A33:03	ANKRD30A	Breast	889	RELENFMAI	HLA-B13:02	POTEE	Colorectal;Uterine	5370
FTWAAKGRPR	HLA-A33:03	ANKRD30A	Breast	890	RELPDYLMKI	HLA-B13:02	POTEE	Colorectal;Uterine	5371
FTWPAKGRPR	HLA-A33:03	ANKRD30A	Breast	891	KQQVVKFLI	HLA-B13:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5372
NSWDSESLR	HLA-A33:03	ANKRD30A	Breast	892	REYAVSSHHHVI	HLA-B13:02	POTEE	Colorectal;Uterine	5373
TVHSCERAR	HLA-A33:03	ANKRD30A	Breast	893	DRELENFMAI	HLA-B13:02	POTEE	Colorectal;Uterine	5374
NTLVSEHAQR	HLA-A33:03	ANKRD30A	Breast	894	ALAPSMMKI	HLA-B13:02	POTEE	Colorectal;Uterine	5375
NYNNHLKNR	HLA-A33:03	ANKRD30A	Breast	895	ELPDYLMKI	HLA-B13:02	POTEE	Colorectal;Uterine	5376
DEAAPLVER	HLA-A33:03	ANKRD30A	Breast	896	GLTPLLLGV	HLA-B13:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5377
EAAPLVER	HLA-A33:03	ANKRD30A	Breast	897	KQIEVVEKM	HLA-B13:02	POTEE	Colorectal;Uterine	5378
IFNYNNHLKNR	HLA-A33:03	ANKRD30A	Breast	898	YSVWVGGSI	HLA-B46:01	POTEE	Colorectal;Uterine	5379
FNYNNHLKNR	HLA-A33:03	ANKRD30A	Breast	899	LMAKALLLY	HLA-B46:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5380
TPREITSPA	HLA-B07:02	ANKRD30A	Breast	900	IAALAPSMM	HLA-B46:01	POTEE	Colorectal;Uterine	5381
KPSAFKPAI	HLA-B07:02	ANKRD30A	Breast	901	YAIYNEDKL	HLA-B46:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5382
HPRLASAV	HLA-B07:02	ANKRD30A	Breast	902	VAIQAVPSL	HLA-B46:01	POTEE	Colorectal;Uterine	5383
TPREIMSPA	HLA-B07:02	ANKRD30A	Breast	903	IIAPPKRKY	HLA-B46:01	POTEE	Colorectal;Uterine	5384

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
WPAKGRPRKI	HLA-B07:02	ANKRD30A	Breast	904	TAREYAVSS	HLA-B46:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5385
VPKATHQKEM	HLA-B07:02	ANKRD30A	Breast	905	INKDGDREL	HLA-B46:01	POTEE	Colorectal;Uterine	5386
KPSAFEPAI	HLA-B07:02	ANKRD30A	Breast	906	TMYPGMAH	HLA-B46:01	POTEE	Colorectal;Uterine	5387
TPDEAASL	HLA-B07:02	ANKRD30A	Breast	907	SQRFKGSEN	HLA-B46:01	POTEE	Colorectal;Uterine	5388
VPNKALEL	HLA-B07:02	ANKRD30A	Breast	908	TMDDDTAVL	HLA-C01:02	POTEE	Colorectal;Uterine	5389
EPPGKPSAF	HLA-B07:02	ANKRD30A	Breast	909	ALPHATLRL	HLA-C01:02	POTEE	Colorectal;Uterine	5390
QMKKKFCVL	HLA-B08:01	ANKRD30A	Breast	910	RMQKEIAAL	HLA-C01:02	POTEE	Colorectal;Uterine	5391
MEQMKKKFCVL	HLA-B08:01	ANKRD30A	Breast	911	VAIQAVPSL	HLA-C01:02	POTEE	Colorectal;Uterine	5392
KMEQMKKKFCVL	HLA-B08:01	ANKRD30A	Breast	912	KLMAKALLL	HLA-C01:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5393
MKKKFCVL	HLA-B08:01	ANKRD30A	Breast	913	TVPIYEGNAL	HLA-C01:02	POTEE	Colorectal;Uterine	5394
EQMKKKFCVL	HLA-B08:01	ANKRD30A	Breast	914	VAPEEHPIL	HLA-C01:02	POTEE	Colorectal;Uterine	5395
MLKLEIATL	HLA-B08:01	ANKRD30A	Breast	915	NIPDEYGNTTL	HLA-C01:02	POTEE	Colorectal;Uterine	5396
MEQMKKKFCVLK	HLA-B08:01	ANKRD30A	Breast	916	SQPEKMSQEL	HLA-C01:02	POTEE	Colorectal;Uterine	5397
TLKLKEESL	HLA-B08:01	ANKRD30A	Breast	917	VAIQAVPSL	HLA-C03:04	POTEE	Colorectal;Uterine	5398
ILKEKNAEL	HLA-B08:01	ANKRD30A	Breast	918	IAALAPSMM	HLA-C03:04	POTEE	Colorectal;Uterine	5399
VNKYKCTAL	HLA-B08:01	ANKRD30A	Breast	919	YAVSSHHHV	HLA-C03:04	POTEE	Colorectal;Uterine	5400
EVHNKASL	HLA-B08:01	ANKRD30A	Breast	920	YSVWVGGSI	HLA-C03:04	POTEE	Colorectal;Uterine	5401
EAQRKSKSL	HLA-B08:01	ANKRD30A	Breast	921	YAIYNEDKL	HLA-C03:04	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5402
SEQIVEFLLI	HLA-B13:02	ANKRD30A	Breast	922	IAMLRLEL	HLA-C03:04	POTEE	Colorectal;Uterine	5403
KEIAMLKLEI	HLA-B13:02	ANKRD30A	Breast	923	NALPHATL	HLA-C03:04	POTEE	Colorectal;Uterine	5404
QEACANILI	HLA-B13:02	ANKRD30A	Breast	924	TMDDDTAVL	HLA-C04:01	POTEE	Colorectal;Uterine	5405
HEEVVTFLV	HLA-B13:02	ANKRD30A	Breast	925	MYPGMAHRM	HLA-C04:01	POTEE	Colorectal;Uterine	5406
HQEACANILI	HLA-B13:02	ANKRD30A	Breast	926	RLDLAGREL	HLA-C04:01	POTEE	Colorectal;Uterine	5407
SQYSGQLKV	HLA-B13:02	ANKRD30A	Breast	927	LFQPCFLGM	HLA-C04:01	POTEE	Colorectal;Uterine	5408
EQIVEFLLI	HLA-B13:02	ANKRD30A	Breast	928	WGDYDDSAF	HLA-C04:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5409
AVYSEILSV	HLA-B13:02	ANKRD30A	Breast	929	DYDDSAFM	HLA-C04:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5410
EQHRKELEV	HLA-B13:02	ANKRD30A	Breast	930	MDDDTAVLV	HLA-C04:01	POTEE	Colorectal;Uterine	5411
KQDKEILEA	HLA-B13:02	ANKRD30A	Breast	931	DRYGRTALI	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5412
SQLENQKV	HLA-B13:02	ANKRD30A	Breast	932	LDRYGRTALI	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5413
SAFEPATEM	HLA-B46:01	ANKRD30A	Breast	933	HRAAWWGKV	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5414
SAFEPAIEM	HLA-B46:01	ANKRD30A	Breast	934	HRMQKEIAAL	HLA-C07:01	POTEE	Colorectal;Uterine	5415
YSCDSRSLF	HLA-B46:01	ANKRD30A	Breast	935	MYPGMAHRM	HLA-C07:01	POTEE	Colorectal;Uterine	5416
HIIHEQIMEY	HLA-B46:01	ANKRD30A	Breast	936	DRYGRTALIL	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5417

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SAFKPAIEM	HLA-B46:01	ANKRD30A	Breast	937	PRKDLIVML	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5418
YAVYSEILSV	HLA-B46:01	ANKRD30A	Breast	938	RRCQLNVL	HLA-C07:01	POTEE	Colorectal;Uterine	5419
ILKEKNAEL	HLA-B46:01	ANKRD30A	Breast	939	SRTPESQQF	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5420
HLKNRIYQY	HLA-B46:01	ANKRD30A	Breast	940	RCFPCYRES	HLA-C07:01	POTEE	Colorectal;Uterine	5421
SVPNKALEL	HLA-C01:02	ANKRD30A	Breast	941	LSGQTAREY	HLA-C07:01	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5422
SIPTKALEL	HLA-C01:02	ANKRD30A	Breast	942	MYPGMAHRM	HLA-C07:02	POTEE	Colorectal;Uterine	5423
SVPNKAFEL	HLA-C01:02	ANKRD30A	Breast	943	DRYGRTALI	HLA-C07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5424
KTPDEAASL	HLA-C01:02	ANKRD30A	Breast	944	HRMQKEIAAL	HLA-C07:02	POTEE	Colorectal;Uterine	5425
KTPDEAAPL	HLA-C01:02	ANKRD30A	Breast	945	RYGRTALIL	HLA-C07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5426
SAFEPAIEM	HLA-C01:02	ANKRD30A	Breast	946	HHHVICQLL	HLA-C07:02	POTEE	Colorectal;Uterine	5427
HSCERAREL	HLA-C01:02	ANKRD30A	Breast	947	PRKDLIVML	HLA-C07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5428
SAFEPATEM	HLA-C03:04	ANKRD30A	Breast	948	SRTPESQQF	HLA-C07:02	POTEG; POTEE; POTEH	Colorectal;Prostate;Uterine	5429
SAFEPAIEM	HLA-C03:04	ANKRD30A	Breast	949	VAPEEHPIL	HLA-C07:02	POTEE	Colorectal;Uterine	5430
SAFKPAIEM	HLA-C03:04	ANKRD30A	Breast	950	VRGEDLDKL	HLA-C07:02	POTEE	Colorectal;Uterine	5431
RASQYSGQL	HLA-C03:04	ANKRD30A	Breast	951	NTALHYAIY	HLA-A01:01	POTEG; POTEH	Prostate	5432
STIYNNEVL	HLA-C03:04	ANKRD30A	Breast	952	YGNTALHYAIY	HLA-A01:01	POTEG; POTEH	Prostate	5433
YAVYSEILSV	HLA-C03:04	ANKRD30A	Breast	953	GNTALHYAIY	HLA-A01:01	POTEG; POTEH	Prostate	5434
VSIPTKALEL	HLA-C03:04	ANKRD30A	Breast	954	EYGNTALHYAIY	HLA-A01:01	POTEG; POTEH	Prostate	5435
VSIPTKAL	HLA-C03:04	ANKRD30A	Breast	955	FPDTENEQY	HLA-A01:01	POTEG; POTEH	Prostate	5436
YSCDSRSL	HLA-C03:04	ANKRD30A	Breast	956	YGNTALHYAIYN	HLA-A01:01	POTEG; POTEH	Prostate	5437
HQEACANIL	HLA-C04:01	ANKRD30A	Breast	957	IPDEYGNTALHY	HLA-A01:01	POTEG; POTEH	Prostate	5438
GHEEVVTFL	HLA-C04:01	ANKRD30A	Breast	958	LSDYKEKQMLKV	HLA-A01:01	POTEG	Prostate	5439
YFEDIKILK	HLA-C04:01	ANKRD30A	Breast	959	NVICQLLSDY	HLA-A01:01	POTEG; POTEH	Prostate	5440
FHIAGDACL	HLA-C04:01	ANKRD30A	Breast	960	LSEEQNTGIL	HLA-A01:01	POTEG; POTEH	Prostate	5441
SVPNKAFEL	HLA-C04:01	ANKRD30A	Breast	961	LSEEQNTGI	HLA-A01:01	POTEG; POTEH	Prostate	5442
HYAVYSEIL	HLA-C04:01	ANKRD30A	Breast	962	VLQPQPQLF	HLA-A01:01	POTEG; POTEH	Prostate	5443
AFEPAIEM	HLA-C04:01	ANKRD30A	Breast	963	LSEEQNTG	HLA-A01:01	POTEG; POTEH	Prostate	5444
AFEPATEM	HLA-C04:01	ANKRD30A	Breast	964	LSEEQNTGILQ	HLA-A01:01	POTEG; POTEH	Prostate	5445
IFNYNNHL	HLA-C04:01	ANKRD30A	Breast	965	TADNGDDGL	HLA-A01:01	POTEG; POTEH	Prostate	5446
TPDEAASL	HLA-C04:01	ANKRD30A	Breast	966	QLFFSFFLFI	HLA-A02:01	POTEG; POTEH	Prostate	5447
SWDTESLC	HLA-C04:01	ANKRD30A	Breast	967	QPQLFFSFFL	HLA-A02:01	POTEG; POTEH	Prostate	5448
SWDSESLC	HLA-C04:01	ANKRD30A	Breast	968	QLFFSFFL	HLA-A02:01	POTEG; POTEH	Prostate	5449
HRTPLMKAL	HLA-C07:01	ANKRD30A	Breast	969	FLFIFIFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5450
SIYQKVMEI	HLA-C07:01	ANKRD30A	Breast	970	LLLDRRCQLNI	HLA-A02:01	POTEG; POTEH	Prostate	5451
KRSEQIVEF	HLA-C07:01	ANKRD30A	Breast	971	PQLFFSFFL	HLA-A02:01	POTEG; POTEH	Prostate	5452
FHHIIHEQIM	HLA-C07:01	ANKRD30A	Breast	972	QLFFSFFLFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5453
ERKMQHHHLL	HLA-C07:01	ANKRD30A	Breast	973	FSFFLFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5454

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
NKYKCTALM	HLA-C07:01	ANKRD30A	Breast	974	QLFFSFFLF	HLA-A02:01	POTEG; POTEH	Prostate	5455
RRNADILNE	HLA-C07:01	ANKRD30A	Breast	975	FLFIFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5456
KRSEQIVE	HLA-C07:01	ANKRD30A	Breast	976	SLQPRPPEA	HLA-A02:01	POTEG; POTEH	Prostate	5457
CGFHHIHEQ	HLA-C07:01	ANKRD30A	Breast	977	LLDRRCQLNI	HLA-A02:01	POTEG; POTEH	Prostate	5458
RSEQIVEF	HLA-C07:01	ANKRD30A	Breast	978	KLLLDRRCQLNI	HLA-A02:01	POTEG; POTEH	Prostate	5459
HIHEQIMEY	HLA-C07:01	ANKRD30A	Breast	979	MVAEAGSMPA	HLA-A02:01	POTEG; POTEH	Prostate	5460
HRTPLMKAL	HLA-C07:02	ANKRD30A	Breast	980	GSMPAASSV	HLA-A02:01	POTEG; POTEH	Prostate	5461
KRSEQIVEF	HLA-C07:02	ANKRD30A	Breast	981	PQLFFSFFLFI	HLA-A02:01	POTEG; POTEH	Prostate	5462
HYAVYSEIL	HLA-C07:02	ANKRD30A	Breast	982	LLLDRRCQLNIL	HLA-A02:01	POTEG; POTEH	Prostate	5463
FHHIHEQIM	HLA-C07:02	ANKRD30A	Breast	983	GILQDEILI	HLA-A02:01	POTEG; POTEH	Prostate	5464
KYKCTALML	HLA-C07:02	ANKRD30A	Breast	984	QPQPQLFFSFFL	HLA-A02:01	POTEG; POTEH	Prostate	5465
SIYQKVMEI	HLA-C07:02	ANKRD30A	Breast	985	YAVSSHHNV	HLA-A02:01	POTEG	Prostate	5466
FHIAGDACL	HLA-C07:02	ANKRD30A	Breast	986	ILQDEILI	HLA-A02:01	POTEG; POTEH	Prostate	5467
HIHEQIMEY	HLA-C07:02	ANKRD30A	Breast	987	QPQLFFSFFLFI	HLA-A02:01	POTEG; POTEH	Prostate	5468
KTPDEAASL	HLA-C07:02	ANKRD30A	Breast	988	FLFIFIFIF	HLA-A02:01	POTEG; POTEH	Prostate	5469
CSGHTLLEY	HLA-A01:01	AQP12B; AQP12A	Pancreas	989	FFLFIFIFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5470
FACSGHTLLEY	HLA-A01:01	AQP12B; AQP12A	Pancreas	990	FFSFFLFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5471
HLFQRNLFY	HLA-A01:01	AQP12B; AQP12A	Pancreas	991	LFFSFFLFI	HLA-A02:01	POTEG; POTEH	Prostate	5472
LSDLHLLQS	HLA-A01:01	AQP12B; AQP12A	Pancreas	992	SFFLFIFIFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5473
LSDLHLLQ	HLA-A01:01	AQP12B; AQP12A	Pancreas	993	VLQPQPQL	HLA-A02:01	POTEG; POTEH	Prostate	5474
LLEYVQVY	HLA-A01:01	AQP12B; AQP12A	Pancreas	994	ILQDEILIH	HLA-A02:01	POTEG; POTEH	Prostate	5475
FLLFLAHGV	HLA-A02:01	AQP12B; AQP12A	Pancreas	995	ILDNKKRTA	HLA-A02:01	POTEG; POTEH	Prostate	5476
LMRLCWAWEL	HLA-A02:01	AQP12A	Pancreas	996	ILDNKKRTAL	HLA-A02:01	POTEG; POTEH	Prostate	5477
LLLTLLFLL	HLA-A02:01	AQP12B; AQP12A	Pancreas	997	VLQPQPQLF	HLA-A02:01	POTEG; POTEH	Prostate	5478
ALLPVGAYEV	HLA-A02:01	AQP12B; AQP12A	Pancreas	998	ILQDEILIHE	HLA-A02:01	POTEG; POTEH	Prostate	5479
LLPVGAYEV	HLA-A02:01	AQP12B; AQP12A	Pancreas	999	QLSEEQNTGI	HLA-A02:01	POTEG; POTEH	Prostate	5480
LFLLFLAHGV	HLA-A02:01	AQP12B; AQP12A	Pancreas	1000	MVLQPQPQL	HLA-A02:01	POTEG; POTEH	Prostate	5481
FLLFLAHGVT	HLA-A02:01	AQP12B; AQP12A	Pancreas	1001	THMGFPENL	HLA-A02:01	POTEG; POTEH	Prostate	5482
TLMRLCWAWEL	HLA-A02:01	AQP12A	Pancreas	1002	ILQDEILIHEE	HLA-A02:01	POTEG; POTEH	Prostate	5483
SLSFFFATFA	HLA-A02:01	AQP12A	Pancreas	1003	SLQPRPPEAQ	HLA-A02:01	POTEG; POTEH	Prostate	5484
FTSAFFNPA	HLA-A02:01	AQP12B; AQP12A	Pancreas	1004	VLQPQPQLFF	HLA-A02:01	POTEG; POTEH	Prostate	5485

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
TLLEYVQVYWL	HLA-A02:01	AQP12B; AQP12A	Pancreas	1005	QLSEEQNTG	HLA-A02:01	POTEG; POTEH	Prostate	5486
SLPGTLLKL	HLA-A02:01	AQP12B; AQP12A	Pancreas	1006	GHPNFPTTL	HLA-A02:01	POTEG	Prostate	5487
TLLEYVQV	HLA-A02:01	AQP12B; AQP12A	Pancreas	1007	IPDEYGNTAL	HLA-A02:01	POTEG; POTEH	Prostate	5488
ALAASVTFA	HLA-A02:01	AQP12B; AQP12A	Pancreas	1008	ALHYAIYNE	HLA-A02:01	POTEG; POTEH	Prostate	5489
TLVELGPWA	HLA-A02:01	AQP12B; AQP12A	Pancreas	1009	FFLFIFIFI	HLA-A02:01	POTEG; POTEH	Prostate	5490
FLAHGVTL	HLA-A02:01	AQP12B; AQP12A	Pancreas	1010	IPDEYGNTA	HLA-A02:01	POTEG; POTEH	Prostate	5491
HLFQRNLFY	HLA-A03:01	AQP12B; AQP12A	Pancreas	1011	VMLKDTDMNK	HLA-A03:01	POTEG; POTEH	Prostate	5492
RNLFYGQKNK	HLA-A03:01	AQP12B; AQP12A	Pancreas	1012	GSMPAASSVK	HLA-A03:01	POTEG; POTEH	Prostate	5493
HLFQRNLFYGQK	HLA-A03:01	AQP12B; AQP12A	Pancreas	1013	MLKDTDMNK	HLA-A03:01	POTEG; POTEH	Prostate	5494
ALLVTVTAY	HLA-A03:01	AQP12B; AQP12A	Pancreas	1014	MLKDTDMNKK	HLA-A03:01	POTEG; POTEH	Prostate	5495
QSLPGTLLK	HLA-A03:01	AQP12A	Pancreas	1015	KVPRKDLIVMLK	HLA-A03:01	POTEG; POTEH	Prostate	5496
QSLPGTLLK	HLA-A11:01	AQP12A	Pancreas	1016	ILDNKKRTALTK	HLA-A03:01	POTEG; POTEH	Prostate	5497
MAEQSLPGTLLK	HLA-A11:01	AQP12A	Pancreas	1017	ALHYAIYNEDK	HLA-A03:01	POTEG; POTEH	Prostate	5498
HLFQRNLFY	HLA-A11:01	AQP12B; AQP12A	Pancreas	1018	GSMPAASSVKK	HLA-A03:01	POTEG; POTEH	Prostate	5499
ATFALCEAAR	HLA-A11:01	AQP12A	Pancreas	1019	IVMLKDTDMNK	HLA-A03:01	POTEG; POTEH	Prostate	5500
GRLPHLFQR	HLA-A11:01	AQP12B; AQP12A	Pancreas	1020	ILQDEILIH	HLA-A03:01	POTEG; POTEH	Prostate	5501
AYTAGPFTSAFF	HLA-A24:02	AQP12B; AQP12A	Pancreas	1021	HCFPWCRGSGK	HLA-A03:01	POTEG; POTEH	Prostate	5502
SLSFFFATF	HLA-A24:02	AQP12B; AQP12A	Pancreas	1022	GILQDEILIH	HLA-A03:01	POTEG; POTEH	Prostate	5503
SFFFATFAL	HLA-A24:02	AQP12A	Pancreas	1023	QLFFSFFLF	HLA-A03:01	POTEG; POTEH	Prostate	5504
AYSGPAVALL	HLA-A24:02	AQP12B; AQP12A	Pancreas	1024	FLFIFIFIFI	HLA-A03:01	POTEG; POTEH	Prostate	5505
AYSGPAVAL	HLA-A24:02	AQP12B; AQP12A	Pancreas	1025	VLQPQPQLFF	HLA-A03:01	POTEG; POTEH	Prostate	5506
LLTLLFLLF	HLA-A24:02	AQP12B; AQP12A	Pancreas	1026	FIFIFIFIFF	HLA-A03:01	POTEG; POTEH	Prostate	5507
KYRAPRGKPA	HLA-A30:01	AQP12B; AQP12A	Pancreas	1027	FLFIFIFIF	HLA-A03:01	POTEG; POTEH	Prostate	5508
ASKALLPVGA	HLA-A30:01	AQP12B; AQP12A	Pancreas	1028	SVSQAGVQW	HLA-A03:01	POTEG; POTEH	Prostate	5509

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RAPRGKPAPA	HLA-A30:01	AQP12B; AQP12A	Pancreas	1029	GSMPAASSVK	HLA-A11:01	POTEG; POTEH	Prostate	5510
KNKYRAPRGK	HLA-A30:01	AQP12B; AQP12A	Pancreas	1030	MSQEPEINK	HLA-A11:01	POTEG; POTEH	Prostate	5511
HTLLEYYQV	HLA-A30:01	AQP12B; AQP12A	Pancreas	1031	GSMPAASSVKK	HLA-A11:01	POTEG; POTEH	Prostate	5512
SVREPGRSGV	HLA-A30:01	AQP12B; AQP12A	Pancreas	1032	VMLKDTDMNK	HLA-A11:01	POTEG; POTEH	Prostate	5513
EVFAREAMR	HLA-A33:03	AQP12A	Pancreas	1033	KVPRKDLIVMLK	HLA-A11:01	POTEG; POTEH	Prostate	5514
YEVFAREAMR	HLA-A33:03	AQP12A	Pancreas	1034	TALHYAIYNEDK	HLA-A11:01	POTEG; POTEH	Prostate	5515
TFALCEAAR	HLA-A33:03	AQP12A	Pancreas	1035	CQLNILDNK	HLA-A11:01	POTEG; POTEH	Prostate	5516
LFYGQKNKYR	HLA-A33:03	AQP12B; AQP12A	Pancreas	1036	MLKDTDMNK	HLA-A11:01	POTEG; POTEH	Prostate	5517
MAQSCSSALR	HLA-A33:03	AQP12B; AQP12A	Pancreas	1037	IVMLKDTDMNK	HLA-A11:01	POTEG; POTEH	Prostate	5518
FYGQKNKYR	HLA-A33:03	AQP12B; AQP12A	Pancreas	1038	SVSQAGVQW	HLA-A11:01	POTEG; POTEH	Prostate	5519
AARRASKAL	HLA-B07:02	AQP12B; AQP12A	Pancreas	1039	RKVEEEMKK	HLA-A11:01	POTEG; POTEH	Prostate	5520
APRGKPAPA	HLA-B07:02	AQP12B; AQP12A	Pancreas	1040	RKDLIVMLK	HLA-A11:01	POTEG; POTEH	Prostate	5521
RAPRGKPAPA	HLA-B07:02	AQP12B; AQP12A	Pancreas	1041	GILQDEILIH	HLA-A11:01	POTEG; POTEH	Prostate	5522
GPDLLLTLL	HLA-B07:02	AQP12B; AQP12A	Pancreas	1042	FSPFLFIFI	HLA-A11:01	POTEG; POTEH	Prostate	5523
AYSGPAVAL	HLA-B07:02	AQP12B; AQP12A	Pancreas	1043	PQPQLFFSF	HLA-A24:02	POTEG; POTEH	Prostate	5524
LLHLRHSPPA	HLA-B08:01	AQP12B; AQP12A	Pancreas	1044	KWCRHCFPW	HLA-A24:02	POTEG	Prostate	5525
LLHLRHSPP	HLA-B08:01	AQP12B; AQP12A	Pancreas	1045	QLFFSFFLF	HLA-A24:02	POTEG; POTEH	Prostate	5526
LMRLCWAWEL	HLA-B08:01	AQP12A	Pancreas	1046	LFFSFFLF	HLA-A24:02	POTEG; POTEH	Prostate	5527
LLHQGRLPHL	HLA-B08:01	AQP12B; AQP12A	Pancreas	1047	PQLFFSFFLF	HLA-A24:02	POTEG; POTEH	Prostate	5528
DLHLLQSL	HLA-B08:01	AQP12B; AQP12A	Pancreas	1048	QPQPQLFFSF	HLA-A24:02	POTEG; POTEH	Prostate	5529
SANPTVSL	HLA-B08:01	AQP12B; AQP12A	Pancreas	1049	VLQPQPQLF	HLA-A24:02	POTEG; POTEH	Prostate	5530
EMRTLVEL	HLA-B08:01	AQP12B; AQP12A	Pancreas	1050	VLQPQPQLFFSF	HLA-A24:02	POTEG; POTEH	Prostate	5531
LEMRTLVEL	HLA-B13:02	AQP12B; AQP12A	Pancreas	1051	SFFLFIFIF	HLA-A24:02	POTEG; POTEH	Prostate	5532
WELSDLHLL	HLA-B13:02	AQP12B; AQP12A	Pancreas	1052	PQPQLFFSFF	HLA-A24:02	POTEG; POTEH	Prostate	5533

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LEYVQVYWL	HLA-B13:02	AQP12B; AQP12A	Pancreas	1053	IFIFIFIFF	HLA-A24:02	POTEG; POTEH	Prostate	5534
SLPGTLLKL	HLA-B13:02	AQP12B; AQP12A	Pancreas	1054	FFSFFLFIF	HLA-A24:02	POTEG; POTEH	Prostate	5535
RLPHLFQRN	HLA-B13:02	AQP12B; AQP12A	Pancreas	1055	LFIFIFIFI	HLA-A24:02	POTEG; POTEH	Prostate	5536
ALLPVGAYEV	HLA-B13:02	AQP12B; AQP12A	Pancreas	1056	VLQPQPQLFF	HLA-A24:02	POTEG; POTEH	Prostate	5537
YTAGPFTSAF	HLA-B46:01	AQP12B; AQP12A	Pancreas	1057	GSMPAASSVK	HLA-A30:01	POTEG; POTEH	Prostate	5538
FAREAMRTL	HLA-B46:01	AQP12A	Pancreas	1058	HVRREDLDK	HLA-A30:01	POTEG; POTEH	Prostate	5539
FAREAVGAV	HLA-B46:01	AQP12B; AQP12A	Pancreas	1059	MLKDTDMNK	HLA-A30:01	POTEG; POTEH	Prostate	5540
TAGPFTSAF	HLA-B46:01	AQP12B; AQP12A	Pancreas	1060	GSMPAASSV	HLA-A30:01	POTEG; POTEH	Prostate	5541
ASANPTVSL	HLA-B46:01	AQP12B; AQP12A	Pancreas	1061	SSKSNVGTS	HLA-A30:01	POTEG	Prostate	5542
SANPTVSL	HLA-B46:01	AQP12B; AQP12A	Pancreas	1062	STHMGFPEN	HLA-A30:01	POTEG; POTEH	Prostate	5543
YSGPAVALL	HLA-C01:02	AQP12B; AQP12A	Pancreas	1063	STHMGFPENL	HLA-A30:01	POTEG; POTEH	Prostate	5544
MAQSCSSAL	HLA-C01:02	AQP12B; AQP12A	Pancreas	1064	KNKIESHSV	HLA-A30:01	POTEG; POTEH	Prostate	5545
FGPDLLLTL	HLA-C01:02	AQP12B; AQP12A	Pancreas	1065	RYHVRREDLDK	HLA-A30:01	POTEG; POTEH	Prostate	5546
LGPLTGMVL	HLA-C01:02	AQP12B; AQP12A	Pancreas	1066	RSKMGKWCR	HLA-A30:01	POTEG; POTEH	Prostate	5547
SLPGTLLKL	HLA-C01:02	AQP12B; AQP12A	Pancreas	1067	MSQEPEINK	HLA-A30:01	POTEG; POTEH	Prostate	5548
MAQSCSSAL	HLA-C03:04	AQP12B; AQP12A	Pancreas	1068	MVLQPQPQL	HLA-A30:01	POTEG; POTEH	Prostate	5549
FAREAMRTL	HLA-C03:04	AQP12A	Pancreas	1069	CQLNILDNK	HLA-A30:01	POTEG; POTEH	Prostate	5550
FACSGHTLL	HLA-C03:04	AQP12B; AQP12A	Pancreas	1070	KSKVGPWGD	HLA-A30:01	POTEG	Prostate	5551
FACSGHTL	HLA-C03:04	AQP12B; AQP12A	Pancreas	1071	RDFSGHPNF	HLA-A30:01	POTEG	Prostate	5552
MAQSCSSAL	HLA-C04:01	AQP12B; AQP12A	Pancreas	1072	RKVEEEMKK	HLA-A30:01	POTEG; POTEH	Prostate	5553
AYSGPAVAL	HLA-C04:01	AQP12B; AQP12A	Pancreas	1073	FMEPRYHVRR	HLA-A33:03	POTEG; POTEH	Prostate	5554
MRLCWAWEL	HLA-C04:01	AQP12A	Pancreas	1074	RSKMGKWCR	HLA-A33:03	POTEG; POTEH	Prostate	5555
FFNPALAASV	HLA-C04:01	AQP12B; AQP12A	Pancreas	1075	AFMEPRYHVRR	HLA-A33:03	POTEG; POTEH	Prostate	5556

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
AFCFHLTLL	HLA-C04:01	AQP12B; AQP12A	Pancreas	1076	SAFMEPRYHVRR	HLA-A33:03	POTEG; POTEH	Prostate	5557
CFHLTLLHL	HLA-C04:01	AQP12B; AQP12A	Pancreas	1077	TLRSKMGKWCR	HLA-A33:03	POTEG	Prostate	5558
MRLCWAWEL	HLA-C07:01	AQP12A	Pancreas	1078	CFPWCRGSSK	HLA-A33:03	POTEG	Prostate	5559
FAREAMRTL	HLA-C07:01	AQP12A	Pancreas	1079	WCRHCFPWCR	HLA-A33:03	POTEG	Prostate	5560
YRAPRGKPA	HLA-C07:01	AQP12B; AQP12A	Pancreas	1080	LRSKMGKWCR	HLA-A33:03	POTEG; POTEH	Prostate	5561
TLLEYVQVY	HLA-C07:01	AQP12B; AQP12A	Pancreas	1081	CFPWCRGSGK	HLA-A33:03	POTEG; POTEH	Prostate	5562
CSGHTLLEY	HLA-C07:01	AQP12B; AQP12A	Pancreas	1082	DTENEQYHR	HLA-A33:03	POTEG	Prostate	5563
MRLCWAWEL	HLA-C07:02	AQP12A	Pancreas	1083	NILDNKKR	HLA-A33:03	POTEG; POTEH	Prostate	5564
FAREAMRTL	HLA-C07:02	AQP12A	Pancreas	1084	TALTKAVQCR	HLA-A33:03	POTEG	Prostate	5565
SFFFATFAL	HLA-C07:02	AQP12A	Pancreas	1085	MNKKDKQKR	HLA-A33:03	POTEG; POTEH	Prostate	5566
AYSGPAVAL	HLA-C07:02	AQP12B; AQP12A	Pancreas	1086	TALTKAVQC	HLA-A33:03	POTEG; POTEH	Prostate	5567
FGPDLLLTL	HLA-C07:02	AQP12B; AQP12A	Pancreas	1087	EPRYHVRR	HLA-A33:03	POTEG; POTEH	Prostate	5568
FLEMRTLVEL	HLA-A01:01	AQP12B	Pancreas	1088	MSQEPEINK	HLA-A33:03	POTEG; POTEH	Prostate	5569
LTRLCWAWEL	HLA-A01:01	AQP12B	Pancreas	1089	EINKGGDR	HLA-A33:03	POTEG; POTEH	Prostate	5570
FATFTLCEA	HLA-A01:01	AQP12B	Pancreas	1090	DMNKKDKQKR	HLA-A33:03	POTEG; POTEH	Prostate	5571
CTLTRLCWA	HLA-A01:01	AQP12B	Pancreas	1091	HPNFPTTLPI	HLA-B07:02	POTEG	Prostate	5572
FLEMRTLV	HLA-A01:01	AQP12B	Pancreas	1092	QPRPPEAQM	HLA-B07:02	POTEG; POTEH	Prostate	5573
ESLPGTLLK	HLA-A01:01	AQP12B	Pancreas	1093	LQPRPPEAQM	HLA-B07:02	POTEG; POTEH	Prostate	5574
FLEMRTLVE	HLA-A01:01	AQP12B	Pancreas	1094	RPPEAQMVL	HLA-B07:02	POTEG; POTEH	Prostate	5575
FLEMRTLVEL	HLA-A02:01	AQP12B	Pancreas	1095	IPDEYGNTAL	HLA-B07:02	POTEG; POTEH	Prostate	5576
FLMAEESLPGT	HLA-A02:01	AQP12B	Pancreas	1096	QPRPPEAQMVL	HLA-B07:02	POTEG; POTEH	Prostate	5577
CFLEMRTLVEL	HLA-A02:01	AQP12B	Pancreas	1097	HPNFPTTL	HLA-B07:02	POTEG	Prostate	5578
RLHPDAPLL	HLA-A02:01	AQP12B	Pancreas	1098	SLQPRPPEAQM	HLA-B07:02	POTEG; POTEH	Prostate	5579
ACFLEMRTLVEL	HLA-A02:01	AQP12B	Pancreas	1099	SSLQPRPPEAQM	HLA-B07:02	POTEG; POTEH	Prostate	5580
FLEMRTLVELG	HLA-A02:01	AQP12B	Pancreas	1100	FPWCRGSSKSNV	HLA-B07:02	POTEG	Prostate	5581
TLTRLCWAWEL	HLA-A02:01	AQP12B	Pancreas	1101	QPRPPEAQMV	HLA-B07:02	POTEG; POTEH	Prostate	5582
FLMAEESL	HLA-A02:01	AQP12B	Pancreas	1102	QPQLFFSFF	HLA-B07:02	POTEG; POTEH	Prostate	5583
EFLMAEESLPGT	HLA-A02:01	AQP12B	Pancreas	1103	QPQPQLFFSF	HLA-B07:02	POTEG; POTEH	Prostate	5584
RLHPDAPLLGL	HLA-A02:01	AQP12B	Pancreas	1104	QPQPQLFF	HLA-B07:02	POTEG; POTEH	Prostate	5585
TLCEAARRA	HLA-A02:01	AQP12B	Pancreas	1105	ILDNKKRTAL	HLA-B08:01	POTEG; POTEH	Prostate	5586
FLMAEESLP	HLA-A02:01	AQP12B	Pancreas	1106	MNKKDKQKRTAL	HLA-B08:01	POTEG; POTEH	Prostate	5587
FLEMRTLV	HLA-A02:01	AQP12B	Pancreas	1107	EMKKHGSTHM	HLA-B08:01	POTEG; POTEH	Prostate	5588
SLSFFFATFTL	HLA-A02:01	AQP12B	Pancreas	1108	NILDNKKRTAL	HLA-B08:01	POTEG; POTEH	Prostate	5589
GMQAACTLTR	HLA-A03:01	AQP12B	Pancreas	1109	LLLDRRCQLNIL	HLA-B08:01	POTEG; POTEH	Prostate	5590
MAEESLPGTLLK	HLA-A03:01	AQP12B	Pancreas	1110	LNILDNKKRTAL	HLA-B08:01	POTEG; POTEH	Prostate	5591
TLCEAARRASK	HLA-A03:01	AQP12B	Pancreas	1111	FPWCRGSSKSNV	HLA-B08:01	POTEG	Prostate	5592
AEESLPGTLLK	HLA-A03:01	AQP12B	Pancreas	1112	MGKWCRHCF	HLA-B08:01	POTEG; POTEH	Prostate	5593

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ESLPGTLLK	HLA-A03:01	AQP12B	Pancreas	1113	DRRCQLNIL	HLA-B08:01	POTEG; POTEH	Prostate	5594
RLHPDAPLLGL	HLA-A03:01	AQP12B	Pancreas	1114	HPNFPTTL	HLA-B08:01	POTEG	Prostate	5595
RLHPDAPLLG	HLA-A03:01	AQP12B	Pancreas	1115	ESKNKIESH	HLA-B08:01	POTEG; POTEH	Prostate	5596
ESLPGTLLK	HLA-A11:01	AQP12B	Pancreas	1116	FIFIFIFF	HLA-B08:01	POTEG; POTEH	Prostate	5597
MAEESLPGTLLK	HLA-A11:01	AQP12B	Pancreas	1117	EEKQIEVA	HLA-B08:01	POTEG; POTEH	Prostate	5598
AEESLPGTLLK	HLA-A11:01	AQP12B	Pancreas	1118	TALTKAVQ	HLA-B08:01	POTEG; POTEH	Prostate	5599
ATFTLCEAAR	HLA-A11:01	AQP12B	Pancreas	1119	DEYGNTAL	HLA-B08:01	POTEG; POTEH	Prostate	5600
GTGAGHAGR	HLA-A11:01	AQP12B	Pancreas	1120	FLFIFIFIF	HLA-B08:01	POTEG; POTEH	Prostate	5601
SFFFATFTL	HLA-A24:02	AQP12B	Pancreas	1121	QPQLFFSF	HLA-B08:01	POTEG; POTEH	Prostate	5602
LSFFFATFTL	HLA-A24:02	AQP12B	Pancreas	1122	HHNVICQL	HLA-B08:01	POTEG	Prostate	5603
SLSFFFATFTL	HLA-A24:02	AQP12B	Pancreas	1123	HPNFPTTLPI	HLA-B13:02	POTEG	Prostate	5604
RLHPDAPLL	HLA-A24:02	AQP12B	Pancreas	1124	REYAVSSHHNVI	HLA-B13:02	POTEG	Prostate	5605
FFFATFTL	HLA-A24:02	AQP12B	Pancreas	1125	REDECALMLL	HLA-B13:02	POTEG	Prostate	5606
RGVSAWHAA	HLA-A30:01	AQP12B	Pancreas	1126	FSFFLFIFI	HLA-B13:02	POTEG; POTEH	Prostate	5607
HGRGVSAWHA	HLA-A30:01	AQP12B	Pancreas	1127	QPQLFFSFFL	HLA-B13:02	POTEG; POTEH	Prostate	5608
CTLTRLCWA	HLA-A30:01	AQP12B	Pancreas	1128	LDRRCQLNI	HLA-B13:02	POTEG; POTEH	Prostate	5609
RLHPDAPLL	HLA-A30:01	AQP12B	Pancreas	1129	QLFFSFFLFI	HLA-B13:02	POTEG; POTEH	Prostate	5610
ESLPGTLLK	HLA-A30:01	AQP12B	Pancreas	1130	QLFFSFFLF	HLA-B13:02	POTEG; POTEH	Prostate	5611
ACFLEMRTL	HLA-A30:01	AQP12B	Pancreas	1131	REYAVSSHHNV	HLA-B13:02	POTEG	Prostate	5612
TFTLCEAAR	HLA-A33:03	AQP12B	Pancreas	1132	REDECALML	HLA-B13:02	POTEG	Prostate	5613
ATFTLCEAAR	HLA-A33:03	AQP12B	Pancreas	1133	SQEPEINKG	HLA-B13:02	POTEG; POTEH	Prostate	5614
FTLCEAARR	HLA-A33:03	AQP12B	Pancreas	1134	KQLSEEQNT	HLA-B13:02	POTEG; POTEH	Prostate	5615
ESLPGTLLK	HLA-A33:03	AQP12B	Pancreas	1135	SQAGVQWCD	HLA-B13:02	POTEG; POTEH	Prostate	5616
VPHGRGVSA	HLA-B07:02	AQP12B	Pancreas	1136	KQIEVAENE	HLA-B13:02	POTEG; POTEH	Prostate	5617
HPDAPLLGL	HLA-B07:02	AQP12B	Pancreas	1137	GILQDEILI	HLA-B13:02	POTEG; POTEH	Prostate	5618
GVPHGRGVSA	HLA-B07:02	AQP12B	Pancreas	1138	ADIESKNKI	HLA-B13:02	POTEG; POTEH	Prostate	5619
VPHGRGVSAW	HLA-B07:02	AQP12B	Pancreas	1139	AVSSHHNVI	HLA-B13:02	POTEG	Prostate	5620
FLEMRTLVEL	HLA-B08:01	AQP12B	Pancreas	1140	EQNDTQKQL	HLA-B13:02	POTEG; POTEH	Prostate	5621
VPHGRGVSA	HLA-B08:01	AQP12B	Pancreas	1141	RPPEAQMV	HLA-B13:02	POTEG; POTEH	Prostate	5622
FLEMRTLV	HLA-B08:01	AQP12B	Pancreas	1142	YAVSSHHNV	HLA-B46:01	POTEG	Prostate	5623
ESLPGTLL	HLA-B08:01	AQP12B	Pancreas	1143	GSMPAASSV	HLA-B46:01	POTEG; POTEH	Prostate	5624
LSFFFATFTL	HLA-B13:02	AQP12B	Pancreas	1144	NTALHYAIY	HLA-B46:01	POTEG; POTEH	Prostate	5625
FLEMRTLVEL	HLA-B13:02	AQP12B	Pancreas	1145	YAVSSHHNVI	HLA-B46:01	POTEG	Prostate	5626
MQAACTLTRL	HLA-B13:02	AQP12B	Pancreas	1146	MVAEAGSMPA	HLA-B46:01	POTEG; POTEH	Prostate	5627
RLHPDAPLL	HLA-B13:02	AQP12B	Pancreas	1147	VLQPQPQLF	HLA-B46:01	POTEG; POTEH	Prostate	5628
AVGAVQLGA	HLA-B13:02	AQP12B	Pancreas	1148	MVLQPQPQLF	HLA-B46:01	POTEG; POTEH	Prostate	5629
HPDAPLLGL	HLA-B13:02	AQP12B	Pancreas	1149	FSFFLFIFI	HLA-B46:01	POTEG; POTEH	Prostate	5630
GAVQLGACF	HLA-B46:01	AQP12B	Pancreas	1150	LQPQPQLFF	HLA-B46:01	POTEG; POTEH	Prostate	5631
FATFTLCEA	HLA-B46:01	AQP12B	Pancreas	1151	ESKNKIESH	HLA-B46:01	POTEG; POTEH	Prostate	5632
MQAACTLTRL	HLA-B46:01	AQP12B	Pancreas	1152	KSKVGPWGDY	HLA-B46:01	POTEG	Prostate	5633
VSAWHAAEA	HLA-B46:01	AQP12B	Pancreas	1153	FIFIFIFIF	HLA-B46:01	POTEG; POTEH	Prostate	5634
VPHGRGVSA	HLA-B46:01	AQP12B	Pancreas	1154	FLFIFIFIF	HLA-B46:01	POTEG; POTEH	Prostate	5635
HAAEAGGTG	HLA-B46:01	AQP12B	Pancreas	1155	KSKVGPWGD	HLA-B46:01	POTEG	Prostate	5636

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RLHPDAPLL	HLA-C01:02	AQP12B	Pancreas	1156	SLQPRPPEA	HLA-B46:01	POTEG; POTEH	Prostate	5637
SFFFATFTL	HLA-C01:02	AQP12B	Pancreas	1157	MLKVSSEN	HLA-B46:01	POTEG	Prostate	5638
FLEMRTLVEL	HLA-C01:02	AQP12B	Pancreas	1158	YHRDFSGH	HLA-B46:01	POTEG	Prostate	5639
LHPDAPLLGL	HLA-C01:02	AQP12B	Pancreas	1159	RPPEAQMVL	HLA-C01:02	POTEG; POTEH	Prostate	5640
RLHPDAPL	HLA-C01:02	AQP12B	Pancreas	1160	GSMPAASSV	HLA-C01:02	POTEG; POTEH	Prostate	5641
FATFTLCEA	HLA-C03:04	AQP12B	Pancreas	1161	VLQPQPQLF	HLA-C01:02	POTEG; POTEH	Prostate	5642
QAACTLTRL	HLA-C03:04	AQP12B	Pancreas	1162	FSGHPNFPTTL	HLA-C01:02	POTEG	Prostate	5643
MQAACTLTRL	HLA-C03:04	AQP12B	Pancreas	1163	YAVSSHHNV	HLA-C01:02	POTEG	Prostate	5644
FFFATFTL	HLA-C03:04	AQP12B	Pancreas	1164	MVLQPQPQL	HLA-C01:02	POTEG; POTEH	Prostate	5645
ESLPGTLL	HLA-C03:04	AQP12B	Pancreas	1165	AVSSHHNVI	HLA-C01:02	POTEG	Prostate	5646
FLMAEESL	HLA-C03:04	AQP12B	Pancreas	1166	LQPQPQLFF	HLA-C01:02	POTEG; POTEH	Prostate	5647
RLHPDAPLL	HLA-C04:01	AQP12B	Pancreas	1167	SGHPNFPTTL	HLA-C01:02	POTEG	Prostate	5648
TRLCWAWEL	HLA-C04:01	AQP12B	Pancreas	1168	NLPNGATAD	HLA-C01:02	POTEG	Prostate	5649
LHPDAPLLGL	HLA-C04:01	AQP12B	Pancreas	1169	NIPDEYGNTAL	HLA-C01:02	POTEG; POTEH	Prostate	5650
FFFATFTL	HLA-C04:01	AQP12B	Pancreas	1170	GHPNFPTTL	HLA-C01:02	POTEG	Prostate	5651
SFFFATFTL	HLA-C04:01	AQP12B	Pancreas	1171	NLPNGATA	HLA-C01:02	POTEG	Prostate	5652
FFFATFTLC	HLA-C04:01	AQP12B	Pancreas	1172	NFPTTLPI	HLA-C01:02	POTEG	Prostate	5653
TRLCWAWEL	HLA-C07:01	AQP12B	Pancreas	1173	NLPNGATADN	HLA-C01:02	POTEG	Prostate	5654
SFFFATFTL	HLA-C07:01	AQP12B	Pancreas	1174	RPPEAQMV	HLA-C01:02	POTEG; POTEH	Prostate	5655
LTRLCWAWEL	HLA-C07:01	AQP12B	Pancreas	1175	YAVSSHHNV	HLA-C03:04	POTEG	Prostate	5656
ACFLEMRTL	HLA-C07:01	AQP12B	Pancreas	1176	GSMPAASSV	HLA-C03:04	POTEG; POTEH	Prostate	5657
GRLHPDAPLL	HLA-C07:01	AQP12B	Pancreas	1177	YAVSSHHNVI	HLA-C03:04	POTEG	Prostate	5658
TRLCWAWEL	HLA-C07:02	AQP12B	Pancreas	1178	MVLQPQPQL	HLA-C03:04	POTEG; POTEH	Prostate	5659
SFFFATFTL	HLA-C07:02	AQP12B	Pancreas	1179	AVSSHHNVI	HLA-C03:04	POTEG	Prostate	5660
RLHPDAPLL	HLA-C07:02	AQP12B	Pancreas	1180	IVMLKDTDM	HLA-C03:04	POTEG; POTEH	Prostate	5661
LHPDAPLL	HLA-C07:02	AQP12B	Pancreas	1181	AGSMPAASSV	HLA-C03:04	POTEG; POTEH	Prostate	5662
FFFATFTL	HLA-C07:02	AQP12B	Pancreas	1182	FSFFLFIFI	HLA-C03:04	POTEG; POTEH	Prostate	5663
NSDFAPHPY	HLA-A01:01	C2orf53	Testis	1183	RPPEAQMVL	HLA-C03:04	POTEG; POTEH	Prostate	5664
SNSDFAPHPY	HLA-A01:01	C2orf53	Testis	1184	FSGHPNFPTTL	HLA-C03:04	POTEG	Prostate	5665
CDSNSDFAPHPY	HLA-A01:01	C2orf53	Testis	1185	FIFIFIFIF	HLA-C03:04	POTEG; POTEH	Prostate	5666
ASSPSNHWLY	HLA-A01:01	C2orf53	Testis	1186	FIFIFIFIF	HLA-C03:04	POTEG; POTEH	Prostate	5667
SSPSNHWLY	HLA-A01:01	C2orf53	Testis	1187	FIFIFIFI	HLA-C03:04	POTEG; POTEH	Prostate	5668
RLLAFPQLL	HLA-A02:01	C2orf53	Testis	1188	VLQPQPQLF	HLA-C04:01	POTEG; POTEH	Prostate	5669
RLLAFPQLLPCV	HLA-A02:01	C2orf53	Testis	1189	HHNVICQLL	HLA-C04:01	POTEG	Prostate	5670
YMPGVPPA	HLA-A02:01	C2orf53	Testis	1190	LQPQPQLFF	HLA-C04:01	POTEG; POTEH	Prostate	5671
ALASVQGHWV	HLA-A02:01	C2orf53	Testis	1191	REDECALML	HLA-C04:01	POTEG	Prostate	5672
ALAQALVVQL	HLA-A02:01	C2orf53	Testis	1192	RPPEAQMVL	HLA-C04:01	POTEG; POTEH	Prostate	5673
WLYPSPPLT	HLA-A02:01	C2orf53	Testis	1193	HRDFSGHPNF	HLA-C04:01	POTEG	Prostate	5674
LLAFPQLLPCV	HLA-A02:01	C2orf53	Testis	1194	CREDECALM	HLA-C04:01	POTEG	Prostate	5675
WLYPSPPL	HLA-A02:01	C2orf53	Testis	1195	VLQPQPQLFF	HLA-C04:01	POTEG; POTEH	Prostate	5676
PRLLAFPQLL	HLA-A02:01	C2orf53	Testis	1196	REDECALMLL	HLA-C04:01	POTEG	Prostate	5677
PLLPPPQV	HLA-A02:01	C2orf53	Testis	1197	IFIFIFIFF	HLA-C04:01	POTEG; POTEH	Prostate	5678
SVQGHWVRV	HLA-A02:01	C2orf53	Testis	1198	FFSFFLFIF	HLA-C04:01	POTEG; POTEH	Prostate	5679

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
QLVDSSPHNL	HLA-A02:01	C2orf53	Testis	1199	SFFLFIFIF	HLA-C04:01	POTEG; POTEH	Prostate	5680
RLLAFPQL	HLA-A02:01	C2orf53	Testis	1200	SFFLFIFI	HLA-C04:01	POTEG; POTEH	Prostate	5681
YLSLPRPRA	HLA-A02:01	C2orf53	Testis	1201	FFSFFLFI	HLA-C04:01	POTEG; POTEH	Prostate	5682
RQTWRWHQYR	HLA-A03:01	C2orf53	Testis	1202	IFIFIFIF	HLA-C04:01	POTEG; POTEH	Prostate	5683
RALHLLPEK	HLA-A03:01	C2orf53	Testis	1203	LFFSFFLF	HLA-C04:01	POTEG; POTEH	Prostate	5684
RLHSNRQTWR	HLA-A03:01	C2orf53	Testis	1204	FFLFIFIF	HLA-C04:01	POTEG; POTEH	Prostate	5685
RLLAFPQLLPC	HLA-A03:01	C2orf53	Testis	1205	CREDECALM	HLA-C07:01	POTEG	Prostate	5686
VSLELILQK	HLA-A03:01	C2orf53	Testis	1206	HHNVICQLL	HLA-C07:01	POTEG	Prostate	5687
WLYPSPPLTP	HLA-A03:01	C2orf53	Testis	1207	SHHNVICQL	HLA-C07:01	POTEG	Prostate	5688
VSLELILQK	HLA-A11:01	C2orf53	Testis	1208	KRTALTKAV	HLA-C07:01	POTEG; POTEH	Prostate	5689
ATAFAAPVAR	HLA-A11:01	C2orf53	Testis	1209	HRDFSGHPNF	HLA-C07:01	POTEG	Prostate	5690
RALHLLPEK	HLA-A11:01	C2orf53	Testis	1210	THMGFPENL	HLA-C07:01	POTEG; POTEH	Prostate	5691
QTWRWHQYR	HLA-A11:01	C2orf53	Testis	1211	DRRCQLNIL	HLA-C07:01	POTEG; POTEH	Prostate	5692
ASVQGHWVR	HLA-A11:01	C2orf53	Testis	1212	VRREDLDKL	HLA-C07:01	POTEG; POTEH	Prostate	5693
LYPSPPLTPSF	HLA-A24:02	C2orf53	Testis	1213	SHHNVICQLL	HLA-C07:01	POTEG	Prostate	5694
FFHQNYLSL	HLA-A24:02	C2orf53	Testis	1214	PRPPEAQMVL	HLA-C07:01	POTEG; POTEH	Prostate	5695
RYRTGPRLLAF	HLA-A24:02	C2orf53	Testis	1215	RPPEAQMVL	HLA-C07:01	POTEG; POTEH	Prostate	5696
RLLLLQHLW	HLA-A24:02	C2orf53	Testis	1216	PRYHVRRED	HLA-C07:01	POTEG; POTEH	Prostate	5697
SLPSSPTFF	HLA-A24:02	C2orf53	Testis	1217	HPNFPTTL	HLA-C07:01	POTEG	Prostate	5698
RYRTGPRLL	HLA-A24:02	C2orf53	Testis	1218	LPNGATAD	HLA-C07:01	POTEG	Prostate	5699
RTRPAATAFA	HLA-A30:01	C2orf53	Testis	1219	RRCQLNIL	HLA-C07:01	POTEG; POTEH	Prostate	5700
RTRPAATAFAA	HLA-A30:01	C2orf53	Testis	1220	RYHVRRED	HLA-C07:01	POTEG; POTEH	Prostate	5701
HRTRPAATAFA	HLA-A30:01	C2orf53	Testis	1221	TENEQYHSD	HLA-C07:01	POTEG; POTEH	Prostate	5702
VSLELILQK	HLA-A30:01	C2orf53	Testis	1222	REDECALML	HLA-C07:01	POTEG	Prostate	5703
RYRTGPRLL	HLA-A30:01	C2orf53	Testis	1223	SHHNVICQL	HLA-C07:02	POTEG	Prostate	5704
SVLPGRPTW	HLA-A30:01	C2orf53	Testis	1224	HHNVICQLL	HLA-C07:02	POTEG	Prostate	5705
QTWRWHQYR	HLA-A33:03	C2orf53	Testis	1225	GHPNFPTTL	HLA-C07:02	POTEG	Prostate	5706
NRQTWRWHQYR	HLA-A33:03	C2orf53	Testis	1226	THMGFPENL	HLA-C07:02	POTEG; POTEH	Prostate	5707
RQTWRWHQYR	HLA-A33:03	C2orf53	Testis	1227	RYHVRREDL	HLA-C07:02	POTEG; POTEH	Prostate	5708
TAFAAPVAR	HLA-A33:03	C2orf53	Testis	1228	CREDECALM	HLA-C07:02	POTEG	Prostate	5709
NYLSLPRPR	HLA-A33:03	C2orf53	Testis	1229	VLQPQPQLF	HLA-C07:02	POTEG; POTEH	Prostate	5710
RPRSPSCPL	HLA-B07:02	C2orf53	Testis	1230	KRTALTKAV	HLA-C07:02	POTEG; POTEH	Prostate	5711
APKQVTTSL	HLA-B07:02	C2orf53	Testis	1231	HRDFSGHPNF	HLA-C07:02	POTEG	Prostate	5712
RPTWGFSQL	HLA-B07:02	C2orf53	Testis	1232	PRPPEAQMVL	HLA-C07:02	POTEG; POTEH	Prostate	5713
LPRYRTGPRL	HLA-B07:02	C2orf53	Testis	1233	VRREDLDKL	HLA-C07:02	POTEG; POTEH	Prostate	5714
LRPRSPSCPL	HLA-B07:02	C2orf53	Testis	1234	PRPPEAQM	HLA-C07:02	POTEG; POTEH	Prostate	5715
SPSLPSSPTF	HLA-B07:02	C2orf53	Testis	1235	EYGNTALHY	HLA-C07:02	POTEG; POTEH	Prostate	5716
SPSQPQNSSL	HLA-B07:02	C2orf53	Testis	1236	RPPEAQMVL	HLA-C07:02	POTEG; POTEH	Prostate	5717
LPRYRTGPRL	HLA-B08:01	C2orf53	Testis	1237	FIFIFIFIF	HLA-C07:02	POTEG; POTEH	Prostate	5718
CLRPRSPSCPL	HLA-B08:01	C2orf53	Testis	1238	RREDLDKL	HLA-C07:02	POTEG; POTEH	Prostate	5719
LPRYRTGPRLL	HLA-B08:01	C2orf53	Testis	1239	FLFIFIFIF	HLA-C07:02	POTEG; POTEH	Prostate	5720
PGPKRPVSL	HLA-B08:01	C2orf53	Testis	1240	LSDYKEKQILKV	HLA-A01:01	POTEH	Prostate	5721
APKQVTTSL	HLA-B08:01	C2orf53	Testis	1241	LSDYKEKQI	HLA-A01:01	POTEH	Prostate	5722

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
GPKRPVSL	HLA-B08:01	C2orf53	Testis	1242	LSDYKEKQILK	HLA-A01:01	POTEH	Prostate	5723
VEYPICLVCL	HLA-B13:02	C2orf53	Testis	1243	LSDYKEKQIL	HLA-A01:01	POTEH	Prostate	5724
RPTWGFSQLV	HLA-B13:02	C2orf53	Testis	1244	RHNVICQLLSDY	HLA-A01:01	POTEH	Prostate	5725
GQAPVVEYPI	HLA-B13:02	C2orf53	Testis	1245	LLSDYKEKQILK	HLA-A01:01	POTEH	Prostate	5726
GQESGPLRI	HLA-B13:02	C2orf53	Testis	1246	LLSDYKEKQI	HLA-A01:01	POTEH	Prostate	5727
GQARALHLL	HLA-B13:02	C2orf53	Testis	1247	VSSRHNVICQLL	HLA-A01:01	POTEH	Prostate	5728
RLLAFPQLL	HLA-B13:02	C2orf53	Testis	1248	MGKWCRHCFA	HLA-A01:01	POTEH	Prostate	5729
RTRPAATAF	HLA-B46:01	C2orf53	Testis	1249	FAWCRGSGK	HLA-A01:01	POTEH	Prostate	5730
HRTRPAATAF	HLA-B46:01	C2orf53	Testis	1250	YKEKQILKV	HLA-A01:01	POTEH	Prostate	5731
RTGPRLLAF	HLA-B46:01	C2orf53	Testis	1251	YKEKQILK	HLA-A01:01	POTEH	Prostate	5732
FFHQNYLSL	HLA-B46:01	C2orf53	Testis	1252	LTNGATADN	HLA-A01:01	POTEH	Prostate	5733
FSGPPPRAP	HLA-B46:01	C2orf53	Testis	1253	LTNGATAD	HLA-A01:01	POTEH	Prostate	5734
PSPPLTPSF	HLA-B46:01	C2orf53	Testis	1254	VSSRHNVIC	HLA-A01:01	POTEH	Prostate	5735
FAPHPYSPSL	HLA-C01:02	C2orf53	Testis	1255	LLSDYKEKQI	HLA-A02:01	POTEH	Prostate	5736
SSPHNLQPL	HLA-C01:02	C2orf53	Testis	1256	KMGKWCRHCFA	HLA-A02:01	POTEH	Prostate	5737
SLPSSPTFF	HLA-C01:02	C2orf53	Testis	1257	FAWCRGSGKSNV	HLA-A02:01	POTEH	Prostate	5738
FFHQNYLSL	HLA-C01:02	C2orf53	Testis	1258	YAVSSRHNV	HLA-A02:01	POTEH	Prostate	5739
RLPQGQARAL	HLA-C01:02	C2orf53	Testis	1259	SKMGKWCRHCFA	HLA-A02:01	POTEH	Prostate	5740
AATAFAAPV	HLA-C03:04	C2orf53	Testis	1260	MGKWCRHCFA	HLA-A02:01	POTEH	Prostate	5741
FAPHPYSPSL	HLA-C03:04	C2orf53	Testis	1261	LLSDYKEKQIL	HLA-A02:01	POTEH	Prostate	5742
LAHDLRLLL	HLA-C03:04	C2orf53	Testis	1262	KMGKWCRHCFAW	HLA-A02:01	POTEH	Prostate	5743
FAAPVARQN	HLA-C03:04	C2orf53	Testis	1263	HMGFPENLT	HLA-A02:01	POTEH	Prostate	5744
FFHQNYLSL	HLA-C04:01	C2orf53	Testis	1264	QLLSDYKEKQIL	HLA-A02:01	POTEH	Prostate	5745
SLPSSPTFF	HLA-C04:01	C2orf53	Testis	1265	QLLSDYKEKQI	HLA-A02:01	POTEH	Prostate	5746
AHDLRLLLL	HLA-C04:01	C2orf53	Testis	1266	CQLLSDYKEKQI	HLA-A02:01	POTEH	Prostate	5747
LVDSSPHNL	HLA-C04:01	C2orf53	Testis	1267	FAWCRGSGK	HLA-A02:01	POTEH	Prostate	5748
YRTGPRLLAF	HLA-C07:01	C2orf53	Testis	1268	KMGKWCCHCFPW	HLA-A02:01	POTEH	Prostate	5749
RRIAHDLRL	HLA-C07:01	C2orf53	Testis	1269	AVSSRHNVICQL	HLA-A02:01	POTEH	Prostate	5750
YRTGPRLLA	HLA-C07:01	C2orf53	Testis	1270	GKWCRHCFA	HLA-A02:01	POTEH	Prostate	5751
RRIAHDLRLL	HLA-C07:01	C2orf53	Testis	1271	AVSSRHNVI	HLA-A02:01	POTEH	Prostate	5752
KRPVSLEL	HLA-C07:01	C2orf53	Testis	1272	FAWCRGSGKS	HLA-A02:01	POTEH	Prostate	5753
TGQAPVVEY	HLA-C07:01	C2orf53	Testis	1273	HMGFPENLTNGA	HLA-A02:01	POTEH	Prostate	5754
FFHQNYLSL	HLA-C07:02	C2orf53	Testis	1274	THMGFPENLT	HLA-A02:01	POTEH	Prostate	5755
YRTGPRLLAF	HLA-C07:02	C2orf53	Testis	1275	YAVSSRHNVI	HLA-A02:01	POTEH	Prostate	5756
RRIAHDLRL	HLA-C07:02	C2orf53	Testis	1276	LLSDYKEKQILK	HLA-A02:01	POTEH	Prostate	5757
KRPVSLEL	HLA-C07:02	C2orf53	Testis	1277	KWCCHCFPWC	HLA-A02:01	POTEH	Prostate	5758
YRTGPRLL	HLA-C07:02	C2orf53	Testis	1278	GKWCCHCFPW	HLA-A02:01	POTEH	Prostate	5759
NRPGPSRGVSY	HLA-C07:02	C2orf53	Testis	1279	HMGFPENLTN	HLA-A02:01	POTEH	Prostate	5760
WTFRGKIHAF	HLA-A01:01	CCDC70	Testis	1280	KQILKVSSE	HLA-A02:01	POTEH	Prostate	5761
WMENNGHIA	HLA-A01:01	CCDC70	Testis	1281	KWCCHCFPW	HLA-A02:01	POTEH	Prostate	5762
WVEERALLF	HLA-A01:01	CCDC70	Testis	1282	YKEKQILKV	HLA-A02:01	POTEH	Prostate	5763
LLEGEKALW	HLA-A01:01	CCDC70	Testis	1283	SRHNVICQL	HLA-A02:01	POTEH	Prostate	5764
LWEDKTSLW	HLA-A01:01	CCDC70	Testis	1284	ALTKAVQCQ	HLA-A02:01	POTEH	Prostate	5765

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LWEEENALW	HLA-A01:01	CCDC70	Testis	1285	NLTNGATAD	HLA-A02:01	POTEH	Prostate	5766
SLWEEENAL	HLA-A02:01	CCDC70	Testis	1286	AVSSRHNV	HLA-A02:01	POTEH	Prostate	5767
ALWEDKTSL	HLA-A02:01	CCDC70	Testis	1287	SDYKEKQILKV	HLA-A02:01	POTEH	Prostate	5768
SLAASSPSI	HLA-A02:01	CCDC70	Testis	1288	SDYKEKQIL	HLA-A02:01	POTEH	Prostate	5769
ALWEEEKAL	HLA-A02:01	CCDC70	Testis	1289	CRGSGKNKV	HLA-A02:01	POTEH	Prostate	5770
ALWERDRNL	HLA-A02:01	CCDC70	Testis	1290	DYKEKQILKV	HLA-A02:01	POTEH	Prostate	5771
ALWERDRNLL	HLA-A02:01	CCDC70	Testis	1291	ILKVSSENS	HLA-A02:01	POTEH	Prostate	5772
ALWEEEKALWV	HLA-A02:01	CCDC70	Testis	1292	MGFPENLTN	HLA-A02:01	POTEH	Prostate	5773
ALLEGEKAL	HLA-A02:01	CCDC70	Testis	1293	ALTKAVQCQE	HLA-A02:01	POTEH	Prostate	5774
ALWVEERALL	HLA-A02:01	CCDC70	Testis	1294	RHNVICQLL	HLA-A02:01	POTEH	Prostate	5775
MLEDGPHNA	HLA-A02:01	CCDC70	Testis	1295	NLTNGATADN	HLA-A02:01	POTEH	Prostate	5776
RLIRKMFSFK	HLA-A03:01	CCDC70	Testis	1296	QILKVSSEN	HLA-A02:01	POTEH	Prostate	5777
LIRKMFSFK	HLA-A03:01	CCDC70	Testis	1297	SRHNVICQLL	HLA-A02:01	POTEH	Prostate	5778
KMFSFKVSR	HLA-A03:01	CCDC70	Testis	1298	KEKQILKV	HLA-A02:01	POTEH	Prostate	5779
ATPPFRLIRK	HLA-A03:01	CCDC70	Testis	1299	LSDYKEKQI	HLA-A02:01	POTEH	Prostate	5780
ASSPSIRQK	HLA-A03:01	CCDC70	Testis	1300	FAWCRGSGK	HLA-A03:01	POTEH	Prostate	5781
ATPPFRLIRK	HLA-A11:01	CCDC70	Testis	1301	CFAWCRGSGK	HLA-A03:01	POTEH	Prostate	5782
RLIRKMFSFK	HLA-A11:01	CCDC70	Testis	1302	LLSDYKEKQILK	HLA-A03:01	POTEH	Prostate	5783
KTFWKKYRTFW K	HLA-A11:01	CCDC70	Testis	1303	RHCFAWCRGSGK	HLA-A03:01	POTEH	Prostate	5784
ASSPSIRQK	HLA-A11:01	CCDC70	Testis	1304	HCFAWCRGSGK	HLA-A03:01	POTEH	Prostate	5785
ATPPFRLIR	HLA-A11:01	CCDC70	Testis	1305	FAWCRGSGKS	HLA-A03:01	POTEH	Prostate	5786
RLIRKMFSF	HLA-A24:02	CCDC70	Testis	1306	LSDYKEKQILK	HLA-A03:01	POTEH	Prostate	5787
TFWKKYRTF	HLA-A24:02	CCDC70	Testis	1307	SDYKEKQILK	HLA-A03:01	POTEH	Prostate	5788
RWMGLACF	HLA-A24:02	CCDC70	Testis	1308	TAREYAVSSR	HLA-A03:01	POTEH	Prostate	5789
PFWEEEKTF	HLA-A24:02	CCDC70	Testis	1309	REYAVSSRH	HLA-A03:01	POTEH	Prostate	5790
IFREKIEDF	HLA-A24:02	CCDC70	Testis	1310	DYKEKQILK	HLA-A03:01	POTEH	Prostate	5791
RLIRKMFSFK	HLA-A30:01	CCDC70	Testis	1311	AVSSRHNVIC	HLA-A03:01	POTEH	Prostate	5792
LIRKMFSFK	HLA-A30:01	CCDC70	Testis	1312	REYAVSSR	HLA-A03:01	POTEH	Prostate	5793
KYRTFWKEDK	HLA-A30:01	CCDC70	Testis	1313	CCRGSGKNK	HLA-A03:01	POTEH	Prostate	5794
KYRTFWKED	HLA-A30:01	CCDC70	Testis	1314	FAWCRGSGK	HLA-A11:01	POTEH	Prostate	5795
ASSPSIRQK	HLA-A30:01	CCDC70	Testis	1315	LLSDYKEKQILK	HLA-A11:01	POTEH	Prostate	5796
SSPSIRQKK	HLA-A30:01	CCDC70	Testis	1316	CFAWCRGSGK	HLA-A11:01	POTEH	Prostate	5797
TFRGKIHAFR	HLA-A33:03	CCDC70	Testis	1317	LSDYKEKQILK	HLA-A11:01	POTEH	Prostate	5798
SFWEMEKSFR	HLA-A33:03	CCDC70	Testis	1318	SDYKEKQILK	HLA-A11:01	POTEH	Prostate	5799
DFREEMWTFR	HLA-A33:03	CCDC70	Testis	1319	RHCFAWCRGSGK	HLA-A11:01	POTEH	Prostate	5800
EDGPHNANR	HLA-A33:03	CCDC70	Testis	1320	QTAREYAVSSR	HLA-A11:01	POTEH	Prostate	5801
ENALWEEER	HLA-A33:03	CCDC70	Testis	1321	TAREYAVSSR	HLA-A11:01	POTEH	Prostate	5802
SPSIRQKKL	HLA-B07:02	CCDC70	Testis	1322	HCFAWCRGSGK	HLA-A11:01	POTEH	Prostate	5803
SPSIRQKKLM	HLA-B07:02	CCDC70	Testis	1323	DYKEKQILK	HLA-A11:01	POTEH	Prostate	5804
SSPSIRQKKL	HLA-B07:02	CCDC70	Testis	1324	AVSSRHNVI	HLA-A11:01	POTEH	Prostate	5805
IHAFRGQIL	HLA-B07:02	CCDC70	Testis	1325	AVSSRHNVIC	HLA-A11:01	POTEH	Prostate	5806
FRLIRKMFSF	HLA-B08:01	CCDC70	Testis	1326	CCRGSGKNK	HLA-A11:01	POTEH	Prostate	5807

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
TFRGKIHAF	HLA-B08:01	CCDC70	Testis	1327	AREYAVSSR	HLA-A11:01	POTEH	Prostate	5808
RLIRKMFSF	HLA-B08:01	CCDC70	Testis	1328	MGFPENLTN	HLA-A11:01	POTEH	Prostate	5809
ALWEDKTSL	HLA-B08:01	CCDC70	Testis	1329	KWCCHCFPW	HLA-A24:02	POTEH	Prostate	5810
FWKEDNAL	HLA-B08:01	CCDC70	Testis	1330	KWCRHCFAW	HLA-A24:02	POTEH	Prostate	5811
ALWERDRNL	HLA-B08:01	CCDC70	Testis	1331	GKWCCHCFPW	HLA-A24:02	POTEH	Prostate	5812
RSLAASSPSI	HLA-B13:02	CCDC70	Testis	1332	KMGKWCCHCFPW	HLA-A24:02	POTEH	Prostate	5813
MATPPFRLI	HLA-B13:02	CCDC70	Testis	1333	MGKWCCHCFPW	HLA-A24:02	POTEH	Prostate	5814
REEMWTFRGKI	HLA-B13:02	CCDC70	Testis	1334	GKWCRHCFAW	HLA-A24:02	POTEH	Prostate	5815
RQKKLMHKL	HLA-B13:02	CCDC70	Testis	1335	RHNVICQLL	HLA-A24:02	POTEH	Prostate	5816
KAFREEMKI	HLA-B13:02	CCDC70	Testis	1336	MGKWCRHCFAW	HLA-A24:02	POTEH	Prostate	5817
GQILGFWEE	HLA-B13:02	CCDC70	Testis	1337	KMGKWCRHCFAW	HLA-A24:02	POTEH	Prostate	5818
FSFKVSRWM	HLA-B46:01	CCDC70	Testis	1338	DYKEKQILK	HLA-A24:02	POTEH	Prostate	5819
WTFRGKIHAF	HLA-B46:01	CCDC70	Testis	1339	DYKEKQIL	HLA-A24:02	POTEH	Prostate	5820
HAFRGQILGF	HLA-B46:01	CCDC70	Testis	1340	EYAVSSRHN	HLA-A24:02	POTEH	Prostate	5821
VSRWMGLAC	HLA-B46:01	CCDC70	Testis	1341	EYAVSSRHNVI	HLA-A24:02	POTEH	Prostate	5822
TFRGKIHAF	HLA-B46:01	CCDC70	Testis	1342	EYAVSSRHNV	HLA-A24:02	POTEH	Prostate	5823
ALWEDKTSL	HLA-B46:01	CCDC70	Testis	1343	DYKEKQILKV	HLA-A24:02	POTEH	Prostate	5824
MATPPFRLI	HLA-C01:02	CCDC70	Testis	1344	AVSSRHNVI	HLA-A24:02	POTEH	Prostate	5825
SLAASSPSI	HLA-C01:02	CCDC70	Testis	1345	MGKWCRHCFA	HLA-A30:01	POTEH	Prostate	5826
FSFKVSRWM	HLA-C01:02	CCDC70	Testis	1346	SSRHNVICQL	HLA-A30:01	POTEH	Prostate	5827
ALWEDKTSL	HLA-C01:02	CCDC70	Testis	1347	SSRHNVICQ	HLA-A30:01	POTEH	Prostate	5828
SLWEEENAL	HLA-C01:02	CCDC70	Testis	1348	SDYKEKQILK	HLA-A30:01	POTEH	Prostate	5829
ALWEEEKAL	HLA-C01:02	CCDC70	Testis	1349	KMGKWCRHCFA	HLA-A30:01	POTEH	Prostate	5830
MATPPFRLI	HLA-C03:04	CCDC70	Testis	1350	AVSSRHNVI	HLA-A30:01	POTEH	Prostate	5831
FSFKVSRWM	HLA-C03:04	CCDC70	Testis	1351	RHCFAWCRGSGK	HLA-A30:01	POTEH	Prostate	5832
MGLACFRSL	HLA-C03:04	CCDC70	Testis	1352	CCRGSGKNK	HLA-A30:01	POTEH	Prostate	5833
HAFRGQIL	HLA-C03:04	CCDC70	Testis	1353	KWCRHCFAWC	HLA-A30:01	POTEH	Prostate	5834
MATPPFRLI	HLA-C04:01	CCDC70	Testis	1354	DYKEKQILK	HLA-A30:01	POTEH	Prostate	5835
FWEEERPFW	HLA-C04:01	CCDC70	Testis	1355	DYKEKQILKV	HLA-A30:01	POTEH	Prostate	5836
FWMENNGHI	HLA-C04:01	CCDC70	Testis	1356	SRHNVICQL	HLA-A30:01	POTEH	Prostate	5837
SFWEMEKSF	HLA-C04:01	CCDC70	Testis	1357	KEKQILKV	HLA-A30:01	POTEH	Prostate	5838
FWEEEKTF	HLA-C04:01	CCDC70	Testis	1358	KNKVGPWGD	HLA-A30:01	POTEH	Prostate	5839
LWEEENAL	HLA-C04:01	CCDC70	Testis	1359	AVSSRHNV	HLA-A30:01	POTEH	Prostate	5840
NRGQRLLAF	HLA-C07:01	CCDC70	Testis	1360	TAREYAVSSR	HLA-A33:03	POTEH	Prostate	5841
FSFKVSRWM	HLA-C07:01	CCDC70	Testis	1361	CFAWCRGSGK	HLA-A33:03	POTEH	Prostate	5842
FKVSRWMGL	HLA-C07:01	CCDC70	Testis	1362	WCRHCFAWCR	HLA-A33:03	POTEH	Prostate	5843
FRGQILGF	HLA-C07:01	CCDC70	Testis	1363	FAWCRGSGK	HLA-A33:03	POTEH	Prostate	5844
FRGKIHAF	HLA-C07:01	CCDC70	Testis	1364	CCHCFPWCR	HLA-A33:03	POTEH	Prostate	5845
ANRGQRLL	HLA-C07:01	CCDC70	Testis	1365	DYKEKQILK	HLA-A33:03	POTEH	Prostate	5846
NRGQRLLAF	HLA-C07:02	CCDC70	Testis	1366	WCCHCFPWCR	HLA-A33:03	POTEH	Prostate	5847
TFRGKIHAF	HLA-C07:02	CCDC70	Testis	1367	CRHCFAWCR	HLA-A33:03	POTEH	Prostate	5848
TFWKKYRTF	HLA-C07:02	CCDC70	Testis	1368	QTAREYAVSSR	HLA-A33:03	POTEH	Prostate	5849
FRLIRKMFSF	HLA-C07:02	CCDC70	Testis	1369	EYAVSSRHN	HLA-A33:03	POTEH	Prostate	5850

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FRGKIHAF	HLA-C07:02	CCDC70	Testis	1370	EYAVSSRHNV	HLA-A33:03	POTEH	Prostate	5851
FRGQILGF	HLA-C07:02	CCDC70	Testis	1371	DYKEKQILKV	HLA-A33:03	POTEH	Prostate	5852
FREEMWTF	HLA-C07:02	CCDC70	Testis	1372	EYAVSSRH	HLA-A33:03	POTEH	Prostate	5853
LSCGDPTYPPY	HLA-A01:01	CELA2A	Pancreas	1373	ENLTNGATAD	HLA-A33:03	POTEH	Prostate	5854
CGDPTYPPY	HLA-A01:01	CELA2A	Pancreas	1374	AVSSRHNVI	HLA-B07:02	POTEH	Prostate	5855
LTDKIQLACL	HLA-A01:01	CELA2A; CELA2B	Pancreas	1375	YAVSSRHNV	HLA-B07:02	POTEH	Prostate	5856
ALSCGDPTYPPY	HLA-A01:01	CELA2A	Pancreas	1376	YAVSSRHNVI	HLA-B07:02	POTEH	Prostate	5857
LTDKIQLAC	HLA-A01:01	CELA2A; CELA2B	Pancreas	1377	SSRHNVICQL	HLA-B07:02	POTEH	Prostate	5858
NSWPWQVSLQY	HLA-A01:01	CELA2A; CELA2B	Pancreas	1378	FPCCRGSGKNKV	HLA-B07:02	POTEH	Prostate	5859
LTDKIQLA	HLA-A01:01	CELA2A; CELA2B	Pancreas	1379	FAWCRGSGK	HLA-B07:02	POTEH	Prostate	5860
SLIANSWVL	HLA-A02:01	CELA2A; CELA2B	Pancreas	1380	FPENLTNGATAD	HLA-B07:02	POTEH	Prostate	5861
ILPNNYPCYV	HLA-A02:01	CELA2A; CELA2B	Pancreas	1381	MGFPENLTNGAT	HLA-B07:02	POTEH	Prostate	5862
ALLKLANPV	HLA-A02:01	CELA2A; CELA2B	Pancreas	1382	REYAVSSRHNVI	HLA-B07:02	POTEH	Prostate	5863
GLGRHNLYV	HLA-A02:01	CELA2A	Pancreas	1383	RHNVICQLL	HLA-B07:02	POTEH	Prostate	5864
LLSTLVAGA	HLA-A02:01	CELA2A; CELA2B	Pancreas	1384	SDYKEKQIL	HLA-B07:02	POTEH	Prostate	5865
LLLSTLVAGA	HLA-A02:01	CELA2A; CELA2B	Pancreas	1385	SRHNVICQL	HLA-B07:02	POTEH	Prostate	5866
YIDWINSVI	HLA-A02:01	CELA2A	Pancreas	1386	AVSSRHNV	HLA-B07:02	POTEH	Prostate	5867
IQLACLPPA	HLA-A02:01	CELA2A; CELA2B	Pancreas	1387	RHNVICQL	HLA-B07:02	POTEH	Prostate	5868
SLIANSWV	HLA-A02:01	CELA2A; CELA2B	Pancreas	1388	FPCCRGSGKN	HLA-B07:02	POTEH	Prostate	5869
LLSTLVAGAL	HLA-A02:01	CELA2A; CELA2B	Pancreas	1389	MGKWCRHCFA	HLA-B08:01	POTEH	Prostate	5870
SLTDKIQLA	HLA-A02:01	CELA2A; CELA2B	Pancreas	1390	YAVSSRHNVI	HLA-B08:01	POTEH	Prostate	5871
VLQQGRLLV	HLA-A02:01	CELA2A	Pancreas	1391	AVSSRHNVI	HLA-B08:01	POTEH	Prostate	5872
KLANPVSL	HLA-A02:01	CELA2A; CELA2B	Pancreas	1392	FAWCRGSGKSNV	HLA-B08:01	POTEH	Prostate	5873
SLTDKIQL	HLA-A02:01	CELA2A; CELA2B	Pancreas	1393	KMGKWCRHCFA	HLA-B08:01	POTEH	Prostate	5874
YVAESGSLAV	HLA-A02:01	CELA2A; CELA2B	Pancreas	1394	SKMGKWCRHCFA	HLA-B08:01	POTEH	Prostate	5875
VLQQGRLLVV	HLA-A02:01	CELA2A	Pancreas	1395	FAWCRGSG	HLA-B08:01	POTEH	Prostate	5876
KLANPVSLTDK	HLA-A03:01	CELA2A; CELA2B	Pancreas	1396	FPCCRGSGKNKV	HLA-B08:01	POTEH	Prostate	5877

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SSAWWGSSVK	HLA-A03:01	CELA2A	Pancreas	1397	SSRHNVICQL	HLA-B08:01	POTEH	Prostate	5878
RTYRVGLGR	HLA-A03:01	CELA2A	Pancreas	1398	DYKEKQIL	HLA-B08:01	POTEH	Prostate	5879
LKLANPVSLTDK	HLA-A03:01	CELA2A; CELA2B	Pancreas	1399	DYKEKQILKV	HLA-B08:01	POTEH	Prostate	5880
SVFTRVSNY	HLA-A03:01	CELA2A	Pancreas	1400	SDYKEKQIL	HLA-B08:01	POTEH	Prostate	5881
SVSKIVVHK	HLA-A11:01	CELA2A; CELA2B	Pancreas	1401	SGKNKVGP	HLA-B08:01	POTEH	Prostate	5882
GSLAVSVSK	HLA-A11:01	CELA2A; CELA2B	Pancreas	1402	DYKEKQILK	HLA-B08:01	POTEH	Prostate	5883
SGSLAVSVSK	HLA-A11:01	CELA2A; CELA2B	Pancreas	1403	KEKQILKV	HLA-B08:01	POTEH	Prostate	5884
PTYPPYVTR	HLA-A11:01	CELA2A	Pancreas	1404	QILKVSSE	HLA-B08:01	POTEH	Prostate	5885
RWQVHGIVSF	HLA-A24:02	CELA2A	Pancreas	1405	LLSDYKEKQIL	HLA-B08:01	POTEH	Prostate	5886
TYPPYVTRV	HLA-A24:02	CELA2A	Pancreas	1406	REYAVSSRHNVI	HLA-B13:02	POTEH	Prostate	5887
NYYHKPSVF	HLA-A24:02	CELA2A	Pancreas	1407	REYAVSSRHNV	HLA-B13:02	POTEH	Prostate	5888
NYIDWINSVI	HLA-A24:02	CELA2A	Pancreas	1408	CQLLSDYKEKQI	HLA-B13:02	POTEH	Prostate	5889
NYIDWINSV	HLA-A24:02	CELA2A	Pancreas	1409	GKWCCHCFPW	HLA-B13:02	POTEH	Prostate	5890
SSRTYRVGL	HLA-A30:01	CELA2A	Pancreas	1410	AREYAVSSRHNV	HLA-B13:02	POTEH	Prostate	5891
GSLAVSVSK	HLA-A30:01	CELA2A; CELA2B	Pancreas	1411	SDYKEKQILKV	HLA-B13:02	POTEH	Prostate	5892
SVKTSMICA	HLA-A30:01	CELA2A	Pancreas	1412	YAVSSRHNV	HLA-B13:02	POTEH	Prostate	5893
RTLLLSTLV	HLA-A30:01	CELA2A; CELA2B	Pancreas	1413	GKWCRHCFAW	HLA-B13:02	POTEH	Prostate	5894
KGNDIALLK	HLA-A30:01	CELA2A; CELA2B	Pancreas	1414	YAVSSRHNVI	HLA-B13:02	POTEH	Prostate	5895
SVSKIVVHK	HLA-A30:01	CELA2A; CELA2B	Pancreas	1415	KEKQILKV	HLA-B13:02	POTEH	Prostate	5896
SVFTRVSNY	HLA-A30:01	CELA2A	Pancreas	1416	YKEKQILKV	HLA-B13:02	POTEH	Prostate	5897
CISSSRTYR	HLA-A33:03	CELA2A	Pancreas	1417	AVSSRHNVI	HLA-B13:02	POTEH	Prostate	5898
HCISSSRTYR	HLA-A33:03	CELA2A	Pancreas	1418	RGSGKNKV	HLA-B13:02	POTEH	Prostate	5899
YYHKPSVFTR	HLA-A33:03	CELA2A	Pancreas	1419	SDYKEKQIL	HLA-B13:02	POTEH	Prostate	5900
NYYHKPSVFTR	HLA-A33:03	CELA2A	Pancreas	1420	RHNVICQLL	HLA-B13:02	POTEH	Prostate	5901
PTYPPYVTR	HLA-A33:03	CELA2A	Pancreas	1421	ALTKAVQCQ	HLA-B13:02	POTEH	Prostate	5902
RPNSWPWQVSL	HLA-B07:02	CELA2A; CELA2B	Pancreas	1422	KQILKVSSE	HLA-B13:02	POTEH	Prostate	5903
YPPYVTRVV	HLA-B07:02	CELA2A	Pancreas	1423	AVSSRHNV	HLA-B13:02	POTEH	Prostate	5904
ARPNSWPWQVSL	HLA-B07:02	CELA2A; CELA2B	Pancreas	1424	YAVSSRHNV	HLA-B46:01	POTEH	Prostate	5905
RPNSWPWQV	HLA-B07:02	CELA2A; CELA2B	Pancreas	1425	YAVSSRHNVI	HLA-B46:01	POTEH	Prostate	5906
LPPAGTIL	HLA-B07:02	CELA2A; CELA2B	Pancreas	1426	FAWCRGSGK	HLA-B46:01	POTEH	Prostate	5907
MIRTLLLSTL	HLA-B08:01	CELA2A; CELA2B	Pancreas	1427	SSRHNVICQL	HLA-B46:01	POTEH	Prostate	5908

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LLKLANPVSL	HLA-B08:01	CELA2A; CELA2B	Pancreas	1428	AVSSRHNVI	HLA-B46:01	POTEH	Prostate	5909
SSRTYRVGL	HLA-B08:01	CELA2A	Pancreas	1429	SGKNKVGPW	HLA-B46:01	POTEH	Prostate	5910
SLTDKIQL	HLA-B08:01	CELA2A; CELA2B	Pancreas	1430	FAWCRGSGKSNV	HLA-B46:01	POTEH	Prostate	5911
VLQQGRLL	HLA-B08:01	CELA2A	Pancreas	1431	SRHNVICQL	HLA-B46:01	POTEH	Prostate	5912
KLANPVSL	HLA-B08:01	CELA2A; CELA2B	Pancreas	1432	FAWCRGSGKS	HLA-B46:01	POTEH	Prostate	5913
RTLLLSTLV	HLA-B13:02	CELA2A; CELA2B	Pancreas	1433	ILKVSSEN	HLA-B46:01	POTEH	Prostate	5914
IDWINSVIA	HLA-B13:02	CELA2A	Pancreas	1434	KNKVGPWGDY	HLA-B46:01	POTEH	Prostate	5915
SNYIDWINSV	HLA-B13:02	CELA2A	Pancreas	1435	NLTNGATAD	HLA-B46:01	POTEH	Prostate	5916
RVSNYIDWI	HLA-B13:02	CELA2A	Pancreas	1436	YAVSSRHN	HLA-B46:01	POTEH	Prostate	5917
SLAVSVSKI	HLA-B13:02	CELA2A; CELA2B	Pancreas	1437	KQILKVSSE	HLA-B46:01	POTEH	Prostate	5918
NQISKGNDI	HLA-B13:02	CELA2A	Pancreas	1438	ILKVSSENS	HLA-B46:01	POTEH	Prostate	5919
YATCSSSAW	HLA-B46:01	CELA2A	Pancreas	1439	YAVSSRHNV	HLA-C01:02	POTEH	Prostate	5920
WQVHGIVSF	HLA-B46:01	CELA2A	Pancreas	1440	AVSSRHNVI	HLA-C01:02	POTEH	Prostate	5921
SVFTRVSNY	HLA-B46:01	CELA2A	Pancreas	1441	YAVSSRHNVI	HLA-C01:02	POTEH	Prostate	5922
SSAWWGSSV	HLA-B46:01	CELA2A	Pancreas	1442	RHNVICQLL	HLA-C01:02	POTEH	Prostate	5923
NSWPWQVSL	HLA-B46:01	CELA2A; CELA2B	Pancreas	1443	LSDYKEKQI	HLA-C01:02	POTEH	Prostate	5924
CLPPAGTIL	HLA-C01:02	CELA2A; CELA2B	Pancreas	1444	SSRHNVICQL	HLA-C01:02	POTEH	Prostate	5925
YIDWINSVI	HLA-C01:02	CELA2A	Pancreas	1445	SRHNVICQL	HLA-C01:02	POTEH	Prostate	5926
NSWPWQVSL	HLA-C01:02	CELA2A; CELA2B	Pancreas	1446	FAWCRGSGK	HLA-C01:02	POTEH	Prostate	5927
SAWWGSSV	HLA-C01:02	CELA2A	Pancreas	1447	LSDYKEKQIL	HLA-C01:02	POTEH	Prostate	5928
SSAWWGSSV	HLA-C03:04	CELA2A	Pancreas	1448	NLTNGATAD	HLA-C01:02	POTEH	Prostate	5929
YATCSSSAW	HLA-C03:04	CELA2A	Pancreas	1449	VSSRHNVI	HLA-C01:02	POTEH	Prostate	5930
LSTLVAGAL	HLA-C03:04	CELA2A; CELA2B	Pancreas	1450	RHNVICQL	HLA-C01:02	POTEH	Prostate	5931
NSWPWQVSL	HLA-C03:04	CELA2A; CELA2B	Pancreas	1451	ILKVSSEN	HLA-C01:02	POTEH	Prostate	5932
LANPVSLTD	HLA-C03:04	CELA2A; CELA2B	Pancreas	1452	YAVSSRHNV	HLA-C03:04	POTEH	Prostate	5933
YIDWINSVI	HLA-C04:01	CELA2A	Pancreas	1453	YAVSSRHNVI	HLA-C03:04	POTEH	Prostate	5934
WYHTCGGSL	HLA-C04:01	CELA2A; CELA2B	Pancreas	1454	AVSSRHNVI	HLA-C03:04	POTEH	Prostate	5935
CLPPAGTIL	HLA-C04:01	CELA2A; CELA2B	Pancreas	1455	FAWCRGSGKSNV	HLA-C03:04	POTEH	Prostate	5936
NYYHKPSVF	HLA-C04:01	CELA2A	Pancreas	1456	FAWCRGSGK	HLA-C03:04	POTEH	Prostate	5937
TYPPYVTRV	HLA-C04:01	CELA2A	Pancreas	1457	EYAVSSRHNVI	HLA-C03:04	POTEH	Prostate	5938
YYHKPSVF	HLA-C04:01	CELA2A	Pancreas	1458	EYAVSSRHNV	HLA-C03:04	POTEH	Prostate	5939

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
NYIDWINSV	HLA-C07:01	CELA2A	Pancreas	1459	RHNVICQLL	HLA-C03:04	POTEH	Prostate	5940
IRTLLLSTL	HLA-C07:01	CELA2A; CELA2B	Pancreas	1460	REYAVSSRHNVI	HLA-C03:04	POTEH	Prostate	5941
YRVGLGRHNL	HLA-C07:01	CELA2A	Pancreas	1461	YAVSSRHN	HLA-C03:04	POTEH	Prostate	5942
NSWPWQVSL	HLA-C07:01	CELA2A; CELA2B	Pancreas	1462	SRHNVICQL	HLA-C03:04	POTEH	Prostate	5943
TNGAVPDVL	HLA-C07:01	CELA2A	Pancreas	1463	LSDYKEKQIL	HLA-C03:04	POTEH	Prostate	5944
LANPVSLTD	HLA-C07:01	CELA2A; CELA2B	Pancreas	1464	FAWCRGSG	HLA-C03:04	POTEH	Prostate	5945
NYYHKPSVF	HLA-C07:02	CELA2A	Pancreas	1465	MGFPENLTN	HLA-C03:04	POTEH	Prostate	5946
TYPPYVTRV	HLA-C07:02	CELA2A	Pancreas	1466	SDYKEKQIL	HLA-C03:04	POTEH	Prostate	5947
NYIDWINSV	HLA-C07:02	CELA2A	Pancreas	1467	RHNVICQLL	HLA-C04:01	POTEH	Prostate	5948
YYHKPSVF	HLA-C07:02	CELA2A	Pancreas	1468	FAWCRGSGK	HLA-C04:01	POTEH	Prostate	5949
ARPNSWPWQV	HLA-C07:02	CELA2A; CELA2B	Pancreas	1469	SRHNVICQL	HLA-C04:01	POTEH	Prostate	5950
LTSVLGCNYY	HLA-A01:01	CELA2B	Pancreas	1470	SRHNVICQLL	HLA-C04:01	POTEH	Prostate	5951
LTSVLGCNY	HLA-A01:01	CELA2B	Pancreas	1471	CFAWCRGSGK	HLA-C04:01	POTEH	Prostate	5952
LTSVLGCNYYY	HLA-A01:01	CELA2B	Pancreas	1472	YAVSSRHNV	HLA-C04:01	POTEH	Prostate	5953
YSSNGQWY	HLA-A01:01	CELA2B	Pancreas	1473	AVSSRHNVI	HLA-C04:01	POTEH	Prostate	5954
MLGQHNLYV	HLA-A02:01	CELA2B	Pancreas	1474	YAVSSRHNVI	HLA-C04:01	POTEH	Prostate	5955
VMLGQHNLYV	HLA-A02:01	CELA2B	Pancreas	1475	MGKWCRHCFA	HLA-C04:01	POTEH	Prostate	5956
LVAGALSCGV	HLA-A02:01	CELA2B	Pancreas	1476	DYKEKQIL	HLA-C04:01	POTEH	Prostate	5957
MLGQHNLYVA	HLA-A02:01	CELA2B	Pancreas	1477	RHNVICQL	HLA-C04:01	POTEH	Prostate	5958
VLQRCSLIL	HLA-A02:01	CELA2B	Pancreas	1478	LSDYKEKQI	HLA-C04:01	POTEH	Prostate	5959
YRVMLGQHNLYV	HLA-A02:01	CELA2B	Pancreas	1479	LSDYKEKQIL	HLA-C04:01	POTEH	Prostate	5960
ALSCGVSTYA	HLA-A02:01	CELA2B	Pancreas	1480	YKEKQILKV	HLA-C04:01	POTEH	Prostate	5961
FVRDLCSSQLEL	HLA-A02:01	CELA2B	Pancreas	1481	LTNGATADN	HLA-C04:01	POTEH	Prostate	5962
SLILFFVRDL	HLA-A02:01	CELA2B	Pancreas	1482	LTNGATAD	HLA-C04:01	POTEH	Prostate	5963
RVMLGQHNLYV	HLA-A02:01	CELA2B	Pancreas	1483	SRHNVICQL	HLA-C07:01	POTEH	Prostate	5964
ALPDDLKQG	HLA-A02:01	CELA2B	Pancreas	1484	SRHNVICQLL	HLA-C07:01	POTEH	Prostate	5965
DLKQGQLLV	HLA-A02:01	CELA2B	Pancreas	1485	SSRHNVICQL	HLA-C07:01	POTEH	Prostate	5966
DLCSSQLEL	HLA-A02:01	CELA2B	Pancreas	1486	RHNVICQLL	HLA-C07:01	POTEH	Prostate	5967
SQLELTGV	HLA-A02:01	CELA2B	Pancreas	1487	YAVSSRHNV	HLA-C07:01	POTEH	Prostate	5968
ALPDDLKQGQL	HLA-A02:01	CELA2B	Pancreas	1488	YKEKQILKV	HLA-C07:01	POTEH	Prostate	5969
AGSSGIYRV	HLA-A02:01	CELA2B	Pancreas	1489	SSRHNVICQLL	HLA-C07:01	POTEH	Prostate	5970
SVLGCNYYYK	HLA-A03:01	CELA2B	Pancreas	1490	CRGSGKNKV	HLA-C07:01	POTEH	Prostate	5971
VLGCNYYYK	HLA-A03:01	CELA2B	Pancreas	1491	AVSSRHNVI	HLA-C07:01	POTEH	Prostate	5972
SSGWWGSTVK	HLA-A03:01	CELA2B	Pancreas	1492	SDYKEKQIL	HLA-C07:01	POTEH	Prostate	5973
SIFTRVSNY	HLA-A03:01	CELA2B	Pancreas	1493	LTNGATAD	HLA-C07:01	POTEH	Prostate	5974
SVLGCNYYY	HLA-A03:01	CELA2B	Pancreas	1494	DYKEKQIL	HLA-C07:01	POTEH	Prostate	5975
SVLGCNYYYK	HLA-A11:01	CELA2B	Pancreas	1495	GSGKNKVGP	HLA-C07:01	POTEH	Prostate	5976
STYAPDMSR	HLA-A11:01	CELA2B	Pancreas	1496	LSDYKEKQIL	HLA-C07:01	POTEH	Prostate	5977
SSGWWGSTVK	HLA-A11:01	CELA2B	Pancreas	1497	KNKVGPWGD	HLA-C07:01	POTEH	Prostate	5978

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SSSGWWGSTVK	HLA-A11:01	CELA2B	Pancreas	1498	RHNVICQL	HLA-C07:01	POTEH	Prostate	5979
GVSAGSSGIYR	HLA-A11:01	CELA2B	Pancreas	1499	HCFAWCRGS	HLA-C07:01	POTEH	Prostate	5980
NYYYKPSIF	HLA-A24:02	CELA2B	Pancreas	1500	SRHNVICQL	HLA-C07:02	POTEH	Prostate	5981
YYKPSIFTRV	HLA-A24:02	CELA2B	Pancreas	1501	SRHNVICQLL	HLA-C07:02	POTEH	Prostate	5982
CNYYYKPSIF	HLA-A24:02	CELA2B	Pancreas	1502	RHNVICQLL	HLA-C07:02	POTEH	Prostate	5983
TYAPDMSRM	HLA-A24:02	CELA2B	Pancreas	1503	SSRHNVICQL	HLA-C07:02	POTEH	Prostate	5984
YYYKPSIF	HLA-A24:02	CELA2B	Pancreas	1504	YAVSSRHNV	HLA-C07:02	POTEH	Prostate	5985
AAHCIRQIK	HLA-A30:01	CELA2B	Pancreas	1505	SSRHNVICQLL	HLA-C07:02	POTEH	Prostate	5986
KVLQRCSLI	HLA-A30:01	CELA2B	Pancreas	1506	AVSSRHNVI	HLA-C07:02	POTEH	Prostate	5987
RVMLGQHNL	HLA-A30:01	CELA2B	Pancreas	1507	YKEKQILKV	HLA-C07:02	POTEH	Prostate	5988
MSRMLGGEEA	HLA-A30:01	CELA2B	Pancreas	1508	CRHCFAWCR	HLA-C07:02	POTEH	Prostate	5989
SVLGCNYYYK	HLA-A30:01	CELA2B	Pancreas	1509	DYKEKQIL	HLA-C07:02	POTEH	Prostate	5990
SIFTRVSNY	HLA-A30:01	CELA2B	Pancreas	1510	NKVGPWGDY	HLA-C07:02	POTEH	Prostate	5991
YYKPSIFTR	HLA-A33:03	CELA2B	Pancreas	1511	SRHNVICQ	HLA-C07:02	POTEH	Prostate	5992
YYYKPSIFTR	HLA-A33:03	CELA2B	Pancreas	1512	AREYAVSSR	HLA-C07:02	POTEH	Prostate	5993
STYAPDMSR	HLA-A33:03	CELA2B	Pancreas	1513	SDYKEKQIL	HLA-C07:02	POTEH	Prostate	5994
NYYYKPSIFTR	HLA-A33:03	CELA2B	Pancreas	1514	RHNVICQL	HLA-C07:02	POTEH	Prostate	5995
RVMLGQHNL	HLA-B07:02	CELA2B	Pancreas	1515	STGEKGFRY	HLA-A01:01	PPIAL4G	Colorectal:Uterine	5996
KPSIFTRVS	HLA-B07:02	CELA2B	Pancreas	1516	IVEAMEHFGY	HLA-A01:01	PPIAL4G	Colorectal:Uterine	5997
FVRDLCSSQL	HLA-B07:02	CELA2B	Pancreas	1517	LSTGEKGFRY	HLA-A01:01	PPIAL4G	Colorectal:Uterine	5998
APDMSRML	HLA-B07:02	CELA2B	Pancreas	1518	SVIFFDITV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	5999
LPDDLKQGQL	HLA-B07:02	CELA2B	Pancreas	1519	MVNSVIFFDI	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6000
APDMSRMLG	HLA-B07:02	CELA2B	Pancreas	1520	NSVIFFDITV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6001
WGRLQTNGAL	HLA-B08:01	CELA2B	Pancreas	1521	MVNSVIFFDITV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6002
IIKAHKVL	HLA-B08:01	CELA2B	Pancreas	1522	SVIFFDITVD	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6003
KVLQRCSL	HLA-B08:01	CELA2B	Pancreas	1523	WLDGKHVAF	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6004
DLKQGQLL	HLA-B08:01	CELA2B	Pancreas	1524	WLDGKHVAFGKV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6005
QIIKAHKVL	HLA-B08:01	CELA2B	Pancreas	1525	VIFFDITV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6006
GQWYHTCGGSLI	HLA-B13:02	CELA2B	Pancreas	1526	VNSVIFFDITV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6007
CNYYYKPSI	HLA-B13:02	CELA2B	Pancreas	1527	KVKERVNIV	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6008
SNYNDWINSV	HLA-B13:02	CELA2B	Pancreas	1528	WLDGKHVA	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6009
RQIIKAHKV	HLA-B13:02	CELA2B	Pancreas	1529	FADKIPKTA	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6010
RVSNYNDWI	HLA-B13:02	CELA2B	Pancreas	1530	FDDENLIRK	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6011
AGSSGIYRV	HLA-B13:02	CELA2B	Pancreas	1531	WLDGKHVAFG	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6012
VSAGSSGIY	HLA-B46:01	CELA2B	Pancreas	1532	EWLDGKHVA	HLA-A02:01	PPIAL4G	Colorectal:Uterine	6013
SSSGIYRVM	HLA-B46:01	CELA2B	Pancreas	1533	RISIKQFADK	HLA-A03:01	PPIAL4G	Colorectal:Uterine	6014
ALSCGVSTY	HLA-B46:01	CELA2B	Pancreas	1534	AMEHFGYRNSK	HLA-A03:01	PPIAL4G	Colorectal:Uterine	6015
AAHCISSSG	HLA-B46:01	CELA2B	Pancreas	1535	ALSTGEKGFRYK	HLA-A03:01	PPIAL4G	Colorectal:Uterine	6016
VSKGNDIAL	HLA-B46:01	CELA2B	Pancreas	1536	KQFADKIPK	HLA-A03:01	PPIAL4G	Colorectal:Uterine	6017
YAPDMSRML	HLA-C01:02	CELA2B	Pancreas	1537	STGEKGFRYK	HLA-A03:01	PPIAL4G	Colorectal:Uterine	6018
VLQRCSLIL	HLA-C01:02	CELA2B	Pancreas	1538	STGEKGFRYK	HLA-A11:01	PPIAL4G	Colorectal:Uterine	6019
RVMLGQHNL	HLA-C01:02	CELA2B	Pancreas	1539	SVIFFDITVDGK	HLA-A11:01	PPIAL4G	Colorectal:Uterine	6020
FVRDLCSSQL	HLA-C01:02	CELA2B	Pancreas	1540	ISIKQFADK	HLA-A11:01	PPIAL4G	Colorectal:Uterine	6021

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YAPDMSRM	HLA-C01:02	CELA2B	Pancreas	1541	ITVDGKPLGR	HLA-A11:01	PPIAL4G	Colorectal:Uterine	6022
DLCSSQLEL	HLA-C01:02	CELA2B	Pancreas	1542	TVDGKPLGR	HLA-A11:01	PPIAL4G	Colorectal:Uterine	6023
YAPDMSRML	HLA-C03:04	CELA2B	Pancreas	1543	RYKGSCFHRI	HLA-A24:02	PPIAL4G	Colorectal:Uterine	6024
SSSGIYRVM	HLA-C03:04	CELA2B	Pancreas	1544	RYKGSCFHRII	HLA-A24:02	PPIAL4G	Colorectal:Uterine	6025
HGIGSLTSV	HLA-C03:04	CELA2B	Pancreas	1545	FRYKGSCFHRI	HLA-A24:02	PPIAL4G	Colorectal:Uterine	6026
VSKGNDIAL	HLA-C03:04	CELA2B	Pancreas	1546	EWLDGKHVAF	HLA-A24:02	PPIAL4G	Colorectal:Uterine	6027
QIIKAHKVL	HLA-C03:04	CELA2B	Pancreas	1547	KIPKTAENF	HLA-A24:02	PPIAL4G	Colorectal:Uterine	6028
YNDWINSVI	HLA-C04:01	CELA2B	Pancreas	1548	KVKERVNIV	HLA-A30:01	PPIAL4G	Colorectal:Uterine	6029
FFVRDLCSSQL	HLA-C04:01	CELA2B	Pancreas	1549	GYRNSKTSK	HLA-A30:01	PPIAL4G	Colorectal:Uterine	6030
VRDLCSSQL	HLA-C04:01	CELA2B	Pancreas	1550	KQFADKIPK	HLA-A30:01	PPIAL4G	Colorectal:Uterine	6031
NYYYKPSIF	HLA-C04:01	CELA2B	Pancreas	1551	STGEKGFRYK	HLA-A30:01	PPIAL4G	Colorectal:Uterine	6032
NYNDWINSV	HLA-C04:01	CELA2B	Pancreas	1552	EAMEHFGYR	HLA-A33:03	PPIAL4G	Colorectal:Uterine	6033
YYYKPSIF	HLA-C04:01	CELA2B	Pancreas	1553	VEAMEHFGYR	HLA-A33:03	PPIAL4G	Colorectal:Uterine	6034
NYNDWINSV	HLA-C07:01	CELA2B	Pancreas	1554	FRYKGSCFHR	HLA-A33:03	PPIAL4G	Colorectal:Uterine	6035
YRVMLGQHNL	HLA-C07:01	CELA2B	Pancreas	1555	VAFGKVKER	HLA-A33:03	PPIAL4G	Colorectal:Uterine	6036
VRDLCSSQL	HLA-C07:01	CELA2B	Pancreas	1556	TVDGKPLGR	HLA-A33:03	PPIAL4G	Colorectal:Uterine	6037
NYYYKPSIF	HLA-C07:01	CELA2B	Pancreas	1557	IPKTAENFRAL	HLA-B07:02	PPIAL4G	Colorectal:Uterine	6038
SSGIYRVML	HLA-C07:01	CELA2B	Pancreas	1558	KPLGRISI	HLA-B07:02	PPIAL4G	Colorectal:Uterine	6039
RVMLGQHNL	HLA-C07:01	CELA2B	Pancreas	1559	HPNGTGDKSI	HLA-B07:02	PPIAL4G	Colorectal:Uterine	6040
QRCSLILFF	HLA-C07:01	CELA2B	Pancreas	1560	KPLGRISIK	HLA-B07:02	PPIAL4G	Colorectal:Uterine	6041
NYYYKPSIF	HLA-C07:02	CELA2B	Pancreas	1561	FGKVKERVNI	HLA-B08:01	PPIAL4G	Colorectal:Uterine	6042
TYAPDMSRM	HLA-C07:02	CELA2B	Pancreas	1562	LIRKHTGSGI	HLA-B08:01	PPIAL4G	Colorectal:Uterine	6043
NYNDWINSV	HLA-C07:02	CELA2B	Pancreas	1563	KVKERVNIV	HLA-B08:01	PPIAL4G	Colorectal:Uterine	6044
YYKPSIFTR	HLA-C07:02	CELA2B	Pancreas	1564	ENLIRKHTG	HLA-B08:01	PPIAL4G	Colorectal:Uterine	6045
YYYKPSIF	HLA-C07:02	CELA2B	Pancreas	1565	WLDGKHVAF	HLA-B08:01	PPIAL4G	Colorectal:Uterine	6046
TIDAKELKV	HLA-A01:01	CETN1	Testis	1566	MVNSVIFFDI	HLA-B13:02	PPIAL4G	Colorectal:Uterine	6047
ISFNDFLAVM	HLA-A01:01	CETN1	Testis	1567	VNSVIFFDI	HLA-B13:02	PPIAL4G	Colorectal:Uterine	6048
LTEDQKQEV	HLA-A01:01	CETN1	Testis	1568	SVIFFDITV	HLA-B13:02	PPIAL4G	Colorectal:Uterine	6049
FNDFLAVMTQKM	HLA-A01:01	CETN1	Testis	1569	RNSKTSKKI	HLA-B13:02	PPIAL4G	Colorectal:Uterine	6050
TIDAKELK	HLA-A01:01	CETN1	Testis	1570	AFGKVKERV	HLA-B13:02	PPIAL4G	Colorectal:Uterine	6051
KISFNDFLAV	HLA-A02:01	CETN1	Testis	1571	ITLADCGQF	HLA-B46:01	PPIAL4G	Colorectal:Uterine	6052
FLAVMTQKM	HLA-A02:01	CETN1	Testis	1572	HTGSGILSM	HLA-B46:01	PPIAL4G	Colorectal:Uterine	6053
ISFNDFLAV	HLA-A02:01	CETN1	Testis	1573	NIVEAMEHF	HLA-B46:01	PPIAL4G	Colorectal:Uterine	6054
KISFNDFLA	HLA-A02:01	CETN1	Testis	1574	VIFFDITVD	HLA-B46:01	PPIAL4G	Colorectal:Uterine	6055
GKISFNDFLAV	HLA-A02:01	CETN1	Testis	1575	STGEKGFRY	HLA-B46:01	PPIAL4G	Colorectal:Uterine	6056
DFLAVMTQKM	HLA-A02:01	CETN1	Testis	1576	WLDGKHVAF	HLA-B46:01	PPIAL4G	Colorectal:Uterine	6057
TGKISFNDFLAV	HLA-A02:01	CETN1	Testis	1577	WLDGKHVAF	HLA-C01:02	PPIAL4G	Colorectal:Uterine	6058
FLAVMTQKMS	HLA-A02:01	CETN1	Testis	1578	HTGSGILSM	HLA-C01:02	PPIAL4G	Colorectal:Uterine	6059
KISFNDFLAVM	HLA-A02:01	CETN1	Testis	1579	KIPKTAENF	HLA-C01:02	PPIAL4G	Colorectal:Uterine	6060
RLFDDDETG	HLA-A02:01	CETN1	Testis	1580	KIPKTAENFRAL	HLA-C01:02	PPIAL4G	Colorectal:Uterine	6061
TIDAKELKV	HLA-A02:01	CETN1	Testis	1581	KIPKTAEN	HLA-C01:02	PPIAL4G	Colorectal:Uterine	6062
ELTEDQKQEV	HLA-A02:01	CETN1	Testis	1582	HTGSGILSM	HLA-C03:04	PPIAL4G	Colorectal:Uterine	6063
RLFDDDETGKI	HLA-A02:01	CETN1	Testis	1583	ITLADCGQF	HLA-C03:04	PPIAL4G	Colorectal:Uterine	6064

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RLFDDDETGK	HLA-A02:01	CETN1	Testis	1584	WLDGKHVAF	HLA-C03:04	PPIAL4G	Colorectal;Uterine	6065
GTIDAKELKV	HLA-A02:01	CETN1	Testis	1585	FADKIPKTA	HLA-C03:04	PPIAL4G	Colorectal;Uterine	6066
NLKRVANEL	HLA-A02:01	CETN1	Testis	1586	ITVDGKPL	HLA-C03:04	PPIAL4G	Colorectal;Uterine	6067
AVMTQKMSEK	HLA-A03:01	CETN1	Testis	1587	FDITVDGKPL	HLA-C03:04	PPIAL4G	Colorectal;Uterine	6068
KPSAASTGQK	HLA-A03:01	CETN1	Testis	1588	WLDGKHVAF	HLA-C04:01	PPIAL4G	Colorectal;Uterine	6069
AMRALGFEPRK	HLA-A03:01	CETN1	Testis	1589	FFDITVDGKPL	HLA-C04:01	PPIAL4G	Colorectal;Uterine	6070
RLFDDDETGK	HLA-A03:01	CETN1	Testis	1590	FFDITVDGK	HLA-C04:01	PPIAL4G	Colorectal;Uterine	6071
RALGFEPRK	HLA-A03:01	CETN1	Testis	1591	KFDDENLI	HLA-C04:01	PPIAL4G	Colorectal;Uterine	6072
AVMTQKMSEK	HLA-A11:01	CETN1	Testis	1592	FFDITVDG	HLA-C04:01	PPIAL4G	Colorectal;Uterine	6073
GTIDAKELK	HLA-A11:01	CETN1	Testis	1593	FRYKGSCFH	HLA-C07:01	PPIAL4G	Colorectal;Uterine	6074
SGTIDAKELK	HLA-A11:01	CETN1	Testis	1594	FRYKGSCFHRII	HLA-C07:01	PPIAL4G	Colorectal;Uterine	6075
RALGFEPRK	HLA-A11:01	CETN1	Testis	1595	FRYKGSCFHRI	HLA-C07:01	PPIAL4G	Colorectal;Uterine	6076
EILKAFRLF	HLA-A24:02	CETN1	Testis	1596	HTGSGILSM	HLA-C07:01	PPIAL4G	Colorectal;Uterine	6077
SFNDFLAVM	HLA-A24:02	CETN1	Testis	1597	SIYGEKFDD	HLA-C07:01	PPIAL4G	Colorectal;Uterine	6078
ILKAFRLF	HLA-A24:02	CETN1	Testis	1598	IFFDITVD	HLA-C07:01	PPIAL4G	Colorectal;Uterine	6079
EVREAFDLF	HLA-A24:02	CETN1	Testis	1599	FRYKGSCFH	HLA-C07:02	PPIAL4G	Colorectal;Uterine	6080
GQKRKVAPK	HLA-A30:01	CETN1	Testis	1600	FRYKGSCF	HLA-C07:02	PPIAL4G	Colorectal;Uterine	6081
RALGFEPRK	HLA-A30:01	CETN1	Testis	1601	FRYKGSCFHRII	HLA-C07:02	PPIAL4G	Colorectal;Uterine	6082
AMRALGFEPRK	HLA-A30:01	CETN1	Testis	1602	ERVNIVEAM	HLA-C07:02	PPIAL4G	Colorectal;Uterine	6083
GTIDAKELK	HLA-A30:01	CETN1	Testis	1603	YRNSKTSK	HLA-C07:02	PPIAL4G	Colorectal;Uterine	6084
RLFDDDETGK	HLA-A30:01	CETN1	Testis	1604	LSNLTHVLY	HLA-A01:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6085
EVNEEEFLR	HLA-A33:03	CETN1	Testis	1605	CSQLTTLSFY	HLA-A01:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6086
AMRALGFEPR	HLA-A33:03	CETN1	Testis	1606	WSGNRASLY	HLA-A01:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6087
DFLAVMTQK	HLA-A33:03	CETN1	Testis	1607	ITDDQLLAL	HLA-A01:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6088
DAKELKVAMR	HLA-A33:03	CETN1	Testis	1608	YVDSLFFLR	HLA-A01:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6089
SAASTGQKR	HLA-A33:03	CETN1	Testis	1609	NLTHVLYPV	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6090
EPRKEEMKKM	HLA-B07:02	CETN1	Testis	1610	ALYVDSLFFL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6091
RVANELGENL	HLA-B07:02	CETN1	Testis	1611	TLAKFSPYL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6092

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KPSAASTGQ	HLA-B07:02	CETN1	Testis	1612	QLLALLPSL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6093
APKPELTED	HLA-B07:02	CETN1	Testis	1613	WLLHHSWVWV	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6094
RKVAPKPEL	HLA-B07:02	CETN1	Testis	1614	SLLQHLIGL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6095
EEFLRIMKKTSL	HLA-B08:01	CETN1	Testis	1615	SNLTHVLYPV	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6096
NLKRVANEL	HLA-B08:01	CETN1	Testis	1616	YELQEALISL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6097
FKNLKRVANEL	HLA-B08:01	CETN1	Testis	1617	VLDGLDVLL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6098
DAKELKVAM	HLA-B08:01	CETN1	Testis	1618	ALISLPHGL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6099
TGQKRKVAP	HLA-B08:01	CETN1	Testis	1619	ALQSLLQHL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6100
EILKAFRL	HLA-B08:01	CETN1	Testis	1620	RLSEGDVMHL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6101
ISFNDFLAV	HLA-B13:02	CETN1	Testis	1621	ALLERASATL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6102
REAFDLFDV	HLA-B13:02	CETN1	Testis	1622	ELQEALISL	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6103
FDVDGSGTI	HLA-B13:02	CETN1	Testis	1623	RLDQLLRHV	HLA-A02:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6104
TIDAKELKV	HLA-B13:02	CETN1	Testis	1624	VLYPVPLESY	HLA-A03:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6105
ASTGQKRKV	HLA-B13:02	CETN1	Testis	1625	KIFAMPMQDIK	HLA-A03:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6106
FLAVMTQKM	HLA-B46:01	CETN1	Testis	1626	VELAGQSLLK	HLA-A03:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6107

peptide	allele	gene	cancer	SEQ		peptide	allele	gene	cancer	SEQ
ISFNDFLAV	HLA-B46:01	CETN1	Testis	1627		ELFSYLIEK	HLA-A03:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6108
ISFNDFLAVM	HLA-B46:01	CETN1	Testis	1628		VLYPVPLES	HLA-A03:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6109
VANELGEN	HLA-B46:01	CETN1	Testis	1629		ASSYISPEK	HLA-A11:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6110
VANELGENL	HLA-B46:01	CETN1	Testis	1630		CTWKLPTLAK	HLA-A11:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6111
DAKELKVAM	HLA-B46:01	CETN1	Testis	1631		ISMSVWTSPR	HLA-A11:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6112
FLAVMTQKM	HLA-C01:02	CETN1	Testis	1632		YVDSLFFLR	HLA-A11:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6113
ISFNDFLAV	HLA-C01:02	CETN1	Testis	1633		EVLVDLFLK	HLA-A11:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6114
SFNDFLAVM	HLA-C01:02	CETN1	Testis	1634		ELFSYLIEK	HLA-A11:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6115
VANELGENL	HLA-C01:02	CETN1	Testis	1635		QYIAQFTSQF	HLA-A24:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6116
VAPKPELTED	HLA-C01:02	CETN1	Testis	1636		RWLLHHSWVW	HLA-A24:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6117
VAPKPELTE	HLA-C01:02	CETN1	Testis	1637		TWKLPTLAKF	HLA-A24:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6118
ISFNDFLAV	HLA-C03:04	CETN1	Testis	1638		LYVDSLFFL	HLA-A24:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6119
FLAVMTQKM	HLA-C03:04	CETN1	Testis	1639		PYLGQMINL	HLA-A24:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6120
VANELGENL	HLA-C03:04	CETN1	Testis	1640		SYEDIHGTL	HLA-A24:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6121
GTIDAKEL	HLA-C03:04	CETN1	Testis	1641		QSRYISMSV	HLA-A30:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6122

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KVAPKPEL	HLA-C03:04	CETN1	Testis	1642	KLKIFAMPM	HLA-A30:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6123
SFNDFLAVM	HLA-C04:01	CETN1	Testis	1643	IQSRYISMSV	HLA-A30:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6124
LFDVDGSGTI	HLA-C04:01	CETN1	Testis	1644	ASSYISPEK	HLA-A30:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6125
FLAVMTQKM	HLA-C04:01	CETN1	Testis	1645	TWKLPTLAK	HLA-A30:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6126
AFDLFDVDG	HLA-C04:01	CETN1	Testis	1646	RLRELLCEL	HLA-A30:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6127
SFNDFLAVM	HLA-C07:01	CETN1	Testis	1647	HSWVWVPFR	HLA-A33:03	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6128
ISFNDFLAV	HLA-C07:01	CETN1	Testis	1648	SMSVWTSPR	HLA-A33:03	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6129
FLAVMTQKM	HLA-C07:01	CETN1	Testis	1649	ISMSVWTSPR	HLA-A33:03	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6130
REGTGKISF	HLA-C07:01	CETN1	Testis	1650	ETLSITNCR	HLA-A33:03	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6131
APKPELTED	HLA-C07:01	CETN1	Testis	1651	DSLFFLRGR	HLA-A33:03	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6132
KVAPKPEL	HLA-C07:01	CETN1	Testis	1652	YVDSLFFLR	HLA-A33:03	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6133
SFNDFLAVM	HLA-C07:02	CETN1	Testis	1653	RPRRWKLQVL	HLA-B07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6134
FLAVMTQKM	HLA-C07:02	CETN1	Testis	1654	LPRGLGRWL	HLA-B07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6135
ISFNDFLAVM	HLA-C07:02	CETN1	Testis	1655	RPRRWKLQV	HLA-B07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6136
KRKVAPKPEL	HLA-C07:02	CETN1	Testis	1656	LPRELFPPL	HLA-B07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6137

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KVAPKPEL	HLA-C07:02	CETN1	Testis	1657	SPYLGQMINL	HLA-B07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6138
RKVAPKPEL	HLA-C07:02	CETN1	Testis	1658	SPSVSQLSVL	HLA-B07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6139
WTAHAIIRDFY	HLA-A01:01	CLDN6	Ovarian	1659	YLHARLREL	HLA-B08:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6140
CWTAHAIIRDFY	HLA-A01:01	CLDN6	Ovarian	1660	MINLRRLLL	HLA-B08:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6141
LVALFGLLVY	HLA-A01:01	CLDN6	Ovarian	1661	FLRGRLDQL	HLA-B08:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6142
PSEYPTKNY	HLA-A01:01	CLDN6	Ovarian	1662	KVKRKKNVL	HLA-B08:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6143
ALFGLLVY	HLA-A01:01	CLDN6	Ovarian	1663	REYELQEALI	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6144
ALFGLLVYL	HLA-A02:01	CLDN6	Ovarian	1664	CDELFSYLI	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6145
VLTSGIVFV	HLA-A02:01	CLDN6	Ovarian	1665	LQSLLQHLI	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6146
TLLGWVNGL	HLA-A02:01	CLDN6	Ovarian	1666	AEQPFIPVEV	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6147
TLIPVCWTA	HLA-A02:01	CLDN6	Ovarian	1667	EQPFIPVEV	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6148
FVISGVLTL	HLA-A02:01	CLDN6	Ovarian	1668	RLCCKKLKI	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6149
YMARYSTSA	HLA-A02:01	CLDN6	Ovarian	1669	RLWGSIQSR	HLA-B13:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6150
ALLVALFGL	HLA-A02:01	CLDN6	Ovarian	1670	YIAQFTSQF	HLA-B46:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6151
ALFGLLVYLA	HLA-A02:01	CLDN6	Ovarian	1671	LSHIHASSY	HLA-B46:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6152

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
					FAMPMQDIKM	HLA-B46:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6153
					VLYPVPLESY	HLA-B46:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6154
					AAFDGRHSQ	HLA-B46:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6155
					VSPEPLQAL	HLA-C01:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6156
					YLHARLREL	HLA-C01:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6157
					ITDDQLLAL	HLA-C01:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6158
					TSPRRLVEL	HLA-C01:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6159
					AWPFTCLPL	HLA-C01:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6160
					ISISALQSL	HLA-C03:04	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6161
					LAIAALELL	HLA-C03:04	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6162
					HVMNPLETL	HLA-C03:04	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6163
					LAIAALEL	HLA-C03:04	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6164
					FTSQFLSL	HLA-C03:04	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6165
					FYDPEPILCPCF	HLA-C04:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6166
					SYEDIHGTL	HLA-C04:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6167
FVISGVLTLIPV	HLA-A02:01	CLDN6	Ovarian	1672					
ILGVVLTLL	HLA-A02:01	CLDN6	Ovarian	1673					
GLLVYLAGA	HLA-A02:01	CLDN6	Ovarian	1674					
LVSCALPMWK	HLA-A03:01	CLDN6	Ovarian	1675					
VSCALPMWK	HLA-A03:01	CLDN6	Ovarian	1676					
GLLVYLAGAK	HLA-A03:01	CLDN6	Ovarian	1677					
ALFGLLVYL	HLA-A03:01	CLDN6	Ovarian	1678					
ALFGLLVY	HLA-A03:01	CLDN6	Ovarian	1679					
LVALFGLLVY	HLA-A03:01	CLDN6	Ovarian	1680					
VSCALPMWK	HLA-A11:01	CLDN6	Ovarian	1681					
STSAPAISR	HLA-A11:01	CLDN6	Ovarian	1682					
LVSCALPMWK	HLA-A11:01	CLDN6	Ovarian	1683					
ALFGLLVYL	HLA-A11:01	CLDN6	Ovarian	1684					
MWKALLFLTL	HLA-A24:02	CLDN6	Ovarian	1685					
RYSTSAPAI	HLA-A24:02	CLDN6	Ovarian	1686					

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LYLGWAASGL	HLA-A24:02	CLDN6	Ovarian	1687	HHSWVWVPF	HLA-C04:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6168
VIALLVALF	HLA-A24:02	CLDN6	Ovarian	1688	FYDPEPILC	HLA-C04:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6169
VFVISGVLTL	HLA-A24:02	CLDN6	Ovarian	1689	FYDPEPIL	HLA-C04:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6170
KARLVLTSG	HLA-A30:01	CLDN6	Ovarian	1690	VFDECGITD	HLA-C04:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6171
KARLVLTSGI	HLA-A30:01	CLDN6	Ovarian	1691	YLHARLREL	HLA-C07:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6172
MARYSTSAPA	HLA-A30:01	CLDN6	Ovarian	1692	KRKKNVLRL	HLA-C07:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6173
RGPSEYPTK	HLA-A30:01	CLDN6	Ovarian	1693	SFYGNSISI	HLA-C07:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6174
ALFGLLVYL	HLA-A30:01	CLDN6	Ovarian	1694	LHLERLAYL	HLA-C07:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6175
GVLTLIPVC	HLA-A30:01	CLDN6	Ovarian	1695	RRWKLQVL	HLA-C07:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6176
STSAPAISR	HLA-A33:03	CLDN6	Ovarian	1696	RRWKLQVLDL	HLA-C07:01	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6177
YSTSAPAISR	HLA-A33:03	CLDN6	Ovarian	1697	YLHARLREL	HLA-C07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6178
FYNPLVAEAQKR	HLA-A33:03	CLDN6	Ovarian	1698	LYVDSLFFL	HLA-C07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6179
TSAPAISR	HLA-A33:03	CLDN6	Ovarian	1699	LHLERLAYL	HLA-C07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6180
WTAHAIIR	HLA-A33:03	CLDN6	Ovarian	1700	KRKKNVLRL	HLA-C07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6181
LPMWKVTAF	HLA-B07:02	CLDN6	Ovarian	1701	FYDPEPIL	HLA-C07:02	PRAME	Lung squam.;Melanoma;Ovarian;Uterine	6182

peptide	allele	gene	cancer	SEQ							
ALPMWKVTAF	HLA-B07:02	CLDN6	Ovarian	1702	SYEDIHGTL	HLA-C07:02	PRAME	PRDM7	Lung squam.;Melanoma;Ovarian;Uterine	6183
LPMWKVTAFI	HLA-B07:02	CLDN6	Ovarian	1703	KSSANWMRY	HLA-A01:01	PRDM7	PRDM7	Melanoma	6184
LPMWKALLF	HLA-B07:02	CLDN6	Ovarian	1704	ISEPQDDDY	HLA-A01:01	PRDM7	PRDM7	Melanoma	6185
LPMWKALLFL	HLA-B07:02	CLDN6	Ovarian	1705	ISEPQDDDYLY	HLA-A01:01	PRDM7	PRDM7	Melanoma	6186
LPMWKVTAF	HLA-B08:01	CLDN6	Ovarian	1706	ITEDEEAANSGY	HLA-A01:01	PRDM7	PRDM7	Melanoma	6187
LPMWKVTAFI	HLA-B08:01	CLDN6	Ovarian	1707	ASDLPLGLH	HLA-A01:01	PRDM7	PRDM7	Melanoma	6188
LPMWKALLFLTL	HLA-B08:01	CLDN6	Ovarian	1708	YLYCEMCQNFFI	HLA-A02:01	PRDM7	PRDM7	Melanoma	6189
DSKARLVL	HLA-B08:01	CLDN6	Ovarian	1709	NMWNAITPL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6190
VIALLVAL	HLA-B08:01	CLDN6	Ovarian	1710	KMNYNALITV	HLA-A02:01	PRDM7	PRDM7	Melanoma	6191
RALCVIALLV	HLA-B13:02	CLDN6	Ovarian	1711	FSVNMWNAITPL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6192
LTSGIVFVI	HLA-B13:02	CLDN6	Ovarian	1712	SLLSELPRTI	HLA-A02:01	PRDM7	PRDM7	Melanoma	6193
SEYPTKNYV	HLA-B13:02	CLDN6	Ovarian	1713	VLLMGPLHL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6194
ALCVIALLV	HLA-B13:02	CLDN6	Ovarian	1714	VNMWNAITPL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6195
ALFGLLVYL	HLA-B13:02	CLDN6	Ovarian	1715	SMSLMLSGL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6196
VLTSGIVFV	HLA-B13:02	CLDN6	Ovarian	1716	SLLSELPRT	HLA-A02:01	PRDM7	PRDM7	Melanoma	6197
FVISGVLTL	HLA-B46:01	CLDN6	Ovarian	1717	LMLSGLFKSKI	HLA-A02:01	PRDM7	PRDM7	Melanoma	6198
MASAGMQIL	HLA-B46:01	CLDN6	Ovarian	1718	ALITVGLRA	HLA-A02:01	PRDM7	PRDM7	Melanoma	6199
VALFGLLVY	HLA-B46:01	CLDN6	Ovarian	1719	LLSELPRTI	HLA-A02:01	PRDM7	PRDM7	Melanoma	6200
IIRDFYNPL	HLA-B46:01	CLDN6	Ovarian	1720	LLMGPLHL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6201
ISRGPSEY	HLA-B46:01	CLDN6	Ovarian	1721	ELSGTPNLL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6202
TAHAIIRDF	HLA-B46:01	CLDN6	Ovarian	1722	SLRELSGTPNL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6203
FVISGVLTL	HLA-C01:02	CLDN6	Ovarian	1723	SGDEYGQEL	HLA-A02:01	PRDM7	PRDM7	Melanoma	6204
YLGWAASGL	HLA-C01:02	CLDN6	Ovarian	1724	MSLMLSGLFK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6205
ALPMWKALL	HLA-C01:02	CLDN6	Ovarian	1725	SLMLSGLFK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6206
ALPMWKAL	HLA-C01:02	CLDN6	Ovarian	1726	KMYSLRERK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6207
ALPMWKVTAF	HLA-C01:02	CLDN6	Ovarian	1727	ILIHAAVMTK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6208
FVISGVLTL	HLA-C03:04	CLDN6	Ovarian	1728	SGYSWLITK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6209
MASAGMQIL	HLA-C03:04	CLDN6	Ovarian	1729	AVMTKPKVK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6210
CALPMWKAL	HLA-C03:04	CLDN6	Ovarian	1730	SELPRTICK	HLA-A03:01	PRDM7	PRDM7	Melanoma	6211
KALLFLTL	HLA-C03:04	CLDN6	Ovarian	1731	MSLMLSGLFK	HLA-A11:01	PRDM7	PRDM7	Melanoma	6212
LPMWKALLF	HLA-C04:01	CLDN6	Ovarian	1732	SLMLSGLFK	HLA-A11:01	PRDM7	PRDM7	Melanoma	6213
RYSTSAPAI	HLA-C04:01	CLDN6	Ovarian	1733	SSANWMRTK	HLA-A11:01	PRDM7	PRDM7	Melanoma	6214
YLGWAASGL	HLA-C04:01	CLDN6	Ovarian	1734	SGYSWLITK	HLA-A11:01	PRDM7	PRDM7	Melanoma	6215
LFGLLVYL	HLA-C04:01	CLDN6	Ovarian	1735	AVMTKPKVK	HLA-A11:01	PRDM7	PRDM7	Melanoma	6216
ILGVVLTLL	HLA-C04:01	CLDN6	Ovarian	1736	AHGPPTFVK	HLA-A11:01	PRDM7	PRDM7	Melanoma	6217
VFVISGVL	HLA-C04:01	CLDN6	Ovarian	1737	LYCEMCQNF	HLA-A24:02	PRDM7	PRDM7	Melanoma	6218
IRDFYNPLV	HLA-C07:01	CLDN6	Ovarian	1738	YLYCEMCQNF	HLA-A24:02	PRDM7	PRDM7	Melanoma	6219
FVISGVLTL	HLA-C07:01	CLDN6	Ovarian	1739	LYCEMCQNFF	HLA-A24:02	PRDM7	PRDM7	Melanoma	6220
ARYSTSAPAI	HLA-C07:01	CLDN6	Ovarian	1740	HVPHAVWPF	HLA-A24:02	PRDM7	PRDM7	Melanoma	6221
RDFYNPLVA	HLA-C07:01	CLDN6	Ovarian	1741	VWPFQVKNF	HLA-A24:02	PRDM7	PRDM7	Melanoma	6222
TSGIVFVI	HLA-C07:01	CLDN6	Ovarian	1742	AFKDISIYF	HLA-A24:02	PRDM7	PRDM7	Melanoma	6223

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SRGPSEYP	HLA-C07:01	CLDN6	Ovarian	1743	RIRSGNILI	HLA-A30:01	PRDM7	Melanoma	6224
RYSTSAPAI	HLA-C07:02	CLDN6	Ovarian	1744	KTRYRNVKM	HLA-A30:01	PRDM7	Melanoma	6225
FVISGVLTL	HLA-C07:02	CLDN6	Ovarian	1745	RCVRTSSLTA	HLA-A30:01	PRDM7	Melanoma	6226
IRDFYNPLV	HLA-C07:02	CLDN6	Ovarian	1746	RTKARDPSM	HLA-A30:01	PRDM7	Melanoma	6227
QKRELGASL	HLA-C07:02	CLDN6	Ovarian	1747	RYRNVKMNY	HLA-A30:01	PRDM7	Melanoma	6228
SRGPSEYPT	HLA-C07:02	CLDN6	Ovarian	1748	AFKDISIYF	HLA-A30:01	PRDM7	Melanoma	6229
YTYDEYTKGY	HLA-A01:01	COL10A1	Breast	1749	RLKLELRRK	HLA-A30:01	PRDM7	Melanoma	6230
FTCQIPGIYY	HLA-A01:01	COL10A1	Breast	1750	HAVWPFQVK	HLA-A30:01	PRDM7	Melanoma	6231
FTCQIPGIY	HLA-A01:01	COL10A1	Breast	1751	QVKPPWMAFR	HLA-A33:03	PRDM7	Melanoma	6232
MYTYDEYTKGY	HLA-A01:01	COL10A1	Breast	1752	WMRYVNCAR	HLA-A33:03	PRDM7	Melanoma	6233
NAESNGLY	HLA-A01:01	COL10A1	Breast	1753	FQYHRQIFYR	HLA-A33:03	PRDM7	Melanoma	6234
GSDGKPGY	HLA-A01:01	COL10A1	Breast	1754	NLVAFQYHR	HLA-A33:03	PRDM7	Melanoma	6235
LTENDQVWL	HLA-A01:01	COL10A1	Breast	1755	EMGDWEKTRYR	HLA-A33:03	PRDM7	Melanoma	6236
GIYYFSYHV	HLA-A02:01	COL10A1	Breast	1756	QYHRQIFYR	HLA-A33:03	PRDM7	Melanoma	6237
MLPQIPFLL	HLA-A02:01	COL10A1	Breast	1757	YSWLITKGR	HLA-A33:03	PRDM7	Melanoma	6238
NLVHGVFYA	HLA-A02:01	COL10A1	Breast	1758	EMGDWEKTR	HLA-A33:03	PRDM7	Melanoma	6239
FLLLVSLNL	HLA-A02:01	COL10A1	Breast	1759	HPNRSALSL	HLA-B07:02	PRDM7	Melanoma	6240
LLLVSLNLV	HLA-A02:01	COL10A1	Breast	1760	RPAFMCHRRQAI	HLA-B07:02	PRDM7	Melanoma	6241
FLLLVSLNLV	HLA-A02:01	COL10A1	Breast	1761	KARDPSMSL	HLA-B07:02	PRDM7	Melanoma	6242
ILSKAYPAI	HLA-A02:01	COL10A1	Breast	1762	LPRGSESGAAI	HLA-B07:02	PRDM7	Melanoma	6243
MLPQIPFLLL	HLA-A02:01	COL10A1	Breast	1763	GPSGIPQAGL	HLA-B07:02	PRDM7	Melanoma	6244
MLPQIPFLLLV	HLA-A02:01	COL10A1	Breast	1764	KPMVSEPL	HLA-B07:02	PRDM7	Melanoma	6245
GLYKNGTPV	HLA-A02:01	COL10A1	Breast	1765	IPQAGLGVW	HLA-B07:02	PRDM7	Melanoma	6246
GLDGPKGNPGL	HLA-A02:01	COL10A1	Breast	1766	FMCHRRQAI	HLA-B08:01	PRDM7	Melanoma	6247
SLSGTPLVSA	HLA-A02:01	COL10A1	Breast	1767	NVKMNYNAL	HLA-B08:01	PRDM7	Melanoma	6248
SLSGTPLV	HLA-A02:01	COL10A1	Breast	1768	IVRCVRTSSL	HLA-B08:01	PRDM7	Melanoma	6249
GLYSSEYV	HLA-A02:01	COL10A1	Breast	1769	WMRTKARDPSM	HLA-B08:01	PRDM7	Melanoma	6250
GLPGPPGPSA	HLA-A02:01	COL10A1	Breast	1770	HSRLKLEL	HLA-B08:01	PRDM7	Melanoma	6251
GTHVWVGLYK	HLA-A03:01	COL10A1	Breast	1771	NALITVGL	HLA-B08:01	PRDM7	Melanoma	6252
VMYTYDEYTK	HLA-A03:01	COL10A1	Breast	1772	DGKDKSSA	HLA-B08:01	PRDM7	Melanoma	6253
VSAFTVILSK	HLA-A03:01	COL10A1	Breast	1773	CEMCQNFFI	HLA-B13:02	PRDM7	Melanoma	6254
SAFTVILSK	HLA-A03:01	COL10A1	Breast	1774	YCEMCQNFFI	HLA-B13:02	PRDM7	Melanoma	6255
AIGTPIPEDK	HLA-A03:01	COL10A1	Breast	1775	MNYNALITV	HLA-B13:02	PRDM7	Melanoma	6256
AVMPEGFIK	HLA-A03:01	COL10A1	Breast	1776	YLYCEMCQNFFI	HLA-B13:02	PRDM7	Melanoma	6257
GLYKNGTPVMY	HLA-A03:01	COL10A1	Breast	1777	EQSKHQKI	HLA-B13:02	PRDM7	Melanoma	6258
AVMPEGFIK	HLA-A11:01	COL10A1	Breast	1778	RQIFYRTCRV	HLA-B13:02	PRDM7	Melanoma	6259
SAFTVILSK	HLA-A11:01	COL10A1	Breast	1779	RSIHVPHAV	HLA-B13:02	PRDM7	Melanoma	6260
GTHVWVGLYK	HLA-A11:01	COL10A1	Breast	1780	RQAIKLQV	HLA-B13:02	PRDM7	Melanoma	6261
VSAFTVILSK	HLA-A11:01	COL10A1	Breast	1781	FSVNMWNAI	HLA-B46:01	PRDM7	Melanoma	6262
CQIPGIYYF	HLA-A24:02	COL10A1	Breast	1782	FTKEEWAEM	HLA-B46:01	PRDM7	Melanoma	6263
YYFSYHVHV	HLA-A24:02	COL10A1	Breast	1783	MSLMLSGLF	HLA-B46:01	PRDM7	Melanoma	6264
MLPQIPFLL	HLA-A24:02	COL10A1	Breast	1784	FQVKNFSVNM	HLA-B46:01	PRDM7	Melanoma	6265
EYVHSSFSGF	HLA-A24:02	COL10A1	Breast	1785	QVKPPWMAF	HLA-B46:01	PRDM7	Melanoma	6266

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
HYDPRTGIF	HLA-A24:02	COL10A1	Breast	1786	KARDPSMSL	HLA-B46:01	PRDM7	Melanoma	6267
IGPPGIPGF	HLA-A24:02	COL10A1	Breast	1787	SSIEPAESL	HLA-B46:01	PRDM7	Melanoma	6268
AYPAIGTPIPF	HLA-A24:02	COL10A1	Breast	1788	SLRERKGHAY	HLA-B46:01	PRDM7	Melanoma	6269
KTQFFIPYT	HLA-A30:01	COL10A1	Breast	1789	RTSSLTAVL	HLA-C01:02	PRDM7	Melanoma	6270
KTQFFIPYTI	HLA-A30:01	COL10A1	Breast	1790	KARDPSMSL	HLA-C01:02	PRDM7	Melanoma	6271
RYQMPTGIK	HLA-A30:01	COL10A1	Breast	1791	FSVNMWNAI	HLA-C01:02	PRDM7	Melanoma	6272
SAFTVILSK	HLA-A30:01	COL10A1	Breast	1792	RVIRPGCEL	HLA-C01:02	PRDM7	Melanoma	6273
HVKGTHVWV	HLA-A30:01	COL10A1	Breast	1793	TSPTRESL	HLA-C01:02	PRDM7	Melanoma	6274
LVHGVFYAER	HLA-A33:03	COL10A1	Breast	1794	MSPERSQEE	HLA-C01:02	PRDM7	Melanoma	6275
YYFSYHVHVK	HLA-A33:03	COL10A1	Breast	1795	KIPMKNGHL	HLA-C01:02	PRDM7	Melanoma	6276
YNRQQHYDPR	HLA-A33:03	COL10A1	Breast	1796	KGHPNRSAL	HLA-C01:02	PRDM7	Melanoma	6277
TIKSKGIAVR	HLA-A33:03	COL10A1	Breast	1797	FSVNMWNAI	HLA-C03:04	PRDM7	Melanoma	6278
IPFDKILYNR	HLA-A33:03	COL10A1	Breast	1798	SSIEPAESL	HLA-C03:04	PRDM7	Melanoma	6279
PFDKILYNR	HLA-A33:03	COL10A1	Breast	1799	ASFNNESSL	HLA-C03:04	PRDM7	Melanoma	6280
YTIKSKGIAVR	HLA-A33:03	COL10A1	Breast	1800	KARDPSMSL	HLA-C03:04	PRDM7	Melanoma	6281
RPSLSGTPL	HLA-B07:02	COL10A1	Breast	1801	CAAHGPPTF	HLA-C03:04	PRDM7	Melanoma	6282
MPTGIKGPL	HLA-B07:02	COL10A1	Breast	1802	AANSGYSWL	HLA-C03:04	PRDM7	Melanoma	6283
RPSLSGTPLV	HLA-B07:02	COL10A1	Breast	1803	ARDPSMSLM	HLA-C04:01	PRDM7	Melanoma	6284
QRPSLSGTPL	HLA-B07:02	COL10A1	Breast	1804	RTSSLTAVL	HLA-C04:01	PRDM7	Melanoma	6285
LPQIPFLLL	HLA-B07:02	COL10A1	Breast	1805	AFKDISIYF	HLA-C04:01	PRDM7	Melanoma	6286
IPFLLLVSL	HLA-B07:02	COL10A1	Breast	1806	KARDPSMSL	HLA-C04:01	PRDM7	Melanoma	6287
LPGPPGPSAV	HLA-B07:02	COL10A1	Breast	1807	VWNEASDL	HLA-C04:01	PRDM7	Melanoma	6288
FIKAGQRPSL	HLA-B08:01	COL10A1	Breast	1808	SFNNESSL	HLA-C04:01	PRDM7	Melanoma	6289
TIKSKGIAV	HLA-B08:01	COL10A1	Breast	1809	SGDEYGQEL	HLA-C04:01	PRDM7	Melanoma	6290
YTIKSKGIAV	HLA-B08:01	COL10A1	Breast	1810	LYCEMCQNFF	HLA-C04:01	PRDM7	Melanoma	6291
VILSKAYPA	HLA-B08:01	COL10A1	Breast	1811	LRATRPAFM	HLA-C07:01	PRDM7	Melanoma	6292
IPFLLLVSL	HLA-B08:01	COL10A1	Breast	1812	SSANWMRYV	HLA-C07:01	PRDM7	Melanoma	6293
HVHVKGTHV	HLA-B08:01	COL10A1	Breast	1813	ARDPSMSLM	HLA-C07:01	PRDM7	Melanoma	6294
LPNTKTQF	HLA-B08:01	COL10A1	Breast	1814	IRIRSGNIL	HLA-C07:01	PRDM7	Melanoma	6295
TQFFIPYTI	HLA-B13:02	COL10A1	Breast	1815	GRNCYEYVD	HLA-C07:01	PRDM7	Melanoma	6296
KTQFFIPYTI	HLA-B13:02	COL10A1	Breast	1816	HRQIFYRTC	HLA-C07:01	PRDM7	Melanoma	6297
LPQIPFLLLV	HLA-B13:02	COL10A1	Breast	1817	ARDPSMSL	HLA-C07:01	PRDM7	Melanoma	6298
HSSFSGFLV	HLA-B13:02	COL10A1	Breast	1818	ARDDEEQNL	HLA-C07:01	PRDM7	Melanoma	6299
PQIPFLLLV	HLA-B13:02	COL10A1	Breast	1819	LRATRPAFM	HLA-C07:02	PRDM7	Melanoma	6300
GIYYFSYHV	HLA-B13:02	COL10A1	Breast	1820	ARDPSMSLM	HLA-C07:02	PRDM7	Melanoma	6301
GLYKNGTPV	HLA-B13:02	COL10A1	Breast	1821	IRIRSGNIL	HLA-C07:02	PRDM7	Melanoma	6302
YPAIGTPIPF	HLA-B46:01	COL10A1	Breast	1822	FQYHRQIFY	HLA-C07:02	PRDM7	Melanoma	6303
FSGFLVAPM	HLA-B46:01	COL10A1	Breast	1823	ARDPSMSL	HLA-C07:02	PRDM7	Melanoma	6304
YVHSSFSGF	HLA-B46:01	COL10A1	Breast	1824	IRPGCELL	HLA-C07:02	PRDM7	Melanoma	6305
FTVILSKAY	HLA-B46:01	COL10A1	Breast	1825	VKPPWMAF	HLA-C07:02	PRDM7	Melanoma	6306
ILYNRQQHY	HLA-B46:01	COL10A1	Breast	1826	ARDDEEQNL	HLA-C07:02	PRDM7	Melanoma	6307
TIKSKGIAV	HLA-B46:01	COL10A1	Breast	1827	CRSQSRSRYY	HLA-A01:01	PRM1	Testis	6308
SAIIDLTEN	HLA-B46:01	COL10A1	Breast	1828	RSQSRSRYY	HLA-A01:01	PRM1	Testis	6309

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
PAIGTPIPF	HLA-B46:01	COL10A1	Breast	1829	CCRSQSRSRYY	HLA-A01:01	PRM1	Testis	6310
MLPQIPFLL	HLA-C01:02	COL10A1	Breast	1830	RSQSRSRY	HLA-A01:01	PRM1	Testis	6311
FSGFLVAPM	HLA-C01:02	COL10A1	Breast	1831	SQSRSRYY	HLA-A01:01	PRM1	Testis	6312
MLPQIPFLLL	HLA-C01:02	COL10A1	Breast	1832	RAMRCCRPRY	HLA-A02:01	PRM1	Testis	6313
ILSKAYPAI	HLA-C01:02	COL10A1	Breast	1833	RAMRCCRPR	HLA-A02:01	PRM1	Testis	6314
VGPAGAKGM	HLA-C01:02	COL10A1	Breast	1834	AMRCCRPRY	HLA-A02:01	PRM1	Testis	6315
PGPPGPSAV	HLA-C01:02	COL10A1	Breast	1835	AMRCCRPRYR	HLA-A02:01	PRM1	Testis	6316
FIPYTIKSK	HLA-C01:02	COL10A1	Breast	1836	SQSRSRYYR	HLA-A02:01	PRM1	Testis	6317
MLPQIPFL	HLA-C01:02	COL10A1	Breast	1837	RRAMRCCRPR	HLA-A02:01	PRM1	Testis	6318
FSGFLVAPM	HLA-C03:04	COL10A1	Breast	1838	RSQSRSRYYR	HLA-A02:01	PRM1	Testis	6319
YPAIGTPIPF	HLA-C03:04	COL10A1	Breast	1839	CQTRRRAMRC	HLA-A02:01	PRM1	Testis	6320
YVHSSFSGF	HLA-C03:04	COL10A1	Breast	1840	RAMRCCRPRYR	HLA-A02:01	PRM1	Testis	6321
SANQGVTGM	HLA-C03:04	COL10A1	Breast	1841	MRCCRPRYR	HLA-A02:01	PRM1	Testis	6322
MPVSAFTVI	HLA-C03:04	COL10A1	Breast	1842	SCQTRRRAM	HLA-A02:01	PRM1	Testis	6323
FLLLVSLNL	HLA-C03:04	COL10A1	Breast	1843	RSCQTRRRA	HLA-A02:01	PRM1	Testis	6324
KGIPGSHGL	HLA-C03:04	COL10A1	Breast	1844	SRYYRQRQR	HLA-A02:01	PRM1	Testis	6325
FGKPGLPGL	HLA-C03:04	COL10A1	Breast	1845	YRCCRSQSR	HLA-A02:01	PRM1	Testis	6326
VSAFTVIL	HLA-C03:04	COL10A1	Breast	1846	RYYRQRQRS	HLA-A02:01	PRM1	Testis	6327
HYDPRTGIF	HLA-C04:01	COL10A1	Breast	1847	RSQSRSRYY	HLA-A02:01	PRM1	Testis	6328
MLPQIPFLL	HLA-C04:01	COL10A1	Breast	1848	SCQTRRRA	HLA-A02:01	PRM1	Testis	6329
QHYDPRTGIF	HLA-C04:01	COL10A1	Breast	1849	RAMRCCRPRY	HLA-A03:01	PRM1	Testis	6330
TYDEYTKGYL	HLA-C04:01	COL10A1	Breast	1850	AMRCCRPRYR	HLA-A03:01	PRM1	Testis	6331
HYDPRTGI	HLA-C04:01	COL10A1	Breast	1851	AMRCCRPRY	HLA-A03:01	PRM1	Testis	6332
KGDVGPAGL	HLA-C04:01	COL10A1	Breast	1852	RSQSRSRYY	HLA-A03:01	PRM1	Testis	6333
YYFSYHVHV	HLA-C07:01	COL10A1	Breast	1853	SRYYRQRQR	HLA-A03:01	PRM1	Testis	6334
ERYQMPTGI	HLA-C07:01	COL10A1	Breast	1854	RQRSRRRRR	HLA-A03:01	PRM1	Testis	6335
LYKNGTPVM	HLA-C07:01	COL10A1	Breast	1855	SQSRSRYYR	HLA-A11:01	PRM1	Testis	6336
HYDPRTGIF	HLA-C07:01	COL10A1	Breast	1856	RSQSRSRYYR	HLA-A11:01	PRM1	Testis	6337
CQIPGIYYF	HLA-C07:01	COL10A1	Breast	1857	RAMRCCRPR	HLA-A11:01	PRM1	Testis	6338
SNGLYSSEY	HLA-C07:01	COL10A1	Breast	1858	SRYYRQRQR	HLA-A11:01	PRM1	Testis	6339
SSFSGFLVA	HLA-C07:01	COL10A1	Breast	1859	RYYRQRQRS	HLA-A24:02	PRM1	Testis	6340
IPFDKILY	HLA-C07:01	COL10A1	Breast	1860	RYRCCRSQSR	HLA-A24:02	PRM1	Testis	6341
YYFSYHVHV	HLA-C07:02	COL10A1	Breast	1861	RYYRQRQRSR	HLA-A24:02	PRM1	Testis	6342
HYDPRTGIF	HLA-C07:02	COL10A1	Breast	1862	RYRPRCRRH	HLA-A24:02	PRM1	Testis	6343
LYKNGTPVM	HLA-C07:02	COL10A1	Breast	1863	YYRQRQRSR	HLA-A24:02	PRM1	Testis	6344
VFYAERYQM	HLA-C07:02	COL10A1	Breast	1864	RYRCCRSQS	HLA-A30:01	PRM1	Testis	6345
YKNGTPVMY	HLA-C07:02	COL10A1	Breast	1865	RSRYYRQRQ	HLA-A30:01	PRM1	Testis	6346
NGTPVMYTY	HLA-C07:02	COL10A1	Breast	1866	RSRRRRRRS	HLA-A30:01	PRM1	Testis	6347
FYAERYQM	HLA-C07:02	COL10A1	Breast	1867	RSQSRSRYY	HLA-A30:01	PRM1	Testis	6348
QVDWSRLY	HLA-A01:01	CSAG1	Melanoma	1868	RQRSRRRRR	HLA-A30:01	PRM1	Testis	6349
VSSLLACLH	HLA-A01:01	CSAG1	Melanoma	1869	RSRYYRQR	HLA-A30:01	PRM1	Testis	6350
ATTVSSLLA	HLA-A01:01	CSAG1	Melanoma	1870	SQSRSRYYR	HLA-A33:03	PRM1	Testis	6351
QVDWSRLYR	HLA-A01:01	CSAG1	Melanoma	1871	RSQSRSRYYR	HLA-A33:03	PRM1	Testis	6352

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YRDTGLVKM	HLA-A01:01	CSAG1	Melanoma	1872	AMRCCRPRYR	HLA-A33:03	PRM1	Testis	6353
RLYRDTGLV	HLA-A02:01	CSAG1	Melanoma	1873	RAMRCCRPR	HLA-A33:03	PRM1	Testis	6354
TTACWPAFTV	HLA-A02:01	CSAG1	Melanoma	1874	YYRQRQRSR	HLA-A33:03	PRM1	Testis	6355
TVSSLLACL	HLA-A02:01	CSAG1	Melanoma	1875	SRYYRQRQR	HLA-A33:03	PRM1	Testis	6356
SLLACLHCPG	HLA-A02:01	CSAG1	Melanoma	1876	RYYRQRQR	HLA-A33:03	PRM1	Testis	6357
MSATTACWPA	HLA-A02:01	CSAG1	Melanoma	1877	RSCQTRRRAM	HLA-B07:02	PRM1	Testis	6358
SLLACLHCP	HLA-A02:01	CSAG1	Melanoma	1878	RPRYRPRC	HLA-B07:02	PRM1	Testis	6359
HPLIPGPEAL	HLA-A02:01	CSAG1	Melanoma	1879	SCQTRRRAM	HLA-B07:02	PRM1	Testis	6360
SRLYRDTGLV	HLA-A02:01	CSAG1	Melanoma	1880	RPRYRPRCR	HLA-B07:02	PRM1	Testis	6361
TACWPAFTV	HLA-A02:01	CSAG1	Melanoma	1881	RPRYRPRCRR	HLA-B07:02	PRM1	Testis	6362
PLIPGPEAL	HLA-A02:01	CSAG1	Melanoma	1882	CQTRRRAM	HLA-B08:01	PRM1	Testis	6363
VLGEARGDQV	HLA-A02:01	CSAG1	Melanoma	1883	SCQTRRRAM	HLA-B08:01	PRM1	Testis	6364
PLIPGPEA	HLA-A02:01	CSAG1	Melanoma	1884	MARYRCCRS	HLA-B08:01	PRM1	Testis	6365
ACWPAFTVL	HLA-A02:01	CSAG1	Melanoma	1885	SRRRRRRSC	HLA-B08:01	PRM1	Testis	6366
RLYRDTGL	HLA-A02:01	CSAG1	Melanoma	1886	YYRQRQRSR	HLA-B08:01	PRM1	Testis	6367
RLYRDTGLVKM	HLA-A02:01	CSAG1	Melanoma	1887	RAMRCCRPRY	HLA-B13:02	PRM1	Testis	6368
YRDTGLVKM	HLA-A02:01	CSAG1	Melanoma	1888	AMRCCRPRY	HLA-B13:02	PRM1	Testis	6369
RLYRDTGLVK	HLA-A03:01	CSAG1	Melanoma	1889	RAMRCCRPRYRP	HLA-B13:02	PRM1	Testis	6370
SRLYRDTGLVK	HLA-A03:01	CSAG1	Melanoma	1890	RYYRQRQRS	HLA-B13:02	PRM1	Testis	6371
WSRLYRDTGLVK	HLA-A03:01	CSAG1	Melanoma	1891	RQRQRSRRR	HLA-B13:02	PRM1	Testis	6372
PLIPGPEALSK	HLA-A03:01	CSAG1	Melanoma	1892	RQRSRRRRR	HLA-B13:02	PRM1	Testis	6373
LIPGPEALSK	HLA-A03:01	CSAG1	Melanoma	1893	RAMRCCRPRY	HLA-B46:01	PRM1	Testis	6374
FSNNHPSTPK	HLA-A11:01	CSAG1	Melanoma	1894	RSQSRSRYY	HLA-B46:01	PRM1	Testis	6375
QVDWSRLYR	HLA-A11:01	CSAG1	Melanoma	1895	AMRCCRPRY	HLA-B46:01	PRM1	Testis	6376
RLYRDTGLVK	HLA-A11:01	CSAG1	Melanoma	1896	RSQSRSRY	HLA-B46:01	PRM1	Testis	6377
LIPGPEALSK	HLA-A11:01	CSAG1	Melanoma	1897	RSQSRSRYY	HLA-C01:02	PRM1	Testis	6378
TTVSSLLAC	HLA-A11:01	CSAG1	Melanoma	1898	RSCQTRRRAM	HLA-C01:02	PRM1	Testis	6379
CWPAFTVL	HLA-A24:02	CSAG1	Melanoma	1899	RAMRCCRPR	HLA-C01:02	PRM1	Testis	6380
CWPAFTVLG	HLA-A24:02	CSAG1	Melanoma	1900	AMRCCRPRY	HLA-C01:02	PRM1	Testis	6381
ATTACWPAF	HLA-A24:02	CSAG1	Melanoma	1901	SCQTRRRAM	HLA-C01:02	PRM1	Testis	6382
NHPSTPKRF	HLA-A24:02	CSAG1	Melanoma	1902	RSQSRSRYY	HLA-C03:04	PRM1	Testis	6383
PLIPGPEAL	HLA-A24:02	CSAG1	Melanoma	1903	RAMRCCRPR	HLA-C03:04	PRM1	Testis	6384
ACWPAFTVL	HLA-A24:02	CSAG1	Melanoma	1904	RAMRCCRPRY	HLA-C03:04	PRM1	Testis	6385
MSRKPRASS	HLA-A30:01	CSAG1	Melanoma	1905	SCQTRRRAM	HLA-C03:04	PRM1	Testis	6386
RGRGKHPLI	HLA-A30:01	CSAG1	Melanoma	1906	CQTRRRAM	HLA-C03:04	PRM1	Testis	6387
RLYRDTGLVK	HLA-A30:01	CSAG1	Melanoma	1907	RAMRCCRPR	HLA-C04:01	PRM1	Testis	6388
REKGPVKEV	HLA-A30:01	CSAG1	Melanoma	1908	SQSRSRYYR	HLA-C04:01	PRM1	Testis	6389
LYRDTGLVK	HLA-A30:01	CSAG1	Melanoma	1909	RSQSRSRYY	HLA-C04:01	PRM1	Testis	6390
PVKEVPGTK	HLA-A30:01	CSAG1	Melanoma	1910	RYRPRCRRH	HLA-C04:01	PRM1	Testis	6391
HPSTPKRFPR	HLA-A33:03	CSAG1	Melanoma	1911	YYRQRQRS	HLA-C04:01	PRM1	Testis	6392
QVDWSRLYR	HLA-A33:03	CSAG1	Melanoma	1912	RYRPRCRR	HLA-C04:01	PRM1	Testis	6393
LVKMSRKPR	HLA-A33:03	CSAG1	Melanoma	1913	CRSQSRSRY	HLA-C07:01	PRM1	Testis	6394
DTGLVKMSR	HLA-A33:03	CSAG1	Melanoma	1914	CRSQSRSRYY	HLA-C07:01	PRM1	Testis	6395

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
DQVDWSRLYR	HLA-A33:03	CSAG1	Melanoma	1915	RSQSRSRYYY	HLA-C07:01	PRM1	Testis	6396
HPLIPGPEAL	HLA-B07:02	CSAG1	Melanoma	1916	SRYYRQRQR	HLA-C07:01	PRM1	Testis	6397
KPRASSPF	HLA-B07:02	CSAG1	Melanoma	1917	CRSQSRSRY	HLA-C07:02	PRM1	Testis	6398
FPRQPKREKGPV	HLA-B07:02	CSAG1	Melanoma	1918	RSQSRSRYY	HLA-C07:02	PRM1	Testis	6399
ACWPAFTVL	HLA-B07:02	CSAG1	Melanoma	1919	YYRQRQRSR	HLA-C07:02	PRM1	Testis	6400
TPKRRGRGKHPL	HLA-B08:01	CSAG1	Melanoma	1920	YRPRCRRH	HLA-C07:02	PRM1	Testis	6401
WSRLYRDTGL	HLA-B08:01	CSAG1	Melanoma	1921	YRQRQRSR	HLA-C07:02	PRM1	Testis	6402
SRKPRASSPF	HLA-B08:01	CSAG1	Melanoma	1922	LSERSHEVY	HLA-A01:01	PRM2	Testis	6403
SATTVSSL	HLA-B08:01	CSAG1	Melanoma	1923	SLSERSHEVY	HLA-A01:01	PRM2	Testis	6404
HPLIPGPEAL	HLA-B08:01	CSAG1	Melanoma	1924	LSPEHVEVY	HLA-A01:01	PRM2	Testis	6405
PLIPGPEAL	HLA-B08:01	CSAG1	Melanoma	1925	LGDPLNQNF	HLA-A01:01	PRM2	Testis	6406
TACWPAFTV	HLA-B13:02	CSAG1	Melanoma	1926	SLSERSHEV	HLA-A02:01	PRM2	Testis	6407
TTACWPAFTV	HLA-B13:02	CSAG1	Melanoma	1927	GLSPEHVEV	HLA-A02:01	PRM2	Testis	6408
MSATTACWPA	HLA-B13:02	CSAG1	Melanoma	1928	RSLSERSHEV	HLA-A02:01	PRM2	Testis	6409
RLYRDTGLV	HLA-B13:02	CSAG1	Melanoma	1929	QGLSPEHVEV	HLA-A02:01	PRM2	Testis	6410
REKGPVKEV	HLA-B13:02	CSAG1	Melanoma	1930	KLPGPLTPSWKL	HLA-A02:01	PRM2	Testis	6411
ACWPAFTV	HLA-B13:02	CSAG1	Melanoma	1931	SLGDPLNQNFL	HLA-A02:01	PRM2	Testis	6412
MSATTVSSL	HLA-B46:01	CSAG1	Melanoma	1932	KLPGPLTPS	HLA-A02:01	PRM2	Testis	6413
MSATTVSSLL	HLA-B46:01	CSAG1	Melanoma	1933	GLSPEHVEVY	HLA-A02:01	PRM2	Testis	6414
FSNNHPSTPKRF	HLA-B46:01	CSAG1	Melanoma	1934	SLSERSHEVY	HLA-A02:01	PRM2	Testis	6415
PLIPGPEAL	HLA-B46:01	CSAG1	Melanoma	1935	SLGDPLNQN	HLA-A02:01	PRM2	Testis	6416
FSNNHPSTP	HLA-B46:01	CSAG1	Melanoma	1936	FLSQKAAEP	HLA-A02:01	PRM2	Testis	6417
PLIPGPEA	HLA-B46:01	CSAG1	Melanoma	1937	SLGDPLNQNF	HLA-A02:01	PRM2	Testis	6418
MSATTVSSL	HLA-C01:02	CSAG1	Melanoma	1938	SLGDPLNQ	HLA-A02:01	PRM2	Testis	6419
SATTVSSLL	HLA-C01:02	CSAG1	Melanoma	1939	KLPGPLTPSWK	HLA-A03:01	PRM2	Testis	6420
TVSSLLACL	HLA-C01:02	CSAG1	Melanoma	1940	RTHGQSHYR	HLA-A03:01	PRM2	Testis	6421
LIPGPEAL	HLA-C01:02	CSAG1	Melanoma	1941	LTPSWKLRK	HLA-A03:01	PRM2	Testis	6422
CWPAFTVL	HLA-C01:02	CSAG1	Melanoma	1942	KLPGPLTPS	HLA-A03:01	PRM2	Testis	6423
SATTVSSL	HLA-C01:02	CSAG1	Melanoma	1943	RTHGQSHYR	HLA-A11:01	PRM2	Testis	6424
MSATTVSSL	HLA-C03:04	CSAG1	Melanoma	1944	LTPSWKLRK	HLA-A11:01	PRM2	Testis	6425
SATTVSSLL	HLA-C03:04	CSAG1	Melanoma	1945	RTHGQSHYRR	HLA-A11:01	PRM2	Testis	6426
MSATTVSSLL	HLA-C03:04	CSAG1	Melanoma	1946	KLPGPLTPSW	HLA-A24:02	PRM2	Testis	6427
ACWPAFTVL	HLA-C03:04	CSAG1	Melanoma	1947	SLGDPLNQNF	HLA-A24:02	PRM2	Testis	6428
TACWPAFTVL	HLA-C03:04	CSAG1	Melanoma	1948	KLPGPLTPSWKL	HLA-A24:02	PRM2	Testis	6429
YRDTGLVKM	HLA-C04:01	CSAG1	Melanoma	1949	LGDPLNQNF	HLA-A24:02	PRM2	Testis	6430
LYRDTGLVKM	HLA-C04:01	CSAG1	Melanoma	1950	KSRPKHQVR	HLA-A30:01	PRM2	Testis	6431
MSATTVSSL	HLA-C04:01	CSAG1	Melanoma	1951	RYRVRSLSE	HLA-A30:01	PRM2	Testis	6432
CWPAFTVL	HLA-C04:01	CSAG1	Melanoma	1952	RTRKRTCRR	HLA-A30:01	PRM2	Testis	6433
LIPGPEAL	HLA-C04:01	CSAG1	Melanoma	1953	RSHEVYRQQ	HLA-A30:01	PRM2	Testis	6434
YRDTGLVKM	HLA-C07:01	CSAG1	Melanoma	1954	RSHEVYRQQL	HLA-A30:01	PRM2	Testis	6435
SRLYRDTGL	HLA-C07:01	CSAG1	Melanoma	1955	RTHGQSHYR	HLA-A33:03	PRM2	Testis	6436
MSATTVSSL	HLA-C07:01	CSAG1	Melanoma	1956	HYRRRHCSR	HLA-A33:03	PRM2	Testis	6437
RRGRGKHPL	HLA-C07:01	CSAG1	Melanoma	1957	ERTHGQSHYR	HLA-A33:03	PRM2	Testis	6438

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
TVLGEARGD	HLA-C07:01	CSAG1	Melanoma	1958	EHVEVYER	HLA-A33:03	PRM2	Testis	6439
YRDTGLVKM	HLA-C07:02	CSAG1	Melanoma	1959	EVYERTHGQ	HLA-A33:03	PRM2	Testis	6440
SRLYRDTGL	HLA-C07:02	CSAG1	Melanoma	1960	MVRYRVRSL	HLA-B07:02	PRM2	Testis	6441
LYRDTGLVKM	HLA-C07:02	CSAG1	Melanoma	1961	GPLTPSWKL	HLA-B07:02	PRM2	Testis	6442
ACWPAFTVL	HLA-C07:02	CSAG1	Melanoma	1962	LPGPLTPSWKL	HLA-B07:02	PRM2	Testis	6443
SRKPRASSP	HLA-C07:02	CSAG1	Melanoma	1963	LPGPLTPSW	HLA-B07:02	PRM2	Testis	6444
CSAVFHERY	HLA-A01:01	CTCFL	Cervical;Ovarian	1964	MVRYRVRSL	HLA-B08:01	PRM2	Testis	6445
YSAAELKCRY	HLA-A01:01	CTCFL	Cervical;Ovarian	1965	MVRYRVRSLS	HLA-B08:01	PRM2	Testis	6446
YCSAVFHERY	HLA-A01:01	CTCFL	Cervical;Ovarian	1966	VRYRVRSL	HLA-B08:01	PRM2	Testis	6447
AISIQQELY	HLA-A01:01	CTCFL	Cervical;Ovarian	1967	CSRRRLHRI	HLA-B08:01	PRM2	Testis	6448
RSDEIVLTV	HLA-A01:01	CTCFL	Cervical;Ovarian	1968	SLSERSHEV	HLA-B08:01	PRM2	Testis	6449
PSEESEKY	HLA-A01:01	CTCFL	Cervical;Ovarian	1969	DPLNQNFL	HLA-B08:01	PRM2	Testis	6450
ITDARHHAW	HLA-A01:01	CTCFL	Cervical;Ovarian	1970	REHAEGTKL	HLA-B13:02	PRM2	Testis	6451
KSDLRFLGL	HLA-A01:01	CTCFL	Cervical;Ovarian	1971	RSLSERSHEV	HLA-B13:02	PRM2	Testis	6452
FLVEMGFYHV	HLA-A02:01	CTCFL	Cervical;Ovarian	1972	CSRRRLHRI	HLA-B13:02	PRM2	Testis	6453
MMLVSAWLL	HLA-A02:01	CTCFL	Cervical;Ovarian	1973	GLSPEHVEV	HLA-B13:02	PRM2	Testis	6454
FLDLKLHGI	HLA-A02:01	CTCFL	Cervical;Ovarian	1974	NQNFLSQKA	HLA-B13:02	PRM2	Testis	6455
ILWVGNSEV	HLA-A02:01	CTCFL	Cervical;Ovarian	1975	LSPEHVEVY	HLA-B46:01	PRM2	Testis	6456
ILVEAAVQV	HLA-A02:01	CTCFL	Cervical;Ovarian	1976	MVRYRVRSL	HLA-B46:01	PRM2	Testis	6457
LFLVEMGFYHV	HLA-A02:01	CTCFL	Cervical;Ovarian	1977	LSERSHEVY	HLA-B46:01	PRM2	Testis	6458
LLFIGTIKV	HLA-A02:01	CTCFL	Cervical;Ovarian	1978	YERTHGQSH	HLA-B46:01	PRM2	Testis	6459
RMMLVSAWL	HLA-A02:01	CTCFL	Cervical;Ovarian	1979	KAAEPGREH	HLA-B46:01	PRM2	Testis	6460
LLFLVEMGFYHV	HLA-A02:01	CTCFL	Cervical;Ovarian	1980	MVRYRVRSL	HLA-C01:02	PRM2	Testis	6461
RMMLVSAWLL	HLA-A02:01	CTCFL	Cervical;Ovarian	1981	SLSERSHEV	HLA-C01:02	PRM2	Testis	6462
GLIPTVLTL	HLA-A02:01	CTCFL	Cervical;Ovarian	1982	LSPEHVEVY	HLA-C01:02	PRM2	Testis	6463
KLHGILVEA	HLA-A02:01	CTCFL	Cervical;Ovarian	1983	LSPEHVEV	HLA-C01:02	PRM2	Testis	6464
FLVEMGFYHVS	HLA-A02:01	CTCFL	Cervical;Ovarian	1984	KLPGPLTPS	HLA-C01:02	PRM2	Testis	6465
WILWVGNSEV	HLA-A02:01	CTCFL	Cervical;Ovarian	1985	MVRYRVRSL	HLA-C03:04	PRM2	Testis	6466
KLLFIGTIKV	HLA-A02:01	CTCFL	Cervical;Ovarian	1986	SLSERSHEV	HLA-C03:04	PRM2	Testis	6467
SLAETTGLIKL	HLA-A02:01	CTCFL	Cervical;Ovarian	1987	LSPEHVEVY	HLA-C03:04	PRM2	Testis	6468
VLEEEVELV	HLA-A02:01	CTCFL	Cervical;Ovarian	1988	KAAEPGREH	HLA-C03:04	PRM2	Testis	6469
SVLEEEVEL	HLA-A02:01	CTCFL	Cervical;Ovarian	1989	AAEPGREH	HLA-C03:04	PRM2	Testis	6470
WLIVLLFLV	HLA-A02:01	CTCFL	Cervical;Ovarian	1990	LGDPLNQNF	HLA-C04:01	PRM2	Testis	6471
SVLEEEVELV	HLA-A02:01	CTCFL	Cervical;Ovarian	1991	RRHCSRRRL	HLA-C04:01	PRM2	Testis	6472
ILQKHGENV	HLA-A02:01	CTCFL	Cervical;Ovarian	1992	SLSERSHEV	HLA-C04:01	PRM2	Testis	6473
RMSSFNRHMK	HLA-A03:01	CTCFL	Cervical;Ovarian	1993	SHEVYRQQL	HLA-C04:01	PRM2	Testis	6474
KQAFYYSYK	HLA-A03:01	CTCFL	Cervical;Ovarian	1994	LSPEHVEV	HLA-C04:01	PRM2	Testis	6475
GTMKIHILQK	HLA-A03:01	CTCFL	Cervical;Ovarian	1995	LGDPLNQNFL	HLA-C04:01	PRM2	Testis	6476
VTNSRICYK	HLA-A03:01	CTCFL	Cervical;Ovarian	1996	RRHCSRRRL	HLA-C07:01	PRM2	Testis	6477
RICYKQAFYY	HLA-A03:01	CTCFL	Cervical;Ovarian	1997	MVRYRVRSL	HLA-C07:01	PRM2	Testis	6478
GLIPTVLTLK	HLA-A03:01	CTCFL	Cervical;Ovarian	1998	RRRHRRESL	HLA-C07:01	PRM2	Testis	6479
ANFIPTVYK	HLA-A03:01	CTCFL	Cervical;Ovarian	1999	VRYRVRSL	HLA-C07:01	PRM2	Testis	6480
SLAETTGLIK	HLA-A03:01	CTCFL	Cervical;Ovarian	2000	LSPEHVEVY	HLA-C07:01	PRM2	Testis	6481

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KLLFIGTIK	HLA-A03:01	CTCFL	Cervical;Ovarian	2001	RRHCSRRRL	HLA-C07:02	PRM2	Testis	6482
SLLQGPLCR	HLA-A03:01	CTCFL	Cervical;Ovarian	2002	MVRYRVRSL	HLA-C07:02	PRM2	Testis	6483
GTMKIHILQK	HLA-A11:01	CTCFL	Cervical;Ovarian	2003	RRRHRRESL	HLA-C07:02	PRM2	Testis	6484
VTNSRICYK	HLA-A11:01	CTCFL	Cervical;Ovarian	2004	VRYRVRSL	HLA-C07:02	PRM2	Testis	6485
SVTNSRICYK	HLA-A11:01	CTCFL	Cervical;Ovarian	2005	LSPEHVEVY	HLA-C07:02	PRM2	Testis	6486
KQAFYYSYK	HLA-A11:01	CTCFL	Cervical;Ovarian	2006	FSFTYTPEY	HLA-A01:01	RBPJL	Pancreas	6487
SVLSEQFTK	HLA-A11:01	CTCFL	Cervical;Ovarian	2007	CSDWRWLRA	HLA-A01:01	RBPJL	Pancreas	6488
ANFIPTVYK	HLA-A11:01	CTCFL	Cervical;Ovarian	2008	ETGPTVCGY	HLA-A01:01	RBPJL	Pancreas	6489
KYILTLQTV	HLA-A24:02	CTCFL	Cervical;Ovarian	2009	DVEAETMYRY	HLA-A01:01	RBPJL	Pancreas	6490
KYASVEVKPF	HLA-A24:02	CTCFL	Cervical;Ovarian	2010	ATDADALLE	HLA-A01:01	RBPJL	Pancreas	6491
KYILTLQTVHF	HLA-A24:02	CTCFL	Cervical;Ovarian	2011	ATDADALL	HLA-A01:01	RBPJL	Pancreas	6492
KYQCPHCATI	HLA-A24:02	CTCFL	Cervical;Ovarian	2012	SLACTLEPV	HLA-A02:01	RBPJL	Pancreas	6493
KWSGLKPQTF	HLA-A24:02	CTCFL	Cervical;Ovarian	2013	ALLDVDEPI	HLA-A02:01	RBPJL	Pancreas	6494
IYAGNNMHSL	HLA-A24:02	CTCFL	Cervical;Ovarian	2014	YLSGPGWRV	HLA-A02:01	RBPJL	Pancreas	6495
LYSPQEMEVLQF	HLA-A24:02	CTCFL	Cervical;Ovarian	2015	SLVCVVPDV	HLA-A02:01	RBPJL	Pancreas	6496
IYAGNNMHSLLL	HLA-A24:02	CTCFL	Cervical;Ovarian	2016	YLSVEDGAFV	HLA-A02:01	RBPJL	Pancreas	6497
RVHMRNLHA	HLA-A30:01	CTCFL	Cervical;Ovarian	2017	FSTSLACTLEPV	HLA-A02:01	RBPJL	Pancreas	6498
RTKEQLFFV	HLA-A30:01	CTCFL	Cervical;Ovarian	2018	SLVQLVCTV	HLA-A02:01	RBPJL	Pancreas	6499
RTHSEATSK	HLA-A30:01	CTCFL	Cervical;Ovarian	2019	TSLACTLEPV	HLA-A02:01	RBPJL	Pancreas	6500
KQAFYYSYK	HLA-A30:01	CTCFL	Cervical;Ovarian	2020	YLCLATEKV	HLA-A02:01	RBPJL	Pancreas	6501
HMKTHTSEK	HLA-A30:01	CTCFL	Cervical;Ovarian	2021	ALLESIHQE	HLA-A02:01	RBPJL	Pancreas	6502
STKNQRKTK	HLA-A30:01	CTCFL	Cervical;Ovarian	2022	ALLDVDEPISQL	HLA-A02:01	RBPJL	Pancreas	6503
TMKIHILQK	HLA-A30:01	CTCFL	Cervical;Ovarian	2023	SLQDRSEMQL	HLA-A02:01	RBPJL	Pancreas	6504
RFKCKHCSY	HLA-A30:01	CTCFL	Cervical;Ovarian	2024	GLLQRLALA	HLA-A02:01	RBPJL	Pancreas	6505
FSRWINLHR	HLA-A33:03	CTCFL	Cervical;Ovarian	2025	GTFHSRLIK	HLA-A03:01	RBPJL	Pancreas	6506
TFRTVTLLR	HLA-A33:03	CTCFL	Cervical;Ovarian	2026	RILHAKVAQK	HLA-A03:01	RBPJL	Pancreas	6507
DVCMFTSSR	HLA-A33:03	CTCFL	Cervical;Ovarian	2027	KVISKPSQK	HLA-A03:01	RBPJL	Pancreas	6508
SSRMSSFNR	HLA-A33:03	CTCFL	Cervical;Ovarian	2028	ITLPPMIIRK	HLA-A03:01	RBPJL	Pancreas	6509
MFTSSRMSSFNR	HLA-A33:03	CTCFL	Cervical;Ovarian	2029	TLPPMIIRK	HLA-A03:01	RBPJL	Pancreas	6510
ETYNQGRRR	HLA-A33:03	CTCFL	Cervical;Ovarian	2030	GTFHSRLIK	HLA-A11:01	RBPJL	Pancreas	6511
DCLQMLQVWQR	HLA-A33:03	CTCFL	Cervical;Ovarian	2031	QTVRILHAK	HLA-A11:01	RBPJL	Pancreas	6512
TYNQGRRRR	HLA-A33:03	CTCFL	Cervical;Ovarian	2032	GTYLCLATEK	HLA-A11:01	RBPJL	Pancreas	6513
EKNQLLAER	HLA-A33:03	CTCFL	Cervical;Ovarian	2033	ITLPPMIIRK	HLA-A11:01	RBPJL	Pancreas	6514
KPHLCHLCL	HLA-B07:02	CTCFL	Cervical;Ovarian	2034	RSLPGTWTR	HLA-A11:01	RBPJL	Pancreas	6515
HPKAGLGPEDPL	HLA-B07:02	CTCFL	Cervical;Ovarian	2035	ITLPPMIIR	HLA-A11:01	RBPJL	Pancreas	6516
RPYKCNDCNM	HLA-B07:02	CTCFL	Cervical;Ovarian	2036	RYGSLVQLV	HLA-A24:02	RBPJL	Pancreas	6517
RPYKCNDCNMAF	HLA-B07:02	CTCFL	Cervical;Ovarian	2037	LFYPSAFSF	HLA-A24:02	RBPJL	Pancreas	6518
IPRCKFHPDCL	HLA-B07:02	CTCFL	Cervical;Ovarian	2038	RWLRAPITI	HLA-A24:02	RBPJL	Pancreas	6519
QPGPGLLWL	HLA-B07:02	CTCFL	Cervical;Ovarian	2039	EFTRTNFHLF	HLA-A24:02	RBPJL	Pancreas	6520
SPQEMEVL	HLA-B07:02	CTCFL	Cervical;Ovarian	2040	FYPSAFSF	HLA-A24:02	RBPJL	Pancreas	6521
GPGSGPLL	HLA-B07:02	CTCFL	Cervical;Ovarian	2041	SVRPGHPGV	HLA-A30:01	RBPJL	Pancreas	6522
GPGSGPLLRL	HLA-B07:02	CTCFL	Cervical;Ovarian	2042	GTFHSRLIK	HLA-A30:01	RBPJL	Pancreas	6523
MLQVWQRLFPL	HLA-B08:01	CTCFL	Cervical;Ovarian	2043	HSRLIKVISK	HLA-A30:01	RBPJL	Pancreas	6524

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
CLKTFRTVTL	HLA-B08:01	CTCFL	Cervical;Ovarian	2044	KVISKPSQK	HLA-A30:01	RBPJL	Pancreas	6525
QVWQRLFPL	HLA-B08:01	CTCFL	Cervical;Ovarian	2045	FCSDWRWLR	HLA-A33:03	RBPJL	Pancreas	6526
ELKCRYCSA	HLA-B08:01	CTCFL	Cervical;Ovarian	2046	AFCSDWRWLR	HLA-A33:03	RBPJL	Pancreas	6527
IPRCKFHPDCL	HLA-B08:01	CTCFL	Cervical;Ovarian	2047	AAFCSDWRWLR	HLA-A33:03	RBPJL	Pancreas	6528
CSMCKYASV	HLA-B08:01	CTCFL	Cervical;Ovarian	2048	ESIHQEFTR	HLA-A33:03	RBPJL	Pancreas	6529
EATSKRSL	HLA-B08:01	CTCFL	Cervical;Ovarian	2049	TYTPEYSVR	HLA-A33:03	RBPJL	Pancreas	6530
EQFTKIKEL	HLA-B08:01	CTCFL	Cervical;Ovarian	2050	ITLPPMIIR	HLA-A33:03	RBPJL	Pancreas	6531
DSKLAVSL	HLA-B08:01	CTCFL	Cervical;Ovarian	2051	CPKEANRAL	HLA-B07:02	RBPJL	Pancreas	6532
TIIARKSDL	HLA-B08:01	CTCFL	Cervical;Ovarian	2052	HEPGARRRAL	HLA-B07:02	RBPJL	Pancreas	6533
DLKLHGIL	HLA-B08:01	CTCFL	Cervical;Ovarian	2053	KPSQKKQSL	HLA-B07:02	RBPJL	Pancreas	6534
HDANFIPTV	HLA-B13:02	CTCFL	Cervical;Ovarian	2054	APITIPMSL	HLA-B07:02	RBPJL	Pancreas	6535
LQQCVAISI	HLA-B13:02	CTCFL	Cervical;Ovarian	2055	SPPGGGGTYL	HLA-B07:02	RBPJL	Pancreas	6536
KQAFYYSYKI	HLA-B13:02	CTCFL	Cervical;Ovarian	2056	TPVPLISTL	HLA-B07:02	RBPJL	Pancreas	6537
QAFYYSYKI	HLA-B13:02	CTCFL	Cervical;Ovarian	2057	EPGARRRAL	HLA-B08:01	RBPJL	Pancreas	6538
YHIDANFIPTV	HLA-B13:02	CTCFL	Cervical;Ovarian	2058	MIIRKVAKQCAL	HLA-B08:01	RBPJL	Pancreas	6539
YQCPHCATI	HLA-B13:02	CTCFL	Cervical;Ovarian	2059	EGYVRYGSL	HLA-B08:01	RBPJL	Pancreas	6540
QQQEGVQVV	HLA-B13:02	CTCFL	Cervical;Ovarian	2060	KPSQKKQSL	HLA-B08:01	RBPJL	Pancreas	6541
GLIPTVLTL	HLA-B13:02	CTCFL	Cervical;Ovarian	2061	NPLTHLSL	HLA-B08:01	RBPJL	Pancreas	6542
RSDEIVLTV	HLA-B13:02	CTCFL	Cervical;Ovarian	2062	SDWRWLRAPI	HLA-B13:02	RBPJL	Pancreas	6543
GFSRWILWV	HLA-B13:02	CTCFL	Cervical;Ovarian	2063	VEFSFSTSL	HLA-B13:02	RBPJL	Pancreas	6544
FTSSRMSSF	HLA-B46:01	CTCFL	Cervical;Ovarian	2064	RQWAAFTLHL	HLA-B13:02	RBPJL	Pancreas	6545
YASVEVKPF	HLA-B46:01	CTCFL	Cervical;Ovarian	2065	RSSPEHTTI	HLA-B13:02	RBPJL	Pancreas	6546
YAGNNMHSL	HLA-B46:01	CTCFL	Cervical;Ovarian	2066	YLSGPGWRV	HLA-B13:02	RBPJL	Pancreas	6547
MAATEISVL	HLA-B46:01	CTCFL	Cervical;Ovarian	2067	RLIKVISKP	HLA-B13:02	RBPJL	Pancreas	6548
HDANFIPTVY	HLA-B46:01	CTCFL	Cervical;Ovarian	2068	FSFTYTPEY	HLA-B46:01	RBPJL	Pancreas	6549
VAISIQQEL	HLA-B46:01	CTCFL	Cervical;Ovarian	2069	CVVPIDVAAF	HLA-B46:01	RBPJL	Pancreas	6550
KCNIDCNMAF	HLA-B46:01	CTCFL	Cervical;Ovarian	2070	FTRTNFHLF	HLA-B46:01	RBPJL	Pancreas	6551
FSRWITSKW	HLA-B46:01	CTCFL	Cervical;Ovarian	2071	SARQWAAF	HLA-B46:01	RBPJL	Pancreas	6552
RFKCKHCSY	HLA-B46:01	CTCFL	Cervical;Ovarian	2072	PPREGYVRY	HLA-B46:01	RBPJL	Pancreas	6553
DANFIPTVY	HLA-B46:01	CTCFL	Cervical;Ovarian	2073	FSTSLACTL	HLA-C01:02	RBPJL	Pancreas	6554
FTSSRMSSF	HLA-C01:02	CTCFL	Cervical;Ovarian	2074	SSPEHTTIL	HLA-C01:02	RBPJL	Pancreas	6555
YAGNNMHSL	HLA-C01:02	CTCFL	Cervical;Ovarian	2075	TMYRSPRSL	HLA-C01:02	RBPJL	Pancreas	6556
YSPQEMEVL	HLA-C01:02	CTCFL	Cervical;Ovarian	2076	RAPITIPMSL	HLA-C01:02	RBPJL	Pancreas	6557
MAATEISVL	HLA-C01:02	CTCFL	Cervical;Ovarian	2077	VTPVPLISTL	HLA-C01:02	RBPJL	Pancreas	6558
SAHRNLCLL	HLA-C01:02	CTCFL	Cervical;Ovarian	2078	FSTSLACTL	HLA-C03:04	RBPJL	Pancreas	6559
FTQSGTMKI	HLA-C01:02	CTCFL	Cervical;Ovarian	2079	LSLQDRSEM	HLA-C03:04	RBPJL	Pancreas	6560
LIPTVLTL	HLA-C01:02	CTCFL	Cervical;Ovarian	2080	LVLRGGREL	HLA-C03:04	RBPJL	Pancreas	6561
FHPDCLQML	HLA-C01:02	CTCFL	Cervical;Ovarian	2081	WAAFTLHL	HLA-C03:04	RBPJL	Pancreas	6562
GGPGSGPLL	HLA-C01:02	CTCFL	Cervical;Ovarian	2082	LFYPSAFSF	HLA-C04:01	RBPJL	Pancreas	6563
MAATEISVL	HLA-C03:04	CTCFL	Cervical;Ovarian	2083	FYPSAFSFTY	HLA-C04:01	RBPJL	Pancreas	6564
YAGNNMHSL	HLA-C03:04	CTCFL	Cervical;Ovarian	2084	MYRSPRSLV	HLA-C04:01	RBPJL	Pancreas	6565
VAISIQQEL	HLA-C03:04	CTCFL	Cervical;Ovarian	2085	FYPSAFSF	HLA-C04:01	RBPJL	Pancreas	6566
YASVEASKL	HLA-C03:04	CTCFL	Cervical;Ovarian	2086	ATDADALL	HLA-C04:01	RBPJL	Pancreas	6567

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YASVEVKPF	HLA-C03:04	CTCFL	Cervical;Ovarian	2087	TRTNFHLFI	HLA-C07:01	RBPJL	Pancreas	6568
FTSEAVEL	HLA-C03:04	CTCFL	Cervical;Ovarian	2088	VRYGSLVQL	HLA-C07:01	RBPJL	Pancreas	6569
AATEISVL	HLA-C03:04	CTCFL	Cervical;Ovarian	2089	LRAPTTIPM	HLA-C07:01	RBPJL	Pancreas	6570
HAYSAAEL	HLA-C03:04	CTCFL	Cervical;Ovarian	2090	KRKHFRLVL	HLA-C07:01	RBPJL	Pancreas	6571
YHDANFIPTVY	HLA-C04:01	CTCFL	Cervical;Ovarian	2091	LRGGVRRCL	HLA-C07:01	RBPJL	Pancreas	6572
YHDANFIPTV	HLA-C04:01	CTCFL	Cervical;Ovarian	2092	YRSPRSLVC	HLA-C07:01	RBPJL	Pancreas	6573
HHAWLIVLL	HLA-C04:01	CTCFL	Cervical;Ovarian	2093	TRTNFHLFI	HLA-C07:02	RBPJL	Pancreas	6574
VQQPGPGLL	HLA-C04:01	CTCFL	Cervical;Ovarian	2094	LRAPTTIPM	HLA-C07:02	RBPJL	Pancreas	6575
LHAYSAAEL	HLA-C04:01	CTCFL	Cervical;Ovarian	2095	LFYPSAFSF	HLA-C07:02	RBPJL	Pancreas	6576
HFTSEAVEL	HLA-C04:01	CTCFL	Cervical;Ovarian	2096	ARQWAAFTL	HLA-C07:02	RBPJL	Pancreas	6577
VLEEEVEL	HLA-C04:01	CTCFL	Cervical;Ovarian	2097	FYPSAFSF	HLA-C07:02	RBPJL	Pancreas	6578
FTSEAVEL	HLA-C04:01	CTCFL	Cervical;Ovarian	2098	FYPSAFSFTY	HLA-C07:02	RBPJL	Pancreas	6579
TFRTVTLL	HLA-C04:01	CTCFL	Cervical;Ovarian	2099	DSNPSELKY	HLA-A01:01	RLN1	Prostate	6580
HAWLIVLL	HLA-C04:01	CTCFL	Cervical;Ovarian	2100	ADSNPSELKY	HLA-A01:01	RLN1	Prostate	6581
TRFTQSGTM	HLA-C07:01	CTCFL	Cervical;Ovarian	2101	AADSNPSELKY	HLA-A01:01	RLN1	Prostate	6582
FRKYHDANF	HLA-C07:01	CTCFL	Cervical;Ovarian	2102	FLGALSKLY	HLA-A01:01	RLN1	Prostate	6583
MRTHSGVHM	HLA-C07:01	CTCFL	Cervical;Ovarian	2103	CTKRSLAKY	HLA-A01:01	RLN1	Prostate	6584
SRICYKQAF	HLA-C07:01	CTCFL	Cervical;Ovarian	2104	EAADSNPSELKY	HLA-A01:01	RLN1	Prostate	6585
FRKYHDANFI	HLA-C07:01	CTCFL	Cervical;Ovarian	2105	DSNLSFEEF	HLA-A01:01	RLN1	Prostate	6586
CRYCSAVF	HLA-C07:01	CTCFL	Cervical;Ovarian	2106	DTETIIIMLEF	HLA-A01:01	RLN1	Prostate	6587
RRGSRRVTW	HLA-C07:01	CTCFL	Cervical;Ovarian	2107	FTREFLGALS	HLA-A01:01	RLN1	Prostate	6588
ERSDEIVL	HLA-C07:01	CTCFL	Cervical;Ovarian	2108	LLEFCLLL	HLA-A01:01	RLN1	Prostate	6589
HRSPSELEA	HLA-C07:01	CTCFL	Cervical;Ovarian	2109	LLEFCLLLN	HLA-A01:01	RLN1	Prostate	6590
FRKYHDANF	HLA-C07:02	CTCFL	Cervical;Ovarian	2110	DTETIIIML	HLA-A01:01	RLN1	Prostate	6591
SRICYKQAF	HLA-C07:02	CTCFL	Cervical;Ovarian	2111	AADSNPSEL	HLA-A01:01	RLN1	Prostate	6592
FHPDCLQML	HLA-C07:02	CTCFL	Cervical;Ovarian	2112	PSELKYLGL	HLA-A01:01	RLN1	Prostate	6593
FYYSYKIYA	HLA-C07:02	CTCFL	Cervical;Ovarian	2113	LSERQPSLP	HLA-A01:01	RLN1	Prostate	6594
VHMRNLHAY	HLA-C07:02	CTCFL	Cervical;Ovarian	2114	IMLEFIANL	HLA-A02:01	RLN1	Prostate	6595
HHAWLIVLL	HLA-C07:02	CTCFL	Cervical;Ovarian	2115	FLFHLLEFCL	HLA-A02:01	RLN1	Prostate	6596
YKQAFYYSY	HLA-C07:02	CTCFL	Cervical;Ovarian	2116	SLPELQQYV	HLA-A02:01	RLN1	Prostate	6597
ARHHAWLIVL	HLA-C07:02	CTCFL	Cervical;Ovarian	2117	HLLEFCLLL	HLA-A02:01	RLN1	Prostate	6598
FYYSYKIY	HLA-C07:02	CTCFL	Cervical;Ovarian	2118	IIMLEFIANL	HLA-A02:01	RLN1	Prostate	6599
MRTHSGVHM	HLA-C07:02	CTCFL	Cervical;Ovarian	2119	FHLLEFCLLL	HLA-A02:01	RLN1	Prostate	6600
HSWPWQISLQY	HLA-A01:01	CTRC	Pancreas	2120	FIANLPPEL	HLA-A02:01	RLN1	Prostate	6601
YIDWINEKM	HLA-A01:01	CTRC	Pancreas	2121	ALFEKCCLI	HLA-A02:01	RLN1	Prostate	6602
RIDWWGFRV	HLA-A01:01	CTRC	Pancreas	2122	FLFHLLEFCLLL	HLA-A02:01	RLN1	Prostate	6603
LSDTIQVAC	HLA-A01:01	CTRC	Pancreas	2123	FLFHLLEFCLL	HLA-A02:01	RLN1	Prostate	6604
LLPKDYPCYV	HLA-A02:01	CTRC	Pancreas	2124	FLFHLLEFC	HLA-A02:01	RLN1	Prostate	6605
KLQQGLQPV	HLA-A02:01	CTRC	Pancreas	2125	LLLNQFSRAV	HLA-A02:01	RLN1	Prostate	6606
SLLPKDYPCYV	HLA-A02:01	CTRC	Pancreas	2126	FIQTVSLGI	HLA-A02:01	RLN1	Prostate	6607
TLIASNFVL	HLA-A02:01	CTRC	Pancreas	2127	IIMLEFIANLP	HLA-A02:01	RLN1	Prostate	6608
MLGITVLAAL	HLA-A02:01	CTRC	Pancreas	2128	LFLFHLLEFCL	HLA-A02:01	RLN1	Prostate	6609
CQLENGSWEV	HLA-A02:01	CTRC	Pancreas	2129	MLEFIANL	HLA-A02:01	RLN1	Prostate	6610

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ALIKLAEHV	HLA-A02:01	CTRC	Pancreas	2130	IIIMLEFIANL	HLA-A02:01	RLN1	Prostate	6611
LLLRNDIAL	HLA-A02:01	CTRC	Pancreas	2131	HLLEFCLLLLN	HLA-A02:01	RLN1	Prostate	6612
DSLLPKDYPCYV	HLA-A02:01	CTRC	Pancreas	2132	RLFLFHLLEFCL	HLA-A02:01	RLN1	Prostate	6613
KLAEHVEL	HLA-A02:01	CTRC	Pancreas	2133	LFLFHLLEFCLL	HLA-A02:01	RLN1	Prostate	6614
SLFVGVDTIHV	HLA-A02:01	CTRC	Pancreas	2134	ALSERQPSL	HLA-A02:01	RLN1	Prostate	6615
GLQPVVDHA	HLA-A02:01	CTRC	Pancreas	2135	LLLNQFSRA	HLA-A02:01	RLN1	Prostate	6616
SLFVGVDTI	HLA-A02:01	CTRC	Pancreas	2136	PSLPELQQYV	HLA-A02:01	RLN1	Prostate	6617
KLAEHVELS	HLA-A02:01	CTRC	Pancreas	2137	YVALFEKCCLI	HLA-A02:01	RLN1	Prostate	6618
RTYRVAVGK	HLA-A03:01	CTRC	Pancreas	2138	LLNQFSRAV	HLA-A02:01	RLN1	Prostate	6619
LLRNDIALIK	HLA-A03:01	CTRC	Pancreas	2139	FINKDTETI	HLA-A02:01	RLN1	Prostate	6620
TRTYRVAVGK	HLA-A03:01	CTRC	Pancreas	2140	TIIIMLEFIANL	HLA-A02:01	RLN1	Prostate	6621
RLWTNGPIADK	HLA-A03:01	CTRC	Pancreas	2141	KLCGRELVRA	HLA-A02:01	RLN1	Prostate	6622
VVYTRVSAY	HLA-A03:01	CTRC	Pancreas	2142	VAGDFIQTV	HLA-A02:01	RLN1	Prostate	6623
RTYRVAVGK	HLA-A11:01	CTRC	Pancreas	2143	ELQQYVPAL	HLA-A02:01	RLN1	Prostate	6624
GVDTIIHVIK	HLA-A11:01	CTRC	Pancreas	2144	HLLEFCLL	HLA-A02:01	RLN1	Prostate	6625
TTWRWKTKK	HLA-A11:01	CTRC	Pancreas	2145	KWKDDVIKL	HLA-A02:01	RLN1	Prostate	6626
SAYIDWINEK	HLA-A11:01	CTRC	Pancreas	2146	FLGALSKL	HLA-A02:01	RLN1	Prostate	6627
AYIDWINEK	HLA-A11:01	CTRC	Pancreas	2147	NLPPELKAA	HLA-A02:01	RLN1	Prostate	6628
SRIDWWGFRVK	HLA-A11:01	CTRC	Pancreas	2148	ALFEKCCL	HLA-A02:01	RLN1	Prostate	6629
VYTRVSAYI	HLA-A24:02	CTRC	Pancreas	2149	ALKDSNLSF	HLA-A02:01	RLN1	Prostate	6630
CYVTGWGRLW	HLA-A24:02	CTRC	Pancreas	2150	FLFHLLEF	HLA-A02:01	RLN1	Prostate	6631
KDYPCYVTGW	HLA-A24:02	CTRC	Pancreas	2151	RLFLFHLL	HLA-A02:01	RLN1	Prostate	6632
AYIDWINEK	HLA-A24:02	CTRC	Pancreas	2152	KLCGRELV	HLA-A02:01	RLN1	Prostate	6633
VWPWERTTW	HLA-A24:02	CTRC	Pancreas	2153	KLYHPSSTKI	HLA-A02:01	RLN1	Prostate	6634
RVKKTMVCA	HLA-A30:01	CTRC	Pancreas	2154	YLGLDTHSQ	HLA-A02:01	RLN1	Prostate	6635
RTYRVAVGK	HLA-A30:01	CTRC	Pancreas	2155	KLYHPSSTK	HLA-A03:01	RLN1	Prostate	6636
RTTWRWKTK	HLA-A30:01	CTRC	Pancreas	2156	SKLYHPSSTK	HLA-A03:01	RLN1	Prostate	6637
AYIDWINEK	HLA-A30:01	CTRC	Pancreas	2157	KLYHPSSTKIQK	HLA-A03:01	RLN1	Prostate	6638
CISNTRTYR	HLA-A33:03	CTRC	Pancreas	2158	KLYHPSSTKI	HLA-A03:01	RLN1	Prostate	6639
CSRIDWWGFR	HLA-A33:03	CTRC	Pancreas	2159	ALSKLYHPSSTK	HLA-A03:01	RLN1	Prostate	6640
HCISNTRTYR	HLA-A33:03	CTRC	Pancreas	2160	LSKLYHPSSTK	HLA-A03:01	RLN1	Prostate	6641
EVFGIVSFGSR	HLA-A33:03	CTRC	Pancreas	2161	AEIVPSFINK	HLA-A03:01	RLN1	Prostate	6642
WVWTPSTSTR	HLA-A33:03	CTRC	Pancreas	2162	AICGMSTWSK	HLA-A03:01	RLN1	Prostate	6643
DYPCYVTGWGR	HLA-A33:03	CTRC	Pancreas	2163	FIANLPPELK	HLA-A03:01	RLN1	Prostate	6644
MPSCCAMIL	HLA-B07:02	CTRC	Pancreas	2164	CLIGCTKRSLAK	HLA-A03:01	RLN1	Prostate	6645
LPSSSLQSM	HLA-B07:02	CTRC	Pancreas	2165	EIVPSFINK	HLA-A03:01	RLN1	Prostate	6646
RPHSWPWQISL	HLA-B07:02	CTRC	Pancreas	2166	REFLGALSK	HLA-A03:01	RLN1	Prostate	6647
RPHSWPWQI	HLA-B07:02	CTRC	Pancreas	2167	RLFLFHLLEF	HLA-A03:01	RLN1	Prostate	6648
HVHKRWNAL	HLA-B08:01	CTRC	Pancreas	2168	RPYVALFEK	HLA-A03:01	RLN1	Prostate	6649
IHVHKRWNAL	HLA-B08:01	CTRC	Pancreas	2169	HLLEFCLLL	HLA-A03:01	RLN1	Prostate	6650
HVHKRWNALL	HLA-B08:01	CTRC	Pancreas	2170	RLFLFHLLE	HLA-A03:01	RLN1	Prostate	6651
WINEKMQL	HLA-B08:01	CTRC	Pancreas	2171	AEIVPSFINK	HLA-A11:01	RLN1	Prostate	6652
CLPEKDSL	HLA-B08:01	CTRC	Pancreas	2172	AICGMSTWSK	HLA-A11:01	RLN1	Prostate	6653

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
AEHVELSDTI	HLA-B13:02	CTRC	Pancreas	2173	KLYHPSSTK	HLA-A11:01	RLN1	Prostate	6654
CQLENGSWEV	HLA-B13:02	CTRC	Pancreas	2174	EIVPSFINK	HLA-A11:01	RLN1	Prostate	6655
VELSDTIQV	HLA-B13:02	CTRC	Pancreas	2175	FIANLPPELK	HLA-A11:01	RLN1	Prostate	6656
RIDWWGFRV	HLA-B13:02	CTRC	Pancreas	2176	SKLYHPSSTK	HLA-A11:01	RLN1	Prostate	6657
SLFVGVDTI	HLA-B13:02	CTRC	Pancreas	2177	LQQYVPALK	HLA-A11:01	RLN1	Prostate	6658
RPHSWPWQI	HLA-B13:02	CTRC	Pancreas	2178	IANLPPELK	HLA-A11:01	RLN1	Prostate	6659
VVYTRVSAY	HLA-B46:01	CTRC	Pancreas	2179	AADSNPSELK	HLA-A11:01	RLN1	Prostate	6660
ASSCGVPSF	HLA-B46:01	CTRC	Pancreas	2180	REFLGALSK	HLA-A11:01	RLN1	Prostate	6661
HSWPWQISL	HLA-B46:01	CTRC	Pancreas	2181	RPYVALFEK	HLA-A11:01	RLN1	Prostate	6662
CSRIDWWGF	HLA-B46:01	CTRC	Pancreas	2182	SNLSFEEFKK	HLA-A11:01	RLN1	Prostate	6663
HCISNTRTY	HLA-B46:01	CTRC	Pancreas	2183	IVPSFINK	HLA-A11:01	RLN1	Prostate	6664
HSWPWQISL	HLA-C01:02	CTRC	Pancreas	2184	ADSNPSELK	HLA-A11:01	RLN1	Prostate	6665
AMILPSSSL	HLA-C01:02	CTRC	Pancreas	2185	SNLSFEEFK	HLA-A11:01	RLN1	Prostate	6666
YIDWINEKM	HLA-C01:02	CTRC	Pancreas	2186	RLFLFHLLEF	HLA-A24:02	RLN1	Prostate	6667
ILPSSSLQSM	HLA-C01:02	CTRC	Pancreas	2187	LFLFHLLEF	HLA-A24:02	RLN1	Prostate	6668
CLPEKDSLL	HLA-C01:02	CTRC	Pancreas	2188	LYHPSSTKI	HLA-A24:02	RLN1	Prostate	6669
CLPEKDSL	HLA-C01:02	CTRC	Pancreas	2189	PYVALFEKCCLI	HLA-A24:02	RLN1	Prostate	6670
HSWPWQISL	HLA-C03:04	CTRC	Pancreas	2190	SFINKDTETI	HLA-A24:02	RLN1	Prostate	6671
LGITVLAAL	HLA-C03:04	CTRC	Pancreas	2191	MPRLFLFHLLEF	HLA-A24:02	RLN1	Prostate	6672
AMILPSSSL	HLA-C03:04	CTRC	Pancreas	2192	REFLGALSKL	HLA-A24:02	RLN1	Prostate	6673
CATPGPTVW	HLA-C03:04	CTRC	Pancreas	2193	KLYHPSSTKI	HLA-A24:02	RLN1	Prostate	6674
MILPSSSL	HLA-C03:04	CTRC	Pancreas	2194	KWKDDVIKL	HLA-A24:02	RLN1	Prostate	6675
YIDWINEKM	HLA-C04:01	CTRC	Pancreas	2195	PVAEIVPSF	HLA-A24:02	RLN1	Prostate	6676
MPSCCAMIL	HLA-C04:01	CTRC	Pancreas	2196	EFCLLLNQF	HLA-A24:02	RLN1	Prostate	6677
RHTCGGTLI	HLA-C04:01	CTRC	Pancreas	2197	ALKDSNLSF	HLA-A24:02	RLN1	Prostate	6678
SWEVFGIVSF	HLA-C04:01	CTRC	Pancreas	2198	IMLEFIANL	HLA-A24:02	RLN1	Prostate	6679
VEDEEGSLF	HLA-C04:01	CTRC	Pancreas	2199	EFLGALSKL	HLA-A24:02	RLN1	Prostate	6680
VEDEEGSL	HLA-C04:01	CTRC	Pancreas	2200	KRRPYVALF	HLA-A24:02	RLN1	Prostate	6681
WRHTCGGTL	HLA-C07:01	CTRC	Pancreas	2201	HSQKKRRPYV	HLA-A30:01	RLN1	Prostate	6682
HKRWNALLL	HLA-C07:01	CTRC	Pancreas	2202	SQKKRRPYV	HLA-A30:01	RLN1	Prostate	6683
WRHTCGGTLI	HLA-C07:01	CTRC	Pancreas	2203	KLYHPSSTK	HLA-A30:01	RLN1	Prostate	6684
HSWPWQISL	HLA-C07:01	CTRC	Pancreas	2204	LSKLYHPSS	HLA-A30:01	RLN1	Prostate	6685
TRKKPVVY	HLA-C07:01	CTRC	Pancreas	2205	FSRAVAAKWK	HLA-A30:01	RLN1	Prostate	6686
TRKKPVVYT	HLA-C07:01	CTRC	Pancreas	2206	KALRTGSCFT	HLA-A30:01	RLN1	Prostate	6687
WRHTCGGTL	HLA-C07:02	CTRC	Pancreas	2207	SQKKRRPYVA	HLA-A30:01	RLN1	Prostate	6688
HKRWNALLL	HLA-C07:02	CTRC	Pancreas	2208	LSKLYHPSSTK	HLA-A30:01	RLN1	Prostate	6689
VHKRWNALL	HLA-C07:02	CTRC	Pancreas	2209	RAQIAICGM	HLA-A30:01	RLN1	Prostate	6690
TRKKPVVY	HLA-C07:02	CTRC	Pancreas	2210	KWKDDVIKL	HLA-A30:01	RLN1	Prostate	6691
ARPHSWPWQI	HLA-C07:02	CTRC	Pancreas	2211	KCCLIGCTK	HLA-A30:01	RLN1	Prostate	6692
KADIYTQNFY	HLA-A01:01	CYP11A1	Adrenal Gland	2212	AEIVPSFINK	HLA-A30:01	RLN1	Prostate	6693
TSMTLQWHLY	HLA-A01:01	CYP11A1	Adrenal Gland	2213	REFLGALSK	HLA-A30:01	RLN1	Prostate	6694
TTSMTLQWHLY	HLA-A01:01	CYP11A1	Adrenal Gland	2214	LSFEEFKKL	HLA-A30:01	RLN1	Prostate	6695
HHDYRGILY	HLA-A01:01	CYP11A1	Adrenal Gland	2215	EIVPSFINK	HLA-A30:01	RLN1	Prostate	6696

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YMIPAKTLV	HLA-A02:01	CYP11A1	Adrenal Gland	2216	HSQKKRRPY	HLA-A30:01	RLN1	Prostate	6697
FAFESITNV	HLA-A02:01	CYP11A1	Adrenal Gland	2217	ELKAALSER	HLA-A33:03	RLN1	Prostate	6698
TMLQLVPLL	HLA-A02:01	CYP11A1	Adrenal Gland	2218	EFKKLIRNR	HLA-A33:03	RLN1	Prostate	6699
FLINMLENFRV	HLA-A02:01	CYP11A1	Adrenal Gland	2219	CGMSTWSKR	HLA-A33:03	RLN1	Prostate	6700
YMIPAKTLVQV	HLA-A02:01	CYP11A1	Adrenal Gland	2220	EEFKKLIRNR	HLA-A33:03	RLN1	Prostate	6701
MLAKGLPPRSV	HLA-A02:01	CYP11A1	Adrenal Gland	2221	CLLLNQFSR	HLA-A33:03	RLN1	Prostate	6702
VLRDYMIPA	HLA-A02:01	CYP11A1	Adrenal Gland	2222	EFCLLLNQFSR	HLA-A33:03	RLN1	Prostate	6703
YQMFHTSVPM	HLA-A02:01	CYP11A1	Adrenal Gland	2223	ALRTGSCFTR	HLA-A33:03	RLN1	Prostate	6704
KLGNVESVYV	HLA-A02:01	CYP11A1	Adrenal Gland	2224	PELKAALSER	HLA-A33:03	RLN1	Prostate	6705
RLHPISVTL	HLA-A02:01	CYP11A1	Adrenal Gland	2225	FCLLLNQFSR	HLA-A33:03	RLN1	Prostate	6706
GLPPRSVLV	HLA-A02:01	CYP11A1	Adrenal Gland	2226	EIVPSFINK	HLA-A33:03	RLN1	Prostate	6707
NLPPDLFRL	HLA-A02:01	CYP11A1	Adrenal Gland	2227	DVIKLCGR	HLA-A33:03	RLN1	Prostate	6708
FLIPPWVAY	HLA-A02:01	CYP11A1	Adrenal Gland	2228	DTHSQKKRR	HLA-A33:03	RLN1	Prostate	6709
RLFRTKTWK	HLA-A03:01	CYP11A1	Adrenal Gland	2229	DTHSQKKR	HLA-A33:03	RLN1	Prostate	6710
MLQLVPLLK	HLA-A03:01	CYP11A1	Adrenal Gland	2230	DDVIKLCGR	HLA-A33:03	RLN1	Prostate	6711
ILYRLLGDSK	HLA-A03:01	CYP11A1	Adrenal Gland	2231	TPRPVAGDF	HLA-B07:02	RLN1	Prostate	6712
FLIPPWVAY	HLA-A03:01	CYP11A1	Adrenal Gland	2232	APQTPRPVA	HLA-B07:02	RLN1	Prostate	6713
GLPPRSVLVK	HLA-A03:01	CYP11A1	Adrenal Gland	2233	MPRLFLFHLL	HLA-B07:02	RLN1	Prostate	6714
AAWDVIFSK	HLA-A11:01	CYP11A1	Adrenal Gland	2234	VPALKDSNL	HLA-B07:02	RLN1	Prostate	6715
ATMLQLVPLLK	HLA-A11:01	CYP11A1	Adrenal Gland	2235	RPVAEIVPSF	HLA-B07:02	RLN1	Prostate	6716
SVLHRRIKK	HLA-A11:01	CYP11A1	Adrenal Gland	2236	MPRLFLFHL	HLA-B07:02	RLN1	Prostate	6717
MLQLVPLLK	HLA-A11:01	CYP11A1	Adrenal Gland	2237	LPPELKAAL	HLA-B07:02	RLN1	Prostate	6718
HVAAWDVIFSK	HLA-A11:01	CYP11A1	Adrenal Gland	2238	MPRLFLFHLLEF	HLA-B07:02	RLN1	Prostate	6719
RFIDAIYQMF	HLA-A24:02	CYP11A1	Adrenal Gland	2239	TPRPVAEIV	HLA-B07:02	RLN1	Prostate	6720
IYTQNFYWEL	HLA-A24:02	CYP11A1	Adrenal Gland	2240	HPSSTKIQKL	HLA-B07:02	RLN1	Prostate	6721
GWLNLYHFW	HLA-A24:02	CYP11A1	Adrenal Gland	2241	SPDGGKAL	HLA-B07:02	RLN1	Prostate	6722
IYALGREPTF	HLA-A24:02	CYP11A1	Adrenal Gland	2242	MPRLFLFHLL	HLA-B08:01	RLN1	Prostate	6723
TFFFDPENF	HLA-A24:02	CYP11A1	Adrenal Gland	2243	MPRLFLFHL	HLA-B08:01	RLN1	Prostate	6724
ATKNFLPLL	HLA-A30:01	CYP11A1	Adrenal Gland	2244	QKKRRPYVAL	HLA-B08:01	RLN1	Prostate	6725
STRSPRPFN	HLA-A30:01	CYP11A1	Adrenal Gland	2245	SQKKRRPYVAL	HLA-B08:01	RLN1	Prostate	6726
RLFRTKTWK	HLA-A30:01	CYP11A1	Adrenal Gland	2246	SQKKRRPYV	HLA-B08:01	RLN1	Prostate	6727
KYGPIYREK	HLA-A30:01	CYP11A1	Adrenal Gland	2247	HSQKKRRPYVAL	HLA-B08:01	RLN1	Prostate	6728
NFYWELRQK	HLA-A30:01	CYP11A1	Adrenal Gland	2248	ELQQYVPAL	HLA-B08:01	RLN1	Prostate	6729
AAWDVIFSK	HLA-A30:01	CYP11A1	Adrenal Gland	2249	MPRLFLFHLLEF	HLA-B08:01	RLN1	Prostate	6730
DFVSVLHRR	HLA-A33:03	CYP11A1	Adrenal Gland	2250	LIRNRQSEA	HLA-B08:01	RLN1	Prostate	6731
YTQNFYWELR	HLA-A33:03	CYP11A1	Adrenal Gland	2251	DFIQTVSL	HLA-B08:01	RLN1	Prostate	6732
VAYHQYYQR	HLA-A33:03	CYP11A1	Adrenal Gland	2252	IGCTKRSL	HLA-B08:01	RLN1	Prostate	6733
EVVNPEAQR	HLA-A33:03	CYP11A1	Adrenal Gland	2253	VIKLCGREL	HLA-B08:01	RLN1	Prostate	6734
ESITNVIFGER	HLA-A33:03	CYP11A1	Adrenal Gland	2254	ALFEKCCL	HLA-B08:01	RLN1	Prostate	6735
APREGLGRL	HLA-B07:02	CYP11A1	Adrenal Gland	2255	STWSKRSL	HLA-B08:01	RLN1	Prostate	6736
SAPREGLGRL	HLA-B07:02	CYP11A1	Adrenal Gland	2256	HLLEFCLL	HLA-B08:01	RLN1	Prostate	6737
VPMLNLPPDL	HLA-B07:02	CYP11A1	Adrenal Gland	2257	PPELKAAL	HLA-B08:01	RLN1	Prostate	6738
SPGDNGWLNL	HLA-B07:02	CYP11A1	Adrenal Gland	2258	ALSERQPSL	HLA-B08:01	RLN1	Prostate	6739

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
TPSPGDNGWL	HLA-B07:02	CYP11A1	Adrenal Gland	2259	LPPELKAAL	HLA-B08:01	RLN1	Prostate	6740
TLRLHPISV	HLA-B08:01	CYP11A1	Adrenal Gland	2260	REFLGALSKL	HLA-B13:02	RLN1	Prostate	6741
MATVMLQLVPL	HLA-B08:01	CYP11A1	Adrenal Gland	2261	RELVRAQIAI	HLA-B13:02	RLN1	Prostate	6742
TLQWHLYEM	HLA-B08:01	CYP11A1	Adrenal Gland	2262	LEFCLLLNQF	HLA-B13:02	RLN1	Prostate	6743
TIFLINML	HLA-B08:01	CYP11A1	Adrenal Gland	2263	LEFIANLPP	HLA-B13:02	RLN1	Prostate	6744
YMIPAKTL	HLA-B08:01	CYP11A1	Adrenal Gland	2264	GDFIQTVSL	HLA-B13:02	RLN1	Prostate	6745
AWKKDRVAL	HLA-B08:01	CYP11A1	Adrenal Gland	2265	LEFIANLPPEL	HLA-B13:02	RLN1	Prostate	6746
AELEMTIFLI	HLA-B13:02	CYP11A1	Adrenal Gland	2266	GDFIQTVSLGI	HLA-B13:02	RLN1	Prostate	6747
LEMTIFLI	HLA-B13:02	CYP11A1	Adrenal Gland	2267	MLEFIANLPP	HLA-B13:02	RLN1	Prostate	6748
RNLGFGWGV	HLA-B13:02	CYP11A1	Adrenal Gland	2268	TETIIIMLEFI	HLA-B13:02	RLN1	Prostate	6749
RLHPISVTL	HLA-B13:02	CYP11A1	Adrenal Gland	2269	VAGDFIQTV	HLA-B13:02	RLN1	Prostate	6750
RQGMLEEVV	HLA-B13:02	CYP11A1	Adrenal Gland	2270	ALFEKCCLI	HLA-B13:02	RLN1	Prostate	6751
AQGDMATML	HLA-B13:02	CYP11A1	Adrenal Gland	2271	SLPELQQYV	HLA-B13:02	RLN1	Prostate	6752
FAFESITNV	HLA-B46:01	CYP11A1	Adrenal Gland	2272	QQYVPALKD	HLA-B13:02	RLN1	Prostate	6753
YQMFHTSVPM	HLA-B46:01	CYP11A1	Adrenal Gland	2273	HLLEFCLLL	HLA-B13:02	RLN1	Prostate	6754
FLIPPWVAY	HLA-B46:01	CYP11A1	Adrenal Gland	2274	RQPSLPELQ	HLA-B13:02	RLN1	Prostate	6755
LSKDKNITY	HLA-B46:01	CYP11A1	Adrenal Gland	2275	RLFLFHLLE	HLA-B13:02	RLN1	Prostate	6756
RLHPISVTL	HLA-B46:01	CYP11A1	Adrenal Gland	2276	AGDFIQTV	HLA-B13:02	RLN1	Prostate	6757
RLHPISVTL	HLA-C01:02	CYP11A1	Adrenal Gland	2277	RLFLFHLL	HLA-B13:02	RLN1	Prostate	6758
LMPEKPISF	HLA-C01:02	CYP11A1	Adrenal Gland	2278	FTREFLGAL	HLA-B46:01	RLN1	Prostate	6759
YTQNFYWEL	HLA-C01:02	CYP11A1	Adrenal Gland	2279	FIANLPPEL	HLA-B46:01	RLN1	Prostate	6760
MAPEATKNFL	HLA-C01:02	CYP11A1	Adrenal Gland	2280	IAICGMSTW	HLA-B46:01	RLN1	Prostate	6761
MAPEATKNF	HLA-C01:02	CYP11A1	Adrenal Gland	2281	FINKDTETI	HLA-B46:01	RLN1	Prostate	6762
RSPRPFNEI	HLA-C01:02	CYP11A1	Adrenal Gland	2282	FSRAVAAKW	HLA-B46:01	RLN1	Prostate	6763
FAFESITNV	HLA-C03:04	CYP11A1	Adrenal Gland	2283	FLGALSKLY	HLA-B46:01	RLN1	Prostate	6764
YALGREPTF	HLA-C03:04	CYP11A1	Adrenal Gland	2284	ALKDSNLSF	HLA-B46:01	RLN1	Prostate	6765
FAFESITNVI	HLA-C03:04	CYP11A1	Adrenal Gland	2285	KALRTGSCF	HLA-B46:01	RLN1	Prostate	6766
YTQNFYWEL	HLA-C03:04	CYP11A1	Adrenal Gland	2286	CTKRSLAKY	HLA-B46:01	RLN1	Prostate	6767
YVIDPEDVAL	HLA-C03:04	CYP11A1	Adrenal Gland	2287	ISPDGGKAL	HLA-B46:01	RLN1	Prostate	6768
YYQRPIGVL	HLA-C04:01	CYP11A1	Adrenal Gland	2288	VAGDFIQTV	HLA-B46:01	RLN1	Prostate	6769
FIDAIYQMF	HLA-C04:01	CYP11A1	Adrenal Gland	2289	VIKLCGREL	HLA-B46:01	RLN1	Prostate	6770
HHDYRGILY	HLA-C04:01	CYP11A1	Adrenal Gland	2290	PVAEIVPSF	HLA-B46:01	RLN1	Prostate	6771
NFDPTRWL	HLA-C04:01	CYP11A1	Adrenal Gland	2291	SLPELQQY	HLA-B46:01	RLN1	Prostate	6772
FFDPENFD	HLA-C04:01	CYP11A1	Adrenal Gland	2292	TIIIMLEF	HLA-B46:01	RLN1	Prostate	6773
HWCKWPSML	HLA-C04:01	CYP11A1	Adrenal Gland	2293	FLFHLLEF	HLA-B46:01	RLN1	Prostate	6774
YRGILYRLL	HLA-C07:01	CYP11A1	Adrenal Gland	2294	FIANLPPEL	HLA-C01:02	RLN1	Prostate	6775
YRLLGDSKM	HLA-C07:01	CYP11A1	Adrenal Gland	2295	ISPDGGKAL	HLA-C01:02	RLN1	Prostate	6776
YYQRPIGVL	HLA-C07:01	CYP11A1	Adrenal Gland	2296	FTREFLGAL	HLA-C01:02	RLN1	Prostate	6777
SRDFVSVL	HLA-C07:01	CYP11A1	Adrenal Gland	2297	IMLEFIANL	HLA-C01:02	RLN1	Prostate	6778
VSRDFVSVL	HLA-C07:01	CYP11A1	Adrenal Gland	2298	MSTWSKRSL	HLA-C01:02	RLN1	Prostate	6779
YYQRPIGVL	HLA-C07:02	CYP11A1	Adrenal Gland	2299	SLPELQQYV	HLA-C01:02	RLN1	Prostate	6780
YRGILYRLL	HLA-C07:02	CYP11A1	Adrenal Gland	2300	AADSNPSEL	HLA-C01:02	RLN1	Prostate	6781
RFIDAIYQM	HLA-C07:02	CYP11A1	Adrenal Gland	2301	ALSERQPSL	HLA-C01:02	RLN1	Prostate	6782

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FRVEIQHIL	HLA-C07:02	CYP11A1	Adrenal Gland	2302	FIQTVSLGI	HLA-C01:02	RLN1	Prostate	6783
SSDLVLQNY	HLA-A01:01	CYP11B2; CYP11B1	Adrenal Gland	2303	NLPPELKAAL	HLA-C01:02	RLN1	Prostate	6784
SMDAPTSRLY	HLA-A01:01	CYP11B1	Adrenal Gland	2304	LPPELKAAL	HLA-C01:02	RLN1	Prostate	6785
LTQEDIKMVY	HLA-A01:01	CYP11B2; CYP11B1	Adrenal Gland	2305	SNPSELKYL	HLA-C01:02	RLN1	Prostate	6786
ASSDLVLQNY	HLA-A01:01	CYP11B1	Adrenal Gland	2306	RQPSLPEL	HLA-C01:02	RLN1	Prostate	6787
TLDVQPSIFHY	HLA-A01:01	CYP11B2; CYP11B1	Adrenal Gland	2307	DAPQTPRPV	HLA-C01:02	RLN1	Prostate	6788
WLDIRGSGRNFY	HLA-A01:01	CYP11B1	Adrenal Gland	2308	FIANLPPEL	HLA-C03:04	RLN1	Prostate	6789
FILRPSMFPL	HLA-A02:01	CYP11B1	Adrenal Gland	2309	FTREFLGAL	HLA-C03:04	RLN1	Prostate	6790
FPLLMTLFEL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2310	MSTWSKRSL	HLA-C03:04	RLN1	Prostate	6791
RLAEAEMLL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2311	AADSNPSEL	HLA-C03:04	RLN1	Prostate	6792
RLYPVGLFL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2312	FINKDTETI	HLA-C03:04	RLN1	Prostate	6793
SMFPLLTFRA	HLA-A02:01	CYP11B1	Adrenal Gland	2313	IAICGMSTW	HLA-C03:04	RLN1	Prostate	6794
LLMTLFELA	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2314	RAQIAICGM	HLA-C03:04	RLN1	Prostate	6795
LLMTLFEL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2315	ISPDGGKAL	HLA-C03:04	RLN1	Prostate	6796
MLPEDVEKL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2316	LSFEEFKKL	HLA-C03:04	RLN1	Prostate	6797
SIFHYTIEA	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2317	IANLPPEL	HLA-C03:04	RLN1	Prostate	6798
ILRPSMFPL	HLA-A02:01	CYP11B1	Adrenal Gland	2318	EAADSNPSEL	HLA-C03:04	RLN1	Prostate	6799
ALFGERLGL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2319	FIANLPPEL	HLA-C04:01	RLN1	Prostate	6800
RLAEAEMLLL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2320	AADSNPSEL	HLA-C04:01	RLN1	Prostate	6801
ALFGERLGLV	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2321	SLPELQQYV	HLA-C04:01	RLN1	Prostate	6802
SLHPHRMSL	HLA-A02:01	CYP11B1	Adrenal Gland	2322	LYHPSSTKI	HLA-C04:01	RLN1	Prostate	6803
TLFELARNPNV	HLA-A02:01	CYP11B1	Adrenal Gland	2323	FIQTVSLGI	HLA-C04:01	RLN1	Prostate	6804
RLAEAEMLLLL	HLA-A02:01	CYP11B2; CYP11B1	Adrenal Gland	2324	KRRPYVALF	HLA-C04:01	RLN1	Prostate	6805
TVFPLLMTL	HLA-A02:01	CYP11B1	Adrenal Gland	2325	SFEEFKKLI	HLA-C04:01	RLN1	Prostate	6806
RSLSRWTSPK	HLA-A03:01	CYP11B1	Adrenal Gland	2326	FHLLEFCLLL	HLA-C04:01	RLN1	Prostate	6807
SLSRWTSPK	HLA-A03:01	CYP11B1	Adrenal Gland	2327	FHLLEFCLL	HLA-C04:01	RLN1	Prostate	6808
FLHALEVMFK	HLA-A03:01	CYP11B2; CYP11B1	Adrenal Gland	2328	SFEEFKKL	HLA-C04:01	RLN1	Prostate	6809
SMFPLLTFR	HLA-A03:01	CYP11B1	Adrenal Gland	2329	WKDDVIKL	HLA-C04:01	RLN1	Prostate	6810

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LMFMPRSLSR	HLA-A03:01	CYP11B2; CYP11B1	Adrenal Gland	2330	IANLPPEL	HLA-C04:01	RLN1	Prostate	6811
RLYPVGLFL	HLA-A03:01	CYP11B2; CYP11B1	Adrenal Gland	2331	LFHLLEFCL	HLA-C04:01	RLN1	Prostate	6812
RLYPVGLFLER	HLA-A03:01	CYP11B2; CYP11B1	Adrenal Gland	2332	LFLFHLLEF	HLA-C04:01	RLN1	Prostate	6813
ALFPRPERY	HLA-A03:01	CYP11B2; CYP11B1	Adrenal Gland	2333	EFCLLLNQF	HLA-C04:01	RLN1	Prostate	6814
RVFLYSLGR	HLA-A03:01	CYP11B1	Adrenal Gland	2334	DFIQTVSL	HLA-C04:01	RLN1	Prostate	6815
SLSRWTSPK	HLA-A11:01	CYP11B1	Adrenal Gland	2335	KRRPYVALF	HLA-C07:01	RLN1	Prostate	6816
SMFPLLTFR	HLA-A11:01	CYP11B1	Adrenal Gland	2336	ERQPSLPEL	HLA-C07:01	RLN1	Prostate	6817
RSLSRWTSPK	HLA-A11:01	CYP11B1	Adrenal Gland	2337	LYHPSSTKI	HLA-C07:01	RLN1	Prostate	6818
RVFLYSLGR	HLA-A11:01	CYP11B1	Adrenal Gland	2338	KKRRPYVALF	HLA-C07:01	RLN1	Prostate	6819
ATTELPLLR	HLA-A11:01	CYP11B2; CYP11B1	Adrenal Gland	2339	VRAQIAICGM	HLA-C07:01	RLN1	Prostate	6820
STGSPIQLR	HLA-A11:01	CYP11B1	Adrenal Gland	2340	FTREFLGAL	HLA-C07:01	RLN1	Prostate	6821
QTFQELGPIFR	HLA-A11:01	CYP11B2; CYP11B1	Adrenal Gland	2341	RRPYVALF	HLA-C07:01	RLN1	Prostate	6822
ASISEHPQK	HLA-A11:01	CYP11B2; CYP11B1	Adrenal Gland	2342	FIANLPPEL	HLA-C07:01	RLN1	Prostate	6823
RWLRLLQIW	HLA-A24:02	CYP11B2; CYP11B1	Adrenal Gland	2343	MPRLFLFHLL	HLA-C07:01	RLN1	Prostate	6824
RYNPQRWLDI	HLA-A24:02	CYP11B2; CYP11B1	Adrenal Gland	2344	KRRPYVAL	HLA-C07:01	RLN1	Prostate	6825
VFPLLMTLF	HLA-A24:02	CYP11B1	Adrenal Gland	2345	GDFIQTVSL	HLA-C07:01	RLN1	Prostate	6826
RNFYHVPFGF	HLA-A24:02	CYP11B1	Adrenal Gland	2346	TPRPVAGD	HLA-C07:01	RLN1	Prostate	6827
MFKSTVQLMF	HLA-A24:02	CYP11B2; CYP11B1	Adrenal Gland	2347	STWSKRSL	HLA-C07:01	RLN1	Prostate	6828
QYTSIVAEL	HLA-A24:02	CYP11B1	Adrenal Gland	2348	RRPYVALFE	HLA-C07:01	RLN1	Prostate	6829
TFQELGPIF	HLA-A24:02	CYP11B2; CYP11B1	Adrenal Gland	2349	KRSLSQED	HLA-C07:01	RLN1	Prostate	6830
NFYHVPFGF	HLA-A24:02	CYP11B1	Adrenal Gland	2350	LIGCTKRSL	HLA-C07:01	RLN1	Prostate	6831
RSRHSASFG	HLA-A30:01	CYP11B1	Adrenal Gland	2351	KRRPYVALF	HLA-C07:02	RLN1	Prostate	6832
RSLSRWTSPK	HLA-A30:01	CYP11B1	Adrenal Gland	2352	LYHPSSTKI	HLA-C07:02	RLN1	Prostate	6833
RAKAEVCMA	HLA-A30:01	CYP11B1	Adrenal Gland	2353	KKRRPYVALF	HLA-C07:02	RLN1	Prostate	6834
AYRQHRGHK	HLA-A30:01	CYP11B2; CYP11B1	Adrenal Gland	2354	ERQPSLPEL	HLA-C07:02	RLN1	Prostate	6835
ASISEHPQK	HLA-A30:01	CYP11B2; CYP11B1	Adrenal Gland	2355	RRPYVALF	HLA-C07:02	RLN1	Prostate	6836
QYGDNCIQK	HLA-A30:01	CYP11B2; CYP11B1	Adrenal Gland	2356	FHLLEFCLL	HLA-C07:02	RLN1	Prostate	6837
ALKETLRLY	HLA-A30:01	CYP11B2; CYP11B1	Adrenal Gland	2357	FTREFLGAL	HLA-C07:02	RLN1	Prostate	6838
RWTSPKVWK	HLA-A30:01	CYP11B1	Adrenal Gland	2358	FIANLPPEL	HLA-C07:02	RLN1	Prostate	6839

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SMFPLLTFR	HLA-A33:03	CYP11B1	Adrenal Gland	2359	SQKKRRPYVALF	HLA-C07:02	RLN1	Prostate	6840
MSLEPWVAYR	HLA-A33:03	CYP11B1	Adrenal Gland	2360	KRRPYVAL	HLA-C07:02	RLN1	Prostate	6841
HSASFGRWGR	HLA-A33:03	CYP11B1	Adrenal Gland	2361	ISPDGGKAL	HLA-C07:02	RLN1	Prostate	6842
SASFGRWGR	HLA-A33:03	CYP11B1	Adrenal Gland	2362	KWKDDVIKL	HLA-C07:02	RLN1	Prostate	6843
MFMPRSLSR	HLA-A33:03	CYP11B2; CYP11B1	Adrenal Gland	2363	KKRRPYVAL	HLA-C07:02	RLN1	Prostate	6844
EVLSPNAVQR	HLA-A33:03	CYP11B1	Adrenal Gland	2364	IANLPPEL	HLA-C07:02	RLN1	Prostate	6845
ELGPIFRSR	HLA-A33:03	CYP11B1	Adrenal Gland	2365	FSEGAQHGPY	HLA-A01:01	RSPH6A	Thyroid	6846
STGSPIQLR	HLA-A33:03	CYP11B1	Adrenal Gland	2366	FTGYLDTPVVSY	HLA-A01:01	RSPH6A	Thyroid	6847
MPRRPGNRWL	HLA-B07:02	CYP11B1	Adrenal Gland	2367	FPSEFQPQPY	HLA-A01:01	RSPH6A	Thyroid	6848
HPQKATTEL	HLA-B07:02	CYP11B2; CYP11B1	Adrenal Gland	2368	YLDTPVVSY	HLA-A01:01	RSPH6A	Thyroid	6849
SPIQLRTLSM	HLA-B07:02	CYP11B1	Adrenal Gland	2369	PSELGFPHY	HLA-A01:01	RSPH6A	Thyroid	6850
RPQQYTSIV	HLA-B07:02	CYP11B1	Adrenal Gland	2370	YSDESRMQV	HLA-A01:01	RSPH6A	Thyroid	6851
SPSSASLNF	HLA-B07:02	CYP11B2; CYP11B1	Adrenal Gland	2371	SLYEHLVNL	HLA-A02:01	RSPH6A	Thyroid	6852
RPSMFPLLTF	HLA-B07:02	CYP11B1	Adrenal Gland	2372	LLMPQVFQA	HLA-A02:01	RSPH6A	Thyroid	6853
SLHPHRMSL	HLA-B08:01	CYP11B1	Adrenal Gland	2373	SLYEHLVNLL	HLA-A02:01	RSPH6A	Thyroid	6854
NAVQRFLPM	HLA-B08:01	CYP11B1	Adrenal Gland	2374	GLPWTRLPHV	HLA-A02:01	RSPH6A	Thyroid	6855
MLLLLHHVL	HLA-B08:01	CYP11B2; CYP11B1	Adrenal Gland	2375	LSLYEHLVNL	HLA-A02:01	RSPH6A	Thyroid	6856
WLSLQRAQAL	HLA-B08:01	CYP11B1	Adrenal Gland	2376	HLAPWTTRL	HLA-A02:01	RSPH6A	Thyroid	6857
DIKMVYSF	HLA-B08:01	CYP11B2; CYP11B1	Adrenal Gland	2377	TQWEWFHPKL	HLA-A02:01	RSPH6A	Thyroid	6858
SQALKKKVL	HLA-B08:01	CYP11B2; CYP11B1	Adrenal Gland	2378	SMANWVHHT	HLA-A02:01	RSPH6A	Thyroid	6859
QALKKKVL	HLA-B08:01	CYP11B2; CYP11B1	Adrenal Gland	2379	NLWPGAYAYA	HLA-A02:01	RSPH6A	Thyroid	6860
SLNFLHAL	HLA-B08:01	CYP11B2; CYP11B1	Adrenal Gland	2380	NLLMPQVFQA	HLA-A02:01	RSPH6A	Thyroid	6861
AEAEMLLLL	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2381	SLCPQYSVAV	HLA-A02:01	RSPH6A	Thyroid	6862
LNFLHALEV	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2382	KADEGPEEV	HLA-A02:01	RSPH6A	Thyroid	6863
KEHFEAWDCI	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2383	YLDTPVVSY	HLA-A02:01	RSPH6A	Thyroid	6864
AEMLLLLHHV	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2384	ALQFLPSEL	HLA-A02:01	RSPH6A	Thyroid	6865
RLYPVGLFL	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2385	RLGGMEYPSV	HLA-A02:01	RSPH6A	Thyroid	6866
YGDNCIQKI	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2386	SLSQQENLL	HLA-A02:01	RSPH6A	Thyroid	6867
GQDSEALKY	HLA-B13:02	CYP11B1	Adrenal Gland	2387	GAYAYASGK	HLA-A03:01	RSPH6A	Thyroid	6868

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RQHRGHKC	HLA-B13:02	CYP11B2; CYP11B1	Adrenal Gland	2388	RCTWVNPLQK	HLA-A03:01	RSPH6A	Thyroid	6869
LAFSRPQQY	HLA-B46:01	CYP11B1	Adrenal Gland	2389	SLYEHLVNLLTK	HLA-A03:01	RSPH6A	Thyroid	6870
YSFILRPSM	HLA-B46:01	CYP11B1	Adrenal Gland	2390	GAYAYASGKK	HLA-A03:01	RSPH6A	Thyroid	6871
YTIEASNLAL	HLA-B46:01	CYP11B2; CYP11B1	Adrenal Gland	2391	CTWVNPLQK	HLA-A03:01	RSPH6A	Thyroid	6872
MSLEPWVAY	HLA-B46:01	CYP11B1	Adrenal Gland	2392	SVWKPPPVIPK	HLA-A03:01	RSPH6A	Thyroid	6873
VARDFSQAL	HLA-B46:01	CYP11B2; CYP11B1	Adrenal Gland	2393	STRPCQPPFNK	HLA-A03:01	RSPH6A	Thyroid	6874
SLHPHRMSL	HLA-B46:01	CYP11B1	Adrenal Gland	2394	VWKPPPVIPK	HLA-A03:01	RSPH6A	Thyroid	6875
AARVPRTVL	HLA-B46:01	CYP11B1	Adrenal Gland	2395	TTQWEWFHPK	HLA-A11:01	RSPH6A	Thyroid	6876
SLHPHRMSL	HLA-C01:02	CYP11B1	Adrenal Gland	2396	TQWEWFHPK	HLA-A11:01	RSPH6A	Thyroid	6877
SMDAPTSRL	HLA-C01:02	CYP11B1	Adrenal Gland	2397	GAYAYASGK	HLA-A11:01	RSPH6A	Thyroid	6878
YSLGRNPAL	HLA-C01:02	CYP11B1	Adrenal Gland	2398	CTWVNPLQK	HLA-A11:01	RSPH6A	Thyroid	6879
RVPRTVLPF	HLA-C01:02	CYP11B1	Adrenal Gland	2399	SVWKPPPVIPK	HLA-A11:01	RSPH6A	Thyroid	6880
NGPEWRFNRL	HLA-C01:02	CYP11B2; CYP11B1	Adrenal Gland	2400	STRPCQPPFNK	HLA-A11:01	RSPH6A	Thyroid	6881
HSPSSASL	HLA-C01:02	CYP11B2; CYP11B1	Adrenal Gland	2401	RTTQWEWFHPK	HLA-A11:01	RSPH6A	Thyroid	6882
MLPEDVEKL	HLA-C01:02	CYP11B2; CYP11B1	Adrenal Gland	2402	SYLVAEVEF	HLA-A24:02	RSPH6A	Thyroid	6883
ELPLLRAAL	HLA-C01:02	CYP11B2; CYP11B1	Adrenal Gland	2403	RSYLVAEVEF	HLA-A24:02	RSPH6A	Thyroid	6884
YSLGRNPAL	HLA-C03:04	CYP11B1	Adrenal Gland	2404	MEYPSVNTGF	HLA-A24:02	RSPH6A	Thyroid	6885
YSFILRPSM	HLA-C03:04	CYP11B1	Adrenal Gland	2405	LFQQLDPTF	HLA-A24:02	RSPH6A	Thyroid	6886
NAVQRFLPM	HLA-C03:04	CYP11B1	Adrenal Gland	2406	EYPSVNTGF	HLA-A24:02	RSPH6A	Thyroid	6887
YTIEASNLAL	HLA-C03:04	CYP11B2; CYP11B1	Adrenal Gland	2407	IYIGWGHKY	HLA-A24:02	RSPH6A	Thyroid	6888
VARDFSQAL	HLA-C03:04	CYP11B2; CYP11B1	Adrenal Gland	2408	PYIRDDPALQF	HLA-A24:02	RSPH6A	Thyroid	6889
MAVPWLSL	HLA-C03:04	CYP11B1	Adrenal Gland	2409	KIKKFFTGYL	HLA-A30:01	RSPH6A	Thyroid	6890
SLHPHRMSL	HLA-C03:04	CYP11B1	Adrenal Gland	2410	SFRIFLAMK	HLA-A30:01	RSPH6A	Thyroid	6891
RYDLGGAGM	HLA-C04:01	CYP11B1	Adrenal Gland	2411	STRPCQPPF	HLA-A30:01	RSPH6A	Thyroid	6892
KYDLGGAGM	HLA-C04:01	CYP11B1	Adrenal Gland	2412	GAYAYASGK	HLA-A30:01	RSPH6A	Thyroid	6893
FRYDLGGAGM	HLA-C04:01	CYP11B1	Adrenal Gland	2413	KIKKFFTGY	HLA-A30:01	RSPH6A	Thyroid	6894
SMDAPTSRL	HLA-C04:01	CYP11B1	Adrenal Gland	2414	CTWVNPLQK	HLA-A30:01	RSPH6A	Thyroid	6895
TLDVQPSIF	HLA-C04:01	CYP11B2; CYP11B1	Adrenal Gland	2415	KFENIYIGW	HLA-A30:01	RSPH6A	Thyroid	6896
VFPLLMTLF	HLA-C04:01	CYP11B1	Adrenal Gland	2416	YAYASGNLR	HLA-A33:03	RSPH6A	Thyroid	6897
FRSRHSASF	HLA-C07:01	CYP11B1	Adrenal Gland	2417	STAPRASTR	HLA-A33:03	RSPH6A	Thyroid	6898
MRQCLGRRL	HLA-C07:01	CYP11B2; CYP11B1	Adrenal Gland	2418	WFHPKLDTLR	HLA-A33:03	RSPH6A	Thyroid	6899
ERYNPQRWL	HLA-C07:01	CYP11B2; CYP11B1	Adrenal Gland	2419	HTQHILPQGR	HLA-A33:03	RSPH6A	Thyroid	6900

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SRLYPVGLFL	HLA-C07:01	CYP11B1	Adrenal Gland	2420	QASQRRHSR	HLA-A33:03	RSPH6A	Thyroid	6901
RYNPQRWL	HLA-C07:01	CYP11B2; CYP11B1	Adrenal Gland	2421	EQQPIHTCR	HLA-A33:03	RSPH6A	Thyroid	6902
RRPGNRWL	HLA-C07:01	CYP11B1	Adrenal Gland	2422	EKQKALFTR	HLA-A33:03	RSPH6A	Thyroid	6903
CRNGPEWRF	HLA-C07:01	CYP11B1	Adrenal Gland	2423	MHLAPWTTR	HLA-A33:03	RSPH6A	Thyroid	6904
FRSRHSASF	HLA-C07:02	CYP11B1	Adrenal Gland	2424	APGWSQRGSL	HLA-B07:02	RSPH6A	Thyroid	6905
LRPSMFPLL	HLA-C07:02	CYP11B1	Adrenal Gland	2425	APRASTRPC	HLA-B07:02	RSPH6A	Thyroid	6906
MFKSTVQLM	HLA-C07:02	CYP11B2; CYP11B1	Adrenal Gland	2426	RPEDPLSVL	HLA-B07:02	RSPH6A	Thyroid	6907
MRQCLGRRL	HLA-C07:02	CYP11B2; CYP11B1	Adrenal Gland	2427	APWTTRLSCSL	HLA-B07:02	RSPH6A	Thyroid	6908
FKSTVQLMF	HLA-C07:02	CYP11B2; CYP11B1	Adrenal Gland	2428	SPESFNPAL	HLA-B07:02	RSPH6A	Thyroid	6909
ARVPRTVL	HLA-C07:02	CYP11B1	Adrenal Gland	2429	YPSGPEIMEM	HLA-B07:02	RSPH6A	Thyroid	6910
NYHIPAGVL	HLA-C07:02	CYP11B1	Adrenal Gland	2430	ILGIKRSYL	HLA-B08:01	RSPH6A	Thyroid	6911
VSSDLVLQNY	HLA-A01:01	CYP11B2	Adrenal Gland	2431	YLRAQIARISAA	HLA-B08:01	RSPH6A	Thyroid	6912
GTLVQVFLY	HLA-A01:01	CYP11B2	Adrenal Gland	2432	YKMAEKQKAL	HLA-B08:01	RSPH6A	Thyroid	6913
VVSSDLVLQNY	HLA-A01:01	CYP11B2	Adrenal Gland	2433	WGKILGIKRSYL	HLA-B08:01	RSPH6A	Thyroid	6914
AGTLVQVFLY	HLA-A01:01	CYP11B2	Adrenal Gland	2434	KMAEKQKAL	HLA-B08:01	RSPH6A	Thyroid	6915
ILEPWVAY	HLA-A01:01	CYP11B2	Adrenal Gland	2435	EGIPVLEL	HLA-B08:01	RSPH6A	Thyroid	6916
YTGIVAELL	HLA-A01:01	CYP11B2	Adrenal Gland	2436	DPLSVLESL	HLA-B08:01	RSPH6A	Thyroid	6917
SLSRWISPKV	HLA-A02:01	CYP11B2	Adrenal Gland	2437	WFHPKLDTL	HLA-B08:01	RSPH6A	Thyroid	6918
FILRPGTSPL	HLA-A02:01	CYP11B2	Adrenal Gland	2438	DIVPKSVW	HLA-B08:01	RSPH6A	Thyroid	6919
RMILEPWVA	HLA-A02:01	CYP11B2	Adrenal Gland	2439	CDLSLYEHLV	HLA-B13:02	RSPH6A	Thyroid	6920
LLLKAELSL	HLA-A02:01	CYP11B2	Adrenal Gland	2440	FEGIPVLELV	HLA-B13:02	RSPH6A	Thyroid	6921
FLVETLTQEDI	HLA-A02:01	CYP11B2	Adrenal Gland	2441	TQWEWFHPKL	HLA-B13:02	RSPH6A	Thyroid	6922
LLHHVLKHFL	HLA-A02:01	CYP11B2	Adrenal Gland	2442	CSLCPQYSV	HLA-B13:02	RSPH6A	Thyroid	6923
FLYSLGRNA	HLA-A02:01	CYP11B2	Adrenal Gland	2443	AQIVNARKI	HLA-B13:02	RSPH6A	Thyroid	6924
TLVQVFLYSL	HLA-A02:01	CYP11B2	Adrenal Gland	2444	HLVNLLTKI	HLA-B13:02	RSPH6A	Thyroid	6925
AFPLLMTLFEL	HLA-A02:01	CYP11B2	Adrenal Gland	2445	GQFNLYQTD	HLA-B13:02	RSPH6A	Thyroid	6926
FLVETLTQE	HLA-A02:01	CYP11B2	Adrenal Gland	2446	GQSSLFQQL	HLA-B13:02	RSPH6A	Thyroid	6927
IPAGTLVQV	HLA-A02:01	CYP11B2	Adrenal Gland	2447	YAYASGKKF	HLA-B46:01	RSPH6A	Thyroid	6928
TLFELARNPDV	HLA-A02:01	CYP11B2	Adrenal Gland	2448	LAVQNAKAY	HLA-B46:01	RSPH6A	Thyroid	6929
IVAELLLKA	HLA-A02:01	CYP11B2	Adrenal Gland	2449	SAATQVSPL	HLA-B46:01	RSPH6A	Thyroid	6930
ILRPGTSPLL	HLA-A02:01	CYP11B2	Adrenal Gland	2450	RSNLWPGAY	HLA-B46:01	RSPH6A	Thyroid	6931
FLYSLGRNAA	HLA-A02:01	CYP11B2	Adrenal Gland	2451	HSRDQAQAL	HLA-B46:01	RSPH6A	Thyroid	6932
RSLSRWISPK	HLA-A03:01	CYP11B2	Adrenal Gland	2452	YLDTPVVSY	HLA-B46:01	RSPH6A	Thyroid	6933
SLSRWISPK	HLA-A03:01	CYP11B2	Adrenal Gland	2453	EARLGGMEY	HLA-B46:01	RSPH6A	Thyroid	6934
RLNPDVLSPK	HLA-A03:01	CYP11B2	Adrenal Gland	2454	NLWPGAYAY	HLA-B46:01	RSPH6A	Thyroid	6935
MILEPWVAY	HLA-A03:01	CYP11B2	Adrenal Gland	2455	SLYEHLVNL	HLA-C01:02	RSPH6A	Thyroid	6936
SLSRWISPK	HLA-A11:01	CYP11B2	Adrenal Gland	2456	YSPESFNPAL	HLA-C01:02	RSPH6A	Thyroid	6937
RSLSRWISPK	HLA-A11:01	CYP11B2	Adrenal Gland	2457	VGPPLLTPL	HLA-C01:02	RSPH6A	Thyroid	6938
GTSPLLTFR	HLA-A11:01	CYP11B2	Adrenal Gland	2458	HLAPWTTRL	HLA-C01:02	RSPH6A	Thyroid	6939
GIVAELLLK	HLA-A11:01	CYP11B2	Adrenal Gland	2459	ILPQGRCTW	HLA-C01:02	RSPH6A	Thyroid	6940

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RWISPKVWK	HLA-A11:01	CYP11B2	Adrenal Gland	2460	NAPGWSQRGSL	HLA-C01:02	RSPH6A	Thyroid	6941
RNFHHVPFGF	HLA-A24:02	CYP11B2	Adrenal Gland	2461	YAYASGKKF	HLA-C03:04	RSPH6A	Thyroid	6942
LYSLGRNAALF	HLA-A24:02	CYP11B2	Adrenal Gland	2462	SAATQVSPL	HLA-C03:04	RSPH6A	Thyroid	6943
AFPLLMTLF	HLA-A24:02	CYP11B2	Adrenal Gland	2463	FQEPPVNPL	HLA-C03:04	RSPH6A	Thyroid	6944
HYTGIVAEL	HLA-A24:02	CYP11B2	Adrenal Gland	2464	TSINCDLSL	HLA-C03:04	RSPH6A	Thyroid	6945
NFHHVPFGF	HLA-A24:02	CYP11B2	Adrenal Gland	2465	QVAELTTSL	HLA-C03:04	RSPH6A	Thyroid	6946
RARALGTRA	HLA-A30:01	CYP11B2	Adrenal Gland	2466	YAYASGNL	HLA-C03:04	RSPH6A	Thyroid	6947
RSLSRWISPK	HLA-A30:01	CYP11B2	Adrenal Gland	2467	FEGIPVLEL	HLA-C03:04	RSPH6A	Thyroid	6948
RARALGTRAA	HLA-A30:01	CYP11B2	Adrenal Gland	2468	IRDDPALQF	HLA-C04:01	RSPH6A	Thyroid	6949
RWISPKVWK	HLA-A30:01	CYP11B2	Adrenal Gland	2469	FQEPPVNPL	HLA-C04:01	RSPH6A	Thyroid	6950
LSRWISPKV	HLA-A30:01	CYP11B2	Adrenal Gland	2470	YSDESRMQV	HLA-C04:01	RSPH6A	Thyroid	6951
MILEPWVAYR	HLA-A33:03	CYP11B2	Adrenal Gland	2471	LYEHLVNLL	HLA-C04:01	RSPH6A	Thyroid	6952
GTRAARAPR	HLA-A33:03	CYP11B2	Adrenal Gland	2472	SYLVAEVEF	HLA-C04:01	RSPH6A	Thyroid	6953
YSLGRNAALFPR	HLA-A33:03	CYP11B2	Adrenal Gland	2473	LYEHLVNL	HLA-C04:01	RSPH6A	Thyroid	6954
DVLSPKAVQR	HLA-A33:03	CYP11B2	Adrenal Gland	2474	YLDTPVVSY	HLA-C04:01	RSPH6A	Thyroid	6955
TYQELAFNR	HLA-A33:03	CYP11B2	Adrenal Gland	2475	SRSGANKYL	HLA-C07:01	RSPH6A	Thyroid	6956
SPLLTFRAI	HLA-B07:02	CYP11B2	Adrenal Gland	2476	FRIFLAMKQL	HLA-C07:01	RSPH6A	Thyroid	6957
RPQHYTGIV	HLA-B07:02	CYP11B2	Adrenal Gland	2477	CRFWGKILGI	HLA-C07:01	RSPH6A	Thyroid	6958
AARAPRTVL	HLA-B07:02	CYP11B2	Adrenal Gland	2478	KRSYLVAEV	HLA-C07:01	RSPH6A	Thyroid	6959
GPRMVCVML	HLA-B07:02	CYP11B2	Adrenal Gland	2479	SRMQVAEL	HLA-C07:01	RSPH6A	Thyroid	6960
SPKAVQRFL	HLA-B07:02	CYP11B2	Adrenal Gland	2480	PDFEGIPVL	HLA-C07:01	RSPH6A	Thyroid	6961
WLSLQRARAL	HLA-B08:01	CYP11B2	Adrenal Gland	2481	PSGPEIMEM	HLA-C07:01	RSPH6A	Thyroid	6962
KAVQRFLPM	HLA-B08:01	CYP11B2	Adrenal Gland	2482	QHGPYIRDD	HLA-C07:01	RSPH6A	Thyroid	6963
SPKAVQRFLPM	HLA-B08:01	CYP11B2	Adrenal Gland	2483	WFHPKLDTL	HLA-C07:02	RSPH6A	Thyroid	6964
ELLLKAEL	HLA-B08:01	CYP11B2	Adrenal Gland	2484	IYIGWGHKY	HLA-C07:02	RSPH6A	Thyroid	6965
HHVLKHFL	HLA-B08:01	CYP11B2	Adrenal Gland	2485	YAYASGKKF	HLA-C07:02	RSPH6A	Thyroid	6966
HPGNRWLRL	HLA-B08:01	CYP11B2	Adrenal Gland	2486	IRDDPALQF	HLA-C07:02	RSPH6A	Thyroid	6967
LERVVSSDLV	HLA-B13:02	CYP11B2	Adrenal Gland	2487	VRSNLWPGAY	HLA-C07:02	RSPH6A	Thyroid	6968
LEMHQTFQEL	HLA-B13:02	CYP11B2	Adrenal Gland	2488	QRPEDPLSVL	HLA-C07:02	RSPH6A	Thyroid	6969
VDTTAFPLL	HLA-B13:02	CYP11B2	Adrenal Gland	2489	ETLRLASSY	HLA-A01:01	SCXB	Thyroid	6970
EQGYEHLHL	HLA-B13:02	CYP11B2	Adrenal Gland	2490	IETLRLASSY	HLA-A01:01	SCXB	Thyroid	6971
ARNPDVQQI	HLA-B13:02	CYP11B2	Adrenal Gland	2491	RTNSVNTAF	HLA-A01:01	SCXB	Thyroid	6972
RNPDVQQI	HLA-B13:02	CYP11B2	Adrenal Gland	2492	PTEPADRKL	HLA-A01:01	SCXB	Thyroid	6973
KAVQRFLPM	HLA-B46:01	CYP11B2	Adrenal Gland	2493	GSDSSGSDEK	HLA-A01:01	SCXB	Thyroid	6974
LAFNRPQHY	HLA-B46:01	CYP11B2	Adrenal Gland	2494	YLYPEVSPL	HLA-A02:01	SCXB	Thyroid	6975
RAPRTVLPF	HLA-B46:01	CYP11B2	Adrenal Gland	2495	RYLYPEVSPL	HLA-A02:01	SCXB	Thyroid	6976
MILEPWVAY	HLA-B46:01	CYP11B2	Adrenal Gland	2496	YLYPEVSPLS	HLA-A02:01	SCXB	Thyroid	6977
ILEPWVAY	HLA-B46:01	CYP11B2	Adrenal Gland	2497	RLASSYISHL	HLA-A02:01	SCXB	Thyroid	6978
ILRPGTSPL	HLA-B46:01	CYP11B2	Adrenal Gland	2498	YISHLGNVLL	HLA-A02:01	SCXB	Thyroid	6979
YSLGRNAAL	HLA-C01:02	CYP11B2	Adrenal Gland	2499	GRYLYPEVSPL	HLA-A02:01	SCXB	Thyroid	6980
ILRPGTSPL	HLA-C01:02	CYP11B2	Adrenal Gland	2500	PGRYLYPEVSPL	HLA-A02:01	SCXB	Thyroid	6981
RAPRTVLPF	HLA-C01:02	CYP11B2	Adrenal Gland	2501	MSFATLRPA	HLA-A02:01	SCXB	Thyroid	6982
LRPGTSPL	HLA-C01:02	CYP11B2	Adrenal Gland	2502	YLYPEVSPLSE	HLA-A02:01	SCXB	Thyroid	6983

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
AFPLLMTL	HLA-C01:02	CYP11B2	Adrenal Gland	2503	GSDEKPCRV	HLA-A02:01	SCXB	Thyroid	6984
YSLGRNAAL	HLA-C03:04	CYP11B2	Adrenal Gland	2504	TLIPTEPAD	HLA-A02:01	SCXB	Thyroid	6985
TAFPLLMTL	HLA-C03:04	CYP11B2	Adrenal Gland	2505	GLQGARRRA	HLA-A02:01	SCXB	Thyroid	6986
KAVQRFLPM	HLA-C03:04	CYP11B2	Adrenal Gland	2506	YLYPEVSP	HLA-A02:01	SCXB	Thyroid	6987
VAAPWLSL	HLA-C03:04	CYP11B2	Adrenal Gland	2507	CLSNQRKLSK	HLA-A03:01	SCXB	Thyroid	6988
RYNLGGPRM	HLA-C04:01	CYP11B2	Adrenal Gland	2508	RLASSYISH	HLA-A03:01	SCXB	Thyroid	6989
GYEHLHLEM	HLA-C04:01	CYP11B2	Adrenal Gland	2509	LSNQRKLSK	HLA-A03:01	SCXB	Thyroid	6990
HYTGIVAEL	HLA-C04:01	CYP11B2	Adrenal Gland	2510	YLYPEVSPL	HLA-A03:01	SCXB	Thyroid	6991
AFPLLMTLF	HLA-C04:01	CYP11B2	Adrenal Gland	2511	TLRPAPPGRY	HLA-A03:01	SCXB	Thyroid	6992
AFPLLMTL	HLA-C04:01	CYP11B2	Adrenal Gland	2512	ATLRPAPPGR	HLA-A11:01	SCXB	Thyroid	6993
FRYNLGGPRM	HLA-C07:01	CYP11B2	Adrenal Gland	2513	RTLIPTEPADRK	HLA-A11:01	SCXB	Thyroid	6994
LRPGTSPLL	HLA-C07:01	CYP11B2	Adrenal Gland	2514	LSNQRKLSK	HLA-A11:01	SCXB	Thyroid	6995
FRYNLGGPRMV	HLA-C07:01	CYP11B2	Adrenal Gland	2515	CLSNQRKLSK	HLA-A11:01	SCXB	Thyroid	6996
RNPDVQQIL	HLA-C07:01	CYP11B2	Adrenal Gland	2516	RLASSYISH	HLA-A11:01	SCXB	Thyroid	6997
ARNPDVQQI	HLA-C07:01	CYP11B2	Adrenal Gland	2517	SDSSGSDEK	HLA-A11:01	SCXB	Thyroid	6998
ARAPRTVL	HLA-C07:01	CYP11B2	Adrenal Gland	2518	SYISHLGNV	HLA-A24:02	SCXB	Thyroid	6999
HYTGIVAEL	HLA-C07:02	CYP11B2	Adrenal Gland	2519	SYISHLGNVL	HLA-A24:02	SCXB	Thyroid	7000
LRPGTSPLL	HLA-C07:02	CYP11B2	Adrenal Gland	2520	RYLYPEVSPL	HLA-A24:02	SCXB	Thyroid	7001
FRYNLGGPRM	HLA-C07:02	CYP11B2	Adrenal Gland	2521	SYISHLGNVLL	HLA-A24:02	SCXB	Thyroid	7002
ARAPRTVL	HLA-C07:02	CYP11B2	Adrenal Gland	2522	LYPEVSPLS	HLA-A24:02	SCXB	Thyroid	7003
ARNPDVQQIL	HLA-C07:02	CYP11B2	Adrenal Gland	2523	RVHAARCGL	HLA-A30:01	SCXB	Thyroid	7004
MAVREDLYCFSY	HLA-A01:01	DCAF4L2	Liver	2524	MSFATLRPA	HLA-A30:01	SCXB	Thyroid	7005
WSCAWSLSIHAY	HLA-A01:01	DCAF4L2	Liver	2525	RTLIPTEPA	HLA-A30:01	SCXB	Thyroid	7006
SSDVLAQQF	HLA-A01:01	DCAF4L2	Liver	2526	KIETLRLASSYI	HLA-A30:01	SCXB	Thyroid	7007
LMAVREDLY	HLA-A01:01	DCAF4L2	Liver	2527	RPAPPGRYL	HLA-A30:01	SCXB	Thyroid	7008
QVEAGGSKY	HLA-A01:01	DCAF4L2	Liver	2528	SYISHLGNV	HLA-A30:01	SCXB	Thyroid	7009
HLDSHLLLC	HLA-A01:01	DCAF4L2	Liver	2529	HSGPAFFHAAR	HLA-A33:03	SCXB	Thyroid	7010
LTTPELRVY	HLA-A01:01	DCAF4L2	Liver	2530	SGPAFFHAAR	HLA-A33:03	SCXB	Thyroid	7011
ILQDGQFLV	HLA-A02:01	DCAF4L2	Liver	2531	TLRPAPPGR	HLA-A33:03	SCXB	Thyroid	7012
VLLPASLFI	HLA-A02:01	DCAF4L2	Liver	2532	HTANARER	HLA-A33:03	SCXB	Thyroid	7013
RVYPHKTLYV	HLA-A02:01	DCAF4L2	Liver	2533	TANARERDR	HLA-A33:03	SCXB	Thyroid	7014
AVLLPASLFI	HLA-A02:01	DCAF4L2	Liver	2534	ETLRLASSY	HLA-A33:03	SCXB	Thyroid	7015
SMCWASLNHL	HLA-A02:01	DCAF4L2	Liver	2535	RPAPPGRYL	HLA-B07:02	SCXB	Thyroid	7016
QILQDGQFLV	HLA-A02:01	DCAF4L2	Liver	2536	LRPAPPGRYL	HLA-B07:02	SCXB	Thyroid	7017
SLFIGSFPGM	HLA-A02:01	DCAF4L2	Liver	2537	RPAPPGRYLY	HLA-B07:02	SCXB	Thyroid	7018
FLRFANYCRI	HLA-A02:01	DCAF4L2	Liver	2538	QPCHSGPAF	HLA-B07:02	SCXB	Thyroid	7019
QQFAIMTPL	HLA-A02:01	DCAF4L2	Liver	2539	EPRQRHTANA	HLA-B08:01	SCXB	Thyroid	7020
GLADTPSCAVLL	HLA-A02:01	DCAF4L2	Liver	2540	YLYPEVSPL	HLA-B08:01	SCXB	Thyroid	7021
GLADTPSCAV	HLA-A02:01	DCAF4L2	Liver	2541	EPRQRHTA	HLA-B08:01	SCXB	Thyroid	7022
GLADTPSCA	HLA-A02:01	DCAF4L2	Liver	2542	EPRQRHTAN	HLA-B08:01	SCXB	Thyroid	7023
GLTTPELRV	HLA-A02:01	DCAF4L2	Liver	2543	EPADRKLSK	HLA-B08:01	SCXB	Thyroid	7024
TLYVPNRKV	HLA-A02:01	DCAF4L2	Liver	2544	QPKQICTF	HLA-B08:01	SCXB	Thyroid	7025
HLLLCFVGL	HLA-A02:01	DCAF4L2	Liver	2545	MSFATLRPA	HLA-B13:02	SCXB	Thyroid	7026

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SLNHLDSHLL	HLA-A02:01	DCAF4L2	Liver	2546	SSYISHLGNV	HLA-B13:02	SCXB	Thyroid	7027
GLNAPSMLRK	HLA-A03:01	DCAF4L2	Liver	2547	HSGPAFFHA	HLA-B13:02	SCXB	Thyroid	7028
RVYPHKTLY	HLA-A03:01	DCAF4L2	Liver	2548	YLYPEVSPL	HLA-B13:02	SCXB	Thyroid	7029
KLWDLRATK	HLA-A03:01	DCAF4L2	Liver	2549	HLGNVLLA	HLA-B13:02	SCXB	Thyroid	7030
KTLYVPNRK	HLA-A11:01	DCAF4L2	Liver	2550	RERDRTNSV	HLA-B13:02	SCXB	Thyroid	7031
GLNAPSMLRK	HLA-A11:01	DCAF4L2	Liver	2551	YLYPEVSPL	HLA-B46:01	SCXB	Thyroid	7032
RVYPHKTLY	HLA-A11:01	DCAF4L2	Liver	2552	YISHLGNVL	HLA-B46:01	SCXB	Thyroid	7033
GTIKLWDLR	HLA-A11:01	DCAF4L2	Liver	2553	RTNSVNTAF	HLA-B46:01	SCXB	Thyroid	7034
SSLASDRFNR	HLA-A11:01	DCAF4L2	Liver	2554	RLASSYISH	HLA-B46:01	SCXB	Thyroid	7035
QFAIMTPLLF	HLA-A24:02	DCAF4L2	Liver	2555	YLYPEVSP	HLA-B46:01	SCXB	Thyroid	7036
KYGIITMRGL	HLA-A24:02	DCAF4L2	Liver	2556	YLYPEVSPL	HLA-C01:02	SCXB	Thyroid	7037
AWSCAWSLSI	HLA-A24:02	DCAF4L2	Liver	2557	YISHLGNVL	HLA-C01:02	SCXB	Thyroid	7038
AYLPVHVNE	HLA-A24:02	DCAF4L2	Liver	2558	ISHLGNVLL	HLA-C01:02	SCXB	Thyroid	7039
VYPHKTLYV	HLA-A24:02	DCAF4L2	Liver	2559	LYPEVSPL	HLA-C01:02	SCXB	Thyroid	7040
RVYPHKTLYV	HLA-A30:01	DCAF4L2	Liver	2560	PAPPGRYL	HLA-C01:02	SCXB	Thyroid	7041
ASDRFNRILA	HLA-A30:01	DCAF4L2	Liver	2561	YLYPEVSPL	HLA-C03:04	SCXB	Thyroid	7042
RVYPHKTLY	HLA-A30:01	DCAF4L2	Liver	2562	LASSYISHL	HLA-C03:04	SCXB	Thyroid	7043
KLWDLRATK	HLA-A30:01	DCAF4L2	Liver	2563	YISHLGNVL	HLA-C03:04	SCXB	Thyroid	7044
GSKYGIITM	HLA-A30:01	DCAF4L2	Liver	2564	RPAPPGRYL	HLA-C04:01	SCXB	Thyroid	7045
RVSCMQRKK	HLA-A30:01	DCAF4L2	Liver	2565	RTNSVNTAF	HLA-C04:01	SCXB	Thyroid	7046
FANYCRIAR	HLA-A33:03	DCAF4L2	Liver	2566	YLYPEVSPL	HLA-C04:01	SCXB	Thyroid	7047
FLRFANYCR	HLA-A33:03	DCAF4L2	Liver	2567	LYPEVSPL	HLA-C04:01	SCXB	Thyroid	7048
CYTRIWSLR	HLA-A33:03	DCAF4L2	Liver	2568	ISHLGNVLL	HLA-C04:01	SCXB	Thyroid	7049
SKYGIITMR	HLA-A33:03	DCAF4L2	Liver	2569	LRPAPPGRYL	HLA-C07:01	SCXB	Thyroid	7050
ELRVSCMQR	HLA-A33:03	DCAF4L2	Liver	2570	CRVHAARCGL	HLA-C07:01	SCXB	Thyroid	7051
FPGMRRPGM	HLA-B07:02	DCAF4L2	Liver	2571	SYISHLGNV	HLA-C07:01	SCXB	Thyroid	7052
APSMLRKNQL	HLA-B07:02	DCAF4L2	Liver	2572	LRPAPPGRY	HLA-C07:01	SCXB	Thyroid	7053
VPNRKVNSM	HLA-B07:02	DCAF4L2	Liver	2573	RPAPPGRYL	HLA-C07:01	SCXB	Thyroid	7054
LPASLFIGSF	HLA-B07:02	DCAF4L2	Liver	2574	YLYPEVSPL	HLA-C07:01	SCXB	Thyroid	7055
FPGMRRPGML	HLA-B08:01	DCAF4L2	Liver	2575	RYLYPEVSP	HLA-C07:01	SCXB	Thyroid	7056
FPGMRRPGM	HLA-B08:01	DCAF4L2	Liver	2576	SYISHLGNV	HLA-C07:02	SCXB	Thyroid	7057
CMQRKKVQI	HLA-B08:01	DCAF4L2	Liver	2577	YLYPEVSPL	HLA-C07:02	SCXB	Thyroid	7058
DAWSCAWSL	HLA-B08:01	DCAF4L2	Liver	2578	LRPAPPGRYL	HLA-C07:02	SCXB	Thyroid	7059
TGTIKLWDL	HLA-B08:01	DCAF4L2	Liver	2579	LYPEVSPL	HLA-C07:02	SCXB	Thyroid	7060
PSMLRKNQL	HLA-B08:01	DCAF4L2	Liver	2580	LRPAPPGRY	HLA-C07:02	SCXB	Thyroid	7061
WSCAWSLSI	HLA-B13:02	DCAF4L2	Liver	2581	FTFNLANALY	HLA-A01:01	SERPINI2	Pancreas	7062
LDSHLLLCFV	HLA-B13:02	DCAF4L2	Liver	2582	NTEFAVDLY	HLA-A01:01	SERPINI2	Pancreas	7063
QQFAIMTPLL	HLA-B13:02	DCAF4L2	Liver	2583	KVDFKDVLY	HLA-A01:01	SERPINI2	Pancreas	7064
SQQVLLTNV	HLA-B13:02	DCAF4L2	Liver	2584	FSESSLNY	HLA-A01:01	SERPINI2	Pancreas	7065
GLTTPELRV	HLA-B13:02	DCAF4L2	Liver	2585	FVLKSFFSA	HLA-A02:01	SERPINI2	Pancreas	7066
TLYVPNRKV	HLA-B13:02	DCAF4L2	Liver	2586	YLQEGFTV	HLA-A02:01	SERPINI2	Pancreas	7067
FAIMTPLLF	HLA-B46:01	DCAF4L2	Liver	2587	FIANHPFLFI	HLA-A02:01	SERPINI2	Pancreas	7068
LSIHAYHSF	HLA-B46:01	DCAF4L2	Liver	2588	FLWSLLLL	HLA-A02:01	SERPINI2	Pancreas	7069

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LLTTIPSPY	HLA-B46:01	DCAF4L2	Liver	2589	ALYLQEGFTV	HLA-A02:01	SERPINI2	Pancreas	7070
FQIPDAWSC	HLA-B46:01	DCAF4L2	Liver	2590	FVLKSFFSAI	HLA-A02:01	SERPINI2	Pancreas	7071
SIHAYHSF	HLA-B46:01	DCAF4L2	Liver	2591	VLYSLNITEI	HLA-A02:01	SERPINI2	Pancreas	7072
WSLRHGHLL	HLA-C01:02	DCAF4L2	Liver	2592	WLSEMQEEEV	HLA-A02:01	SERPINI2	Pancreas	7073
FAIMTPLLF	HLA-C01:02	DCAF4L2	Liver	2593	SLNYQVLEL	HLA-A02:01	SERPINI2	Pancreas	7074
LADTPSCAV	HLA-C01:02	DCAF4L2	Liver	2594	FLWSLLLLF	HLA-A02:01	SERPINI2	Pancreas	7075
YVPNRKVNSM	HLA-C01:02	DCAF4L2	Liver	2595	TLVLEMVQL	HLA-A02:01	SERPINI2	Pancreas	7076
YLPVHVNEE	HLA-C01:02	DCAF4L2	Liver	2596	YLQEGFTVK	HLA-A02:01	SERPINI2	Pancreas	7077
LSHDSAVTSL	HLA-C01:02	DCAF4L2	Liver	2597	KSFFSAISEK	HLA-A03:01	SERPINI2	Pancreas	7078
FAIMTPLLF	HLA-C03:04	DCAF4L2	Liver	2598	KLITAQQILK	HLA-A03:01	SERPINI2	Pancreas	7079
SAVTSLQIL	HLA-C03:04	DCAF4L2	Liver	2599	AIYFKGDWK	HLA-A03:01	SERPINI2	Pancreas	7080
LANTNTDQL	HLA-C03:04	DCAF4L2	Liver	2600	ALYLQEGFTVK	HLA-A03:01	SERPINI2	Pancreas	7081
FAIMTPLL	HLA-C03:04	DCAF4L2	Liver	2601	STVKIPMMK	HLA-A11:01	SERPINI2	Pancreas	7082
FANYCRIAREL	HLA-C03:04	DCAF4L2	Liver	2602	KSFFSAISEK	HLA-A11:01	SERPINI2	Pancreas	7083
SHDSAVTSL	HLA-C04:01	DCAF4L2	Liver	2603	AIYFKGDWK	HLA-A11:01	SERPINI2	Pancreas	7084
FRGAPGLLM	HLA-C04:01	DCAF4L2	Liver	2604	TSAGEEFFVLK	HLA-A11:01	SERPINI2	Pancreas	7085
FAIMTPLLF	HLA-C04:01	DCAF4L2	Liver	2605	AGEEFFVLK	HLA-A11:01	SERPINI2	Pancreas	7086
LWDLRATKC	HLA-C04:01	DCAF4L2	Liver	2606	QFIANHPFLF	HLA-A24:02	SERPINI2	Pancreas	7087
HLDSHLLL	HLA-C04:01	DCAF4L2	Liver	2607	LYSLNITEIF	HLA-A24:02	SERPINI2	Pancreas	7088
FRGAPGLLM	HLA-C07:01	DCAF4L2	Liver	2608	LYLQEGFTV	HLA-A24:02	SERPINI2	Pancreas	7089
LRFANYCRI	HLA-C07:01	DCAF4L2	Liver	2609	IYFKGDWKQKF	HLA-A24:02	SERPINI2	Pancreas	7090
LRKNQLGFL	HLA-C07:01	DCAF4L2	Liver	2610	QYLHGNKEF	HLA-A24:02	SERPINI2	Pancreas	7091
RRPGMLCSF	HLA-C07:01	DCAF4L2	Liver	2611	MMKALLRTK	HLA-A30:01	SERPINI2	Pancreas	7092
MRGLTTPEL	HLA-C07:01	DCAF4L2	Liver	2612	RTKYGYFSE	HLA-A30:01	SERPINI2	Pancreas	7093
CRSGEIFGI	HLA-C07:01	DCAF4L2	Liver	2613	KSFFSAISEK	HLA-A30:01	SERPINI2	Pancreas	7094
FRGAPGLLM	HLA-C07:02	DCAF4L2	Liver	2614	YFKGDWKQK	HLA-A30:01	SERPINI2	Pancreas	7095
RRPGMLCSF	HLA-C07:02	DCAF4L2	Liver	2615	SFFSAISEK	HLA-A30:01	SERPINI2	Pancreas	7096
LRFANYCRI	HLA-C07:02	DCAF4L2	Liver	2616	EMISTWVER	HLA-A33:03	SERPINI2	Pancreas	7097
NYCRIAREL	HLA-C07:02	DCAF4L2	Liver	2617	LFFGSQASR	HLA-A33:03	SERPINI2	Pancreas	7098
FRGAPGLL	HLA-C07:02	DCAF4L2	Liver	2618	LLFFGSQASR	HLA-A33:03	SERPINI2	Pancreas	7099
YVISAPSIY	HLA-A01:01	DLL3	Glioma	2619	DTQEIKGR	HLA-A33:03	SERPINI2	Pancreas	7100
FSGLVCACAPGY	HLA-A01:01	DLL3	Glioma	2620	ESILFMGR	HLA-A33:03	SERPINI2	Pancreas	7101
RSFECTCPRGFY	HLA-A01:01	DLL3	Glioma	2621	SPLGITLVL	HLA-B07:02	SERPINI2	Pancreas	7102
CTCPRGFY	HLA-A01:01	DLL3	Glioma	2622	IPMMKALL	HLA-B07:02	SERPINI2	Pancreas	7103
DVDPQGIY	HLA-A01:01	DLL3	Glioma	2623	FSPLGITLVL	HLA-B07:02	SERPINI2	Pancreas	7104
GADPDSAY	HLA-A01:01	DLL3	Glioma	2624	GPLTRLVL	HLA-B07:02	SERPINI2	Pancreas	7105
DVDPQGIYV	HLA-A01:01	DLL3	Glioma	2625	LLRTKYGYF	HLA-B08:01	SERPINI2	Pancreas	7106
LLFPYPSSI	HLA-A02:01	DLL3	Glioma	2626	VLKSFFSAI	HLA-B08:01	SERPINI2	Pancreas	7107
YMGARCEFPV	HLA-A02:01	DLL3	Glioma	2627	IPMMKALL	HLA-B08:01	SERPINI2	Pancreas	7108
YLLPPALGL	HLA-A02:01	DLL3	Glioma	2628	DLYQEVSL	HLA-B08:01	SERPINI2	Pancreas	7109
YLLPPALGLL	HLA-A02:01	DLL3	Glioma	2629	AISEKKQEF	HLA-B08:01	SERPINI2	Pancreas	7110
LLFPYPSSILSV	HLA-A02:01	DLL3	Glioma	2630	HIPVIMSL	HLA-B08:01	SERPINI2	Pancreas	7111
RLPCRLFFRV	HLA-A02:01	DLL3	Glioma	2631	KDVLYSLNI	HLA-B13:02	SERPINI2	Pancreas	7112

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LLFPYPSSIL	HLA-A02:01	DLL3	Glioma	2632	MDTIFLWSLLL	HLA-B13:02	SERPINI2	Pancreas	7113
ALPDALNNL	HLA-A02:01	DLL3	Glioma	2633	MDTIFLWSLL	HLA-B13:02	SERPINI2	Pancreas	7114
YLLPPALGLLV	HLA-A02:01	DLL3	Glioma	2634	YVSQVTQKV	HLA-B13:02	SERPINI2	Pancreas	7115
LPLPDGLLQV	HLA-A02:01	DLL3	Glioma	2635	AQQQIRQTL	HLA-B13:02	SERPINI2	Pancreas	7116
PLPDGLLQV	HLA-A02:01	DLL3	Glioma	2636	AQKNTEFAV	HLA-B13:02	SERPINI2	Pancreas	7117
GLLSQTVIL	HLA-A02:01	DLL3	Glioma	2637	FTFNLANAL	HLA-B46:01	SERPINI2	Pancreas	7118
LLAGTPEPSV	HLA-A02:01	DLL3	Glioma	2638	FIANHPFLF	HLA-B46:01	SERPINI2	Pancreas	7119
ALPAAPPGL	HLA-A02:01	DLL3	Glioma	2639	YSLNITEIF	HLA-B46:01	SERPINI2	Pancreas	7120
GLLSQTVILA	HLA-A02:01	DLL3	Glioma	2640	FTFNLANALY	HLA-B46:01	SERPINI2	Pancreas	7121
RLFFRVCLK	HLA-A03:01	DLL3	Glioma	2641	FAVDLYQEV	HLA-B46:01	SERPINI2	Pancreas	7122
CRLFFRVCLK	HLA-A03:01	DLL3	Glioma	2642	TSAEKKQEF	HLA-B46:01	SERPINI2	Pancreas	7123
RLFFRVCLKP	HLA-A03:01	DLL3	Glioma	2643	VTNPDTQEI	HLA-B46:01	SERPINI2	Pancreas	7124
LPCRLFFRVCLK	HLA-A03:01	DLL3	Glioma	2644	FTFNLANAL	HLA-C01:02	SERPINI2	Pancreas	7125
SLLARVAGR	HLA-A03:01	DLL3	Glioma	2645	FGPLTRLVL	HLA-C01:02	SERPINI2	Pancreas	7126
RLAAGGPWAR	HLA-A03:01	DLL3	Glioma	2646	YGYFSESSL	HLA-C01:02	SERPINI2	Pancreas	7127
YLLPPALGL	HLA-A03:01	DLL3	Glioma	2647	FSPLGITLVL	HLA-C01:02	SERPINI2	Pancreas	7128
RLFFRVCLK	HLA-A11:01	DLL3	Glioma	2648	FSPLGITL	HLA-C01:02	SERPINI2	Pancreas	7129
STSSCLSPR	HLA-A11:01	DLL3	Glioma	2649	FTFNLANAL	HLA-C03:04	SERPINI2	Pancreas	7130
RSFECTCPR	HLA-A11:01	DLL3	Glioma	2650	FAVDLYQEV	HLA-C03:04	SERPINI2	Pancreas	7131
VISAPSIYAR	HLA-A11:01	DLL3	Glioma	2651	YGYFSESSL	HLA-C03:04	SERPINI2	Pancreas	7132
GTFSFIIET	HLA-A11:01	DLL3	Glioma	2652	IHIPVIMSL	HLA-C03:04	SERPINI2	Pancreas	7133
GTFSFIIETWR	HLA-A11:01	DLL3	Glioma	2653	FIANHPFLF	HLA-C04:01	SERPINI2	Pancreas	7134
YVISAPSIYAR	HLA-A11:01	DLL3	Glioma	2654	YFSESSLNY	HLA-C04:01	SERPINI2	Pancreas	7135
IYAREVATPLF	HLA-A24:02	DLL3	Glioma	2655	IFSPLGITL	HLA-C04:01	SERPINI2	Pancreas	7136
RYLLPPALGL	HLA-A24:02	DLL3	Glioma	2656	ITDSSEVYV	HLA-C04:01	SERPINI2	Pancreas	7137
GYMGARCEF	HLA-A24:02	DLL3	Glioma	2657	TFNLANALYL	HLA-C04:01	SERPINI2	Pancreas	7138
TFSFIIETW	HLA-A24:02	DLL3	Glioma	2658	FRKEDTQLI	HLA-C07:01	SERPINI2	Pancreas	7139
IYVISAPSI	HLA-A24:02	DLL3	Glioma	2659	FIANHPFLF	HLA-C07:01	SERPINI2	Pancreas	7140
AYICHCPPGF	HLA-A24:02	DLL3	Glioma	2660	FTFNLANAL	HLA-C07:01	SERPINI2	Pancreas	7141
VFELQIHSF	HLA-A24:02	DLL3	Glioma	2661	SAGEEFFVL	HLA-C07:01	SERPINI2	Pancreas	7142
RARCEPPAV	HLA-A30:01	DLL3	Glioma	2662	SLNYQVLEL	HLA-C07:01	SERPINI2	Pancreas	7143
RLFFRVCLK	HLA-A30:01	DLL3	Glioma	2663	LNYQVLEL	HLA-C07:01	SERPINI2	Pancreas	7144
RVAGRRRLA	HLA-A30:01	DLL3	Glioma	2664	FRKEDTQLI	HLA-C07:02	SERPINI2	Pancreas	7145
CTRLCRPRSA	HLA-A30:01	DLL3	Glioma	2665	FIANHPFLF	HLA-C07:02	SERPINI2	Pancreas	7146
GTFSFIIET	HLA-A30:01	DLL3	Glioma	2666	IHIPVIMSL	HLA-C07:02	SERPINI2	Pancreas	7147
STSSCLSPR	HLA-A33:03	DLL3	Glioma	2667	KKQEFTFNL	HLA-C07:02	SERPINI2	Pancreas	7148
FSFIIETWR	HLA-A33:03	DLL3	Glioma	2668	SYKGDEFSL	HLA-C07:02	SERPINI2	Pancreas	7149
TFSFIIETWR	HLA-A33:03	DLL3	Glioma	2669	FRKEDTQL	HLA-C07:02	SERPINI2	Pancreas	7150
ELRFSYRAR	HLA-A33:03	DLL3	Glioma	2670	FTDFMGQIVY	HLA-A01:01	SLC45A2	Melanoma	7151
YVISAPSIYAR	HLA-A33:03	DLL3	Glioma	2671	FFTDFMGQIVY	HLA-A01:01	SLC45A2	Melanoma	7152
ECEAPLVCR	HLA-A33:03	DLL3	Glioma	2672	LSSDGMYEY	HLA-A01:01	SLC45A2	Melanoma	7153
ISAPSIYAR	HLA-A33:03	DLL3	Glioma	2673	LFFTDFMGQIVY	HLA-A01:01	SLC45A2	Melanoma	7154
APRSPCSARL	HLA-B07:02	DLL3	Glioma	2674	YSAHNSTEFLIY	HLA-A01:01	SLC45A2	Melanoma	7155

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SPRGPSSAT	HLA-B07:02	DLL3	Glioma	2675	FIDGPIKAY	HLA-A01:01	SLC45A2	Melanoma	7156
SPRMSGLL	HLA-B07:02	DLL3	Glioma	2676	YTVPFNLITEY	HLA-A01:01	SLC45A2	Melanoma	7157
SPCALGAAL	HLA-B07:02	DLL3	Glioma	2677	FLSPILGFL	HLA-A02:01	SLC45A2	Melanoma	7158
QPGAPAPDL	HLA-B07:02	DLL3	Glioma	2678	SLYSIVWFL	HLA-A02:01	SLC45A2	Melanoma	7159
VAGRRRLAA	HLA-B08:01	DLL3	Glioma	2679	FLSNMLFFT	HLA-A02:01	SLC45A2	Melanoma	7160
ALRCRCRAGF	HLA-B08:01	DLL3	Glioma	2680	HLIGWTAFL	HLA-A02:01	SLC45A2	Melanoma	7161
YMGARCEFPV	HLA-B08:01	DLL3	Glioma	2681	SLYSYFQKV	HLA-A02:01	SLC45A2	Melanoma	7162
YAREVATPL	HLA-B08:01	DLL3	Glioma	2682	FLSPILGFLL	HLA-A02:01	SLC45A2	Melanoma	7163
TPEPSVHAL	HLA-B08:01	DLL3	Glioma	2683	VMSSTLYTV	HLA-A02:01	SLC45A2	Melanoma	7164
YPSSILSV	HLA-B08:01	DLL3	Glioma	2684	YLLGAIDWA	HLA-A02:01	SLC45A2	Melanoma	7165
CLDLGHAL	HLA-B08:01	DLL3	Glioma	2685	LVLCSLFGV	HLA-A02:01	SLC45A2	Melanoma	7166
VILALIFL	HLA-B08:01	DLL3	Glioma	2686	VMFFFSALV	HLA-A02:01	SLC45A2	Melanoma	7167
SQTVILALI	HLA-B13:02	DLL3	Glioma	2687	RLLGTEFQV	HLA-A02:01	SLC45A2	Melanoma	7168
RDAWPGTFSFII	HLA-B13:02	DLL3	Glioma	2688	SLADDGPFDSV	HLA-A02:01	SLC45A2	Melanoma	7169
WELRFSYRA	HLA-B13:02	DLL3	Glioma	2689	GMYEYGSIEKV	HLA-A02:01	SLC45A2	Melanoma	7170
RDAWPGTFSF	HLA-B13:02	DLL3	Glioma	2690	FLIYERGVEV	HLA-A02:01	SLC45A2	Melanoma	7171
LSQTVILALI	HLA-B13:02	DLL3	Glioma	2691	TLYTVPFNL	HLA-A02:01	SLC45A2	Melanoma	7172
DQIGGGLCL	HLA-B13:02	DLL3	Glioma	2692	GMYEYGSIEK	HLA-A03:01	SLC45A2	Melanoma	7173
PLPDGLLQV	HLA-B13:02	DLL3	Glioma	2693	KVLVSYIGLK	HLA-A03:01	SLC45A2	Melanoma	7174
ALIFLPQTR	HLA-B13:02	DLL3	Glioma	2694	SVFSSLYSCK	HLA-A03:01	SLC45A2	Melanoma	7175
YVISAPSIY	HLA-B46:01	DLL3	Glioma	2695	VLVSYIGLK	HLA-A03:01	SLC45A2	Melanoma	7176
YAREVATPL	HLA-B46:01	DLL3	Glioma	2696	ALIANPRRK	HLA-A03:01	SLC45A2	Melanoma	7177
YAREVATPLF	HLA-B46:01	DLL3	Glioma	2697	SVFSSLYSY	HLA-A03:01	SLC45A2	Melanoma	7178
LLFPYPSSI	HLA-B46:01	DLL3	Glioma	2698	SSLYSYFQK	HLA-A11:01	SLC45A2	Melanoma	7179
DAWPGTFSF	HLA-B46:01	DLL3	Glioma	2699	SVFSSLYSCK	HLA-A11:01	SLC45A2	Melanoma	7180
WARDIQRAG	HLA-B46:01	DLL3	Glioma	2700	SVFSSLYSYFQK	HLA-A11:01	SLC45A2	Melanoma	7181
FIIETWREE	HLA-B46:01	DLL3	Glioma	2701	SVFSSLYSY	HLA-A11:01	SLC45A2	Melanoma	7182
LLPPALGLL	HLA-C01:02	DLL3	Glioma	2702	STEFLIYER	HLA-A11:01	SLC45A2	Melanoma	7183
YAREVATPL	HLA-C01:02	DLL3	Glioma	2703	RYLCISHLI	HLA-A24:02	SLC45A2	Melanoma	7184
YLLPPALGL	HLA-C01:02	DLL3	Glioma	2704	LYFTGYLLF	HLA-A24:02	SLC45A2	Melanoma	7185
LLFPYPSSI	HLA-C01:02	DLL3	Glioma	2705	GLYFTGYLLF	HLA-A24:02	SLC45A2	Melanoma	7186
VHPDGASAL	HLA-C01:02	DLL3	Glioma	2706	YRYLCISHLI	HLA-A24:02	SLC45A2	Melanoma	7187
ALPDALNNL	HLA-C01:02	DLL3	Glioma	2707	VFSSLYSYF	HLA-A24:02	SLC45A2	Melanoma	7188
SAPSRCGPGL	HLA-C01:02	DLL3	Glioma	2708	LYTVPFNLI	HLA-A24:02	SLC45A2	Melanoma	7189
TVPVSTSSCL	HLA-C01:02	DLL3	Glioma	2709	SYIGLKGLYF	HLA-A24:02	SLC45A2	Melanoma	7190
YAREVATPL	HLA-C03:04	DLL3	Glioma	2710	GTRRAMTLK	HLA-A30:01	SLC45A2	Melanoma	7191
VATPLFPPL	HLA-C03:04	DLL3	Glioma	2711	QTRRAMTLK	HLA-A30:01	SLC45A2	Melanoma	7192
YLLPPALGL	HLA-C03:04	DLL3	Glioma	2712	RSRWGRRRPYI	HLA-A30:01	SLC45A2	Melanoma	7193
LLFPYPSSI	HLA-C03:04	DLL3	Glioma	2713	KVKNGYVNP	HLA-A30:01	SLC45A2	Melanoma	7194
FIIETWREEL	HLA-C03:04	DLL3	Glioma	2714	GFIGLFPNV	HLA-A30:01	SLC45A2	Melanoma	7195
YAHFSGLVC	HLA-C03:04	DLL3	Glioma	2715	RSRWGRRRPY	HLA-A30:01	SLC45A2	Melanoma	7196
FRDAWPGTF	HLA-C04:01	DLL3	Glioma	2716	GQAGRHIYK	HLA-A30:01	SLC45A2	Melanoma	7197
LFPYPSSIL	HLA-C04:01	DLL3	Glioma	2717	DFMGQIVYR	HLA-A33:03	SLC45A2	Melanoma	7198

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SQDAGSRLL	HLA-C04:01	DLL3	Glioma	2718	LVNMPPHYR	HLA-A33:03	SLC45A2	Melanoma	7199
LLPPALGLL	HLA-C04:01	DLL3	Glioma	2719	TDFMGQIVYR	HLA-A33:03	SLC45A2	Melanoma	7200
VFELQIHSF	HLA-C04:01	DLL3	Glioma	2720	STEFLIYER	HLA-A33:03	SLC45A2	Melanoma	7201
SFECTCPRGF	HLA-C04:01	DLL3	Glioma	2721	HYHALFTGTR	HLA-A33:03	SLC45A2	Melanoma	7202
FRDAWPGTF	HLA-C07:01	DLL3	Glioma	2722	RPYILTLGVM	HLA-B07:02	SLC45A2	Melanoma	7203
TRPAGVFEL	HLA-C07:01	DLL3	Glioma	2723	RPTSRLIMHSM	HLA-B07:02	SLC45A2	Melanoma	7204
QRYLLPPAL	HLA-C07:01	DLL3	Glioma	2724	FPNVYSTLVL	HLA-B07:02	SLC45A2	Melanoma	7205
FRVCLKPGL	HLA-C07:01	DLL3	Glioma	2725	RPTSRLIM	HLA-B07:02	SLC45A2	Melanoma	7206
ARLPCRLFF	HLA-C07:01	DLL3	Glioma	2726	QPPHWMDSL	HLA-B07:02	SLC45A2	Melanoma	7207
RPGDPQRYL	HLA-C07:01	DLL3	Glioma	2727	TPVLLSVGL	HLA-B07:02	SLC45A2	Melanoma	7208
ARGPVYTEQ	HLA-C07:01	DLL3	Glioma	2728	GPDCVPRGSL	HLA-B07:02	SLC45A2	Melanoma	7209
ARGPVYTE	HLA-C07:01	DLL3	Glioma	2729	WGRRRPYIL	HLA-B08:01	SLC45A2	Melanoma	7210
FRDAWPGTF	HLA-C07:02	DLL3	Glioma	2730	NPRRKLVWAI	HLA-B08:01	SLC45A2	Melanoma	7211
TRPAGVFEL	HLA-C07:02	DLL3	Glioma	2731	RLIMHSMAM	HLA-B08:01	SLC45A2	Melanoma	7212
ARLPCRLFF	HLA-C07:02	DLL3	Glioma	2732	TLKSLLRAL	HLA-B08:01	SLC45A2	Melanoma	7213
QRYLLPPAL	HLA-C07:02	DLL3	Glioma	2733	LIYERGVEV	HLA-B08:01	SLC45A2	Melanoma	7214
GYMGARCEF	HLA-C07:02	DLL3	Glioma	2734	DGPIKAYL	HLA-B08:01	SLC45A2	Melanoma	7215
ARGPVYTEQ	HLA-C07:02	DLL3	Glioma	2735	TGTRRAMTL	HLA-B08:01	SLC45A2	Melanoma	7216
LRPGDPQRY	HLA-C07:02	DLL3	Glioma	2736	YEYGSIEKV	HLA-B13:02	SLC45A2	Melanoma	7217
FTDFVRPLNI	HLA-A01:01	DMRTB1	Testis	2737	FDFAADFIDGPI	HLA-B13:02	SLC45A2	Melanoma	7218
GGDFQPSYY	HLA-A01:01	DMRTB1	Testis	2738	FDFAADFI	HLA-B13:02	SLC45A2	Melanoma	7219
FGAEAAGSGY	HLA-A01:01	DMRTB1	Testis	2739	VEAAYVTPV	HLA-B13:02	SLC45A2	Melanoma	7220
VSEPGGDFQPSY	HLA-A01:01	DMRTB1	Testis	2740	SLYSYFQKV	HLA-B13:02	SLC45A2	Melanoma	7221
FTDFVRPLN	HLA-A01:01	DMRTB1	Testis	2741	RLLGTEFQV	HLA-B13:02	SLC45A2	Melanoma	7222
YLPPPPPPL	HLA-A02:01	DMRTB1	Testis	2742	SLYSIVWFL	HLA-B13:02	SLC45A2	Melanoma	7223
FLPPGYLSA	HLA-A02:01	DMRTB1	Testis	2743	YSAHNSTEF	HLA-B46:01	SLC45A2	Melanoma	7224
FLPPGYLSAL	HLA-A02:01	DMRTB1	Testis	2744	FGVMSSTLY	HLA-B46:01	SLC45A2	Melanoma	7225
SMHPYCPFPL	HLA-A02:01	DMRTB1	Testis	2745	FLSPILGFL	HLA-B46:01	SLC45A2	Melanoma	7226
YLSALHFL	HLA-A02:01	DMRTB1	Testis	2746	SVFSSLYSY	HLA-B46:01	SLC45A2	Melanoma	7227
YLDAPPGVPL	HLA-A02:01	DMRTB1	Testis	2747	FTDFMGQIVY	HLA-B46:01	SLC45A2	Melanoma	7228
SLAGPPFGA	HLA-A02:01	DMRTB1	Testis	2748	SSKSFWSST	HLA-B46:01	SLC45A2	Melanoma	7229
YLDAPPGV	HLA-A02:01	DMRTB1	Testis	2749	FIDGPIKAY	HLA-B46:01	SLC45A2	Melanoma	7230
YLISERQKIMAA	HLA-A02:01	DMRTB1	Testis	2750	SMAMFGREF	HLA-B46:01	SLC45A2	Melanoma	7231
GYLDAPPGV	HLA-A02:01	DMRTB1	Testis	2751	ISHLIGWTAF	HLA-B46:01	SLC45A2	Melanoma	7232
YLISERQKI	HLA-A02:01	DMRTB1	Testis	2752	FLSPILGFL	HLA-C01:02	SLC45A2	Melanoma	7233
KIMAAQKVLK	HLA-A03:01	DMRTB1	Testis	2753	NMPPHYRYL	HLA-C01:02	SLC45A2	Melanoma	7234
IMAAQKVLK	HLA-A03:01	DMRTB1	Testis	2754	SLPVQHAVL	HLA-C01:02	SLC45A2	Melanoma	7235
RQKIMAAQKVLK	HLA-A03:01	DMRTB1	Testis	2755	YSAHNSTEF	HLA-C01:02	SLC45A2	Melanoma	7236
HPYCPFPLGY	HLA-A03:01	DMRTB1	Testis	2756	LFPNVYSTL	HLA-C01:02	SLC45A2	Melanoma	7237
ALQPVLGGR	HLA-A03:01	DMRTB1	Testis	2757	SLPVQHAV	HLA-C01:02	SLC45A2	Melanoma	7238
KIMAAQKVLK	HLA-A11:01	DMRTB1	Testis	2758	YSAHNSTEF	HLA-C03:04	SLC45A2	Melanoma	7239
IMAAQKVLK	HLA-A11:01	DMRTB1	Testis	2759	HASSLPLPL	HLA-C03:04	SLC45A2	Melanoma	7240
AALCAQGPK	HLA-A11:01	DMRTB1	Testis	2760	LSVGLPSSL	HLA-C03:04	SLC45A2	Melanoma	7241

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SSFSLTVLF	HLA-A11:01	DMRTB1	Testis	2761	YSTLVLCSL	HLA-C03:04	SLC45A2	Melanoma	7242
RTVPGPLFT	HLA-A11:01	DMRTB1	Testis	2762	GAIDWAHLFL	HLA-C03:04	SLC45A2	Melanoma	7243
ACFFEQPPR	HLA-A11:01	DMRTB1	Testis	2763	AAYVTPVLL	HLA-C03:04	SLC45A2	Melanoma	7244
GYLSALHFL	HLA-A24:02	DMRTB1	Testis	2764	AAYVTPVL	HLA-C03:04	SLC45A2	Melanoma	7245
PGYLSALHFL	HLA-A24:02	DMRTB1	Testis	2765	AIDWAHLFL	HLA-C03:04	SLC45A2	Melanoma	7246
GYLSALHF	HLA-A24:02	DMRTB1	Testis	2766	LFDFAADFI	HLA-C04:01	SLC45A2	Melanoma	7247
YYLPPPPPPL	HLA-A24:02	DMRTB1	Testis	2767	LFPNVYSTL	HLA-C04:01	SLC45A2	Melanoma	7248
PPPPPSSF	HLA-A24:02	DMRTB1	Testis	2768	FLSPILGFL	HLA-C04:01	SLC45A2	Melanoma	7249
RGRNPGPRA	HLA-A30:01	DMRTB1	Testis	2769	AIDWAHLEL	HLA-C04:01	SLC45A2	Melanoma	7250
RQKIMAAQK	HLA-A30:01	DMRTB1	Testis	2770	LFDFAADF	HLA-C04:01	SLC45A2	Melanoma	7251
RCRNHGFLV	HLA-A30:01	DMRTB1	Testis	2771	YRYLCISHL	HLA-C07:01	SLC45A2	Melanoma	7252
RWKQCLCEK	HLA-A30:01	DMRTB1	Testis	2772	RRRPYILTL	HLA-C07:01	SLC45A2	Melanoma	7253
KCYLISERQK	HLA-A30:01	DMRTB1	Testis	2773	YRYLCISHLI	HLA-C07:01	SLC45A2	Melanoma	7254
MVRTPKCSR	HLA-A33:03	DMRTB1	Testis	2774	RRAMTLKSL	HLA-C07:01	SLC45A2	Melanoma	7255
CFFEQPPRGR	HLA-A33:03	DMRTB1	Testis	2775	RRPYILTL	HLA-C07:01	SLC45A2	Melanoma	7256
KMVRTPKCSR	HLA-A33:03	DMRTB1	Testis	2776	TDFMGQIVY	HLA-C07:01	SLC45A2	Melanoma	7257
EKCYLISER	HLA-A33:03	DMRTB1	Testis	2777	RRRPYILTL	HLA-C07:02	SLC45A2	Melanoma	7258
FFEQPPRGR	HLA-A33:03	DMRTB1	Testis	2778	YRYLCISHL	HLA-C07:02	SLC45A2	Melanoma	7259
DADPGPEGR	HLA-A33:03	DMRTB1	Testis	2779	NMPPHYRYL	HLA-C07:02	SLC45A2	Melanoma	7260
RPMRTVPGPL	HLA-B07:02	DMRTB1	Testis	2780	RRAMTLKSL	HLA-C07:02	SLC45A2	Melanoma	7261
VPAASLRPL	HLA-B07:02	DMRTB1	Testis	2781	LYFTGYLLF	HLA-C07:02	SLC45A2	Melanoma	7262
GPLDLRRPM	HLA-B07:02	DMRTB1	Testis	2782	KRPTSRLIM	HLA-C07:02	SLC45A2	Melanoma	7263
APVPVPAASL	HLA-B07:02	DMRTB1	Testis	2783	RRPYILTL	HLA-C07:02	SLC45A2	Melanoma	7264
GPRALQPVL	HLA-B07:02	DMRTB1	Testis	2784	MSGAQDNSCLY	HLA-A01:01	SPATA8	Testis	7265
YLISERQKIMAA	HLA-B08:01	DMRTB1	Testis	2785	GMSGAQDNSCLY	HLA-A01:01	SPATA8	Testis	7266
SERQKIMAA	HLA-B08:01	DMRTB1	Testis	2786	GAQDNSCLY	HLA-A01:01	SPATA8	Testis	7267
YLISERQKIM	HLA-B08:01	DMRTB1	Testis	2787	AQDNSCLY	HLA-A01:01	SPATA8	Testis	7268
NINPDRAL	HLA-B08:01	DMRTB1	Testis	2788	DSEDKQEKC	HLA-A01:01	SPATA8	Testis	7269
CLCEKCYL	HLA-B08:01	DMRTB1	Testis	2789	PTDSEDKQ	HLA-A01:01	SPATA8	Testis	7270
VPVPAASL	HLA-B08:01	DMRTB1	Testis	2790	GLKGPVWPA	HLA-A02:01	SPATA8	Testis	7271
RNHGFLVPV	HLA-B13:02	DMRTB1	Testis	2791	CLYQEIAPS	HLA-A02:01	SPATA8	Testis	7272
GDFQPSYYL	HLA-B13:02	DMRTB1	Testis	2792	GGLKGPVWPA	HLA-A02:01	SPATA8	Testis	7273
FTDFVRPLNI	HLA-B13:02	DMRTB1	Testis	2793	RVPSASPLI	HLA-A02:01	SPATA8	Testis	7274
YLISERQKI	HLA-B13:02	DMRTB1	Testis	2794	SCLYQEIAPS	HLA-A02:01	SPATA8	Testis	7275
SQYQGGGLV	HLA-B13:02	DMRTB1	Testis	2795	VLFHPYCWS	HLA-A02:01	SPATA8	Testis	7276
RQKIMAAQKV	HLA-B13:02	DMRTB1	Testis	2796	CLYQEIAPSF	HLA-A02:01	SPATA8	Testis	7277
SSMHPYCPF	HLA-B46:01	DMRTB1	Testis	2797	CPVSPILLVL	HLA-A02:01	SPATA8	Testis	7278
SSFSLTVLF	HLA-B46:01	DMRTB1	Testis	2798	GLKGPVWPAK	HLA-A02:01	SPATA8	Testis	7279
YLPPPPPPL	HLA-B46:01	DMRTB1	Testis	2799	PVSPILLVL	HLA-A02:01	SPATA8	Testis	7280
SMHPYCPF	HLA-B46:01	DMRTB1	Testis	2800	EIAPSFQRL	HLA-A02:01	SPATA8	Testis	7281
FLPPGYLSA	HLA-B46:01	DMRTB1	Testis	2801	SASPLIQKI	HLA-A02:01	SPATA8	Testis	7282
YLPPPPPPL	HLA-C01:02	DMRTB1	Testis	2802	GVACKGREQL	HLA-A02:01	SPATA8	Testis	7283
FLPPGYLSAL	HLA-C01:02	DMRTB1	Testis	2803	CPVSPILLV	HLA-A02:01	SPATA8	Testis	7284

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
YLDAPPGVPL	HLA-C01:02	DMRTB1	Testis	2804	ILLVLIFQ	HLA-A02:01	SPATA8	Testis	7285
YCPFPLGYL	HLA-C01:02	DMRTB1	Testis	2805	GLKGPVWPAK	HLA-A03:01	SPATA8	Testis	7286
AAAPAPVPV	HLA-C03:04	DMRTB1	Testis	2806	AMTCPCGWRPFK	HLA-A03:01	SPATA8	Testis	7287
AAAAAPAPV	HLA-C03:04	DMRTB1	Testis	2807	RVPSASPLIQK	HLA-A03:01	SPATA8	Testis	7288
RAAVAMPSL	HLA-C03:04	DMRTB1	Testis	2808	PSASPLIQK	HLA-A03:01	SPATA8	Testis	7289
SGYPGPLDL	HLA-C03:04	DMRTB1	Testis	2809	VPSASPLIQK	HLA-A11:01	SPATA8	Testis	7290
YLPPPPPPL	HLA-C03:04	DMRTB1	Testis	2810	RVPSASPLIQK	HLA-A11:01	SPATA8	Testis	7291
YLPPPPPPL	HLA-C04:01	DMRTB1	Testis	2811	MTCPCGWRPFK	HLA-A11:01	SPATA8	Testis	7292
YLDAPPGVPL	HLA-C04:01	DMRTB1	Testis	2812	PSASPLIQK	HLA-A11:01	SPATA8	Testis	7293
YYLPPPPPPL	HLA-C04:01	DMRTB1	Testis	2813	SASPLIQK	HLA-A11:01	SPATA8	Testis	7294
SFSLTVLF	HLA-C04:01	DMRTB1	Testis	2814	LYQEIAPSF	HLA-A24:02	SPATA8	Testis	7295
NTDDQDAEV	HLA-C04:01	DMRTB1	Testis	2815	CLYQEIAPSF	HLA-A24:02	SPATA8	Testis	7296
FTDFVRPL	HLA-C04:01	DMRTB1	Testis	2816	SCLYQEIAPSF	HLA-A24:02	SPATA8	Testis	7297
FRHVSRSQY	HLA-C07:01	DMRTB1	Testis	2817	KINRRSVLF	HLA-A24:02	SPATA8	Testis	7298
MRTVPGPLF	HLA-C07:01	DMRTB1	Testis	2818	KCPVSPILL	HLA-A24:02	SPATA8	Testis	7299
GRNPGPRAL	HLA-C07:01	DMRTB1	Testis	2819	RVQRRRVPSA	HLA-A30:01	SPATA8	Testis	7300
SGYPGPLDL	HLA-C07:01	DMRTB1	Testis	2820	RVQRRRVPS	HLA-A30:01	SPATA8	Testis	7301
CRNHGFLVP	HLA-C07:01	DMRTB1	Testis	2821	RTSSRHFSEA	HLA-A30:01	SPATA8	Testis	7302
FRHVSRSQY	HLA-C07:02	DMRTB1	Testis	2822	PSASPLIQK	HLA-A30:01	SPATA8	Testis	7303
MRTVPGPLF	HLA-C07:02	DMRTB1	Testis	2823	SRKDPKGSK	HLA-A30:01	SPATA8	Testis	7304
LFTDFVRPL	HLA-C07:02	DMRTB1	Testis	2824	GLKGPVWPAK	HLA-A30:01	SPATA8	Testis	7305
GRNPGPRAL	HLA-C07:02	DMRTB1	Testis	2825	SFQRLPCPR	HLA-A33:03	SPATA8	Testis	7306
YLPPPPPPL	HLA-C07:02	DMRTB1	Testis	2826	EAMTCPCGWR	HLA-A33:03	SPATA8	Testis	7307
ATLEDLDNLY	HLA-A01:01	EPYC	Ovarian	2827	EAFQGWPRR	HLA-A33:03	SPATA8	Testis	7308
TLEDLDNLY	HLA-A01:01	EPYC	Ovarian	2828	EIAPSFQR	HLA-A33:03	SPATA8	Testis	7309
CTCISTTVY	HLA-A01:01	EPYC	Ovarian	2829	EENSCSHGR	HLA-A33:03	SPATA8	Testis	7310
TLESINYDSETY	HLA-A01:01	EPYC	Ovarian	2830	WPRRPQGPGV	HLA-B07:02	SPATA8	Testis	7311
VTAPTLESINY	HLA-A01:01	EPYC	Ovarian	2831	RPFKGGPGGL	HLA-B07:02	SPATA8	Testis	7312
NLYNYENIPV	HLA-A02:01	EPYC	Ovarian	2832	RPQGPGVAC	HLA-B07:02	SPATA8	Testis	7313
TLAGLVLGL	HLA-A02:01	EPYC	Ovarian	2833	CPRTSSRHF	HLA-B07:02	SPATA8	Testis	7314
TLAGLVLGLV	HLA-A02:01	EPYC	Ovarian	2834	SPILLVLIF	HLA-B07:02	SPATA8	Testis	7315
KTLAGLVLGL	HLA-A02:01	EPYC	Ovarian	2835	VQRRRVPSA	HLA-B08:01	SPATA8	Testis	7316
NLDHIPLPL	HLA-A02:01	EPYC	Ovarian	2836	IQKINRRSVL	HLA-B08:01	SPATA8	Testis	7317
YMCLPRLPV	HLA-A02:01	EPYC	Ovarian	2837	LIQKINRRSVL	HLA-B08:01	SPATA8	Testis	7318
YLTDNNLDHI	HLA-A02:01	EPYC	Ovarian	2838	SPILLVLI	HLA-B08:01	SPATA8	Testis	7319
GLVIFDAAV	HLA-A02:01	EPYC	Ovarian	2839	VSPILLVL	HLA-B08:01	SPATA8	Testis	7320
LLCTCISTTV	HLA-A02:01	EPYC	Ovarian	2840	CPVSPILL	HLA-B08:01	SPATA8	Testis	7321
RLDGNPINL	HLA-A02:01	EPYC	Ovarian	2841	CPVSPILLV	HLA-B13:02	SPATA8	Testis	7322
QLPELPTTL	HLA-A02:01	EPYC	Ovarian	2842	QEIAPSFQRL	HLA-B13:02	SPATA8	Testis	7323
SLSDLKRIDL	HLA-A02:01	EPYC	Ovarian	2843	KQEKCPVSPI	HLA-B13:02	SPATA8	Testis	7324
KLPQLRELV	HLA-A02:01	EPYC	Ovarian	2844	SASPLIQKI	HLA-B13:02	SPATA8	Testis	7325
KDMYDLHHLY	HLA-A03:01	EPYC	Ovarian	2845	CSHGRIQRV	HLA-B13:02	SPATA8	Testis	7326
RLDGNPINLSK	HLA-A03:01	EPYC	Ovarian	2846	ASPLIQKI	HLA-B13:02	SPATA8	Testis	7327

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ISNNRLGRK	HLA-A03:01	EPYC	Ovarian	2847	GAQDNSCLY	HLA-B46:01	SPATA8	Testis	7328
HELDAIPPLPK	HLA-A03:01	EPYC	Ovarian	2848	SSRHFSEAM	HLA-B46:01	SPATA8	Testis	7329
ELDAIPPLPK	HLA-A03:01	EPYC	Ovarian	2849	MTCPCGWRPF	HLA-B46:01	SPATA8	Testis	7330
TAYFYSRFNR	HLA-A11:01	EPYC	Ovarian	2850	PAKEENSCSH	HLA-B46:01	SPATA8	Testis	7331
ATVMPSGNR	HLA-A11:01	EPYC	Ovarian	2851	SRKDPKGSK	HLA-B46:01	SPATA8	Testis	7332
ISNNRLGRK	HLA-A11:01	EPYC	Ovarian	2852	RVPSASPLI	HLA-C01:02	SPATA8	Testis	7333
LTPPPQPEK	HLA-A11:01	EPYC	Ovarian	2853	SSRHFSEAM	HLA-C01:02	SPATA8	Testis	7334
SRFNRIKKINK	HLA-A11:01	EPYC	Ovarian	2854	KINRRSVLF	HLA-C01:02	SPATA8	Testis	7335
AYFYSRFNR	HLA-A11:01	EPYC	Ovarian	2855	IAPSFQRL	HLA-C01:02	SPATA8	Testis	7336
YFYSRFNRI	HLA-A24:02	EPYC	Ovarian	2856	RVPSASPL	HLA-C01:02	SPATA8	Testis	7337
AYFYSRFNRI	HLA-A24:02	EPYC	Ovarian	2857	VSPILLVL	HLA-C01:02	SPATA8	Testis	7338
TYIRKALEDI	HLA-A24:02	EPYC	Ovarian	2858	SSRHFSEAM	HLA-C03:04	SPATA8	Testis	7339
PELPTTLTF	HLA-A24:02	EPYC	Ovarian	2859	SASPLIQKI	HLA-C03:04	SPATA8	Testis	7340
MYDLHHLYL	HLA-A24:02	EPYC	Ovarian	2860	RVPSASPLI	HLA-C03:04	SPATA8	Testis	7341
YSRFNRIKK	HLA-A30:01	EPYC	Ovarian	2861	VSPILLVL	HLA-C03:04	SPATA8	Testis	7342
RFNRIKKINK	HLA-A30:01	EPYC	Ovarian	2862	IAPSFQRL	HLA-C03:04	SPATA8	Testis	7343
FYSRFNRIKK	HLA-A30:01	EPYC	Ovarian	2863	PVSPILLVL	HLA-C03:04	SPATA8	Testis	7344
NVKNLTYIRK	HLA-A30:01	EPYC	Ovarian	2864	LYQEIAPSF	HLA-C04:01	SPATA8	Testis	7345
TAYFYSRFNR	HLA-A33:03	EPYC	Ovarian	2865	RVPSASPLI	HLA-C04:01	SPATA8	Testis	7346
NVKNLTYIR	HLA-A33:03	EPYC	Ovarian	2866	KINRRSVLF	HLA-C04:01	SPATA8	Testis	7347
AYFYSRFNR	HLA-A33:03	EPYC	Ovarian	2867	KCPVSPILL	HLA-C04:01	SPATA8	Testis	7348
TFIDISNNR	HLA-A33:03	EPYC	Ovarian	2868	VSPILLVLI	HLA-C04:01	SPATA8	Testis	7349
LPRLPVGSL	HLA-B07:02	EPYC	Ovarian	2869	RRVPSASPL	HLA-C07:01	SPATA8	Testis	7350
CLPRLPVGSL	HLA-B07:02	EPYC	Ovarian	2870	RRVPSASPLI	HLA-C07:01	SPATA8	Testis	7351
YMCLPRLPVGSL	HLA-B07:02	EPYC	Ovarian	2871	CSHGRIQRV	HLA-C07:01	SPATA8	Testis	7352
MCLPRLPVGSL	HLA-B07:02	EPYC	Ovarian	2872	RRSVLFHPY	HLA-C07:01	SPATA8	Testis	7353
SPQEPEFTGV	HLA-B07:02	EPYC	Ovarian	2873	RRPQGPGVA	HLA-C07:01	SPATA8	Testis	7354
LPRLPVGSLV	HLA-B07:02	EPYC	Ovarian	2874	LYQEIAPSF	HLA-C07:02	SPATA8	Testis	7355
LPQLRELVL	HLA-B08:01	EPYC	Ovarian	2875	RRVPSASPL	HLA-C07:02	SPATA8	Testis	7356
LTYIRKAL	HLA-B08:01	EPYC	Ovarian	2876	RRSVLFHPY	HLA-C07:02	SPATA8	Testis	7357
YFYSRFNRI	HLA-B08:01	EPYC	Ovarian	2877	NRRSVLFHPY	HLA-C07:02	SPATA8	Testis	7358
DMYDLHHL	HLA-B08:01	EPYC	Ovarian	2878	YSEKISYVY	HLA-A01:01	SSX1	Liver;Melanoma;Thyroid	7359
LPELPTTL	HLA-B08:01	EPYC	Ovarian	2879	KYSEKISYVY	HLA-A01:01	SSX1	Liver;Melanoma;Thyroid	7360
LPENLRAL	HLA-B08:01	EPYC	Ovarian	2880	ATDFQGNDF	HLA-A01:01	SSX1	Liver;Melanoma;Thyroid	7361
HELDAIPPL	HLA-B13:02	EPYC	Ovarian	2881	ATDFQGNDFD	HLA-A01:01	SSX1	Liver;Melanoma;Thyroid	7362
YENIPVDKV	HLA-B13:02	EPYC	Ovarian	2882	AMTKLGFKV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7363
RELVLRDNKI	HLA-B13:02	EPYC	Ovarian	2883	RLHRIIPKI	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7364
RQLPELPTT	HLA-B13:02	EPYC	Ovarian	2884	MTFGRLHRI	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7365
SRFNRIKKI	HLA-B13:02	EPYC	Ovarian	2885	KMKYSEKISYV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7366
KVEIEIATV	HLA-B13:02	EPYC	Ovarian	2886	KAMTKLGFKV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7367
LQNNNILEM	HLA-B46:01	EPYC	Ovarian	2887	QMTFGRLHRI	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7368
LTSNLISEI	HLA-B46:01	EPYC	Ovarian	2888	YKAMTKLGFKV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7369
LSKTPQAYM	HLA-B46:01	EPYC	Ovarian	2889	KQLVIYEEI	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7370

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SINYDSETY	HLA-B46:01	EPYC	Ovarian	2890	KKMKYSEKISYV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7371
FCNVKNLTY	HLA-B46:01	EPYC	Ovarian	2891	RLRERKQLV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7372
LSKTPQAY	HLA-B46:01	EPYC	Ovarian	2892	KYSEKISYV	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7373
VMPSGNREL	HLA-C01:02	EPYC	Ovarian	2893	KLGFKVTL	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7374
FIDISNNRL	HLA-C01:02	EPYC	Ovarian	2894	TKLGFKVTL	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7375
KTPQAYMCL	HLA-C01:02	EPYC	Ovarian	2895	RLRERKQLVI	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7376
QLPELPTTL	HLA-C01:02	EPYC	Ovarian	2896	KLGFKVTLP	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7377
FDAAVTAPTL	HLA-C03:04	EPYC	Ovarian	2897	KAFDDIATY	HLA-A02:01	SSX1	Liver;Melanoma;Thyroid	7378
LQNNNILEM	HLA-C03:04	EPYC	Ovarian	2898	RIIPKIMPK	HLA-A03:01	SSX1	Liver;Melanoma;Thyroid	7379
VTAPTLESI	HLA-C03:04	EPYC	Ovarian	2899	YVYMKRNYK	HLA-A03:01	SSX1	Liver;Melanoma;Thyroid	7380
TVYCDDHEL	HLA-C03:04	EPYC	Ovarian	2900	RIIPKIMPKK	HLA-A03:01	SSX1	Liver;Melanoma;Thyroid	7381
AAVTAPTL	HLA-C03:04	EPYC	Ovarian	2901	VTLPPFMCNK	HLA-A03:01	SSX1	Liver;Melanoma;Thyroid	7382
DAAVTAPTL	HLA-C03:04	EPYC	Ovarian	2902	RIIPKIMPK	HLA-A11:01	SSX1	Liver;Melanoma;Thyroid	7383
KTLAGLVL	HLA-C03:04	EPYC	Ovarian	2903	MTFGRLHRIIPK	HLA-A11:01	SSX1	Liver;Melanoma;Thyroid	7384
MYDLHHLYL	HLA-C04:01	EPYC	Ovarian	2904	VTLPPFMCNK	HLA-A11:01	SSX1	Liver;Melanoma;Thyroid	7385
FIDISNNRL	HLA-C04:01	EPYC	Ovarian	2905	ATYFSKKEWKK	HLA-A11:01	SSX1	Liver;Melanoma;Thyroid	7386
TYDATLEDL	HLA-C04:01	EPYC	Ovarian	2906	KYSEKISYV	HLA-A24:02	SSX1	Liver;Melanoma;Thyroid	7387
IFDAAVTAP	HLA-C04:01	EPYC	Ovarian	2907	VYMKRNYKAM	HLA-A24:02	SSX1	Liver;Melanoma;Thyroid	7388
SRFNRIKKI	HLA-C07:01	EPYC	Ovarian	2908	NYKAMTKLGF	HLA-A24:02	SSX1	Liver;Melanoma;Thyroid	7389
LRDNKIRQL	HLA-C07:01	EPYC	Ovarian	2909	AFDDIATYF	HLA-A24:02	SSX1	Liver;Melanoma;Thyroid	7390
FRKLPQLREL	HLA-C07:01	EPYC	Ovarian	2910	KAMTKLGFK	HLA-A30:01	SSX1	Liver;Melanoma;Thyroid	7391
KRIDLTSNL	HLA-C07:01	EPYC	Ovarian	2911	RIIPKIMPK	HLA-A30:01	SSX1	Liver;Melanoma;Thyroid	7392
YNYENIPVD	HLA-C07:01	EPYC	Ovarian	2912	YVYMKRNYK	HLA-A30:01	SSX1	Liver;Melanoma;Thyroid	7393
RDNKIRQL	HLA-C07:01	EPYC	Ovarian	2913	RIIPKIMPKK	HLA-A30:01	SSX1	Liver;Melanoma;Thyroid	7394
MYDLHHLYL	HLA-C07:02	EPYC	Ovarian	2914	KYSEKISYV	HLA-A30:01	SSX1	Liver;Melanoma;Thyroid	7395
YFYSRFNRI	HLA-C07:02	EPYC	Ovarian	2915	MTFGRLHR	HLA-A33:03	SSX1	Liver;Melanoma;Thyroid	7396
LRDNKIRQL	HLA-C07:02	EPYC	Ovarian	2916	YVYMKRNYK	HLA-A33:03	SSX1	Liver;Melanoma;Thyroid	7397
VYCDDHEL	HLA-C07:02	EPYC	Ovarian	2917	HAWTHRLRER	HLA-A33:03	SSX1	Liver;Melanoma;Thyroid	7398
KRIDLTSNL	HLA-C07:02	EPYC	Ovarian	2918	NISEKINKR	HLA-A33:03	SSX1	Liver;Melanoma;Thyroid	7399
NKNDFASL	HLA-C07:02	EPYC	Ovarian	2919	NDFDNDHNR	HLA-A33:03	SSX1	Liver;Melanoma;Thyroid	7400
LTSLTILQLY	HLA-A01:01	G6PC2	Pancreas	2920	HPQMTFGRL	HLA-B07:02	SSX1	Liver;Melanoma;Thyroid	7401
IPTHEEHLFY	HLA-A01:01	G6PC2	Pancreas	2921	RPRDDAKAS	HLA-B07:02	SSX1	Liver;Melanoma;Thyroid	7402
PTHEEHLFY	HLA-A01:01	G6PC2	Pancreas	2922	GPQNDGKQL	HLA-B07:02	SSX1	Liver;Melanoma;Thyroid	7403
LSCRGGNNY	HLA-A01:01	G6PC2	Pancreas	2923	EHPQMTFGRL	HLA-B07:02	SSX1	Liver;Melanoma;Thyroid	7404
FLFAVGFYL	HLA-A02:01	G6PC2	Pancreas	2924	YMKRNYKAM	HLA-B08:01	SSX1	Liver;Melanoma;Thyroid	7405
VLNIDLLWSV	HLA-A02:01	G6PC2	Pancreas	2925	VYMKRNYKAM	HLA-B08:01	SSX1	Liver;Melanoma;Thyroid	7406
FLFAVGFYLL	HLA-A02:01	G6PC2	Pancreas	2926	YMKRNYKAMTKL	HLA-B08:01	SSX1	Liver;Melanoma;Thyroid	7407
RLTWSFLWSV	HLA-A02:01	G6PC2	Pancreas	2927	KLGFKVTL	HLA-B08:01	SSX1	Liver;Melanoma;Thyroid	7408
AMGASCVWYV	HLA-A02:01	G6PC2	Pancreas	2928	EWKKMKYSE	HLA-B08:01	SSX1	Liver;Melanoma;Thyroid	7409
FLWSVFWLI	HLA-A02:01	G6PC2	Pancreas	2929	RLRERKQLV	HLA-B08:01	SSX1	Liver;Melanoma;Thyroid	7410
LTWSFLWSV	HLA-A02:01	G6PC2	Pancreas	2930	KQLVIYEEI	HLA-B13:02	SSX1	Liver;Melanoma;Thyroid	7411
NLFLFLFAV	HLA-A02:01	G6PC2	Pancreas	2931	MTFGRLHRI	HLA-B13:02	SSX1	Liver;Melanoma;Thyroid	7412
RLLCALTSL	HLA-A02:01	G6PC2	Pancreas	2932	KAMTKLGFKV	HLA-B13:02	SSX1	Liver;Melanoma;Thyroid	7413

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FIATHFPHQV	HLA-A02:01	G6PC2	Pancreas	2933	RLHRIIPKI	HLA-B13:02	SSX1	Liver;Melanoma;Thyroid	7414
FLWSVFWLIQI	HLA-A02:01	G6PC2	Pancreas	2934	RLRERKQLV	HLA-B13:02	SSX1	Liver;Melanoma;Thyroid	7415
FLWSVFWL	HLA-A02:01	G6PC2	Pancreas	2935	KAFDDIATY	HLA-B46:01	SSX1	Liver;Melanoma;Thyroid	7416
VLFGLGFAI	HLA-A02:01	G6PC2	Pancreas	2936	YMKRNYKAM	HLA-B46:01	SSX1	Liver;Melanoma;Thyroid	7417
HLFYVLSFCK	HLA-A03:01	G6PC2	Pancreas	2937	YSEKISYVY	HLA-B46:01	SSX1	Liver;Melanoma;Thyroid	7418
MLMKQSGKK	HLA-A03:01	G6PC2	Pancreas	2938	ISYVYMKRNY	HLA-B46:01	SSX1	Liver;Melanoma;Thyroid	7419
LLWSVPIAK	HLA-A03:01	G6PC2	Pancreas	2939	YMKRNYKAM	HLA-C01:02	SSX1	Liver;Melanoma;Thyroid	7420
VIGDWLNLIFK	HLA-A03:01	G6PC2	Pancreas	2940	MTFGRLHRI	HLA-C01:02	SSX1	Liver;Melanoma;Thyroid	7421
LLWSVPIAKK	HLA-A03:01	G6PC2	Pancreas	2941	AFDDIATYF	HLA-C01:02	SSX1	Liver;Melanoma;Thyroid	7422
QTASLGTYLK	HLA-A11:01	G6PC2	Pancreas	2942	SGPQNDGKQL	HLA-C01:02	SSX1	Liver;Melanoma;Thyroid	7423
HLFYVLSFCK	HLA-A11:01	G6PC2	Pancreas	2943	TLPPFMCN	HLA-C01:02	SSX1	Liver;Melanoma;Thyroid	7424
TASLGTYLK	HLA-A11:01	G6PC2	Pancreas	2944	SGPKRGKHAW	HLA-C01:02	SSX1	Liver;Melanoma;Thyroid	7425
GVLIIQHLQK	HLA-A11:01	G6PC2	Pancreas	2945	MTFGRLHRI	HLA-C03:04	SSX1	Liver;Melanoma;Thyroid	7426
AVIGDWLNLIFK	HLA-A11:01	G6PC2	Pancreas	2946	KAFDDIATY	HLA-C03:04	SSX1	Liver;Melanoma;Thyroid	7427
AVGFYLLLR	HLA-A11:01	G6PC2	Pancreas	2947	YMKRNYKAM	HLA-C03:04	SSX1	Liver;Melanoma;Thyroid	7428
TYLKTNLFLF	HLA-A24:02	G6PC2	Pancreas	2948	VTLPPFMCN	HLA-C03:04	SSX1	Liver;Melanoma;Thyroid	7429
IYFPLCFQF	HLA-A24:02	G6PC2	Pancreas	2949	FKVTLPPFM	HLA-C03:04	SSX1	Liver;Melanoma;Thyroid	7430
TWSFLWSVF	HLA-A24:02	G6PC2	Pancreas	2950	AFDDIATYF	HLA-C04:01	SSX1	Liver;Melanoma;Thyroid	7431
NYTLSFRLL	HLA-A24:02	G6PC2	Pancreas	2951	KAFDDIATYF	HLA-C04:01	SSX1	Liver;Melanoma;Thyroid	7432
KDYRAYYTFL	HLA-A30:01	G6PC2	Pancreas	2952	RSKAFDDIATYF	HLA-C04:01	SSX1	Liver;Melanoma;Thyroid	7433
GTKMIWVAV	HLA-A30:01	G6PC2	Pancreas	2953	AFDDIATY	HLA-C04:01	SSX1	Liver;Melanoma;Thyroid	7434
KTNLFLFLFA	HLA-A30:01	G6PC2	Pancreas	2954	FDDIATYF	HLA-C04:01	SSX1	Liver;Melanoma;Thyroid	7435
WLNLIFKWK	HLA-A30:01	G6PC2	Pancreas	2955	MTFGRLHRI	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7436
SVFWLIQISV	HLA-A30:01	G6PC2	Pancreas	2956	LRERKQLVI	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7437
IFKWILFGHR	HLA-A33:03	G6PC2	Pancreas	2957	KRNYKAMTKL	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7438
NSEMFLLSCR	HLA-A33:03	G6PC2	Pancreas	2958	FKVTLPPFM	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7439
FMSNVGDPR	HLA-A33:03	G6PC2	Pancreas	2959	KAFDDIATY	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7440
DKFSITLHR	HLA-A33:03	G6PC2	Pancreas	2960	KRGKHAWTH	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7441
EMFLLSCR	HLA-A33:03	G6PC2	Pancreas	2961	SYVYMKRNY	HLA-C07:01	SSX1	Liver;Melanoma;Thyroid	7442
NNYTLSFR	HLA-A33:03	G6PC2	Pancreas	2962	MTFGRLHRI	HLA-C07:02	SSX1	Liver;Melanoma;Thyroid	7443
TPGIQTASL	HLA-B07:02	G6PC2	Pancreas	2963	KYSEKISYV	HLA-C07:02	SSX1	Liver;Melanoma;Thyroid	7444
YPNHSSPCL	HLA-B07:02	G6PC2	Pancreas	2964	YMKRNYKAM	HLA-C07:02	SSX1	Liver;Melanoma;Thyroid	7445
IPYSVHMLM	HLA-B07:02	G6PC2	Pancreas	2965	KYSEKISYVY	HLA-C07:02	SSX1	Liver;Melanoma;Thyroid	7446
HTPGIQTASL	HLA-B07:02	G6PC2	Pancreas	2966	KYSEKISY	HLA-C07:02	SSX1	Liver;Melanoma;Thyroid	7447
RPYWWVQET	HLA-B07:02	G6PC2	Pancreas	2967	KRGKHAWTH	HLA-C07:02	SSX1	Liver;Melanoma;Thyroid	7448
YLLLRVLNI	HLA-B08:01	G6PC2	Pancreas	2968	YSDQELAY	HLA-A01:01	STAR	Adrenal Gland	7449
FLHRNGVL	HLA-B08:01	G6PC2	Pancreas	2969	VVDQPMERLY	HLA-A01:01	STAR	Adrenal Gland	7450
NLIFKWKSI	HLA-B08:01	G6PC2	Pancreas	2970	YSDQELAYL	HLA-A01:01	STAR	Adrenal Gland	7451
NLIFKWIL	HLA-B08:01	G6PC2	Pancreas	2971	AMGEWNPNV	HLA-A02:01	STAR	Adrenal Gland	7452
NLIFKWILF	HLA-B08:01	G6PC2	Pancreas	2972	KVMSKVVPDV	HLA-A02:01	STAR	Adrenal Gland	7453
IDLLWSVPI	HLA-B13:02	G6PC2	Pancreas	2973	VMSKVVPDV	HLA-A02:01	STAR	Adrenal Gland	7454
MDFLHRNGVLII	HLA-B13:02	G6PC2	Pancreas	2974	RLYEELVERM	HLA-A02:01	STAR	Adrenal Gland	7455
MDFLHRNGVLI	HLA-B13:02	G6PC2	Pancreas	2975	MLLATFKL	HLA-A02:01	STAR	Adrenal Gland	7456

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FLWSVFWLI	HLA-B13:02	G6PC2	Pancreas	2976	AVMAISQEL	HLA-A02:01	STAR	Adrenal Gland	7457
WLIQISVCI	HLA-B13:02	G6PC2	Pancreas	2977	KLTWLLSIDL	HLA-A02:01	STAR	Adrenal Gland	7458
SIWPCNGRI	HLA-B13:02	G6PC2	Pancreas	2978	WLPKSIINQV	HLA-A02:01	STAR	Adrenal Gland	7459
WIHIDTTPF	HLA-B46:01	G6PC2	Pancreas	2979	RLYEELVERMEA	HLA-A02:01	STAR	Adrenal Gland	7460
FAINSEMFL	HLA-B46:01	G6PC2	Pancreas	2980	MLLATFKLCA	HLA-A02:01	STAR	Adrenal Gland	7461
RAYYTFLNF	HLA-B46:01	G6PC2	Pancreas	2981	RLYEELVER	HLA-A02:01	STAR	Adrenal Gland	7462
ISRVFIATH	HLA-B46:01	G6PC2	Pancreas	2982	TLYSDQELA	HLA-A02:01	STAR	Adrenal Gland	7463
LQKDYRAY	HLA-B46:01	G6PC2	Pancreas	2983	TLYSDQELAYL	HLA-A02:01	STAR	Adrenal Gland	7464
FIPYSVHML	HLA-C01:02	G6PC2	Pancreas	2984	ALGGPTPST	HLA-A02:01	STAR	Adrenal Gland	7465
FAINSEMFL	HLA-C01:02	G6PC2	Pancreas	2985	YLQQGEEAM	HLA-A02:01	STAR	Adrenal Gland	7466
GMDKFSITL	HLA-C01:02	G6PC2	Pancreas	2986	TLYSDQEL	HLA-A02:01	STAR	Adrenal Gland	7467
IWPCNGRIL	HLA-C01:02	G6PC2	Pancreas	2987	SSYRHMRNMK	HLA-A03:01	STAR	Adrenal Gland	7468
HTPGIQTASL	HLA-C01:02	G6PC2	Pancreas	2988	SAWSPTLPLK	HLA-A03:01	STAR	Adrenal Gland	7469
FAINSEMFL	HLA-C03:04	G6PC2	Pancreas	2989	KVMSKVVPDVGK	HLA-A03:01	STAR	Adrenal Gland	7470
FAVGFYLLL	HLA-C03:04	G6PC2	Pancreas	2990	RLYEELVER	HLA-A03:01	STAR	Adrenal Gland	7471
LSFCKSASI	HLA-C03:04	G6PC2	Pancreas	2991	AWSPTLPLK	HLA-A03:01	STAR	Adrenal Gland	7472
FAVGFYLL	HLA-C03:04	G6PC2	Pancreas	2992	SAWSPTLPLK	HLA-A11:01	STAR	Adrenal Gland	7473
IGDWLNLIF	HLA-C04:01	G6PC2	Pancreas	2993	SSYRHMRNMK	HLA-A11:01	STAR	Adrenal Gland	7474
VGDPRNIFF	HLA-C04:01	G6PC2	Pancreas	2994	SIDLKGWLPK	HLA-A11:01	STAR	Adrenal Gland	7475
YPNHSSPCL	HLA-C04:01	G6PC2	Pancreas	2995	AVMAISQELNR	HLA-A11:01	STAR	Adrenal Gland	7476
FTIYFPLCF	HLA-C04:01	G6PC2	Pancreas	2996	STWINQVRR	HLA-A11:01	STAR	Adrenal Gland	7477
AFIPYSVHM	HLA-C04:01	G6PC2	Pancreas	2997	LYSDQELAYL	HLA-A24:02	STAR	Adrenal Gland	7478
HRHAGGRGL	HLA-C07:01	G6PC2	Pancreas	2998	RWILPTTCASAW	HLA-A24:02	STAR	Adrenal Gland	7479
YRAYYTFLNF	HLA-C07:01	G6PC2	Pancreas	2999	TWLLSIDLKGW	HLA-A24:02	STAR	Adrenal Gland	7480
LRVLNIDLL	HLA-C07:01	G6PC2	Pancreas	3000	VVPDVGKVF	HLA-A24:02	STAR	Adrenal Gland	7481
CRGGNNYTL	HLA-C07:01	G6PC2	Pancreas	3001	VLSQTQVDF	HLA-A24:02	STAR	Adrenal Gland	7482
NRCPEPHCL	HLA-C07:01	G6PC2	Pancreas	3002	KTKLTWLLS	HLA-A30:01	STAR	Adrenal Gland	7483
THFPHQVIL	HLA-C07:01	G6PC2	Pancreas	3003	KTKLTWLLSI	HLA-A30:01	STAR	Adrenal Gland	7484
YRAYYTFLNF	HLA-C07:02	G6PC2	Pancreas	3004	SSYRHMRNMK	HLA-A30:01	STAR	Adrenal Gland	7485
AYYTFLNFM	HLA-C07:02	G6PC2	Pancreas	3005	NVKEIKVLQK	HLA-A30:01	STAR	Adrenal Gland	7486
LRVLNIDLL	HLA-C07:02	G6PC2	Pancreas	3006	SYRHMRNMK	HLA-A30:01	STAR	Adrenal Gland	7487
SRVFIATHF	HLA-C07:02	G6PC2	Pancreas	3007	CAQLHWYTR	HLA-A33:03	STAR	Adrenal Gland	7488
IYFPLCFQF	HLA-C07:02	G6PC2	Pancreas	3008	DFVSVRCAKR	HLA-A33:03	STAR	Adrenal Gland	7489
NRCPEPHCL	HLA-C07:02	G6PC2	Pancreas	3009	FVSVRCAKR	HLA-A33:03	STAR	Adrenal Gland	7490
ATDLEKHPY	HLA-A01:01	HMGB4	Testis	3010	DFANHLRKR	HLA-A33:03	STAR	Adrenal Gland	7491
TATDLEKHPY	HLA-A01:01	HMGB4	Testis	3011	STWINQVRR	HLA-A33:03	STAR	Adrenal Gland	7492
WSTATDLEKHPY	HLA-A01:01	HMGB4	Testis	3012	RPRWILPTT	HLA-B07:02	STAR	Adrenal Gland	7493
YFEELELY	HLA-A01:01	HMGB4	Testis	3013	RPRWILPTTC	HLA-B07:02	STAR	Adrenal Gland	7494
VSSYVHFLLNY	HLA-A01:01	HMGB4	Testis	3014	SPSKTKLTWL	HLA-B07:02	STAR	Adrenal Gland	7495
YQEEMMNYV	HLA-A02:01	HMGB4	Testis	3015	LPKSIINQVL	HLA-B07:02	STAR	Adrenal Gland	7496
LLFCQDHYA	HLA-A02:01	HMGB4	Testis	3016	QPAVPNCAQL	HLA-B07:02	STAR	Adrenal Gland	7497
FLLFCQDHYA	HLA-A02:01	HMGB4	Testis	3017	CPRPRWIL	HLA-B07:02	STAR	Adrenal Gland	7498
FLLFCQDHYAQL	HLA-A02:01	HMGB4	Testis	3018	NQVRRRSSL	HLA-B08:01	STAR	Adrenal Gland	7499

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KMWSTATDL	HLA-A02:01	HMGB4	Testis	3019	QVRRRSSLL	HLA-B08:01	STAR	Adrenal Gland	7500
LLFCQDHYAQL	HLA-A02:01	HMGB4	Testis	3020	QVRRRSSL	HLA-B08:01	STAR	Adrenal Gland	7501
NVSSYVHFL	HLA-A02:01	HMGB4	Testis	3021	NVKEIKVL	HLA-B08:01	STAR	Adrenal Gland	7502
LLRAKYFEEL	HLA-A02:01	HMGB4	Testis	3022	HLRKRLESH	HLA-B08:01	STAR	Adrenal Gland	7503
SFLLFCQDHYA	HLA-A02:01	HMGB4	Testis	3023	TLYSDQEL	HLA-B08:01	STAR	Adrenal Gland	7504
AKYEALAKL	HLA-A02:01	HMGB4	Testis	3024	KEIKVLQKI	HLA-B13:02	STAR	Adrenal Gland	7505
FCQDHYAQL	HLA-A02:01	HMGB4	Testis	3025	MERLYEELV	HLA-B13:02	STAR	Adrenal Gland	7506
FLLNYRNKF	HLA-A02:01	HMGB4	Testis	3026	GEWNPNVKEI	HLA-B13:02	STAR	Adrenal Gland	7507
ALAKLDKA	HLA-A02:01	HMGB4	Testis	3027	SQQDNGDKV	HLA-B13:02	STAR	Adrenal Gland	7508
LLNYRNKFK	HLA-A03:01	HMGB4	Testis	3028	RLYEELVER	HLA-B13:02	STAR	Adrenal Gland	7509
MMNYVGKRK	HLA-A03:01	HMGB4	Testis	3029	SSYRHMRNM	HLA-B46:01	STAR	Adrenal Gland	7510
MMNYVGKRKK	HLA-A03:01	HMGB4	Testis	3030	SAWSPTLPL	HLA-B46:01	STAR	Adrenal Gland	7511
SSYVHFLLNY	HLA-A03:01	HMGB4	Testis	3031	YLQQGEEAM	HLA-B46:01	STAR	Adrenal Gland	7512
RVALLRAK	HLA-A03:01	HMGB4	Testis	3032	VVPDVGKVF	HLA-B46:01	STAR	Adrenal Gland	7513
RVALLRAKY	HLA-A03:01	HMGB4	Testis	3033	HLRKRLESH	HLA-B46:01	STAR	Adrenal Gland	7514
SSYVHFLLNY	HLA-A11:01	HMGB4	Testis	3034	SAWSPTLPL	HLA-C01:02	STAR	Adrenal Gland	7515
SSYVHFLLNYR	HLA-A11:01	HMGB4	Testis	3035	YSDQELAYL	HLA-C01:02	STAR	Adrenal Gland	7516
YVGFKEFSRK	HLA-A11:01	HMGB4	Testis	3036	CASAWSPTL	HLA-C01:02	STAR	Adrenal Gland	7517
SYVHFLLNYR	HLA-A11:01	HMGB4	Testis	3037	ILPTTCASAW	HLA-C01:02	STAR	Adrenal Gland	7518
STATDLEK	HLA-A11:01	HMGB4	Testis	3038	VGPRDFVSV	HLA-C01:02	STAR	Adrenal Gland	7519
SVVQVAKATGK	HLA-A11:01	HMGB4	Testis	3039	SAWSPTLPL	HLA-C03:04	STAR	Adrenal Gland	7520
VGFKEFSRK	HLA-A11:01	HMGB4	Testis	3040	LAAEAAGNL	HLA-C03:04	STAR	Adrenal Gland	7521
RYQEEMMNYV	HLA-A24:02	HMGB4	Testis	3041	CASAWSPTL	HLA-C03:04	STAR	Adrenal Gland	7522
HFLLNYRNKF	HLA-A24:02	HMGB4	Testis	3042	FANHLRKRL	HLA-C03:04	STAR	Adrenal Gland	7523
RPPSSFLLF	HLA-A24:02	HMGB4	Testis	3043	YSDQELAYL	HLA-C04:01	STAR	Adrenal Gland	7524
KYFEELELY	HLA-A24:02	HMGB4	Testis	3044	LYEELVERM	HLA-C04:01	STAR	Adrenal Gland	7525
RRPPSSFLLF	HLA-A24:02	HMGB4	Testis	3045	SAWSPTLPL	HLA-C04:01	STAR	Adrenal Gland	7526
KAKYEALAK	HLA-A30:01	HMGB4	Testis	3046	VFRLEVVV	HLA-C04:01	STAR	Adrenal Gland	7527
SARNRCRGK	HLA-A30:01	HMGB4	Testis	3047	LRQQAVMAI	HLA-C07:01	STAR	Adrenal Gland	7528
KYRMSARNR	HLA-A30:01	HMGB4	Testis	3048	YRHMRNMKGL	HLA-C07:01	STAR	Adrenal Gland	7529
KARYQEEMMNYV	HLA-A30:01	HMGB4	Testis	3049	SSYRHMRNM	HLA-C07:01	STAR	Adrenal Gland	7530
SEKWRSISK	HLA-A30:01	HMGB4	Testis	3050	RRGSTCVL	HLA-C07:01	STAR	Adrenal Gland	7531
HFLLNYRNK	HLA-A30:01	HMGB4	Testis	3051	KRRGSTCVL	HLA-C07:01	STAR	Adrenal Gland	7532
YVHFLLNYR	HLA-A33:03	HMGB4	Testis	3052	RRGSTCVLA	HLA-C07:01	STAR	Adrenal Gland	7533
SYVHFLLNYR	HLA-A33:03	HMGB4	Testis	3053	LRQQAVMAI	HLA-C07:02	STAR	Adrenal Gland	7534
TYVGFKEFSR	HLA-A33:03	HMGB4	Testis	3054	YRHMRNMKGL	HLA-C07:02	STAR	Adrenal Gland	7535
NYVGKRKKR	HLA-A33:03	HMGB4	Testis	3055	KRRGSTCVL	HLA-C07:02	STAR	Adrenal Gland	7536
EMMNYVGKR	HLA-A33:03	HMGB4	Testis	3056	IRAEHGPTCM	HLA-C07:02	STAR	Adrenal Gland	7537
HPYEQRVAL	HLA-B07:02	HMGB4	Testis	3057	LYSDQELAY	HLA-C07:02	STAR	Adrenal Gland	7538
KHPYEQRVAL	HLA-B07:02	HMGB4	Testis	3058	WSNAISALY	HLA-A01:01	SYCN	Pancreas	7539
HPYEQRVALL	HLA-B07:02	HMGB4	Testis	3059	DWSNAISALY	HLA-A01:01	SYCN	Pancreas	7540
EPRRPPSSF	HLA-B07:02	HMGB4	Testis	3060	HSDGTRTCAKLY	HLA-A01:01	SYCN	Pancreas	7541

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RPPSSFLLF	HLA-B07:02	HMGB4	Testis	3061	LYDKSDPYY	HLA-A01:01	SYCN	Pancreas	7542
LLRAKYFEEL	HLA-B08:01	HMGB4	Testis	3062	LLALALASV	HLA-A02:01	SYCN	Pancreas	7543
LLRAKYFEELEL	HLA-B08:01	HMGB4	Testis	3063	LLLALALASV	HLA-A02:01	SYCN	Pancreas	7544
HPYEQRVAL	HLA-B08:01	HMGB4	Testis	3064	ILGDWSNAI	HLA-A02:01	SYCN	Pancreas	7545
HEKAKYEAL	HLA-B08:01	HMGB4	Testis	3065	PLLLALALASV	HLA-A02:01	SYCN	Pancreas	7546
EIQLKPKAN	HLA-B08:01	HMGB4	Testis	3066	LLALALASVP	HLA-A02:01	SYCN	Pancreas	7547
RENPNWSVV	HLA-B13:02	HMGB4	Testis	3067	RPLLLALALASV	HLA-A02:01	SYCN	Pancreas	7548
YQEEMMNYV	HLA-B13:02	HMGB4	Testis	3068	RPLLLALALA	HLA-A02:01	SYCN	Pancreas	7549
KEQQPNTYV	HLA-B13:02	HMGB4	Testis	3069	YLPSNWANTA	HLA-A02:01	SYCN	Pancreas	7550
EKHPYEQRV	HLA-B13:02	HMGB4	Testis	3070	LLLALALASVP	HLA-A02:01	SYCN	Pancreas	7551
AKYFEELEL	HLA-B13:02	HMGB4	Testis	3071	ALALASVPCA	HLA-A02:01	SYCN	Pancreas	7552
IQLKPKANV	HLA-B13:02	HMGB4	Testis	3072	KLYDKSDPYY	HLA-A02:01	SYCN	Pancreas	7553
SSYVHFLLNY	HLA-B46:01	HMGB4	Testis	3073	PLRPLLLLAL	HLA-A02:01	SYCN	Pancreas	7554
FLLNYRNKF	HLA-B46:01	HMGB4	Testis	3074	ALASVPCA	HLA-A02:01	SYCN	Pancreas	7555
NTYVGFKEF	HLA-B46:01	HMGB4	Testis	3075	SLESGADLPYL	HLA-A02:01	SYCN	Pancreas	7556
LAKLDKARY	HLA-B46:01	HMGB4	Testis	3076	ALASVPCAQ	HLA-A02:01	SYCN	Pancreas	7557
RPPSSFLLF	HLA-C01:02	HMGB4	Testis	3077	KLYDKSDPYY	HLA-A03:01	SYCN	Pancreas	7558
VSSYVHFLL	HLA-C01:02	HMGB4	Testis	3078	KLYDKSDPY	HLA-A03:01	SYCN	Pancreas	7559
KMWSTATDL	HLA-C01:02	HMGB4	Testis	3079	RTCAKLYDK	HLA-A03:01	SYCN	Pancreas	7560
RRPPSSFL	HLA-C01:02	HMGB4	Testis	3080	LTVWSRQGK	HLA-A03:01	SYCN	Pancreas	7561
KHPYEQRVAL	HLA-C01:02	HMGB4	Testis	3081	GTYPRLEEY	HLA-A03:01	SYCN	Pancreas	7562
VSSYVHFLL	HLA-C03:04	HMGB4	Testis	3082	RTCAKLYDK	HLA-A11:01	SYCN	Pancreas	7563
HPYEQRVAL	HLA-C03:04	HMGB4	Testis	3083	ASSLVVAPR	HLA-A11:01	SYCN	Pancreas	7564
FCQDHYAQL	HLA-C03:04	HMGB4	Testis	3084	GTYPRLEEYR	HLA-A11:01	SYCN	Pancreas	7565
SSYVHFLL	HLA-C03:04	HMGB4	Testis	3085	GTYPRLEEYRR	HLA-A11:01	SYCN	Pancreas	7566
RPPSSFLLF	HLA-C04:01	HMGB4	Testis	3086	KFSAGTYPRL	HLA-A24:02	SYCN	Pancreas	7567
YQEEMMNYV	HLA-C04:01	HMGB4	Testis	3087	MSPLRPLLL	HLA-A24:02	SYCN	Pancreas	7568
RRPPSSFLL	HLA-C04:01	HMGB4	Testis	3088	YYENCCGGAEL	HLA-A24:02	SYCN	Pancreas	7569
YFEELELY	HLA-C04:01	HMGB4	Testis	3089	EYRRGILGDW	HLA-A24:02	SYCN	Pancreas	7570
KYFEELEL	HLA-C04:01	HMGB4	Testis	3090	PYLPSNWANTA	HLA-A24:02	SYCN	Pancreas	7571
KYEALAKL	HLA-C04:01	HMGB4	Testis	3091	PYLPSNWAN	HLA-A24:02	SYCN	Pancreas	7572
RRPPSSFLL	HLA-C07:01	HMGB4	Testis	3092	NWANTASSL	HLA-A24:02	SYCN	Pancreas	7573
LRAKYFEEL	HLA-C07:01	HMGB4	Testis	3093	KTHKFSAGT	HLA-A30:01	SYCN	Pancreas	7574
NVSSYVHFL	HLA-C07:01	HMGB4	Testis	3094	KAGKTHKFSA	HLA-A30:01	SYCN	Pancreas	7575
RRPPSSFL	HLA-C07:01	HMGB4	Testis	3095	WSRQGKAGK	HLA-A30:01	SYCN	Pancreas	7576
RRPPSSFLL	HLA-C07:02	HMGB4	Testis	3096	GTRTCAKLY	HLA-A30:01	SYCN	Pancreas	7577
LRAKYFEEL	HLA-C07:02	HMGB4	Testis	3097	RTCAKLYDK	HLA-A30:01	SYCN	Pancreas	7578
RRPPSSFLLF	HLA-C07:02	HMGB4	Testis	3098	NAISALYCR	HLA-A33:03	SYCN	Pancreas	7579
KYFEELEL	HLA-C07:02	HMGB4	Testis	3099	TASSLVVAPR	HLA-A33:03	SYCN	Pancreas	7580
SYVHFLLNY	HLA-C07:02	HMGB4	Testis	3100	ASSLVVAPR	HLA-A33:03	SYCN	Pancreas	7581
STNVGSNTY	HLA-A01:01	IAPP	Pancreas	3101	TYPRLEEYR	HLA-A33:03	SYCN	Pancreas	7582
SSTNVGSNTY	HLA-A01:01	IAPP	Pancreas	3102	DLKHSDGTR	HLA-A33:03	SYCN	Pancreas	7583
LSSTNVGSNTY	HLA-A01:01	IAPP	Pancreas	3103	SPLRPLLLAL	HLA-B07:02	SYCN	Pancreas	7584

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
VLKREPLNY	HLA-A01:01	IAPP	Pancreas	3104	RPLLLALAL	HLA-B07:02	SYCN	Pancreas	7585
FLIVLSVAL	HLA-A02:01	IAPP	Pancreas	3105	YPRLEEYRRGIL	HLA-B07:02	SYCN	Pancreas	7586
VLSRNILLEL	HLA-A02:01	IAPP	Pancreas	3106	APRCELTVW	HLA-B07:02	SYCN	Pancreas	7587
VFLIVLSVAL	HLA-A02:01	IAPP	Pancreas	3107	YPRLEEYRRGIL	HLA-B08:01	SYCN	Pancreas	7588
VLSVALNHL	HLA-A02:01	IAPP	Pancreas	3108	SPLRPLLLAL	HLA-B08:01	SYCN	Pancreas	7589
GILKLQVFL	HLA-A02:01	IAPP	Pancreas	3109	MSPLRPLLLAL	HLA-B08:01	SYCN	Pancreas	7590
KLQVFLIVL	HLA-A02:01	IAPP	Pancreas	3110	WANTASSL	HLA-B08:01	SYCN	Pancreas	7591
CLDQIPIFTV	HLA-A02:01	IAPP	Pancreas	3111	SPLRPLLL	HLA-B08:01	SYCN	Pancreas	7592
RQEWIIPV	HLA-A02:01	IAPP	Pancreas	3112	VVAPRCEL	HLA-B08:01	SYCN	Pancreas	7593
MGILKLQVFL	HLA-A02:01	IAPP	Pancreas	3113	GDWSNAISA	HLA-B13:02	SYCN	Pancreas	7594
TVFQENHQV	HLA-A02:01	IAPP	Pancreas	3114	GDWSNAISAL	HLA-B13:02	SYCN	Pancreas	7595
RLANFLVHS	HLA-A02:01	IAPP	Pancreas	3115	LESGADLPYL	HLA-B13:02	SYCN	Pancreas	7596
CLDQIPIFT	HLA-A02:01	IAPP	Pancreas	3116	RLEEYRRGI	HLA-B13:02	SYCN	Pancreas	7597
VLSVALNHLK	HLA-A03:01	IAPP	Pancreas	3117	RQGKAGKT	HLA-B13:02	SYCN	Pancreas	7598
ILLELRGAK	HLA-A03:01	IAPP	Pancreas	3118	RQGKAGKTH	HLA-B13:02	SYCN	Pancreas	7599
IVLSVALNHLK	HLA-A03:01	IAPP	Pancreas	3119	WSNAISALY	HLA-B46:01	SYCN	Pancreas	7600
TVFQENHQVEK	HLA-A03:01	IAPP	Pancreas	3120	GTYPRLEEY	HLA-B46:01	SYCN	Pancreas	7601
IVLSVALNH	HLA-A03:01	IAPP	Pancreas	3121	FSAGTYPRL	HLA-B46:01	SYCN	Pancreas	7602
LSVALNHLK	HLA-A11:01	IAPP	Pancreas	3122	KLYDKSDPY	HLA-B46:01	SYCN	Pancreas	7603
VLSVALNHLK	HLA-A11:01	IAPP	Pancreas	3123	PLRPLLLAL	HLA-B46:01	SYCN	Pancreas	7604
IVLSVALNHLK	HLA-A11:01	IAPP	Pancreas	3124	MSPLRPLLL	HLA-C01:02	SYCN	Pancreas	7605
TVFQENHQVEK	HLA-A11:01	IAPP	Pancreas	3125	FSAGTYPRL	HLA-C01:02	SYCN	Pancreas	7606
ATLPHVQR	HLA-A11:01	IAPP	Pancreas	3126	LVVAPRCEL	HLA-C01:02	SYCN	Pancreas	7607
ATPIESHQVEK	HLA-A11:01	IAPP	Pancreas	3127	VAPRCELTV	HLA-C01:02	SYCN	Pancreas	7608
RWKSGNATL	HLA-A24:02	IAPP	Pancreas	3128	LRPLLLLAL	HLA-C01:02	SYCN	Pancreas	7609
VQRSAWQIF	HLA-A24:02	IAPP	Pancreas	3129	FSAGTYPRL	HLA-C03:04	SYCN	Pancreas	7610
NFLVHSSNNF	HLA-A24:02	IAPP	Pancreas	3130	WANTASSLV	HLA-C03:04	SYCN	Pancreas	7611
LDQIPIFTVF	HLA-A24:02	IAPP	Pancreas	3131	LSLESGADL	HLA-C03:04	SYCN	Pancreas	7612
DQIPIFTVF	HLA-A24:02	IAPP	Pancreas	3132	WANTASSL	HLA-C03:04	SYCN	Pancreas	7613
RCLDQIPIF	HLA-A24:02	IAPP	Pancreas	3133	LYDKSDPYY	HLA-C04:01	SYCN	Pancreas	7614
KSKVIRWKS	HLA-A30:01	IAPP	Pancreas	3134	YYENCCGGAEL	HLA-C04:01	SYCN	Pancreas	7615
ATQRLANFLV	HLA-A30:01	IAPP	Pancreas	3135	MSPLRPLLL	HLA-C04:01	SYCN	Pancreas	7616
KVIRWKSGNA	HLA-A30:01	IAPP	Pancreas	3136	NWANTASSL	HLA-C04:01	SYCN	Pancreas	7617
KSKVIRWKSGNA	HLA-A30:01	IAPP	Pancreas	3137	MSPLRPLLL	HLA-C07:01	SYCN	Pancreas	7618
KSKVIRWK	HLA-A30:01	IAPP	Pancreas	3138	WSNAISALY	HLA-C07:01	SYCN	Pancreas	7619
QVFLIVLSV	HLA-A30:01	IAPP	Pancreas	3139	GTYPRLEEY	HLA-C07:01	SYCN	Pancreas	7620
RWKSGNATL	HLA-A30:01	IAPP	Pancreas	3140	YRRGILGD	HLA-C07:01	SYCN	Pancreas	7621
NATLPHVQR	HLA-A33:03	IAPP	Pancreas	3141	ASADLKIISD	HLA-C07:01	SYCN	Pancreas	7622
NTATCATQR	HLA-A33:03	IAPP	Pancreas	3142	EYRRGILGD	HLA-C07:01	SYCN	Pancreas	7623
HLKATPIER	HLA-A33:03	IAPP	Pancreas	3143	MSPLRPLLL	HLA-C07:02	SYCN	Pancreas	7624
EWIIPVLSR	HLA-A33:03	IAPP	Pancreas	3144	LRPLLLLALAL	HLA-C07:02	SYCN	Pancreas	7625
IPVLSRNIL	HLA-B07:02	IAPP	Pancreas	3145	WSNAISALY	HLA-C07:02	SYCN	Pancreas	7626
IPVLSRNILL	HLA-B07:02	IAPP	Pancreas	3146	LRPLLLLAL	HLA-C07:02	SYCN	Pancreas	7627

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
IIPVLSRNIL	HLA-B07:02	IAPP	Pancreas	3147	TYPRLEEY	HLA-C07:02	SYCN	Pancreas	7628
LPHVQRSAW	HLA-B07:02	IAPP	Pancreas	3148	CVDAEGMEVY	HLA-A01:01	TG	Thyroid	7629
LNHLKATPI	HLA-B08:01	IAPP	Pancreas	3149	FTATSFGHPY	HLA-A01:01	TG	Thyroid	7630
MGILKLQVF	HLA-B08:01	IAPP	Pancreas	3150	FSLFIQSLY	HLA-A01:01	TG	Thyroid	7631
MGILKLQVFL	HLA-B08:01	IAPP	Pancreas	3151	RTSSKTAFY	HLA-A01:01	TG	Thyroid	7632
ILKLQVFLI	HLA-B08:01	IAPP	Pancreas	3152	YSLEHSTDDY	HLA-A01:01	TG	Thyroid	7633
ILKLQVFL	HLA-B08:01	IAPP	Pancreas	3153	YSDFSTPLAH	HLA-A01:01	TG	Thyroid	7634
GILKLQVF	HLA-B08:01	IAPP	Pancreas	3154	STFTETTLY	HLA-A01:01	TG	Thyroid	7635
LDQIPIFTV	HLA-B13:02	IAPP	Pancreas	3155	ITESASLYF	HLA-A01:01	TG	Thyroid	7636
IERQEWIIPV	HLA-B13:02	IAPP	Pancreas	3156	YSDFSTPLA	HLA-A01:01	TG	Thyroid	7637
TQRLANFLV	HLA-B13:02	IAPP	Pancreas	3157	WVSANIFEY	HLA-A01:01	TG	Thyroid	7638
IERCLDQIPI	HLA-B13:02	IAPP	Pancreas	3158	QVDQFLGVPY	HLA-A01:01	TG	Thyroid	7639
RQEWIIPVL	HLA-B13:02	IAPP	Pancreas	3159	TTEPEISCDFY	HLA-A01:01	TG	Thyroid	7640
DQIPIFTV	HLA-B13:02	IAPP	Pancreas	3160	FTDLIQSGSF	HLA-A01:01	TG	Thyroid	7641
HVQRSAWQI	HLA-B13:02	IAPP	Pancreas	3161	STSPGVSEDCLY	HLA-A01:01	TG	Thyroid	7642
FLVHSSNNF	HLA-B46:01	IAPP	Pancreas	3162	STTEPEISCDFY	HLA-A01:01	TG	Thyroid	7643
STNVGSNTY	HLA-B46:01	IAPP	Pancreas	3163	LAAQSTLSFY	HLA-A01:01	TG	Thyroid	7644
HSSNNFGAI	HLA-B46:01	IAPP	Pancreas	3164	RVEAAATWYY	HLA-A01:01	TG	Thyroid	7645
VQRSAWQIF	HLA-B46:01	IAPP	Pancreas	3165	ITESASLY	HLA-A01:01	TG	Thyroid	7646
FLIVLSVAL	HLA-B46:01	IAPP	Pancreas	3166	ILEDKVKNFY	HLA-A01:01	TG	Thyroid	7647
SSNNFGAIL	HLA-C01:02	IAPP	Pancreas	3167	SLEHSTDDY	HLA-A01:01	TG	Thyroid	7648
LSRNILLEL	HLA-C01:02	IAPP	Pancreas	3168	LAEITESASLY	HLA-A01:01	TG	Thyroid	7649
HSSNNFGAI	HLA-C01:02	IAPP	Pancreas	3169	FTDLIQSGS	HLA-A01:01	TG	Thyroid	7650
IIPVLSRNI	HLA-C01:02	IAPP	Pancreas	3170	LLADVQFAL	HLA-A02:01	TG	Thyroid	7651
REPLNYLPL	HLA-C01:02	IAPP	Pancreas	3171	WLFKHLFSA	HLA-A02:01	TG	Thyroid	7652
TLPHVQRSAW	HLA-C01:02	IAPP	Pancreas	3172	FLLFLQHAI	HLA-A02:01	TG	Thyroid	7653
VLSVALNHL	HLA-C01:02	IAPP	Pancreas	3173	NLFGGKFLV	HLA-A02:01	TG	Thyroid	7654
HSSNNFGAI	HLA-C03:04	IAPP	Pancreas	3174	SLLELPEFL	HLA-A02:01	TG	Thyroid	7655
SSNNFGAIL	HLA-C03:04	IAPP	Pancreas	3175	TLLASICWV	HLA-A02:01	TG	Thyroid	7656
FLIVLSVAL	HLA-C03:04	IAPP	Pancreas	3176	SLACVPCPV	HLA-A02:01	TG	Thyroid	7657
KATPIERCL	HLA-C03:04	IAPP	Pancreas	3177	YLLCPFPPM	HLA-A02:01	TG	Thyroid	7658
RQEWIIPVL	HLA-C04:01	IAPP	Pancreas	3178	FTLLASICWV	HLA-A02:01	TG	Thyroid	7659
SSNNFGAIL	HLA-C04:01	IAPP	Pancreas	3179	SLTEKVFKV	HLA-A02:01	TG	Thyroid	7660
RWKSGNATL	HLA-C04:01	IAPP	Pancreas	3180	IMQYFSHFI	HLA-A02:01	TG	Thyroid	7661
HSSNNFGAI	HLA-C04:01	IAPP	Pancreas	3181	SLLELPEFLL	HLA-A02:01	TG	Thyroid	7662
FLIVLSVAL	HLA-C04:01	IAPP	Pancreas	3182	GLLDQVAAL	HLA-A02:01	TG	Thyroid	7663
CLDQIPIF	HLA-C04:01	IAPP	Pancreas	3183	SLLSYEASV	HLA-A02:01	TG	Thyroid	7664
VLSVALNHL	HLA-C04:01	IAPP	Pancreas	3184	LLDEIYDTI	HLA-A02:01	TG	Thyroid	7665
ERQEWIIPV	HLA-C07:01	IAPP	Pancreas	3185	VIFDANAPV	HLA-A02:01	TG	Thyroid	7666
NTYGKRNAV	HLA-C07:01	IAPP	Pancreas	3186	YLNVFIPQNV	HLA-A02:01	TG	Thyroid	7667
LKREPLNYL	HLA-C07:01	IAPP	Pancreas	3187	FLAAVGNLI	HLA-A02:01	TG	Thyroid	7668
KRNAVEVL	HLA-C07:01	IAPP	Pancreas	3188	LMMQKFEKV	HLA-A02:01	TG	Thyroid	7669
SRNILLEL	HLA-C07:01	IAPP	Pancreas	3189	NMLSGLYNPI	HLA-A02:01	TG	Thyroid	7670

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RQEWIIPVL	HLA-C07:01	IAPP	Pancreas	3190	LLQTFQVFI	HLA-A02:01	TG	Thyroid	7671
ERQEWIIPV	HLA-C07:02	IAPP	Pancreas	3191	MLSGLYNPI	HLA-A02:01	TG	Thyroid	7672
LKREPLNYL	HLA-C07:02	IAPP	Pancreas	3192	LLLDEIYDTI	HLA-A02:01	TG	Thyroid	7673
RWKSGNATL	HLA-C07:02	IAPP	Pancreas	3193	ELLADVQFAL	HLA-A02:01	TG	Thyroid	7674
KRNAVEVL	HLA-C07:02	IAPP	Pancreas	3194	FLVNYGQFNL	HLA-A02:01	TG	Thyroid	7675
SRNILLEL	HLA-C07:02	IAPP	Pancreas	3195	YLLCPFPPMA	HLA-A02:01	TG	Thyroid	7676
KREPLNYL	HLA-C07:02	IAPP	Pancreas	3196	FLASLLELPEFL	HLA-A02:01	TG	Thyroid	7677
FGDIQEGIY	HLA-A01:01	KIF2B	Testis	3197	FLSSGSGEV	HLA-A02:01	TG	Thyroid	7678
VTEINRENY	HLA-A01:01	KIF2B	Testis	3198	GLTTELFSPV	HLA-A02:01	TG	Thyroid	7679
STYEKLDLKVY	HLA-A01:01	KIF2B	Testis	3199	KQVDQFLGV	HLA-A02:01	TG	Thyroid	7680
PSDNVVMVH	HLA-A01:01	KIF2B	Testis	3200	SLWVEVDLLI	HLA-A02:01	TG	Thyroid	7681
TSCENTLNTLRY	HLA-A01:01	KIF2B	Testis	3201	WGLLDQVAAL	HLA-A02:01	TG	Thyroid	7682
KIDLETILL	HLA-A01:01	KIF2B	Testis	3202	MLPGLTTFL	HLA-A02:01	TG	Thyroid	7683
YQFTAQPLV	HLA-A02:01	KIF2B	Testis	3203	ALVLEIFTLL	HLA-A02:01	TG	Thyroid	7684
KVYGTFFEI	HLA-A02:01	KIF2B	Testis	3204	QNLFGGKFLV	HLA-A02:01	TG	Thyroid	7685
KLLLADLIHV	HLA-A02:01	KIF2B	Testis	3205	SLLSYEASVPSV	HLA-A02:01	TG	Thyroid	7686
YALVAQDVFL	HLA-A02:01	KIF2B	Testis	3206	FLAAVGNLIV	HLA-A02:01	TG	Thyroid	7687
ALKECILAL	HLA-A02:01	KIF2B	Testis	3207	SLFIQSLYEA	HLA-A02:01	TG	Thyroid	7688
IMHGKFSLV	HLA-A02:01	KIF2B	Testis	3208	HWLFKHLFSA	HLA-A02:01	TG	Thyroid	7689
ALVAQDVFL	HLA-A02:01	KIF2B	Testis	3209	ASLLELPEFL	HLA-A02:01	TG	Thyroid	7690
ALVAQDVFLL	HLA-A02:01	KIF2B	Testis	3210	HLMQKFEKV	HLA-A02:01	TG	Thyroid	7691
RIMHGKFSLV	HLA-A02:01	KIF2B	Testis	3211	FLASLLEL	HLA-A02:01	TG	Thyroid	7692
LLLADLIHV	HLA-A02:01	KIF2B	Testis	3212	KIMQYFSHFI	HLA-A02:01	TG	Thyroid	7693
TLKDLDIITV	HLA-A02:01	KIF2B	Testis	3213	LLADVQFALG	HLA-A02:01	TG	Thyroid	7694
HLDSSKISV	HLA-A02:01	KIF2B	Testis	3214	MLSGLYNPIV	HLA-A02:01	TG	Thyroid	7695
ALTEIQKKL	HLA-A02:01	KIF2B	Testis	3215	ALVLEIFTL	HLA-A02:01	TG	Thyroid	7696
GLQEKEVCCV	HLA-A02:01	KIF2B	Testis	3216	GLYNPIVFSA	HLA-A02:01	TG	Thyroid	7697
TLLGKDTTI	HLA-A02:01	KIF2B	Testis	3217	GLREDLLSL	HLA-A02:01	TG	Thyroid	7698
VLEDGNQQI	HLA-A02:01	KIF2B	Testis	3218	SLQDVPLAA	HLA-A02:01	TG	Thyroid	7699
CLWEIQKL	HLA-A02:01	KIF2B	Testis	3219	SLQDVPLAAL	HLA-A02:01	TG	Thyroid	7700
KVYDLLNWK	HLA-A03:01	KIF2B	Testis	3220	VLNDAQTKL	HLA-A02:01	TG	Thyroid	7701
LLLRNSTYEK	HLA-A03:01	KIF2B	Testis	3221	FLVAKGIRL	HLA-A02:01	TG	Thyroid	7702
KVYDLLNWKK	HLA-A03:01	KIF2B	Testis	3222	SLYEAGQQDV	HLA-A02:01	TG	Thyroid	7703
RVPSKPCLMK	HLA-A03:01	KIF2B	Testis	3223	DLGDVMETV	HLA-A02:01	TG	Thyroid	7704
KVYGTFFEIY	HLA-A03:01	KIF2B	Testis	3224	FLREPPARA	HLA-A02:01	TG	Thyroid	7705
STYEKLDLK	HLA-A03:01	KIF2B	Testis	3225	VIFDANAPVAV	HLA-A02:01	TG	Thyroid	7706
STYEKLDLK	HLA-A11:01	KIF2B	Testis	3226	GLLSSPSVL	HLA-A02:01	TG	Thyroid	7707
KVYDLLNWK	HLA-A11:01	KIF2B	Testis	3227	SLEEKSLSL	HLA-A02:01	TG	Thyroid	7708
VETLPTLLGK	HLA-A11:01	KIF2B	Testis	3228	FLAAVGNLIVV	HLA-A02:01	TG	Thyroid	7709
KVYDLLNWKK	HLA-A11:01	KIF2B	Testis	3229	ELAETGLEL	HLA-A02:01	TG	Thyroid	7710
GTFFEIYGGK	HLA-A11:01	KIF2B	Testis	3230	GLLSSPSVLL	HLA-A02:01	TG	Thyroid	7711
AVFQIILK	HLA-A11:01	KIF2B	Testis	3231	VLPSLTEKV	HLA-A02:01	TG	Thyroid	7712
RQLEGAEINK	HLA-A11:01	KIF2B	Testis	3232	SLALSSVVV	HLA-A02:01	TG	Thyroid	7713

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RYLQNQTFCF	HLA-A24:02	KIF2B	Testis	3233	SLWVEVDLL	HLA-A02:01	TG	Thyroid	7714
IYALVAQDVF	HLA-A24:02	KIF2B	Testis	3234	ELPEFLLFL	HLA-A02:01	TG	Thyroid	7715
IYGGKVYDLL	HLA-A24:02	KIF2B	Testis	3235	QLAEITESA	HLA-A02:01	TG	Thyroid	7716
VYQFTAQPL	HLA-A24:02	KIF2B	Testis	3236	GLLSSPSV	HLA-A02:01	TG	Thyroid	7717
IYGGKVYDL	HLA-A24:02	KIF2B	Testis	3237	RLEDIPVASL	HLA-A02:01	TG	Thyroid	7718
RYANRVKKL	HLA-A24:02	KIF2B	Testis	3238	ELAETGLELL	HLA-A02:01	TG	Thyroid	7719
RTSRQTPVNA	HLA-A30:01	KIF2B	Testis	3239	GLINRAKAV	HLA-A02:01	TG	Thyroid	7720
RVKKLNVDV	HLA-A30:01	KIF2B	Testis	3240	ALLSNSSML	HLA-A02:01	TG	Thyroid	7721
RSDKRIHLAV	HLA-A30:01	KIF2B	Testis	3241	GLLDQVAA	HLA-A02:01	TG	Thyroid	7722
LLRNSTYEK	HLA-A30:01	KIF2B	Testis	3242	TLYPEAQV	HLA-A02:01	TG	Thyroid	7723
KVYDLLNWK	HLA-A30:01	KIF2B	Testis	3243	KLMGISIRNK	HLA-A03:01	TG	Thyroid	7724
RSLSILEQK	HLA-A30:01	KIF2B	Testis	3244	RLYFGTSGY	HLA-A03:01	TG	Thyroid	7725
TFFEIYGGK	HLA-A30:01	KIF2B	Testis	3245	HTYPFGWYQK	HLA-A03:01	TG	Thyroid	7726
KVYDLLNWKK	HLA-A30:01	KIF2B	Testis	3246	RLILPQMPK	HLA-A03:01	TG	Thyroid	7727
IMHMIEEYR	HLA-A33:03	KIF2B	Testis	3247	RTSGLLSSWK	HLA-A03:01	TG	Thyroid	7728
EIMHMIEEYR	HLA-A33:03	KIF2B	Testis	3248	CLSFCQLQK	HLA-A03:01	TG	Thyroid	7729
HYPIGHEAPR	HLA-A33:03	KIF2B	Testis	3249	SLYFTCTLY	HLA-A03:01	TG	Thyroid	7730
NVDVRPYHR	HLA-A33:03	KIF2B	Testis	3250	CRLILPQMPK	HLA-A03:01	TG	Thyroid	7731
QWLENIQER	HLA-A33:03	KIF2B	Testis	3251	RLLHGVGDK	HLA-A03:01	TG	Thyroid	7732
EGIYVAIQR	HLA-A33:03	KIF2B	Testis	3252	ACLSFCQLQK	HLA-A03:01	TG	Thyroid	7733
EIQKLQEQR	HLA-A33:03	KIF2B	Testis	3253	SRLYFGTSGY	HLA-A03:01	TG	Thyroid	7734
RPYHRGHYPI	HLA-B07:02	KIF2B	Testis	3254	RLGVNVTWK	HLA-A03:01	TG	Thyroid	7735
RPLNQRETTL	HLA-B07:02	KIF2B	Testis	3255	IIDMASAWAK	HLA-A03:01	TG	Thyroid	7736
HPMPPPPLSPL	HLA-B07:02	KIF2B	Testis	3256	SLSSQKHWLFK	HLA-A03:01	TG	Thyroid	7737
TPFRASKLTL	HLA-B07:02	KIF2B	Testis	3257	RLQQNLFGGK	HLA-A03:01	TG	Thyroid	7738
MPPPPLSPL	HLA-B07:02	KIF2B	Testis	3258	AIQYGTSWK	HLA-A03:01	TG	Thyroid	7739
MPPPPLSPLAL	HLA-B07:02	KIF2B	Testis	3259	VVLPSLTEK	HLA-A03:01	TG	Thyroid	7740
HPMPPPPL	HLA-B07:02	KIF2B	Testis	3260	SVFPPGPLIC	HLA-A03:01	TG	Thyroid	7741
LMKQKKSPCL	HLA-B08:01	KIF2B	Testis	3261	SVFPPGPLICS	HLA-A03:01	TG	Thyroid	7742
LMKQKKSPC	HLA-B08:01	KIF2B	Testis	3262	AIFPSRGLAR	HLA-A03:01	TG	Thyroid	7743
RPYHRGHYPI	HLA-B08:01	KIF2B	Testis	3263	ATSCPPTIK	HLA-A03:01	TG	Thyroid	7744
EIRARRAL	HLA-B08:01	KIF2B	Testis	3264	GLYNPIVFS	HLA-A03:01	TG	Thyroid	7745
NWKKKLQVL	HLA-B08:01	KIF2B	Testis	3265	KLLVKIMSY	HLA-A03:01	TG	Thyroid	7746
EIQKKLKLL	HLA-B08:01	KIF2B	Testis	3266	ILLEPYLFW	HLA-A03:01	TG	Thyroid	7747
ESKQKVDL	HLA-B08:01	KIF2B	Testis	3267	HTYPFGWYQK	HLA-A11:01	TG	Thyroid	7748
ALKECILAL	HLA-B08:01	KIF2B	Testis	3268	STFTETTLYR	HLA-A11:01	TG	Thyroid	7749
YQFTAQPLV	HLA-B13:02	KIF2B	Testis	3269	SSQKHWLFK	HLA-A11:01	TG	Thyroid	7750
KVYGTFFEI	HLA-B13:02	KIF2B	Testis	3270	VVLPSLTEK	HLA-A11:01	TG	Thyroid	7751
LDLKVYGTFFEI	HLA-B13:02	KIF2B	Testis	3271	STLSFYQRR	HLA-A11:01	TG	Thyroid	7752
IDFCIARSLSI	HLA-B13:02	KIF2B	Testis	3272	RLILPQMPK	HLA-A11:01	TG	Thyroid	7753
SLSILEQKI	HLA-B13:02	KIF2B	Testis	3273	IIDMASAWAK	HLA-A11:01	TG	Thyroid	7754
GQNSSTCMI	HLA-B13:02	KIF2B	Testis	3274	GSFQLHLDSK	HLA-A11:01	TG	Thyroid	7755
LQRDEFIKI	HLA-B13:02	KIF2B	Testis	3275	RTSGLLSSWK	HLA-A11:01	TG	Thyroid	7756

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
MVHESKQKV	HLA-B13:02	KIF2B	Testis	3276	ATSCPPTIK	HLA-A11:01	TG	Thyroid	7757
YALVAQDVF	HLA-B46:01	KIF2B	Testis	3277	ATSNFSAVR	HLA-A11:01	TG	Thyroid	7758
FLLLRNSTY	HLA-B46:01	KIF2B	Testis	3278	KLMGISIRNK	HLA-A11:01	TG	Thyroid	7759
QTFCFDHAF	HLA-B46:01	KIF2B	Testis	3279	AFSQTHLMQK	HLA-A11:01	TG	Thyroid	7760
RASKLTLVL	HLA-B46:01	KIF2B	Testis	3280	VHTYPFGWYQK	HLA-A11:01	TG	Thyroid	7761
EIMHMIEEY	HLA-B46:01	KIF2B	Testis	3281	ATNSQLFRR	HLA-A11:01	TG	Thyroid	7762
IMHMIEEY	HLA-B46:01	KIF2B	Testis	3282	SSQDDGLINR	HLA-A11:01	TG	Thyroid	7763
YEIMHMIEEY	HLA-B46:01	KIF2B	Testis	3283	AVQSVISGR	HLA-A11:01	TG	Thyroid	7764
HAFDDKASN	HLA-B46:01	KIF2B	Testis	3284	ATPWPDFVPR	HLA-A11:01	TG	Thyroid	7765
MPPPPLSPL	HLA-C01:02	KIF2B	Testis	3285	TTLYRILQR	HLA-A11:01	TG	Thyroid	7766
RVPSKPCLM	HLA-C01:02	KIF2B	Testis	3286	SQDDGLINR	HLA-A11:01	TG	Thyroid	7767
RASKLTLVL	HLA-C01:02	KIF2B	Testis	3287	SVQVGCLTR	HLA-A11:01	TG	Thyroid	7768
VAQDVFLLL	HLA-C01:02	KIF2B	Testis	3288	VTFSSFQRR	HLA-A11:01	TG	Thyroid	7769
CLPESPCL	HLA-C01:02	KIF2B	Testis	3289	GTFNFSQFFQQ	HLA-A11:01	TG	Thyroid	7770
PMPPPPLSPL	HLA-C01:02	KIF2B	Testis	3290	RFPDAFVTF	HLA-A24:02	TG	Thyroid	7771
ESPCLSPL	HLA-C01:02	KIF2B	Testis	3291	ADYADLLQTF	HLA-A24:02	TG	Thyroid	7772
LALAPSSAI	HLA-C03:04	KIF2B	Testis	3292	SGYFSQHDLF	HLA-A24:02	TG	Thyroid	7773
RASKLTLVL	HLA-C03:04	KIF2B	Testis	3293	SYNRFPDAFVTF	HLA-A24:02	TG	Thyroid	7774
YALVAQDVF	HLA-C03:04	KIF2B	Testis	3294	GYFSQHDLF	HLA-A24:02	TG	Thyroid	7775
VAQDVFLLL	HLA-C03:04	KIF2B	Testis	3295	SYRVGVFGF	HLA-A24:02	TG	Thyroid	7776
FCLPESPCL	HLA-C03:04	KIF2B	Testis	3296	RWASPRVARF	HLA-A24:02	TG	Thyroid	7777
LALKECILAL	HLA-C03:04	KIF2B	Testis	3297	NRFPDAFVTF	HLA-A24:02	TG	Thyroid	7778
AFDDKASNEL	HLA-C04:01	KIF2B	Testis	3298	DYADLLQTF	HLA-A24:02	TG	Thyroid	7779
RVPSKPCLM	HLA-C04:01	KIF2B	Testis	3299	VYLKKGAII	HLA-A24:02	TG	Thyroid	7780
YLQNQTFCF	HLA-C04:01	KIF2B	Testis	3300	RFPDAFVTFSSF	HLA-A24:02	TG	Thyroid	7781
YQFTAQPLV	HLA-C04:01	KIF2B	Testis	3301	SYNRFPDAF	HLA-A24:02	TG	Thyroid	7782
MPPPPLSPL	HLA-C04:01	KIF2B	Testis	3302	FYPAYEGQF	HLA-A24:02	TG	Thyroid	7783
NYWVTVEWV	HLA-C04:01	KIF2B	Testis	3303	TFPAETIRF	HLA-A24:02	TG	Thyroid	7784
FDDKASNEL	HLA-C04:01	KIF2B	Testis	3304	SADYADLLQTF	HLA-A24:02	TG	Thyroid	7785
KIDLETILL	HLA-C04:01	KIF2B	Testis	3305	KFLVNVGQF	HLA-A24:02	TG	Thyroid	7786
FRASKLTLV	HLA-C07:01	KIF2B	Testis	3306	IYDTIFAGL	HLA-A24:02	TG	Thyroid	7787
FRASKLTLVL	HLA-C07:01	KIF2B	Testis	3307	PYMPQCDAF	HLA-A24:02	TG	Thyroid	7788
FRKGMATCF	HLA-C07:01	KIF2B	Testis	3308	LYFGTSGYF	HLA-A24:02	TG	Thyroid	7789
TRYLQNQTF	HLA-C07:01	KIF2B	Testis	3309	EFMPVQCKF	HLA-A24:02	TG	Thyroid	7790
TRNPNYEIM	HLA-C07:01	KIF2B	Testis	3310	NYKEFSELL	HLA-A24:02	TG	Thyroid	7791
ERAGGVHHD	HLA-C07:01	KIF2B	Testis	3311	EFSRKVPTF	HLA-A24:02	TG	Thyroid	7792
TRNPNYEI	HLA-C07:01	KIF2B	Testis	3312	QYPGSYSDF	HLA-A24:02	TG	Thyroid	7793
FRASKLTLV	HLA-C07:02	KIF2B	Testis	3313	FYTRLPFQKL	HLA-A24:02	TG	Thyroid	7794
FRASKLTLVL	HLA-C07:02	KIF2B	Testis	3314	SSQKHWLFK	HLA-A30:01	TG	Thyroid	7795
FRKGMATCF	HLA-C07:02	KIF2B	Testis	3315	KSRTSGLLS	HLA-A30:01	TG	Thyroid	7796
RYANRVKKL	HLA-C07:02	KIF2B	Testis	3316	GTRQLGRPK	HLA-A30:01	TG	Thyroid	7797
TRNPNYEIM	HLA-C07:02	KIF2B	Testis	3317	KVKNFYTRL	HLA-A30:01	TG	Thyroid	7798
VRPYHRGHY	HLA-C07:02	KIF2B	Testis	3318	SGRFRCPTK	HLA-A30:01	TG	Thyroid	7799

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
VYGTFFEIY	HLA-C07:02	KIF2B	Testis	3319	SSKTAFYQA	HLA-A30:01	TG	Thyroid	7800
ETKDPTNGYY	HLA-A01:01	KIRREL2	Pancreas	3320	RSQENPSPK	HLA-A30:01	TG	Thyroid	7801
TLETKDPTNGYY	HLA-A01:01	KIRREL2	Pancreas	3321	GTRGTFNFS	HLA-A30:01	TG	Thyroid	7802
LETKDPTNGYY	HLA-A01:01	KIRREL2	Pancreas	3322	KSRTSGLLSS	HLA-A30:01	TG	Thyroid	7803
DTAITLSLQY	HLA-A01:01	KIRREL2	Pancreas	3323	RARGNVFMY	HLA-A30:01	TG	Thyroid	7804
TKDPTNGYY	HLA-A01:01	KIRREL2	Pancreas	3324	GTRSAIGKPK	HLA-A30:01	TG	Thyroid	7805
TLETKDPTNGY	HLA-A01:01	KIRREL2	Pancreas	3325	RARMQSLMGS	HLA-A30:01	TG	Thyroid	7806
FLTEPVSCEV	HLA-A02:01	KIRREL2	Pancreas	3326	KSRLEDIPV	HLA-A30:01	TG	Thyroid	7807
GLGPGLISV	HLA-A02:01	KIRREL2	Pancreas	3327	KSRLEDIPVA	HLA-A30:01	TG	Thyroid	7808
FLVETFPA	HLA-A02:01	KIRREL2	Pancreas	3328	GTRTSTSPG	HLA-A30:01	TG	Thyroid	7809
TLLMVITGV	HLA-A02:01	KIRREL2	Pancreas	3329	ATRDYFIIC	HLA-A30:01	TG	Thyroid	7810
MLRMRVPALL	HLA-A02:01	KIRREL2	Pancreas	3330	RNKVPMSEK	HLA-A30:01	TG	Thyroid	7811
VLFGPILQA	HLA-A02:01	KIRREL2	Pancreas	3331	KLMGISIRNK	HLA-A30:01	TG	Thyroid	7812
FLCQATAQPPV	HLA-A02:01	KIRREL2	Pancreas	3332	AKKDGTMNK	HLA-A30:01	TG	Thyroid	7813
ILQAKPEPV	HLA-A02:01	KIRREL2	Pancreas	3333	WSKYISSLK	HLA-A30:01	TG	Thyroid	7814
FLQQPEDLVVLL	HLA-A02:01	KIRREL2	Pancreas	3334	YQRWEAQNK	HLA-A30:01	TG	Thyroid	7815
FLQQPEDLV	HLA-A02:01	KIRREL2	Pancreas	3335	SQKDRGSGK	HLA-A30:01	TG	Thyroid	7816
TTLLMVITGV	HLA-A02:01	KIRREL2	Pancreas	3336	HTYPFGWYQK	HLA-A30:01	TG	Thyroid	7817
LLMVITGV	HLA-A02:01	KIRREL2	Pancreas	3337	CTGFGFLNV	HLA-A30:01	TG	Thyroid	7818
TLSASPHTV	HLA-A02:01	KIRREL2	Pancreas	3338	YTRLPFQKL	HLA-A30:01	TG	Thyroid	7819
VLLGEEARL	HLA-A02:01	KIRREL2	Pancreas	3339	NFQQVYLWK	HLA-A30:01	TG	Thyroid	7820
VLGGPSVSL	HLA-A02:01	KIRREL2	Pancreas	3340	MPKALFRKK	HLA-A30:01	TG	Thyroid	7821
VLVPPEAPQV	HLA-A02:01	KIRREL2	Pancreas	3341	KVILEDKVK	HLA-A30:01	TG	Thyroid	7822
RLGEGGAQA	HLA-A02:01	KIRREL2	Pancreas	3342	MQYFSHFIR	HLA-A33:03	TG	Thyroid	7823
ALHSAPAFL	HLA-A02:01	KIRREL2	Pancreas	3343	STHGRLLGR	HLA-A33:03	TG	Thyroid	7824
FLQQPEDLVV	HLA-A02:01	KIRREL2	Pancreas	3344	EAFAEQFLR	HLA-A33:03	TG	Thyroid	7825
ATFHQTLLK	HLA-A03:01	KIRREL2	Pancreas	3345	IMQYFSHFIR	HLA-A33:03	TG	Thyroid	7826
VLFGPILQAK	HLA-A03:01	KIRREL2	Pancreas	3346	TTLYRILQR	HLA-A33:03	TG	Thyroid	7827
GATFHQTLLK	HLA-A03:01	KIRREL2	Pancreas	3347	FVTFSSFQR	HLA-A33:03	TG	Thyroid	7828
RLYRARAGY	HLA-A03:01	KIRREL2	Pancreas	3348	DMASAWAKR	HLA-A33:03	TG	Thyroid	7829
VLFGPILQA	HLA-A03:01	KIRREL2	Pancreas	3349	STLSFYQRR	HLA-A33:03	TG	Thyroid	7830
ATAQPPVTGY	HLA-A03:01	KIRREL2	Pancreas	3350	LLVKIMSYR	HLA-A33:03	TG	Thyroid	7831
ATFHQTLLK	HLA-A11:01	KIRREL2	Pancreas	3351	MIFDLVHSYNR	HLA-A33:03	TG	Thyroid	7832
GATFHQTLLK	HLA-A11:01	KIRREL2	Pancreas	3352	EAIRAIFPSR	HLA-A33:03	TG	Thyroid	7833
ASASFSEQK	HLA-A11:01	KIRREL2	Pancreas	3353	HTYPFGWYQK	HLA-A33:03	TG	Thyroid	7834
VLFGPILQAK	HLA-A11:01	KIRREL2	Pancreas	3354	MAGCWAGPR	HLA-A33:03	TG	Thyroid	7835
ATFHQTLLKE	HLA-A11:01	KIRREL2	Pancreas	3355	MMIFDLVHSYNR	HLA-A33:03	TG	Thyroid	7836
ATQAGLRSR	HLA-A11:01	KIRREL2	Pancreas	3356	EVYGTRQLGR	HLA-A33:03	TG	Thyroid	7837
GTQESIDFSR	HLA-A11:01	KIRREL2	Pancreas	3357	DANAPVAVR	HLA-A33:03	TG	Thyroid	7838
RVPALLVLLF	HLA-A24:02	KIRREL2	Pancreas	3358	EFSELLPNR	HLA-A33:03	TG	Thyroid	7839
LWFRDGVLL	HLA-A24:02	KIRREL2	Pancreas	3359	YAAPPLAER	HLA-A33:03	TG	Thyroid	7840
SYIKPTSF	HLA-A24:02	KIRREL2	Pancreas	3360	SSQDDGLINR	HLA-A33:03	TG	Thyroid	7841
RLPCALGAYW	HLA-A24:02	KIRREL2	Pancreas	3361	AVQSVISGR	HLA-A33:03	TG	Thyroid	7842

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LGPPGTPTF	HLA-A24:02	KIRREL2	Pancreas	3362	FILDELTAR	HLA-A33:03	TG	Thyroid	7843
QYPPEVTL	HLA-A24:02	KIRREL2	Pancreas	3363	TLYRILQRR	HLA-A33:03	TG	Thyroid	7844
PFSHDDGATF	HLA-A24:02	KIRREL2	Pancreas	3364	STLSFYQR	HLA-A33:03	TG	Thyroid	7845
KVRGVSPPA	HLA-A30:01	KIRREL2	Pancreas	3365	DVASIHLLTAR	HLA-A33:03	TG	Thyroid	7846
RSRPAQLHV	HLA-A30:01	KIRREL2	Pancreas	3366	DKVKNFYTR	HLA-A33:03	TG	Thyroid	7847
KVRGVSVSL	HLA-A30:01	KIRREL2	Pancreas	3367	EVRGTQLKR	HLA-A33:03	TG	Thyroid	7848
RMRVPALLV	HLA-A30:01	KIRREL2	Pancreas	3368	RPQPRENIL	HLA-B07:02	TG	Thyroid	7849
ATFHQTLLK	HLA-A30:01	KIRREL2	Pancreas	3369	RPLPFLTPF	HLA-B07:02	TG	Thyroid	7850
ETKDPTNGY	HLA-A30:01	KIRREL2	Pancreas	3370	QPRACQRPQL	HLA-B07:02	TG	Thyroid	7851
MVPPCRLYR	HLA-A33:03	KIRREL2	Pancreas	3371	RPASPTEAGL	HLA-B07:02	TG	Thyroid	7852
FSRSFNCSAR	HLA-A33:03	KIRREL2	Pancreas	3372	APENYGHGSL	HLA-B07:02	TG	Thyroid	7853
DASFSCAWR	HLA-A33:03	KIRREL2	Pancreas	3373	FPSRGLARLAL	HLA-B07:02	TG	Thyroid	7854
CFRGRAGWSR	HLA-A33:03	KIRREL2	Pancreas	3374	SPRVARFAT	HLA-B07:02	TG	Thyroid	7855
ETFPAPESR	HLA-A33:03	KIRREL2	Pancreas	3375	GPRPSRASC	HLA-B07:02	TG	Thyroid	7856
EVSNAVGSANR	HLA-A33:03	KIRREL2	Pancreas	3376	RPQPRENILL	HLA-B07:02	TG	Thyroid	7857
SFNCSARNR	HLA-A33:03	KIRREL2	Pancreas	3377	RPLPFLTPFSSL	HLA-B07:02	TG	Thyroid	7858
EDAGDYVCR	HLA-A33:03	KIRREL2	Pancreas	3378	FPSRGLARL	HLA-B07:02	TG	Thyroid	7859
APAFLRGPA	HLA-B07:02	KIRREL2	Pancreas	3379	APVAVRSKV	HLA-B07:02	TG	Thyroid	7860
HPRAFTSYI	HLA-B07:02	KIRREL2	Pancreas	3380	VPISTHGRL	HLA-B07:02	TG	Thyroid	7861
FPAPESRGGL	HLA-B07:02	KIRREL2	Pancreas	3381	LPFLTPFSSL	HLA-B07:02	TG	Thyroid	7862
APAFLRGPARL	HLA-B07:02	KIRREL2	Pancreas	3382	YPAYEGQFSL	HLA-B07:02	TG	Thyroid	7863
SPLGPPGTPTF	HLA-B07:02	KIRREL2	Pancreas	3383	KPMSLDSWQSL	HLA-B07:02	TG	Thyroid	7864
SPDSRVTSF	HLA-B07:02	KIRREL2	Pancreas	3384	APNASVLVF	HLA-B07:02	TG	Thyroid	7865
APQVLGGPSV	HLA-B07:02	KIRREL2	Pancreas	3385	SPDDSAGASAL	HLA-B07:02	TG	Thyroid	7866
VPPEAPQVL	HLA-B07:02	KIRREL2	Pancreas	3386	APSFCPLVVL	HLA-B07:02	TG	Thyroid	7867
MLRMRVPAL	HLA-B08:01	KIRREL2	Pancreas	3387	IYRKPGISL	HLA-B07:02	TG	Thyroid	7868
MLRMRVPALL	HLA-B08:01	KIRREL2	Pancreas	3388	WPAIDGSFL	HLA-B07:02	TG	Thyroid	7869
MLRMRVPALLVL	HLA-B08:01	KIRREL2	Pancreas	3389	YPSLQDVPL	HLA-B07:02	TG	Thyroid	7870
FVCRARSQAL	HLA-B08:01	KIRREL2	Pancreas	3390	IPVASLPDL	HLA-B07:02	TG	Thyroid	7871
DLHIRPVEL	HLA-B08:01	KIRREL2	Pancreas	3391	SPTEAGLTTEL	HLA-B07:02	TG	Thyroid	7872
YYKVRGVSV	HLA-B08:01	KIRREL2	Pancreas	3392	ILQRRFLAV	HLA-B08:01	TG	Thyroid	7873
TSYIKPTSF	HLA-B08:01	KIRREL2	Pancreas	3393	SAMRHLYLL	HLA-B08:01	TG	Thyroid	7874
YDFNPHLGMV	HLA-B13:02	KIRREL2	Pancreas	3394	FLRTVQAL	HLA-B08:01	TG	Thyroid	7875
RDLLPTVRI	HLA-B13:02	KIRREL2	Pancreas	3395	LMMQKFEKV	HLA-B08:01	TG	Thyroid	7876
ADASFLTEPV	HLA-B13:02	KIRREL2	Pancreas	3396	RILQRRFLAV	HLA-B08:01	TG	Thyroid	7877
RDLLPTVRIV	HLA-B13:02	KIRREL2	Pancreas	3397	YRILQRRFLAV	HLA-B08:01	TG	Thyroid	7878
CQATAQPPV	HLA-B13:02	KIRREL2	Pancreas	3398	LQRRFLAV	HLA-B08:01	TG	Thyroid	7879
GQHDLHIRP	HLA-B13:02	KIRREL2	Pancreas	3399	SAMRHLYL	HLA-B08:01	TG	Thyroid	7880
GQHDLHIRPV	HLA-B13:02	KIRREL2	Pancreas	3400	KQRARMQSL	HLA-B08:01	TG	Thyroid	7881
GLISVLHI	HLA-B13:02	KIRREL2	Pancreas	3401	YQRRRFSPDDSA	HLA-B08:01	TG	Thyroid	7882
LQYPPEVTL	HLA-B13:02	KIRREL2	Pancreas	3402	SQLFRRAVL	HLA-B08:01	TG	Thyroid	7883
FSHDDGATF	HLA-B46:01	KIRREL2	Pancreas	3403	CLRQKPANVL	HLA-B08:01	TG	Thyroid	7884
FASPAPDAV	HLA-B46:01	KIRREL2	Pancreas	3404	MPKALFRKKVIL	HLA-B08:01	TG	Thyroid	7885

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FTSYIKPTSF	HLA-B46:01	KIRREL2	Pancreas	3405	HLMQKFEKV	HLA-B08:01	TG	Thyroid	7886
AAATTTLLM	HLA-B46:01	KIRREL2	Pancreas	3406	QLFRRAVL	HLA-B08:01	TG	Thyroid	7887
TSYIKPTSF	HLA-B46:01	KIRREL2	Pancreas	3407	CLRQKPANV	HLA-B08:01	TG	Thyroid	7888
TAQPPVTGY	HLA-B46:01	KIRREL2	Pancreas	3408	ALFRKKKVIL	HLA-B08:01	TG	Thyroid	7889
YAAFPTPSH	HLA-B46:01	KIRREL2	Pancreas	3409	EAKLRVLQF	HLA-B08:01	TG	Thyroid	7890
VAAATTTLL	HLA-C01:02	KIRREL2	Pancreas	3410	ECQWREHSL	HLA-B08:01	TG	Thyroid	7891
FLPPPSPL	HLA-C01:02	KIRREL2	Pancreas	3411	DLLGRFTDL	HLA-B08:01	TG	Thyroid	7892
RVPALLVLL	HLA-C01:02	KIRREL2	Pancreas	3412	GWYQKPMSL	HLA-B08:01	TG	Thyroid	7893
NAPPVVTAL	HLA-C01:02	KIRREL2	Pancreas	3413	ALKFLASL	HLA-B08:01	TG	Thyroid	7894
EAPGGGLFL	HLA-C01:02	KIRREL2	Pancreas	3414	DAQTKLLAV	HLA-B08:01	TG	Thyroid	7895
RGPARLQCL	HLA-C01:02	KIRREL2	Pancreas	3415	SLEEKSLSL	HLA-B08:01	TG	Thyroid	7896
VAAATTTLL	HLA-C03:04	KIRREL2	Pancreas	3416	DPSIRHFDV	HLA-B08:01	TG	Thyroid	7897
FASPAPDAV	HLA-C03:04	KIRREL2	Pancreas	3417	EACLITTL	HLA-B08:01	TG	Thyroid	7898
FSHDDGATF	HLA-C03:04	KIRREL2	Pancreas	3418	YRKPGISL	HLA-B08:01	TG	Thyroid	7899
AAATTTLLM	HLA-C03:04	KIRREL2	Pancreas	3419	CASERQQAL	HLA-B08:01	TG	Thyroid	7900
NAPPVVTAL	HLA-C03:04	KIRREL2	Pancreas	3420	GLINRAKAV	HLA-B08:01	TG	Thyroid	7901
LQYPPEVTL	HLA-C03:04	KIRREL2	Pancreas	3421	DLTPAKLL	HLA-B08:01	TG	Thyroid	7902
YAAFPTPSH	HLA-C03:04	KIRREL2	Pancreas	3422	TDMMIFDLV	HLA-B13:02	TG	Thyroid	7903
FYDFNPHLGM	HLA-C04:01	KIRREL2	Pancreas	3423	RDYFHCPI	HLA-B13:02	TG	Thyroid	7904
SHDDGATFV	HLA-C04:01	KIRREL2	Pancreas	3424	RDYFHCPII	HLA-B13:02	TG	Thyroid	7905
FYDFNPHL	HLA-C04:01	KIRREL2	Pancreas	3425	LEIFTLLASI	HLA-B13:02	TG	Thyroid	7906
FYDFNPHLG	HLA-C04:01	KIRREL2	Pancreas	3426	CDAFGSWEPV	HLA-B13:02	TG	Thyroid	7907
QYPPEVTL	HLA-C04:01	KIRREL2	Pancreas	3427	SEQAFLRTV	HLA-B13:02	TG	Thyroid	7908
LRMRVPALL	HLA-C07:01	KIRREL2	Pancreas	3428	TTDMMIFDLV	HLA-B13:02	TG	Thyroid	7909
MRVPALLVL	HLA-C07:01	KIRREL2	Pancreas	3429	LEPYLFWQI	HLA-B13:02	TG	Thyroid	7910
MLRMRVPALL	HLA-C07:01	KIRREL2	Pancreas	3430	YEASVPSVPI	HLA-B13:02	TG	Thyroid	7911
TRRGGAQVL	HLA-C07:01	KIRREL2	Pancreas	3431	ADLLQTFQV	HLA-B13:02	TG	Thyroid	7912
RRGGAQVL	HLA-C07:01	KIRREL2	Pancreas	3432	CTEDEACSFFTV	HLA-B13:02	TG	Thyroid	7913
DRGPIVHTD	HLA-C07:01	KIRREL2	Pancreas	3433	FDLRNCWCV	HLA-B13:02	TG	Thyroid	7914
SRPAQLHVL	HLA-C07:01	KIRREL2	Pancreas	3434	LELPEFLLFL	HLA-B13:02	TG	Thyroid	7915
LRMRVPALL	HLA-C07:02	KIRREL2	Pancreas	3435	VQFALGLPF	HLA-B13:02	TG	Thyroid	7916
MRVPALLVL	HLA-C07:02	KIRREL2	Pancreas	3436	RDLCCDGFV	HLA-B13:02	TG	Thyroid	7917
SRPAQLHVL	HLA-C07:02	KIRREL2	Pancreas	3437	DEACSFFTV	HLA-B13:02	TG	Thyroid	7918
LYRARAGYL	HLA-C07:02	KIRREL2	Pancreas	3438	SQYPSLQDV	HLA-B13:02	TG	Thyroid	7919
QYPPEVTL	HLA-C07:02	KIRREL2	Pancreas	3439	ALTWVQTHI	HLA-B13:02	TG	Thyroid	7920
NAPPVVTAL	HLA-C07:02	KIRREL2	Pancreas	3440	AQCPSLCNV	HLA-B13:02	TG	Thyroid	7921
LSNDMCARAY	HLA-A01:01	KLK2	Prostate	3441	GQYRASQKD	HLA-B13:02	TG	Thyroid	7922
HSQPWQVAVY	HLA-A01:01	KLK2	Prostate	3442	GQWRQVQCN	HLA-B13:02	TG	Thyroid	7923
YSEKVTEFM	HLA-A01:01	KLK2	Prostate	3443	NLFGGKFLV	HLA-B13:02	TG	Thyroid	7924
STCLLGTCY	HLA-A01:01	KLK2	Prostate	3444	SQTHLMQKF	HLA-B13:02	TG	Thyroid	7925
LSTCLLGTCY	HLA-A01:01	KLK2	Prostate	3445	RQSRAPQAL	HLA-B13:02	TG	Thyroid	7926
DTCGVSHPY	HLA-A01:01	KLK2	Prostate	3446	KQVDQFLGV	HLA-B13:02	TG	Thyroid	7927
LLSNDMCARAY	HLA-A01:01	KLK2	Prostate	3447	RLLGRSQAI	HLA-B13:02	TG	Thyroid	7928

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
HLLSNDMCARAY	HLA-A01:01	KLK2	Prostate	3448	EQTPERLFV	HLA-B13:02	TG	Thyroid	7929
SNDMCARAY	HLA-A01:01	KLK2	Prostate	3449	GQQDVFPVL	HLA-B13:02	TG	Thyroid	7930
ITDVVKVLG	HLA-A01:01	KLK2	Prostate	3450	VQCDVQQV	HLA-B13:02	TG	Thyroid	7931
YSEKVTEF	HLA-A01:01	KLK2	Prostate	3451	GQFSLEEKS	HLA-B13:02	TG	Thyroid	7932
ITDVVKVLGL	HLA-A01:01	KLK2	Prostate	3452	LAAQSTLSF	HLA-B46:01	TG	Thyroid	7933
YSEKVTEFMLC	HLA-A01:01	KLK2	Prostate	3453	FMYHAPENY	HLA-B46:01	TG	Thyroid	7934
YSEKVTEFML	HLA-A01:01	KLK2	Prostate	3454	WTSDNVACM	HLA-B46:01	TG	Thyroid	7935
ITDVVKVL	HLA-A01:01	KLK2	Prostate	3455	YINSTDTSY	HLA-B46:01	TG	Thyroid	7936
SLQCVSLHL	HLA-A02:01	KLK2	Prostate	3456	FSLFIQSLY	HLA-B46:01	TG	Thyroid	7937
LVLSIALSV	HLA-A02:01	KLK2	Prostate	3457	FTATSFGHPY	HLA-B46:01	TG	Thyroid	7938
VILGVHLSV	HLA-A02:01	KLK2	Prostate	3458	MIFDLVHSY	HLA-B46:01	TG	Thyroid	7939
VLAPQESSV	HLA-A02:01	KLK2	Prostate	3459	LAKEVSCPM	HLA-B46:01	TG	Thyroid	7940
FMLCAGLWTG	HLA-A02:01	KLK2	Prostate	3460	LAVSGPFHY	HLA-B46:01	TG	Thyroid	7941
ILGVHLSVMV	HLA-A02:01	KLK2	Prostate	3461	FQNMLSGLY	HLA-B46:01	TG	Thyroid	7942
SLLCTPRWCI	HLA-A02:01	KLK2	Prostate	3462	AASGNFSLF	HLA-B46:01	TG	Thyroid	7943
FMLCAGLWT	HLA-A02:01	KLK2	Prostate	3463	FAGLDLPSTF	HLA-B46:01	TG	Thyroid	7944
SLQCVSLHLL	HLA-A02:01	KLK2	Prostate	3464	VQFALGLPF	HLA-B46:01	TG	Thyroid	7945
VLSTCLLGTCYV	HLA-A02:01	KLK2	Prostate	3465	YLLCPFPPM	HLA-B46:01	TG	Thyroid	7946
HLSVMVCFKV	HLA-A02:01	KLK2	Prostate	3466	LAAQSTLSFY	HLA-B46:01	TG	Thyroid	7947
LLGTCYVTSI	HLA-A02:01	KLK2	Prostate	3467	FGFLNVSQL	HLA-B46:01	TG	Thyroid	7948
GLWTGGKDTCGV	HLA-A02:01	KLK2	Prostate	3468	HSTDDYASF	HLA-B46:01	TG	Thyroid	7949
MWDLVLSI	HLA-A02:01	KLK2	Prostate	3469	RSKVPDSEF	HLA-B46:01	TG	Thyroid	7950
FLRPRSLQCV	HLA-A02:01	KLK2	Prostate	3470	SSRFPLGESF	HLA-B46:01	TG	Thyroid	7951
RVILGVHLSV	HLA-A02:01	KLK2	Prostate	3471	NLIVVTASY	HLA-B46:01	TG	Thyroid	7952
ALSVGCTGI	HLA-A02:01	KLK2	Prostate	3472	PLFPPREAF	HLA-B46:01	TG	Thyroid	7953
RSLQCVSLHL	HLA-A02:01	KLK2	Prostate	3473	AARAPGACF	HLA-B46:01	TG	Thyroid	7954
ALSVGCTGAV	HLA-A02:01	KLK2	Prostate	3474	VSLDSWQSL	HLA-B46:01	TG	Thyroid	7955
CLLGTCYV	HLA-A02:01	KLK2	Prostate	3475	RLYFGTSGY	HLA-B46:01	TG	Thyroid	7956
VLSTCLLGT	HLA-A02:01	KLK2	Prostate	3476	SRFPLGESF	HLA-B46:01	TG	Thyroid	7957
LLSNDMCARA	HLA-A02:01	KLK2	Prostate	3477	NATCPGVTY	HLA-B46:01	TG	Thyroid	7958
WLRVILGVHLSV	HLA-A02:01	KLK2	Prostate	3478	KLLVKIMSY	HLA-B46:01	TG	Thyroid	7959
KVTEFMLCA	HLA-A02:01	KLK2	Prostate	3479	QAIPGTRSA	HLA-B46:01	TG	Thyroid	7960
CLLGTCYVT	HLA-A02:01	KLK2	Prostate	3480	ILRLGDQEF	HLA-B46:01	TG	Thyroid	7961
SVCEPPSPV	HLA-A02:01	KLK2	Prostate	3481	MLPGLTTEL	HLA-C01:02	TG	Thyroid	7962
MLCAGLWTG	HLA-A02:01	KLK2	Prostate	3482	FTNFQQVYL	HLA-C01:02	TG	Thyroid	7963
DLVLSIALSV	HLA-A02:01	KLK2	Prostate	3483	ILPQMPKAL	HLA-C01:02	TG	Thyroid	7964
LLGTCYVTSIAV	HLA-A02:01	KLK2	Prostate	3484	SAMRHLYLL	HLA-C01:02	TG	Thyroid	7965
GLPTQEPAL	HLA-A02:01	KLK2	Prostate	3485	LLSSPSVLL	HLA-C01:02	TG	Thyroid	7966
ALPEKPAV	HLA-A02:01	KLK2	Prostate	3486	LLADVQFAL	HLA-C01:02	TG	Thyroid	7967
RLSEPAKITDV	HLA-A02:01	KLK2	Prostate	3487	ASLYFTCTL	HLA-C01:02	TG	Thyroid	7968
AKITDVVKV	HLA-A02:01	KLK2	Prostate	3488	SLEEKSLSL	HLA-C01:02	TG	Thyroid	7969
ALPEKPAVYT	HLA-A02:01	KLK2	Prostate	3489	YLLCPFPPM	HLA-C01:02	TG	Thyroid	7970

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KITDVVKV	HLA-A02:01	KLK2	Prostate	3490	CSAMRHLYL	HLA-C01:02	TG	Thyroid	7971
KITDVVKVL	HLA-A02:01	KLK2	Prostate	3491	RAQQQAIAL	HLA-C01:02	TG	Thyroid	7972
ALPEKPAVY	HLA-A02:01	KLK2	Prostate	3492	FATSCPPTI	HLA-C01:02	TG	Thyroid	7973
AWLRVILGV	HLA-A02:01	KLK2	Prostate	3493	FGFLNVSQL	HLA-C01:02	TG	Thyroid	7974
STGDHLLRL	HLA-A02:01	KLK2	Prostate	3494	FSAVRDLCL	HLA-C01:02	TG	Thyroid	7975
HLLSNDMCA	HLA-A02:01	KLK2	Prostate	3495	AAATWYYSL	HLA-C01:02	TG	Thyroid	7976
SLLKHQSL	HLA-A02:01	KLK2	Prostate	3496	SCPPTIKEL	HLA-C01:02	TG	Thyroid	7977
ALSVGCTGA	HLA-A02:01	KLK2	Prostate	3497	VAPNASYL	HLA-C01:02	TG	Thyroid	7978
RLSEPAKI	HLA-A02:01	KLK2	Prostate	3498	AIPGTRSAI	HLA-C01:02	TG	Thyroid	7979
ALSHVPCL	HLA-A02:01	KLK2	Prostate	3499	NAPSFCPL	HLA-C01:02	TG	Thyroid	7980
FLRPRSLQC	HLA-A02:01	KLK2	Prostate	3500	NAPVAVRSK	HLA-C01:02	TG	Thyroid	7981
NLFEPEDTG	HLA-A02:01	KLK2	Prostate	3501	SGPTGSAM	HLA-C01:02	TG	Thyroid	7982
HPLYNMSLLK	HLA-A03:01	KLK2	Prostate	3502	VDPASGEEL	HLA-C01:02	TG	Thyroid	7983
ALSHVPCLK	HLA-A03:01	KLK2	Prostate	3503	AQPLRPCEL	HLA-C01:02	TG	Thyroid	7984
PLYNMSLLK	HLA-A03:01	KLK2	Prostate	3504	ELPEFLLFL	HLA-C01:02	TG	Thyroid	7985
FPHPLYNMSLLK	HLA-A03:01	KLK2	Prostate	3505	VSPGYVPAC	HLA-C01:02	TG	Thyroid	7986
HLSVMVCFK	HLA-A03:01	KLK2	Prostate	3506	FEPTGFQNM	HLA-C01:02	TG	Thyroid	7987
PHPLYNMSLLK	HLA-A03:01	KLK2	Prostate	3507	FSPDDSAGASAL	HLA-C01:02	TG	Thyroid	7988
VHLSVMVCFK	HLA-A03:01	KLK2	Prostate	3508	FIPGSLTAR	HLA-C01:02	TG	Thyroid	7989
MLLRLSEPAK	HLA-A03:01	KLK2	Prostate	3509	FATSCPPTI	HLA-C03:04	TG	Thyroid	7990
GALSHVPCLK	HLA-A03:01	KLK2	Prostate	3510	WSVFPPGPL	HLA-C03:04	TG	Thyroid	7991
AVYTKVVHY	HLA-A03:01	KLK2	Prostate	3511	LAAQSTLSF	HLA-C03:04	TG	Thyroid	7992
AVYSHGWAH	HLA-A03:01	KLK2	Prostate	3512	MSLDSWQSL	HLA-C03:04	TG	Thyroid	7993
AVYTKVVHYR	HLA-A03:01	KLK2	Prostate	3513	FGFLNVSQL	HLA-C03:04	TG	Thyroid	7994
ALPEKPAVY	HLA-A03:01	KLK2	Prostate	3514	AATSNFSAV	HLA-C03:04	TG	Thyroid	7995
AVYTKVVHYRK	HLA-A03:01	KLK2	Prostate	3515	SALSPAAVI	HLA-C03:04	TG	Thyroid	7996
AVDGAGQKK	HLA-A03:01	KLK2	Prostate	3516	YLLCPFPPM	HLA-C03:04	TG	Thyroid	7997
HPLYNMSLLK	HLA-A11:01	KLK2	Prostate	3517	YPAYEGQFSL	HLA-C03:04	TG	Thyroid	7998
AVYTKVVHYR	HLA-A11:01	KLK2	Prostate	3518	LAKEVSCPM	HLA-C03:04	TG	Thyroid	7999
ALSHVPCLK	HLA-A11:01	KLK2	Prostate	3519	AAATWYYSL	HLA-C03:04	TG	Thyroid	8000
HLSVMVCFK	HLA-A11:01	KLK2	Prostate	3520	SAMRHLYLL	HLA-C03:04	TG	Thyroid	8001
GALSHVPCLK	HLA-A11:01	KLK2	Prostate	3521	ISGPTGSAM	HLA-C03:04	TG	Thyroid	8002
PLYNMSLLK	HLA-A11:01	KLK2	Prostate	3522	WTSDNVACM	HLA-C03:04	TG	Thyroid	8003
AVYTKVVHY	HLA-A11:01	KLK2	Prostate	3523	AAVGNLIVV	HLA-C03:04	TG	Thyroid	8004
VHLSVMVCFK	HLA-A11:01	KLK2	Prostate	3524	CADSQGREL	HLA-C03:04	TG	Thyroid	8005
VTSIAVDPGK	HLA-A11:01	KLK2	Prostate	3525	YAAPPLAER	HLA-C03:04	TG	Thyroid	8006
AVYTKVVHYRK	HLA-A11:01	KLK2	Prostate	3526	FIICPIIDM	HLA-C03:04	TG	Thyroid	8007
AVDGAGQKK	HLA-A11:01	KLK2	Prostate	3527	FATPWPDFV	HLA-C03:04	TG	Thyroid	8008
ASTGDHLLR	HLA-A11:01	KLK2	Prostate	3528	CASERQQAL	HLA-C03:04	TG	Thyroid	8009
SVGCTGIAR	HLA-A11:01	KLK2	Prostate	3529	YASFSRAL	HLA-C03:04	TG	Thyroid	8010
GSIEPEEFLR	HLA-A11:01	KLK2	Prostate	3530	RAIFPSRGL	HLA-C03:04	TG	Thyroid	8011
AVYSHGWAH	HLA-A11:01	KLK2	Prostate	3531	PAYEGQFSL	HLA-C03:04	TG	Thyroid	8012
SIEPEEFLR	HLA-A11:01	KLK2	Prostate	3532	LAETGLFL	HLA-C03:04	TG	Thyroid	8013

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
VWLGRHNLF	HLA-A24:02	KLK2	Prostate	3533	FSLFIQSL	HLA-C03:04	TG	Thyroid	8014
AYSEKVTEF	HLA-A24:02	KLK2	Prostate	3534	FLTPFSSL	HLA-C03:04	TG	Thyroid	8015
RAYSEKVTEF	HLA-A24:02	KLK2	Prostate	3535	YADTQSCTHSL	HLA-C03:04	TG	Thyroid	8016
QVWLGRHNLF	HLA-A24:02	KLK2	Prostate	3536	FSAVRDLCL	HLA-C03:04	TG	Thyroid	8017
SFPHPLYNM	HLA-A24:02	KLK2	Prostate	3537	FTNFQQVYL	HLA-C03:04	TG	Thyroid	8018
EFMLCAGLW	HLA-A24:02	KLK2	Prostate	3538	IYDTIFAGL	HLA-C04:01	TG	Thyroid	8019
TEFMLCAGLW	HLA-A24:02	KLK2	Prostate	3539	RFPDAFVTF	HLA-C04:01	TG	Thyroid	8020
VYTKVVHYRKWI	HLA-A24:02	KLK2	Prostate	3540	SYSDFSTPL	HLA-C04:01	TG	Thyroid	8021
VYTKVVHYRKW	HLA-A24:02	KLK2	Prostate	3541	FYQALQNSL	HLA-C04:01	TG	Thyroid	8022
VYTKVVHYR	HLA-A24:02	KLK2	Prostate	3542	FYQEQAGSL	HLA-C04:01	TG	Thyroid	8023
VYSHGWAHC	HLA-A24:02	KLK2	Prostate	3543	TFPAETIRF	HLA-C04:01	TG	Thyroid	8024
QRVPVSHSF	HLA-A24:02	KLK2	Prostate	3544	RFPLGESFL	HLA-C04:01	TG	Thyroid	8025
SWGPEPCAL	HLA-A24:02	KLK2	Prostate	3545	SQPAGSTLF	HLA-C04:01	TG	Thyroid	8026
VHLSVMVCF	HLA-A24:02	KLK2	Prostate	3546	GQDSPAVYL	HLA-C04:01	TG	Thyroid	8027
RTRGVLAPQ	HLA-A30:01	KLK2	Prostate	3547	YREAASGNF	HLA-C04:01	TG	Thyroid	8028
KTQARGSLS	HLA-A30:01	KLK2	Prostate	3548	LQDVPLAAL	HLA-C04:01	TG	Thyroid	8029
KTQARGSLSA	HLA-A30:01	KLK2	Prostate	3549	FYPAYEGQF	HLA-C04:01	TG	Thyroid	8030
RTRGVLAPQE	HLA-A30:01	KLK2	Prostate	3550	SYNRFPDAF	HLA-C04:01	TG	Thyroid	8031
RTRGVLAPQESS	HLA-A30:01	KLK2	Prostate	3551	MLPGLTTEL	HLA-C04:01	TG	Thyroid	8032
RTRGVLAPQES	HLA-A30:01	KLK2	Prostate	3552	TEDEACSFF	HLA-C04:01	TG	Thyroid	8033
RTRGVLAP	HLA-A30:01	KLK2	Prostate	3553	IFDANAPVAV	HLA-C04:01	TG	Thyroid	8034
LLRLSEPAK	HLA-A30:01	KLK2	Prostate	3554	HFDVAHVST	HLA-C04:01	TG	Thyroid	8035
GSRTPSQPT	HLA-A30:01	KLK2	Prostate	3555	VVDPSIRHF	HLA-C04:01	TG	Thyroid	8036
AVYTKVVHY	HLA-A30:01	KLK2	Prostate	3556	IFDLVHSYN	HLA-C04:01	TG	Thyroid	8037
KITDVVKVL	HLA-A30:01	KLK2	Prostate	3557	IFDLVHSY	HLA-C04:01	TG	Thyroid	8038
AVDGAGQKK	HLA-A30:01	KLK2	Prostate	3558	CVDEAGQEL	HLA-C04:01	TG	Thyroid	8039
LVLSIALSV	HLA-A30:01	KLK2	Prostate	3559	HFDVAHVSTA	HLA-C04:01	TG	Thyroid	8040
SVCEPPSPV	HLA-A30:01	KLK2	Prostate	3560	SFCPLVVL	HLA-C04:01	TG	Thyroid	8041
RVILGVHLSV	HLA-A30:01	KLK2	Prostate	3561	TYDQESHQV	HLA-C04:01	TG	Thyroid	8042
VILGVHLSV	HLA-A30:01	KLK2	Prostate	3562	GQDLTPAKL	HLA-C04:01	TG	Thyroid	8043
TSIAVDPGK	HLA-A30:01	KLK2	Prostate	3563	HFDLRNCWC	HLA-C04:01	TG	Thyroid	8044
VYTKVVHYR	HLA-A33:03	KLK2	Prostate	3564	YRKPGISLL	HLA-C07:01	TG	Thyroid	8045
MSLLKHQSLR	HLA-A33:03	KLK2	Prostate	3565	YRILQRRFL	HLA-C07:01	TG	Thyroid	8046
AVYTKVVHYR	HLA-A33:03	KLK2	Prostate	3566	RRFLAVQSV	HLA-C07:01	TG	Thyroid	8047
CLKSLLCTPR	HLA-A33:03	KLK2	Prostate	3567	TRLPFQKLM	HLA-C07:01	TG	Thyroid	8048
SLLKHQSLR	HLA-A33:03	KLK2	Prostate	3568	YRVGVFGFL	HLA-C07:01	TG	Thyroid	8049
LSATASHTR	HLA-A33:03	KLK2	Prostate	3569	SRFPLGESF	HLA-C07:01	TG	Thyroid	8050
NMSLLKHQSLR	HLA-A33:03	KLK2	Prostate	3570	LREPPARAL	HLA-C07:01	TG	Thyroid	8051
SVGCTGIAR	HLA-A33:03	KLK2	Prostate	3571	WREHSLRPL	HLA-C07:01	TG	Thyroid	8052
YNMSLLKHQSLR	HLA-A33:03	KLK2	Prostate	3572	RRFQAPEPL	HLA-C07:01	TG	Thyroid	8053
EPEEFLRPR	HLA-A33:03	KLK2	Prostate	3573	CRQGSWSVF	HLA-C07:01	TG	Thyroid	8054
GAVPLIQSR	HLA-A33:03	KLK2	Prostate	3574	LRQKPANVL	HLA-C07:01	TG	Thyroid	8055
STGDHLLRLR	HLA-A33:03	KLK2	Prostate	3575	YTRLPFQKLM	HLA-C07:01	TG	Thyroid	8056

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SIEPEEFLR	HLA-A33:03	KLK2	Prostate	3576	YREAASGNF	HLA-C07:01	TG	Thyroid	8057
TGDHLLRLR	HLA-A33:03	KLK2	Prostate	3577	ARATNSQLF	HLA-C07:01	TG	Thyroid	8058
RPRSLQCVSL	HLA-B07:02	KLK2	Prostate	3578	SRFPLGESFL	HLA-C07:01	TG	Thyroid	8059
RPRSLQCVSLHL	HLA-B07:02	KLK2	Prostate	3579	QRARMQSLM	HLA-C07:01	TG	Thyroid	8060
FPHPLYNMSL	HLA-B07:02	KLK2	Prostate	3580	RRFPEVSGY	HLA-C07:01	TG	Thyroid	8061
KPAVYTKVV	HLA-B07:02	KLK2	Prostate	3581	ARGNVFMY	HLA-C07:01	TG	Thyroid	8062
SPIPVLSTCL	HLA-B07:02	KLK2	Prostate	3582	RNPNYPYEF	HLA-C07:01	TG	Thyroid	8063
HPLYNMSLL	HLA-B07:02	KLK2	Prostate	3583	CNGPPEQVF	HLA-C07:01	TG	Thyroid	8064
HPQWVLTAAHCL	HLA-B07:02	KLK2	Prostate	3584	SCPPTIKEL	HLA-C07:01	TG	Thyroid	8065
LRPRSLQCVSL	HLA-B07:02	KLK2	Prostate	3585	GRNPNYPYEF	HLA-C07:01	TG	Thyroid	8066
RPRSLQCVS	HLA-B07:02	KLK2	Prostate	3586	RARGNVFMY	HLA-C07:01	TG	Thyroid	8067
SPIPVLSTC	HLA-B07:02	KLK2	Prostate	3587	RNGDYQAVQ	HLA-C07:01	TG	Thyroid	8068
IPVLSTCLL	HLA-B07:02	KLK2	Prostate	3588	KRSLWVEVD	HLA-C07:01	TG	Thyroid	8069
SPIPVLSTCLL	HLA-B07:02	KLK2	Prostate	3589	RRFPEVSG	HLA-C07:01	TG	Thyroid	8070
GPAHPGAST	HLA-B07:02	KLK2	Prostate	3590	TRDYFHCP	HLA-C07:01	TG	Thyroid	8071
TPSQPTPEC	HLA-B07:02	KLK2	Prostate	3591	MIFDLVHSY	HLA-C07:01	TG	Thyroid	8072
FLRPRSLQCVSL	HLA-B08:01	KLK2	Prostate	3592	RRVSPGYVP	HLA-C07:01	TG	Thyroid	8073
MSLLKHQSL	HLA-B08:01	KLK2	Prostate	3593	YRKPGISLL	HLA-C07:02	TG	Thyroid	8074
NMSLLKHQSL	HLA-B08:01	KLK2	Prostate	3594	YRILQRRFL	HLA-C07:02	TG	Thyroid	8075
FLRPRSLQCV	HLA-B08:01	KLK2	Prostate	3595	SYSDFSTPL	HLA-C07:02	TG	Thyroid	8076
FLRPRSLQC	HLA-B08:01	KLK2	Prostate	3596	FYQALQNSL	HLA-C07:02	TG	Thyroid	8077
SLLKHQSL	HLA-B08:01	KLK2	Prostate	3597	FYQEQAGSL	HLA-C07:02	TG	Thyroid	8078
FPHPLYNMSL	HLA-B08:01	KLK2	Prostate	3598	YRVGVFGFL	HLA-C07:02	TG	Thyroid	8079
ILGVHLSVM	HLA-B08:01	KLK2	Prostate	3599	TRLPFQKLM	HLA-C07:02	TG	Thyroid	8080
YNMSLLKHQSL	HLA-B08:01	KLK2	Prostate	3600	ARATNSQLF	HLA-C07:02	TG	Thyroid	8081
CFKVSHHGAL	HLA-B08:01	KLK2	Prostate	3601	LYFGTSGYF	HLA-C07:02	TG	Thyroid	8082
EEFLRPRSL	HLA-B08:01	KLK2	Prostate	3602	RRFLAVQSV	HLA-C07:02	TG	Thyroid	8083
DLVLSIAL	HLA-B08:01	KLK2	Prostate	3603	SRFPLGESF	HLA-C07:02	TG	Thyroid	8084
HPLYNMSL	HLA-B08:01	KLK2	Prostate	3604	CRQGSWSVF	HLA-C07:02	TG	Thyroid	8085
VPCLKSLL	HLA-B08:01	KLK2	Prostate	3605	FWSKYISSL	HLA-C07:02	TG	Thyroid	8086
EPAKITDV	HLA-B08:01	KLK2	Prostate	3606	RRFQAPEPL	HLA-C07:02	TG	Thyroid	8087
DVVKVLGL	HLA-B08:01	KLK2	Prostate	3607	SYNRFPDAF	HLA-C07:02	TG	Thyroid	8088
HVPCLKSL	HLA-B08:01	KLK2	Prostate	3608	FYPAYEGQF	HLA-C07:02	TG	Thyroid	8089
RAWLRVILGV	HLA-B13:02	KLK2	Prostate	3609	GRNPNYPYEF	HLA-C07:02	TG	Thyroid	8090
TEFMLCAGL	HLA-B13:02	KLK2	Prostate	3610	YRKPGISL	HLA-C07:02	TG	Thyroid	8091
MWDLVLSIAL	HLA-B13:02	KLK2	Prostate	3611	NRFPDAFVTF	HLA-C07:02	TG	Thyroid	8092
TEFMLCAGLW	HLA-B13:02	KLK2	Prostate	3612	ARGNVFMY	HLA-C07:02	TG	Thyroid	8093
WDLVLSIAL	HLA-B13:02	KLK2	Prostate	3613	RRFPEVSGY	HLA-C07:02	TG	Thyroid	8094
KDRAWLRVI	HLA-B13:02	KLK2	Prostate	3614	RNPNYPYEF	HLA-C07:02	TG	Thyroid	8095
WAHCGGVLV	HLA-B13:02	KLK2	Prostate	3615	ARVEAAATWY	HLA-C07:02	TG	Thyroid	8096
WDLVLSIALSV	HLA-B13:02	KLK2	Prostate	3616	NYKEFSELL	HLA-C07:02	TG	Thyroid	8097
LSVMVCFKV	HLA-B13:02	KLK2	Prostate	3617	NYGHGSLEL	HLA-C07:02	TG	Thyroid	8098
AWLRVILGV	HLA-B13:02	KLK2	Prostate	3618	NRFPDAFVT	HLA-C07:02	TG	Thyroid	8099

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ALSVGCTGI	HLA-B13:02	KLK2	Prostate	3619	ASEVFTSFQY	HLA-A01:01	TGM4	Prostate	8100
KITDVVKV	HLA-B13:02	KLK2	Prostate	3620	WTGDYEGGTAPY	HLA-A01:01	TGM4	Prostate	8101
RLSEPAKI	HLA-B13:02	KLK2	Prostate	3621	MTHDSVWNFH	HLA-A01:01	TGM4	Prostate	8102
GQHRTRGV	HLA-B13:02	KLK2	Prostate	3622	WTGSAPILQQYY	HLA-A01:01	TGM4	Prostate	8103
AKITDVVKV	HLA-B13:02	KLK2	Prostate	3623	GSAPILQQYY	HLA-A01:01	TGM4	Prostate	8104
VILGVHLSV	HLA-B13:02	KLK2	Prostate	3624	WTGSAPILQQY	HLA-A01:01	TGM4	Prostate	8105
HSQPWQVAV	HLA-B13:02	KLK2	Prostate	3625	MASEVFTSFQY	HLA-A01:01	TGM4	Prostate	8106
RAYSEKVTE	HLA-B13:02	KLK2	Prostate	3626	SSPNAILGKY	HLA-A01:01	TGM4	Prostate	8107
HSFPHPLYNM	HLA-B46:01	KLK2	Prostate	3627	GSAPILQQY	HLA-A01:01	TGM4	Prostate	8108
HSQPWQVAVY	HLA-B46:01	KLK2	Prostate	3628	ILNDTGCHY	HLA-A01:01	TGM4	Prostate	8109
LSNDMCARAY	HLA-B46:01	KLK2	Prostate	3629	ILGSFELQLY	HLA-A01:01	TGM4	Prostate	8110
LSVGCTGAV	HLA-B46:01	KLK2	Prostate	3630	VLDPRTPSDHY	HLA-A01:01	TGM4	Prostate	8111
SQPWQVAVY	HLA-B46:01	KLK2	Prostate	3631	DTERNLTVDTY	HLA-A01:01	TGM4	Prostate	8112
RAYSEKVTEF	HLA-B46:01	KLK2	Prostate	3632	VTSSPNAILGKY	HLA-A01:01	TGM4	Prostate	8113
WAHCGGVLV	HLA-B46:01	KLK2	Prostate	3633	KSEENILY	HLA-A01:01	TGM4	Prostate	8114
YSEKVTEFM	HLA-B46:01	KLK2	Prostate	3634	LTDVKFSLE	HLA-A01:01	TGM4	Prostate	8115
LSTCLLGTCY	HLA-B46:01	KLK2	Prostate	3635	VMDHAFLLL	HLA-A01:01	TGM4	Prostate	8116
AVYTKVVHY	HLA-B46:01	KLK2	Prostate	3636	KSEENILYL	HLA-A01:01	TGM4	Prostate	8117
AVYSHGWAH	HLA-B46:01	KLK2	Prostate	3637	FSEVNGDRL	HLA-A01:01	TGM4	Prostate	8118
VSHPYSQHL	HLA-B46:01	KLK2	Prostate	3638	LTDVKFSL	HLA-A01:01	TGM4	Prostate	8119
VSHHGALSH	HLA-B46:01	KLK2	Prostate	3639	ILNDTGCHYV	HLA-A02:01	TGM4	Prostate	8120
ALPEKPAVY	HLA-B46:01	KLK2	Prostate	3640	FQYPEFSIEL	HLA-A02:01	TGM4	Prostate	8121
VSHPYSQH	HLA-B46:01	KLK2	Prostate	3641	ILGKYQLNV	HLA-A02:01	TGM4	Prostate	8122
LARSGWVGT	HLA-B46:01	KLK2	Prostate	3642	LLGNSVNFTV	HLA-A02:01	TGM4	Prostate	8123
HSQPWQVAV	HLA-B46:01	KLK2	Prostate	3643	QVMDHAFLL	HLA-A02:01	TGM4	Prostate	8124
MSLLKHQSL	HLA-C01:02	KLK2	Prostate	3644	VMDHAFLLL	HLA-A02:01	TGM4	Prostate	8125
VSHPYSQHL	HLA-C01:02	KLK2	Prostate	3645	VLDCCISLL	HLA-A02:01	TGM4	Prostate	8126
FPHPLYNMSL	HLA-C01:02	KLK2	Prostate	3646	ILGSFELQL	HLA-A02:01	TGM4	Prostate	8127
HVPCLKSLL	HLA-C01:02	KLK2	Prostate	3647	RQVMDHAFLL	HLA-A02:01	TGM4	Prostate	8128
HSQPWQVAV	HLA-C01:02	KLK2	Prostate	3648	WVFAGILTTV	HLA-A02:01	TGM4	Prostate	8129
WVGTTCLSL	HLA-C01:02	KLK2	Prostate	3649	FIVYDTRFV	HLA-A02:01	TGM4	Prostate	8130
YSEKVTEFM	HLA-C01:02	KLK2	Prostate	3650	MMSFEKGQGV	HLA-A02:01	TGM4	Prostate	8131
STGDHLLRL	HLA-C01:02	KLK2	Prostate	3651	RLIWLVKMV	HLA-A02:01	TGM4	Prostate	8132
ILGVHLSVM	HLA-C01:02	KLK2	Prostate	3652	IPLTDVKFSL	HLA-A02:01	TGM4	Prostate	8133
WGPEPCAL	HLA-C01:02	KLK2	Prostate	3653	VLLGNSVNFTV	HLA-A02:01	TGM4	Prostate	8134
GLPTQEPAL	HLA-C01:02	KLK2	Prostate	3654	YILNDTGCHYV	HLA-A02:01	TGM4	Prostate	8135
HVPCLKSL	HLA-C01:02	KLK2	Prostate	3655	MMDASKELQV	HLA-A02:01	TGM4	Prostate	8136
ALPEKPAV	HLA-C01:02	KLK2	Prostate	3656	KMVNGQEEL	HLA-A02:01	TGM4	Prostate	8137
LAPQESSV	HLA-C01:02	KLK2	Prostate	3657	AILGKYQLNV	HLA-A02:01	TGM4	Prostate	8138
NSPIPVLST	HLA-C01:02	KLK2	Prostate	3658	AMMSFEKGQGV	HLA-A02:01	TGM4	Prostate	8139
ALPEKPAVY	HLA-C01:02	KLK2	Prostate	3659	TLAIPLTDV	HLA-A02:01	TGM4	Prostate	8140
PIPVLSTCL	HLA-C01:02	KLK2	Prostate	3660	IMASEVFTS	HLA-A02:01	TGM4	Prostate	8141
MSLLKHQSL	HLA-C03:04	KLK2	Prostate	3661	SLAILDDEPV	HLA-A02:01	TGM4	Prostate	8142

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LSVGCTGAV	HLA-C03:04	KLK2	Prostate	3662	SMTHDSVWNFHV	HLA-A02:01	TGM4	Prostate	8143
WAHCGGVLV	HLA-C03:04	KLK2	Prostate	3663	GQCWVFAGI	HLA-A02:01	TGM4	Prostate	8144
VSHPYSQHL	HLA-C03:04	KLK2	Prostate	3664	QVMDHAFLLL	HLA-A02:01	TGM4	Prostate	8145
HSQPWQVAV	HLA-C03:04	KLK2	Prostate	3665	ILTTVLRAL	HLA-A02:01	TGM4	Prostate	8146
TASHTRSTI	HLA-C03:04	KLK2	Prostate	3666	FGQCWVFAGI	HLA-A02:01	TGM4	Prostate	8147
HSFPHPLYNM	HLA-C03:04	KLK2	Prostate	3667	DVLLGNSVNFTV	HLA-A02:01	TGM4	Prostate	8148
FKVSHHGAL	HLA-C03:04	KLK2	Prostate	3668	WVFAGILTT	HLA-A02:01	TGM4	Prostate	8149
GALSHVPCL	HLA-C03:04	KLK2	Prostate	3669	EYILNDTGCHYV	HLA-A02:01	TGM4	Prostate	8150
LAVDPGKQQ	HLA-C03:04	KLK2	Prostate	3670	VMDHAFLL	HLA-A02:01	TGM4	Prostate	8151
KITDVVKVL	HLA-C03:04	KLK2	Prostate	3671	CIFKNTLAI	HLA-A02:01	TGM4	Prostate	8152
WAHCGGVL	HLA-C03:04	KLK2	Prostate	3672	ILDDEPVIR	HLA-A02:01	TGM4	Prostate	8153
LSHVPCLKSL	HLA-C03:04	KLK2	Prostate	3673	ILDDEPVIRG	HLA-A02:01	TGM4	Prostate	8154
STGDHLLRL	HLA-C03:04	KLK2	Prostate	3674	PLTDVKFSL	HLA-A02:01	TGM4	Prostate	8155
SFPHPLYNM	HLA-C04:01	KLK2	Prostate	3675	AILDDEPVI	HLA-A02:01	TGM4	Prostate	8156
YSEKVTEFM	HLA-C04:01	KLK2	Prostate	3676	TLQNESGKEVTV	HLA-A02:01	TGM4	Prostate	8157
MWDLVLSIAL	HLA-C04:01	KLK2	Prostate	3677	ILDDEPVI	HLA-A02:01	TGM4	Prostate	8158
AYSEKVTEF	HLA-C04:01	KLK2	Prostate	3678	TLQNESGKEV	HLA-A02:01	TGM4	Prostate	8159
GHNSPIPVL	HLA-C04:01	KLK2	Prostate	3679	VFAGILTTV	HLA-A02:01	TGM4	Prostate	8160
FPHPLYNMSL	HLA-C04:01	KLK2	Prostate	3680	SLESLGISSL	HLA-A02:01	TGM4	Prostate	8161
SLQCVSLHL	HLA-C04:01	KLK2	Prostate	3681	VLLGNSVNF	HLA-A02:01	TGM4	Prostate	8162
HSQPWQVAV	HLA-C04:01	KLK2	Prostate	3682	ALGIPARSV	HLA-A02:01	TGM4	Prostate	8163
HSFPHPLYNM	HLA-C04:01	KLK2	Prostate	3683	VLDPRTPSD	HLA-A02:01	TGM4	Prostate	8164
MWDLVLSI	HLA-C04:01	KLK2	Prostate	3684	SIAKHTLVV	HLA-A02:01	TGM4	Prostate	8165
ITDVVKVL	HLA-C04:01	KLK2	Prostate	3685	KGYDGWQAV	HLA-A02:01	TGM4	Prostate	8166
MWDLVLSIA	HLA-C04:01	KLK2	Prostate	3686	FLNQDNAV	HLA-A02:01	TGM4	Prostate	8167
ITDVVKVLG	HLA-C04:01	KLK2	Prostate	3687	SVQSDDVLL	HLA-A02:01	TGM4	Prostate	8168
TGDHLLRL	HLA-C04:01	KLK2	Prostate	3688	SLQTSDHGTV	HLA-A02:01	TGM4	Prostate	8169
SWGPEPCAL	HLA-C04:01	KLK2	Prostate	3689	ALQNVNILG	HLA-A02:01	TGM4	Prostate	8170
HSFPHPLYNM	HLA-C07:01	KLK2	Prostate	3690	QVSEVTLTL	HLA-A02:01	TGM4	Prostate	8171
DRAWLRVIL	HLA-C07:01	KLK2	Prostate	3691	YVNENGEKI	HLA-A02:01	TGM4	Prostate	8172
QRVPVSHSF	HLA-C07:01	KLK2	Prostate	3692	AMCAMMSFEK	HLA-A03:01	TGM4	Prostate	8173
LRLSEPAKI	HLA-C07:01	KLK2	Prostate	3693	KMAKLCDLNK	HLA-A03:01	TGM4	Prostate	8174
HSFPHPLYNMSL	HLA-C07:01	KLK2	Prostate	3694	QLYTGKKMAK	HLA-A03:01	TGM4	Prostate	8175
HSQPWQVAV	HLA-C07:01	KLK2	Prostate	3695	SVNFTVILK	HLA-A03:01	TGM4	Prostate	8176
VSHPYSQHL	HLA-C07:01	KLK2	Prostate	3696	SLLTESSLK	HLA-A03:01	TGM4	Prostate	8177
KDRAWLRVIL	HLA-C07:01	KLK2	Prostate	3697	ILGKYQLNVK	HLA-A03:01	TGM4	Prostate	8178
SHVPCLKSL	HLA-C07:01	KLK2	Prostate	3698	ISLLTESSLK	HLA-A03:01	TGM4	Prostate	8179
HNSPIPVL	HLA-C07:01	KLK2	Prostate	3699	ISMETTSIGK	HLA-A03:01	TGM4	Prostate	8180
HSQPWQVAVY	HLA-C07:01	KLK2	Prostate	3700	AWMKRPDLPK	HLA-A03:01	TGM4	Prostate	8181
HSFPHPLYN	HLA-C07:01	KLK2	Prostate	3701	TLAIPLTDVK	HLA-A03:01	TGM4	Prostate	8182
SWGPEPCAL	HLA-C07:01	KLK2	Prostate	3702	RAMCAMMSFEK	HLA-A03:01	TGM4	Prostate	8183
RSGWVGTTC	HLA-C07:01	KLK2	Prostate	3703	NSVNFTVILK	HLA-A03:01	TGM4	Prostate	8184
KITDVVKVL	HLA-C07:01	KLK2	Prostate	3704	STGPNPSIAK	HLA-A03:01	TGM4	Prostate	8185

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ARSGWVGTT	HLA-C07:01	KLK2	Prostate	3705	AILGKYQLNVK	HLA-A03:01	TGM4	Prostate	8186
AYSEKVTEF	HLA-C07:02	KLK2	Prostate	3706	KTGPKKFIVK	HLA-A03:01	TGM4	Prostate	8187
HSFPHPLYNM	HLA-C07:02	KLK2	Prostate	3707	VTSSPNAILGK	HLA-A03:01	TGM4	Prostate	8188
SFPHPLYNM	HLA-C07:02	KLK2	Prostate	3708	YLLFNPWCK	HLA-A03:01	TGM4	Prostate	8189
QRVPVSHSF	HLA-C07:02	KLK2	Prostate	3709	ILYLLFNPWCK	HLA-A03:01	TGM4	Prostate	8190
SHVPCLKSL	HLA-C07:02	KLK2	Prostate	3710	IIAEIVESK	HLA-A03:01	TGM4	Prostate	8191
VWLGRHNLF	HLA-C07:02	KLK2	Prostate	3711	VLNQPLQSY	HLA-A03:01	TGM4	Prostate	8192
FPHPLYNMSL	HLA-C07:02	KLK2	Prostate	3712	SVNFTVILK	HLA-A11:01	TGM4	Prostate	8193
LRPRSLQCV	HLA-C07:02	KLK2	Prostate	3713	AMCAMMSFEK	HLA-A11:01	TGM4	Prostate	8194
VSHPYSQHL	HLA-C07:02	KLK2	Prostate	3714	ISMETTSIGK	HLA-A11:01	TGM4	Prostate	8195
FKVSHHGAL	HLA-C07:02	KLK2	Prostate	3715	NSVNFTVILK	HLA-A11:01	TGM4	Prostate	8196
VYTKVVHY	HLA-C07:02	KLK2	Prostate	3716	STGPNPSIAK	HLA-A11:01	TGM4	Prostate	8197
ALPEKPAVY	HLA-C07:02	KLK2	Prostate	3717	SLLTESSLK	HLA-A11:01	TGM4	Prostate	8198
LRVILGVHL	HLA-C07:02	KLK2	Prostate	3718	TSSPNAILGK	HLA-A11:01	TGM4	Prostate	8199
LRPDEDSSH	HLA-C07:02	KLK2	Prostate	3719	HVWTDAWMK	HLA-A11:01	TGM4	Prostate	8200
KITDVVKVL	HLA-C07:02	KLK2	Prostate	3720	GSFELQLYTGKK	HLA-A11:01	TGM4	Prostate	8201
HNSPIPVL	HLA-C07:02	KLK2	Prostate	3721	GSFELQLYTGK	HLA-A11:01	TGM4	Prostate	8202
STCSVSHPY	HLA-A01:01	KLK3	Prostate	3722	SSPNAILGK	HLA-A11:01	TGM4	Prostate	8203
VSHSFPHPLY	HLA-A01:01	KLK2; KLK3	Prostate	3723	ATLQNESGK	HLA-A11:01	TGM4	Prostate	8204
KSTCSVSHPY	HLA-A01:01	KLK3	Prostate	3724	SVNFTVILKR	HLA-A11:01	TGM4	Prostate	8205
IAQPAPCSQLLY	HLA-A01:01	KLK3	Prostate	3725	VTSSPNAILGK	HLA-A11:01	TGM4	Prostate	8206
LTDAVKVMDL	HLA-A01:01	KLK3	Prostate	3726	KTGPKKFIVK	HLA-A11:01	TGM4	Prostate	8207
CALPERPSLY	HLA-A01:01	KLK3	Prostate	3727	VNFTVILKR	HLA-A11:01	TGM4	Prostate	8208
CSGDSGGPLV	HLA-A01:01	KLK3	Prostate	3728	QTSSPVFRR	HLA-A11:01	TGM4	Prostate	8209
SSHDLMLLRL	HLA-A01:01	KLK2; KLK3	Prostate	3729	SYHQLKLEF	HLA-A24:02	TGM4	Prostate	8210
QPAPCSQLLY	HLA-A01:01	KLK3	Prostate	3730	TYINSLAIL	HLA-A24:02	TGM4	Prostate	8211
LSEPAELT	HLA-A01:01	KLK3	Prostate	3731	VFTSFQYPEF	HLA-A24:02	TGM4	Prostate	8212
ALPERPSLY	HLA-A01:01	KLK3	Prostate	3732	IFIVYDTRF	HLA-A24:02	TGM4	Prostate	8213
LPERPSLY	HLA-A01:01	KLK3	Prostate	3733	YYNTKQAVCF	HLA-A24:02	TGM4	Prostate	8214
LSEPAELTD	HLA-A01:01	KLK3	Prostate	3734	IMASEVFTSF	HLA-A24:02	TGM4	Prostate	8215
LTDAVKVMD	HLA-A01:01	KLK3	Prostate	3735	RAMCAMMSF	HLA-A24:02	TGM4	Prostate	8216
HSFPHPLY	HLA-A01:01	KLK2; KLK3	Prostate	3736	QYPEFSIEL	HLA-A24:02	TGM4	Prostate	8217
LTDAVKVM	HLA-A01:01	KLK3	Prostate	3737	KTYINSLAIL	HLA-A24:02	TGM4	Prostate	8218
LTMPALPMV	HLA-A02:01	KLK3	Prostate	3738	VYDTRFVF	HLA-A24:02	TGM4	Prostate	8219
FLTLSVTWIA	HLA-A02:01	KLK3	Prostate	3739	QSYHQLKLEF	HLA-A24:02	TGM4	Prostate	8220
KLQCVDLHV	HLA-A02:01	KLK3	Prostate	3740	EFQTSSPVF	HLA-A24:02	TGM4	Prostate	8221
ILITELTMPA	HLA-A02:01	KLK3	Prostate	3741	VLLGNSVNF	HLA-A24:02	TGM4	Prostate	8222
FLTLSVTWI	HLA-A02:01	KLK3	Prostate	3742	IFIVYDTRFVF	HLA-A24:02	TGM4	Prostate	8223
FLTLAVCGGV	HLA-A02:01	KLK3	Prostate	3743	IVYDTRFVF	HLA-A24:02	TGM4	Prostate	8224
MLLRLSEPA	HLA-A02:01	KLK2; KLK3	Prostate	3744	KTYINSLAI	HLA-A30:01	TGM4	Prostate	8225
ELTMPALPMV	HLA-A02:01	KLK3	Prostate	3745	AQKIVLITK	HLA-A30:01	TGM4	Prostate	8226
FLSLPAPLQA	HLA-A02:01	KLK3	Prostate	3746	KFIVKLSSK	HLA-A30:01	TGM4	Prostate	8227
WIAPPLQVLV	HLA-A02:01	KLK3	Prostate	3747	MAKLCDLNK	HLA-A30:01	TGM4	Prostate	8228

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KKLQCVDLHV	HLA-A02:01	KLK3	Prostate	3748	RAMCAMMSFEK	HLA-A30:01	TGM4	Prostate	8229
FLTPKKLQCV	HLA-A02:01	KLK3	Prostate	3749	KQVKEINAQK	HLA-A30:01	TGM4	Prostate	8230
LITELTMPA	HLA-A02:01	KLK3	Prostate	3750	AIRKGDIFI	HLA-A30:01	TGM4	Prostate	8231
FLSLPAPL	HLA-A02:01	KLK3	Prostate	3751	KTGPKKFIVK	HLA-A30:01	TGM4	Prostate	8232
LMLLRLSEPA	HLA-A02:01	KLK2; KLK3	Prostate	3752	VLRALGIPA	HLA-A30:01	TGM4	Prostate	8233
HLPQNFLPI	HLA-A02:01	KLK3	Prostate	3753	RPVKENFLHM	HLA-A30:01	TGM4	Prostate	8234
KLQCVDLHVI	HLA-A02:01	KLK3	Prostate	3754	SVNFTVILK	HLA-A30:01	TGM4	Prostate	8235
SLVPWRGGV	HLA-A02:01	KLK3	Prostate	3755	KMAKLCDLNK	HLA-A30:01	TGM4	Prostate	8236
LITELTMPAL	HLA-A02:01	KLK3	Prostate	3756	QVKEINAQK	HLA-A30:01	TGM4	Prostate	8237
VLVHPQWVL	HLA-A02:01	KLK2; KLK3; KLK4	Prostate	3757	RRRDITYEYK	HLA-A30:01	TGM4	Prostate	8238
LTLAVCGGV	HLA-A02:01	KLK3	Prostate	3758	RRRDITYEY	HLA-A30:01	TGM4	Prostate	8239
FLTLAVCGGVLV	HLA-A02:01	KLK3	Prostate	3759	RLIWLVKMV	HLA-A30:01	TGM4	Prostate	8240
FLPIAQPA	HLA-A02:01	KLK3	Prostate	3760	RKGDIFIVY	HLA-A30:01	TGM4	Prostate	8241
VFLTLSVTWIA	HLA-A02:01	KLK3	Prostate	3761	DTRFVFSEV	HLA-A30:01	TGM4	Prostate	8242
LLRLSEPAEL	HLA-A02:01	KLK3	Prostate	3762	NVKTGNHILK	HLA-A30:01	TGM4	Prostate	8243
TLAVCGGVLV	HLA-A02:01	KLK3	Prostate	3763	GDRLIWLVK	HLA-A30:01	TGM4	Prostate	8244
VISNDVCAQV	HLA-A02:01	KLK3	Prostate	3764	HTLVVLDPR	HLA-A33:03	TGM4	Prostate	8245
FMLCAGRWT	HLA-A02:01	KLK3	Prostate	3765	HVWTDAWMKR	HLA-A33:03	TGM4	Prostate	8246
ILITELTMPAL	HLA-A02:01	KLK3	Prostate	3766	HAFLLLSSER	HLA-A33:03	TGM4	Prostate	8247
FLRPGDDSTL	HLA-A02:01	KLK3	Prostate	3767	EFQTSSPVFR	HLA-A33:03	TGM4	Prostate	8248
RLSEPAEL	HLA-A02:01	KLK3	Prostate	3768	QTSSPVFRR	HLA-A33:03	TGM4	Prostate	8249
VLTPKKLQCV	HLA-A02:01	KLK3	Prostate	3769	DIFIVYDTR	HLA-A33:03	TGM4	Prostate	8250
SLYTKVVHY	HLA-A02:01	KLK3	Prostate	3770	SVNFTVILKR	HLA-A33:03	TGM4	Prostate	8251
ALPERPSL	HLA-A02:01	KLK3	Prostate	3771	FQTSSPVFRR	HLA-A33:03	TGM4	Prostate	8252
ILLGRHSL	HLA-A02:01	KLK3	Prostate	3772	MVFMPDEDER	HLA-A33:03	TGM4	Prostate	8253
FLTPKKLQC	HLA-A02:01	KLK3	Prostate	3773	NFHVWTDAWMKR	HLA-A33:03	TGM4	Prostate	8254
SGDSGGPLV	HLA-A02:01	KLK3	Prostate	3774	STKAVGQDR	HLA-A33:03	TGM4	Prostate	8255
SLFHPEDTGQV	HLA-A02:01	KLK3	Prostate	3775	AFLLLSSER	HLA-A33:03	TGM4	Prostate	8256
RLSEPAELT	HLA-A02:01	KLK3	Prostate	3776	EFQTSSPVFRR	HLA-A33:03	TGM4	Prostate	8257
VLHGSLVPW	HLA-A02:01	KLK3	Prostate	3777	ESSLKPTDR	HLA-A33:03	TGM4	Prostate	8258
GVLVHPQWV	HLA-A02:01	KLK2; KLK3; KLK4	Prostate	3778	EVFTSFQYP	HLA-A33:03	TGM4	Prostate	8259
WIAPPLQVL	HLA-A02:01	KLK3	Prostate	3779	SIELPNTGR	HLA-A33:03	TGM4	Prostate	8260
TLSVTWIGA	HLA-A02:01	KLK3	Prostate	3780	EFSIELPNTGR	HLA-A33:03	TGM4	Prostate	8261
ELTDAVKV	HLA-A02:01	KLK3	Prostate	3781	VNFTVILKR	HLA-A33:03	TGM4	Prostate	8262
FLRPGDDST	HLA-A02:01	KLK3	Prostate	3782	SPVFRRGQV	HLA-B07:02	TGM4	Prostate	8263
FHPEDTGQV	HLA-A02:01	KLK3	Prostate	3783	RDPVLVCRAM	HLA-B07:02	TGM4	Prostate	8264
TWIAPPLQV	HLA-A02:01	KLK3	Prostate	3784	SPVFRRGQVF	HLA-B07:02	TGM4	Prostate	8265
HPLYDMSLLK	HLA-A03:01	KLK3	Prostate	3785	LPNTGRIGQL	HLA-B07:02	TGM4	Prostate	8266
PLYDMSLLK	HLA-A03:01	KLK3	Prostate	3786	KPTDRRDPV	HLA-B07:02	TGM4	Prostate	8267
VLTAAHCIRK	HLA-A03:01	KLK3	Prostate	3787	KPTDRRDPVL	HLA-B07:02	TGM4	Prostate	8268
LTAAHCIRK	HLA-A03:01	KLK3	Prostate	3788	APYKWTGSA	HLA-B07:02	TGM4	Prostate	8269

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
SLYTKVVHYRK	HLA-A03:01	KLK3	Prostate	3789	NPSIAKHTL	HLA-B07:02	TGM4	Prostate	8270
FPHPLYDMSLLK	HLA-A03:01	KLK3	Prostate	3790	RPVKENFLHM	HLA-B07:02	TGM4	Prostate	8271
SLYTKVVHY	HLA-A03:01	KLK3	Prostate	3791	IPARSVTGF	HLA-B07:02	TGM4	Prostate	8272
SLYTKVVHYR	HLA-A03:01	KLK3	Prostate	3792	APYKWTGSAPI	HLA-B07:02	TGM4	Prostate	8273
PHPLYDMSLLK	HLA-A03:01	KLK3	Prostate	3793	FPQCHPGQV	HLA-B07:02	TGM4	Prostate	8274
KVVHYRKWIK	HLA-A03:01	KLK2; KLK3	Prostate	3794	QPLQSYHQL	HLA-B07:02	TGM4	Prostate	8275
SIEPEEFLTPK	HLA-A03:01	KLK3	Prostate	3795	GPKKFIVKL	HLA-B07:02	TGM4	Prostate	8276
ALPERPSLY	HLA-A03:01	KLK3	Prostate	3796	GPSPLTAI	HLA-B07:02	TGM4	Prostate	8277
WVLTAAHCIRK	HLA-A03:01	KLK3	Prostate	3797	YPEFSIEL	HLA-B07:02	TGM4	Prostate	8278
AVCGGVLVH	HLA-A03:01	KLK3	Prostate	3798	ILKRKTAAL	HLA-B08:01	TGM4	Prostate	8279
ALPERPSLYTK	HLA-A03:01	KLK3	Prostate	3799	FTVILKRKTAAL	HLA-B08:01	TGM4	Prostate	8280
LTAAHCIRK	HLA-A11:01	KLK3	Prostate	3800	VILKRKTAAL	HLA-B08:01	TGM4	Prostate	8281
HPLYDMSLLK	HLA-A11:01	KLK3	Prostate	3801	LKRKTAAL	HLA-B08:01	TGM4	Prostate	8282
STCSVSHPY	HLA-A11:01	KLK3	Prostate	3802	TVILKRKTAAL	HLA-B08:01	TGM4	Prostate	8283
GSIEPEEFLTPK	HLA-A11:01	KLK3	Prostate	3803	ILKRKTAALQ	HLA-B08:01	TGM4	Prostate	8284
SSHDLMLLR	HLA-A11:01	KLK2; KLK3	Prostate	3804	VILKRKTAA	HLA-B08:01	TGM4	Prostate	8285
LTAAHCIRNK	HLA-A11:01	KLK3	Prostate	3805	ILKRKTAA	HLA-B08:01	TGM4	Prostate	8286
VLTAAHCIRK	HLA-A11:01	KLK3	Prostate	3806	ILKRKTAALQNV	HLA-B08:01	TGM4	Prostate	8287
PLYDMSLLK	HLA-A11:01	KLK3	Prostate	3807	HLRLVLNQPL	HLA-B08:01	TGM4	Prostate	8288
SLYTKVVHYR	HLA-A11:01	KLK3	Prostate	3808	SIKCKPWNF	HLA-B08:01	TGM4	Prostate	8289
GAAPLILSR	HLA-A11:01	KLK3	Prostate	3809	EINAQKIVL	HLA-B08:01	TGM4	Prostate	8290
AVCGGVLVH	HLA-A11:01	KLK3	Prostate	3810	NPSIAKHTL	HLA-B08:01	TGM4	Prostate	8291
GVLQGITSW	HLA-A11:01	KLK2; KLK3	Prostate	3811	NCIFKNTL	HLA-B08:01	TGM4	Prostate	8292
STCSWVILI	HLA-A11:01	KLK3	Prostate	3812	DSKTYINSL	HLA-B08:01	TGM4	Prostate	8293
RIVGGWECEK	HLA-A11:01	KLK2; KLK3	Prostate	3813	NAILGKYQL	HLA-B08:01	TGM4	Prostate	8294
WVLTAAHCIRK	HLA-A11:01	KLK3	Prostate	3814	DVKFSLESL	HLA-B08:01	TGM4	Prostate	8295
QVHPQKVTK	HLA-A11:01	KLK3	Prostate	3815	AILGKYQL	HLA-B08:01	TGM4	Prostate	8296
CYASGWGSI	HLA-A24:02	KLK2; KLK3	Prostate	3816	PLTDVKFSL	HLA-B08:01	TGM4	Prostate	8297
TWIGAAPLI	HLA-A24:02	KLK3	Prostate	3817	GPKKFIVKL	HLA-B08:01	TGM4	Prostate	8298
VFLTLSVTW	HLA-A24:02	KLK3	Prostate	3818	WEFQTSSPV	HLA-B13:02	TGM4	Prostate	8299
MWVPVVFLTL	HLA-A24:02	KLK3	Prostate	3819	KENFLHMSV	HLA-B13:02	TGM4	Prostate	8300
KFMLCAGRW	HLA-A24:02	KLK3	Prostate	3820	RQVMDHAFLL	HLA-B13:02	TGM4	Prostate	8301
VVFLTLSVTW	HLA-A24:02	KLK3	Prostate	3821	LEFSTGPNPSI	HLA-B13:02	TGM4	Prostate	8302
HYRKWIKDTI	HLA-A24:02	KLK2; KLK3	Prostate	3822	YDTRFVFSEV	HLA-B13:02	TGM4	Prostate	8303
VTWIGAAPLI	HLA-A24:02	KLK3	Prostate	3823	WEFQTSSPVF	HLA-B13:02	TGM4	Prostate	8304
TCYASGWGSI	HLA-A24:02	KLK2; KLK3	Prostate	3824	IDFLNQDNAV	HLA-B13:02	TGM4	Prostate	8305
ILLGRHSLF	HLA-A24:02	KLK3	Prostate	3825	RGFILAEIV	HLA-B13:02	TGM4	Prostate	8306
VHPQKVTKF	HLA-A24:02	KLK3	Prostate	3826	KTYINSLAI	HLA-B13:02	TGM4	Prostate	8307
LFHPEDTGQVF	HLA-A24:02	KLK3	Prostate	3827	GQCWVFAGI	HLA-B13:02	TGM4	Prostate	8308
VFQVSHSF	HLA-A24:02	KLK3	Prostate	3828	SEVNGDRLIWLV	HLA-B13:02	TGM4	Prostate	8309
GWGSIEPEEF	HLA-A24:02	KLK2; KLK3	Prostate	3829	RLIWLVKMV	HLA-B13:02	TGM4	Prostate	8310
FHPEDTGQVF	HLA-A24:02	KLK3	Prostate	3830	GQLLVCNCI	HLA-B13:02	TGM4	Prostate	8311
YTKVVHYRK	HLA-A30:01	KLK2; KLK3	Prostate	3831	GQVFHLRLV	HLA-B13:02	TGM4	Prostate	8312

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
RGRAVCGGV	HLA-A30:01	KLK3	Prostate	3832	KGYDGWQAV	HLA-B13:02	TGM4	Prostate	8313
VVHYRKWIK	HLA-A30:01	KLK2; KLK3	Prostate	3833	KEINAQKI	HLA-B13:02	TGM4	Prostate	8314
QVHPQKVTK	HLA-A30:01	KLK3	Prostate	3834	GQEELHVI	HLA-B13:02	TGM4	Prostate	8315
KVVHYRKWIK	HLA-A30:01	KLK2; KLK3	Prostate	3835	FQYPEFSI	HLA-B13:02	TGM4	Prostate	8316
KVTKFMLCAG	HLA-A30:01	KLK3	Prostate	3836	SIAKHTLVV	HLA-B13:02	TGM4	Prostate	8317
SSLPHQVPA	HLA-A30:01	KLK3	Prostate	3837	LQSYHQLKL	HLA-B13:02	TGM4	Prostate	8318
LTMPALPMV	HLA-A30:01	KLK3	Prostate	3838	MASEVFTSF	HLA-B46:01	TGM4	Prostate	8319
LTAAHCIRK	HLA-A30:01	KLK3	Prostate	3839	RAMCAMMSF	HLA-B46:01	TGM4	Prostate	8320
ALPERPSLYTK	HLA-A30:01	KLK3	Prostate	3840	IVYDTRFVF	HLA-B46:01	TGM4	Prostate	8321
SLYTKVVHY	HLA-A30:01	KLK3	Prostate	3841	FIVYDTRFVF	HLA-B46:01	TGM4	Prostate	8322
VCAQVHPQK	HLA-A30:01	KLK3	Prostate	3842	FAGILTTVL	HLA-B46:01	TGM4	Prostate	8323
HSQPWQVLV	HLA-A30:01	KLK3	Prostate	3843	FTSFQYPEF	HLA-B46:01	TGM4	Prostate	8324
HSFPHPLY	HLA-A30:01	KLK2; KLK3	Prostate	3844	CRAMCAMMSF	HLA-B46:01	TGM4	Prostate	8325
HSFPHPLYD	HLA-A30:01	KLK3	Prostate	3845	KTYINSLAI	HLA-B46:01	TGM4	Prostate	8326
LTAAHCIRNK	HLA-A30:01	KLK3	Prostate	3846	YVNENGEKI	HLA-B46:01	TGM4	Prostate	8327
SVTWIAPPL	HLA-A30:01	KLK3	Prostate	3847	GSAPILQQY	HLA-B46:01	TGM4	Prostate	8328
MSLLKNRFLR	HLA-A33:03	KLK3	Prostate	3848	IMASEVFTSF	HLA-B46:01	TGM4	Prostate	8329
LYTKVVHYR	HLA-A33:03	KLK3	Prostate	3849	LAIPLTDVKF	HLA-B46:01	TGM4	Prostate	8330
YTKVVHYR	HLA-A33:03	KLK2; KLK3	Prostate	3850	VLNQPLQSY	HLA-B46:01	TGM4	Prostate	8331
SLYTKVVHYR	HLA-A33:03	KLK3	Prostate	3851	ILNDTGCHY	HLA-B46:01	TGM4	Prostate	8332
SLLKNRFLR	HLA-A33:03	KLK3	Prostate	3852	RRRDITYEY	HLA-B46:01	TGM4	Prostate	8333
VTKFMLCAGR	HLA-A33:03	KLK3	Prostate	3853	VSHHTWEF	HLA-B46:01	TGM4	Prostate	8334
YTKVVHYRK	HLA-A33:03	KLK2; KLK3	Prostate	3854	SIKCKPWNF	HLA-B46:01	TGM4	Prostate	8335
DMSLLKNRFLR	HLA-A33:03	KLK3	Prostate	3855	KGYDGWQAV	HLA-B46:01	TGM4	Prostate	8336
SSHDLMLLR	HLA-A33:03	KLK2; KLK3	Prostate	3856	AVSHHTWEF	HLA-B46:01	TGM4	Prostate	8337
YDMSLLKNR	HLA-A33:03	KLK3	Prostate	3857	SAHDTERNL	HLA-B46:01	TGM4	Prostate	8338
EALSPPTQH	HLA-A33:03	KLK3	Prostate	3858	NAVSHHTWEF	HLA-B46:01	TGM4	Prostate	8339
GAAPLILSR	HLA-A33:03	KLK3	Prostate	3859	VMDHAFLLL	HLA-C01:02	TGM4	Prostate	8340
QVLVASRGR	HLA-A33:03	KLK3	Prostate	3860	VLDCCISLL	HLA-C01:02	TGM4	Prostate	8341
LPMVLHGSL	HLA-B07:02	KLK3	Prostate	3861	KTYINSLAI	HLA-C01:02	TGM4	Prostate	8342
ALPMVLHGSL	HLA-B07:02	KLK3	Prostate	3862	MASEVFTSF	HLA-C01:02	TGM4	Prostate	8343
SPDRELGSFL	HLA-B07:02	KLK3	Prostate	3863	FAGILTTVL	HLA-C01:02	TGM4	Prostate	8344
MPALPMVLHGSL	HLA-B07:02	KLK3	Prostate	3864	RAMCAMMSF	HLA-C01:02	TGM4	Prostate	8345
RPSLYTKVV	HLA-B07:02	KLK3	Prostate	3865	VTSSPNAIL	HLA-C01:02	TGM4	Prostate	8346
LPMVLHGSLV	HLA-B07:02	KLK3	Prostate	3866	CGPSPLTAI	HLA-C01:02	TGM4	Prostate	8347
SPSILQQSSL	HLA-B07:02	KLK3	Prostate	3867	IVYDTRFVF	HLA-C01:02	TGM4	Prostate	8348
FPHPLYDMSL	HLA-B07:02	KLK3	Prostate	3868	KSEENILYL	HLA-C01:02	TGM4	Prostate	8349
GPLVCNGVL	HLA-B07:02	KLK2; KLK3	Prostate	3869	CIFKNTLAI	HLA-C01:02	TGM4	Prostate	8350
QPAPCSQLL	HLA-B07:02	KLK3	Prostate	3870	FSTGPNPSI	HLA-C01:02	TGM4	Prostate	8351
APSHLPQNF	HLA-B07:02	KLK3	Prostate	3871	QYPEFSIEL	HLA-C01:02	TGM4	Prostate	8352
QPAPCSQL	HLA-B07:02	KLK3	Prostate	3872	SAHDTERNL	HLA-C01:02	TGM4	Prostate	8353
SPDCQAEAL	HLA-B07:02	KLK3	Prostate	3873	ILTTVLRAL	HLA-C01:02	TGM4	Prostate	8354
MPALPMVL	HLA-B07:02	KLK3	Prostate	3874	FCCGPSPL	HLA-C01:02	TGM4	Prostate	8355

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
VPVVFLTL	HLA-B07:02	KLK3	Prostate	3875	RRPVKENFL	HLA-C01:02	TGM4	Prostate	8356
CIRNKSVIL	HLA-B08:01	KLK3	Prostate	3876	SSPVFRRGQ	HLA-C01:02	TGM4	Prostate	8357
LPMVLHGSL	HLA-B08:01	KLK3	Prostate	3877	SSPVFRRGQV	HLA-C01:02	TGM4	Prostate	8358
ILLGRHSL	HLA-B08:01	KLK3	Prostate	3878	ILKRKTAAL	HLA-C01:02	TGM4	Prostate	8359
LMLLRLSEPA	HLA-B08:01	KLK2; KLK3	Prostate	3879	VFCCGPSPL	HLA-C01:02	TGM4	Prostate	8360
LVASRGRAV	HLA-B08:01	KLK3	Prostate	3880	MASEVFTSF	HLA-C03:04	TGM4	Prostate	8361
ILLGRHSLF	HLA-B08:01	KLK3	Prostate	3881	FAGILTTVL	HLA-C03:04	TGM4	Prostate	8362
LMLLRLSEPAEL	HLA-B08:01	KLK3	Prostate	3882	RAMCAMMSF	HLA-C03:04	TGM4	Prostate	8363
FPHPLYDMSL	HLA-B08:01	KLK3	Prostate	3883	FSTGPNPSI	HLA-C03:04	TGM4	Prostate	8364
LLKNRFLRPG	HLA-B08:01	KLK3	Prostate	3884	AALQNVNIL	HLA-C03:04	TGM4	Prostate	8365
HCIRNKSVIL	HLA-B08:01	KLK3	Prostate	3885	MSVQSDDVL	HLA-C03:04	TGM4	Prostate	8366
HPLYDMSL	HLA-B08:01	KLK3	Prostate	3886	IVYDTRFVF	HLA-C03:04	TGM4	Prostate	8367
WVILITEL	HLA-B08:01	KLK3	Prostate	3887	KTYINSLAI	HLA-C03:04	TGM4	Prostate	8368
ELGSFLSL	HLA-B08:01	KLK3	Prostate	3888	IAKHTLVVL	HLA-C03:04	TGM4	Prostate	8369
HPSPDREL	HLA-B08:01	KLK3	Prostate	3889	ISLLTESSL	HLA-C03:04	TGM4	Prostate	8370
TPKKLQCV	HLA-B08:01	KLK3	Prostate	3890	MSFEKGQGV	HLA-C03:04	TGM4	Prostate	8371
VILLGRHSL	HLA-B08:01	KLK3	Prostate	3891	FQYPEFSIEL	HLA-C03:04	TGM4	Prostate	8372
DVLTPKKL	HLA-B08:01	KLK3	Prostate	3892	SAHDTERNL	HLA-C03:04	TGM4	Prostate	8373
FLTPKKLQC	HLA-B08:01	KLK3	Prostate	3893	QVSEVTLTL	HLA-C03:04	TGM4	Prostate	8374
RELGSFLSL	HLA-B13:02	KLK3	Prostate	3894	NAILGKYQL	HLA-C03:04	TGM4	Prostate	8375
LTMPALPMV	HLA-B13:02	KLK3	Prostate	3895	KSEENILYL	HLA-C03:04	TGM4	Prostate	8376
STCSWVILI	HLA-B13:02	KLK3	Prostate	3896	VSEVTLTL	HLA-C03:04	TGM4	Prostate	8377
LQAHTPSPSI	HLA-B13:02	KLK3	Prostate	3897	VMDHAFLLL	HLA-C04:01	TGM4	Prostate	8378
RAVCGGVLV	HLA-B13:02	KLK3	Prostate	3898	VLDCCISLL	HLA-C04:01	TGM4	Prostate	8379
VTWIGAAPLI	HLA-B13:02	KLK3	Prostate	3899	QYPEFSIEL	HLA-C04:01	TGM4	Prostate	8380
LQCVDLHVI	HLA-B13:02	KLK3	Prostate	3900	RAMCAMMSF	HLA-C04:01	TGM4	Prostate	8381
TELTMPALPMV	HLA-B13:02	KLK3	Prostate	3901	SFEKGQGVL	HLA-C04:01	TGM4	Prostate	8382
HSQPWQVLV	HLA-B13:02	KLK3	Prostate	3902	FQYPEFSIEL	HLA-C04:01	TGM4	Prostate	8383
AQVHPQKV	HLA-B13:02	KLK3	Prostate	3903	WEFQTSSPVF	HLA-C04:01	TGM4	Prostate	8384
QQSSLPHQV	HLA-B13:02	KLK3	Prostate	3904	MASEVFTSF	HLA-C04:01	TGM4	Prostate	8385
GVLVHPQWV	HLA-B13:02	KLK2; KLK3; KLK4	Prostate	3905	FSEVNGIDRL	HLA-C04:01	TGM4	Prostate	8386
ELTDAVKV	HLA-B13:02	KLK3	Prostate	3906	FHVWTDAWM	HLA-C04:01	TGM4	Prostate	8387
HLPQNFLPI	HLA-B13:02	KLK3	Prostate	3907	EFQTSSPVF	HLA-C04:01	TGM4	Prostate	8388
SQPWQVLV	HLA-B13:02	KLK3	Prostate	3908	VYDTRFVFS	HLA-C04:01	TGM4	Prostate	8389
AELTDAVKV	HLA-B13:02	KLK3	Prostate	3909	VYDTRFVF	HLA-C04:01	TGM4	Prostate	8390
HSFPHPLYDM	HLA-B46:01	KLK3	Prostate	3910	YYNTKQAVCF	HLA-C04:01	TGM4	Prostate	8391
WIAPPLQVL	HLA-B46:01	KLK3	Prostate	3911	IFIVYDTRF	HLA-C04:01	TGM4	Prostate	8392
LTMPALPMVL	HLA-B46:01	KLK3	Prostate	3912	VMDHAFLL	HLA-C04:01	TGM4	Prostate	8393
QVFQVSHSF	HLA-B46:01	KLK3	Prostate	3913	VFCCGPSPL	HLA-C04:01	TGM4	Prostate	8394
LTMPALPMV	HLA-B46:01	KLK3	Prostate	3914	VLDCCISL	HLA-C04:01	TGM4	Prostate	8395
STCSVSHPY	HLA-B46:01	KLK3	Prostate	3915	HYNWQATL	HLA-C04:01	TGM4	Prostate	8396
VSHSFPHPL	HLA-B46:01	KLK2; KLK3	Prostate	3916	FRRGQVFHL	HLA-C07:01	TGM4	Prostate	8397

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
TMPALPMVL	HLA-B46:01	KLK3	Prostate	3917	RRRDITYEY	HLA-C07:01	TGM4	Prostate	8398
HLPQNFLPI	HLA-B46:01	KLK3	Prostate	3918	MSFEKGQGV	HLA-C07:01	TGM4	Prostate	8399
WIKDTIVAN	HLA-B46:01	KLK3	Prostate	3919	HYVGAARSI	HLA-C07:01	TGM4	Prostate	8400
VSHPYSQDL	HLA-B46:01	KLK3	Prostate	3920	HRRPVKENF	HLA-C07:01	TGM4	Prostate	8401
SLYTKVVHY	HLA-B46:01	KLK3	Prostate	3921	QVMDHAFLL	HLA-C07:01	TGM4	Prostate	8402
ALPERPSLY	HLA-B46:01	KLK3	Prostate	3922	DHYNWQATL	HLA-C07:01	TGM4	Prostate	8403
GSIEPEEF	HLA-B46:01	KLK2; KLK3	Prostate	3923	IRKGDIFIV	HLA-C07:01	TGM4	Prostate	8404
VSHPYSQD	HLA-B46:01	KLK3	Prostate	3924	CRAMCAMMSF	HLA-C07:01	TGM4	Prostate	8405
SLPAPLQAH	HLA-B46:01	KLK3	Prostate	3925	FHVWTDAWM	HLA-C07:01	TGM4	Prostate	8406
TMPALPMVL	HLA-C01:02	KLK3	Prostate	3926	KTYINSLAI	HLA-C07:01	TGM4	Prostate	8407
WIAPPLQVL	HLA-C01:02	KLK3	Prostate	3927	FRRGQVFHLRL	HLA-C07:01	TGM4	Prostate	8408
VSHSFPHPL	HLA-C01:02	KLK2; KLK3	Prostate	3928	RRGQVFHL	HLA-C07:01	TGM4	Prostate	8409
VTWIGAAPL	HLA-C01:02	KLK3	Prostate	3929	RRDPVLVC	HLA-C07:01	TGM4	Prostate	8410
HLPQNFLPI	HLA-C01:02	KLK3	Prostate	3930	RRDITYEY	HLA-C07:01	TGM4	Prostate	8411
ITELTMPAL	HLA-C01:02	KLK3	Prostate	3931	RKGDIFIVY	HLA-C07:01	TGM4	Prostate	8412
LTMPALPMVL	HLA-C01:02	KLK3	Prostate	3932	KSEENILYL	HLA-C07:01	TGM4	Prostate	8413
LAPPLQVLV	HLA-C01:02	KLK3	Prostate	3933	RRGQVFHLR	HLA-C07:01	TGM4	Prostate	8414
SVTWIAPPL	HLA-C01:02	KLK3	Prostate	3934	RRGQVFHLRL	HLA-C07:01	TGM4	Prostate	8415
ALPERPSL	HLA-C01:02	KLK3	Prostate	3935	ERKEYILND	HLA-C07:01	TGM4	Prostate	8416
WVPVVFLTL	HLA-C01:02	KLK3	Prostate	3936	DRRDPVLVC	HLA-C07:01	TGM4	Prostate	8417
ASPDCQAEAL	HLA-C01:02	KLK3	Prostate	3937	FRRGQVFHL	HLA-C07:02	TGM4	Prostate	8418
LAPPLQVL	HLA-C01:02	KLK3	Prostate	3938	SYHQLKLEF	HLA-C07:02	TGM4	Prostate	8419
AQPAPCSQL	HLA-C01:02	KLK3	Prostate	3939	RRRDITYEY	HLA-C07:02	TGM4	Prostate	8420
QHPSPDREL	HLA-C01:02	KLK3	Prostate	3940	TYINSLAIL	HLA-C07:02	TGM4	Prostate	8421
DLPTQEPAL	HLA-C01:02	KLK3	Prostate	3941	QYPEFSIEL	HLA-C07:02	TGM4	Prostate	8422
SLPAPLQAH	HLA-C01:02	KLK3	Prostate	3942	HYVGAARSI	HLA-C07:02	TGM4	Prostate	8423
WIAPPLQVL	HLA-C03:04	KLK3	Prostate	3943	RRPVKENFL	HLA-C07:02	TGM4	Prostate	8424
VSHSFPHPL	HLA-C03:04	KLK2; KLK3	Prostate	3944	FQYPEFSIEL	HLA-C07:02	TGM4	Prostate	8425
VTWIGAAPL	HLA-C03:04	KLK3	Prostate	3945	FHVWTDAWM	HLA-C07:02	TGM4	Prostate	8426
SVTWIAPPL	HLA-C03:04	KLK3	Prostate	3946	DHYNWQATL	HLA-C07:02	TGM4	Prostate	8427
LTMPALPMV	HLA-C03:04	KLK3	Prostate	3947	HRRPVKENF	HLA-C07:02	TGM4	Prostate	8428
LAVCGGVLV	HLA-C03:04	KLK3	Prostate	3948	KRPDLPKGY	HLA-C07:02	TGM4	Prostate	8429
CALPERPSL	HLA-C03:04	KLK3	Prostate	3949	RKGDIFIVY	HLA-C07:02	TGM4	Prostate	8430
RAVCGGVLV	HLA-C03:04	KLK3	Prostate	3950	IRKGDIFIVY	HLA-C07:02	TGM4	Prostate	8431
LTMPALPMVL	HLA-C03:04	KLK3	Prostate	3951	FKNTLAIPL	HLA-C07:02	TGM4	Prostate	8432
LAPPLQVL	HLA-C03:04	KLK3	Prostate	3952	AKHTLVVL	HLA-C07:02	TGM4	Prostate	8433
VSHPYSQDL	HLA-C03:04	KLK3	Prostate	3953	RRGQVFHL	HLA-C07:02	TGM4	Prostate	8434
LAVCGGVL	HLA-C03:04	KLK3	Prostate	3954	RGDDANRNY	HLA-A01:01	TNP1	Testis	8435
HQVPAPSHL	HLA-C03:04	KLK3	Prostate	3955	KRGDDANRNY	HLA-A01:01	TNP1	Testis	8436
WVPVVFLTL	HLA-C03:04	KLK3	Prostate	3956	SRKRGDDANRNY	HLA-A01:01	TNP1	Testis	8437
FHPEDTGQVF	HLA-C04:01	KLK3	Prostate	3957	GDDANRNY	HLA-A01:01	TNP1	Testis	8438
SFPHPLYDM	HLA-C04:01	KLK3	Prostate	3958	MSTSRKLKS	HLA-A01:01	TNP1	Testis	8439
SHSFPHPLY	HLA-C04:01	KLK2; KLK3	Prostate	3959	KLKSHGMRR	HLA-A02:01	TNP1	Testis	8440

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
TMPALPMVL	HLA-C04:01	KLK3	Prostate	3960	KSRSPHKGV	HLA-A02:01	TNP1	Testis	8441
CYASGWGSI	HLA-C04:01	KLK2; KLK3	Prostate	3961	KLKSHGMRRS	HLA-A02:01	TNP1	Testis	8442
LYDMSLLKNRF	HLA-C04:01	KLK3	Prostate	3962	RKLKSHGMRR	HLA-A02:01	TNP1	Testis	8443
SFLSLPAPL	HLA-C04:01	KLK3	Prostate	3963	STSRKLKSHGM	HLA-A02:01	TNP1	Testis	8444
WIAPPLQVL	HLA-C04:01	KLK3	Prostate	3964	SKSRSPHKGV	HLA-A02:01	TNP1	Testis	8445
HLPQNFLPI	HLA-C04:01	KLK3	Prostate	3965	MSTSRKLKSHGM	HLA-A02:01	TNP1	Testis	8446
MWVPVVFL	HLA-C04:01	KLK3	Prostate	3966	RKYRKGNLK	HLA-A02:01	TNP1	Testis	8447
VFQVSHSF	HLA-C04:01	KLK3	Prostate	3967	KSHGMRRSK	HLA-A02:01	TNP1	Testis	8448
SWVILITEL	HLA-C04:01	KLK3	Prostate	3968	KSRSPHKGVK	HLA-A02:01	TNP1	Testis	8449
RLSEPAEL	HLA-C04:01	KLK3	Prostate	3969	RGDDANRNY	HLA-A02:01	TNP1	Testis	8450
FLSLPAPL	HLA-C04:01	KLK3	Prostate	3970	SRSPHKGV	HLA-A02:01	TNP1	Testis	8451
VMDLPTQE	HLA-C04:01	KLK3	Prostate	3971	KRGDDANRN	HLA-A02:01	TNP1	Testis	8452
SIEPEEFL	HLA-C04:01	KLK2; KLK3	Prostate	3972	NLKSRKRGD	HLA-A02:01	TNP1	Testis	8453
HTPSPSIL	HLA-C04:01	KLK3	Prostate	3973	ANRNYRSHL	HLA-A02:01	TNP1	Testis	8454
IRNKSVILL	HLA-C07:01	KLK3	Prostate	3974	KLKSHGMRRSK	HLA-A03:01	TNP1	Testis	8455
YRKWIKDTI	HLA-C07:01	KLK2; KLK3	Prostate	3975	KLKSHGMRR	HLA-A03:01	TNP1	Testis	8456
HSFPHPLYDM	HLA-C07:01	KLK3	Prostate	3976	RSKSRSPHK	HLA-A03:01	TNP1	Testis	8457
LRLSEPAEL	HLA-C07:01	KLK3	Prostate	3977	RKYRKGNLK	HLA-A03:01	TNP1	Testis	8458
HSQPWQVLV	HLA-C07:01	KLK3	Prostate	3978	RSPHKGVKR	HLA-A03:01	TNP1	Testis	8459
CIRNKSVILL	HLA-C07:01	KLK3	Prostate	3979	RSKSRSPHK	HLA-A11:01	TNP1	Testis	8460
GRAVCGGVL	HLA-C07:01	KLK3	Prostate	3980	KSHGMRRSK	HLA-A11:01	TNP1	Testis	8461
YRKWIKDTIV	HLA-C07:01	KLK3	Prostate	3981	KSRSPHKGVK	HLA-A11:01	TNP1	Testis	8462
MSLLKNRFL	HLA-C07:01	KLK3	Prostate	3982	GSKRKYRKGNLK	HLA-A11:01	TNP1	Testis	8463
HSFPHPLYDMSL	HLA-C07:01	KLK3	Prostate	3983	RSPHKGVKR	HLA-A11:01	TNP1	Testis	8464
HSFPHPLYD	HLA-C07:01	KLK3	Prostate	3984	RKYRKGNLK	HLA-A11:01	TNP1	Testis	8465
HSQPWQVL	HLA-C07:01	KLK3	Prostate	3985	STSRKLKSH	HLA-A11:01	TNP1	Testis	8466
KHSQPWQVL	HLA-C07:01	KLK3	Prostate	3986	KYRKGNLKS	HLA-A24:02	TNP1	Testis	8467
TPGPDVLTP	HLA-C07:01	KLK3	Prostate	3987	KYRKGNLKSR	HLA-A24:02	TNP1	Testis	8468
HPEDTGQVF	HLA-C07:01	KLK3	Prostate	3988	KYRKGNLK	HLA-A24:02	TNP1	Testis	8469
HPSPDREL	HLA-C07:01	KLK3	Prostate	3989	RSKSRSPHK	HLA-A30:01	TNP1	Testis	8470
IRNKSVIL	HLA-C07:01	KLK3	Prostate	3990	KSHGMRRSK	HLA-A30:01	TNP1	Testis	8471
RELGSFLSL	HLA-C07:01	KLK3	Prostate	3991	KSRSPHKGV	HLA-A30:01	TNP1	Testis	8472
IRNKSVILL	HLA-C07:02	KLK3	Prostate	3992	HGMRRSKSR	HLA-A33:03	TNP1	Testis	8473
YRKWIKDTI	HLA-C07:02	KLK2; KLK3	Prostate	3993	KLKSHGMRR	HLA-A33:03	TNP1	Testis	8474
HSFPHPLYDM	HLA-C07:02	KLK3	Prostate	3994	GVKRGGSKR	HLA-A33:03	TNP1	Testis	8475
LRLSEPAEL	HLA-C07:02	KLK3	Prostate	3995	YRKGNLKSR	HLA-A33:03	TNP1	Testis	8476
TMPALPMVL	HLA-C07:02	KLK3	Prostate	3996	KYRKGNLKSR	HLA-A33:03	TNP1	Testis	8477
VHPQKVTKF	HLA-C07:02	KLK3	Prostate	3997	KSRSPHKGV	HLA-B07:02	TNP1	Testis	8478
VSHSFPHPL	HLA-C07:02	KLK2; KLK3	Prostate	3998	SPHKGVKRG	HLA-B07:02	TNP1	Testis	8479
SHSFPHPLY	HLA-C07:02	KLK2; KLK3	Prostate	3999	TSRKLKSHGM	HLA-B07:02	TNP1	Testis	8480
SFPHPLYDM	HLA-C07:02	KLK3	Prostate	4000	ANRNYRSHL	HLA-B07:02	TNP1	Testis	8481
CYASGWGSI	HLA-C07:02	KLK2; KLK3	Prostate	4001	SPHKGVKR	HLA-B07:02	TNP1	Testis	8482
LRPGDDSTL	HLA-C07:02	KLK3	Prostate	4002	SRKLKSHGM	HLA-B08:01	TNP1	Testis	8483

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
IAPPLQVL	HLA-C07:02	KLK3	Prostate	4003	SKRKYRKGNL	HLA-B08:01	TNP1	Testis	8484
IRNKSVIL	HLA-C07:02	KLK3	Prostate	4004	TSRKLKSHGM	HLA-B08:01	TNP1	Testis	8485
ALPERPSL	HLA-C07:02	KLK3	Prostate	4005	NLKSRKRKGD	HLA-B08:01	TNP1	Testis	8486
LYTKVVHY	HLA-C07:02	KLK3	Prostate	4006	KRKYRKGNL	HLA-B08:01	TNP1	Testis	8487
ALPERPSLY	HLA-C07:02	KLK3	Prostate	4007	TSRKLKSH	HLA-B08:01	TNP1	Testis	8488
VSEEVCSKLY	HLA-A01:01	KLK4	Prostate	4008	KSRSPHKGV	HLA-B13:02	TNP1	Testis	8489
CSKLYDPLY	HLA-A01:01	KLK4	Prostate	4009	SKSRSPHKGV	HLA-B13:02	TNP1	Testis	8490
LSAAHCFQNSY	HLA-A01:01	KLK4	Prostate	4010	ANRNYRSHL	HLA-B13:02	TNP1	Testis	8491
VVSEEVCSKLY	HLA-A01:01	KLK4	Prostate	4011	RSPHKGVKR	HLA-B13:02	TNP1	Testis	8492
VLSAAHCFQNSY	HLA-A01:01	KLK4	Prostate	4012	GVKRGGSKR	HLA-B13:02	TNP1	Testis	8493
SVVSEEVCSKLY	HLA-A01:01	KLK4	Prostate	4013	RKYRKGNLKS	HLA-B13:02	TNP1	Testis	8494
SAAHCFQNSY	HLA-A01:01	KLK4	Prostate	4014	KSHGMRRSK	HLA-B46:01	TNP1	Testis	8495
ASLSVRHPEY	HLA-A01:01	KLK4	Prostate	4015	KSRSPHKGV	HLA-B46:01	TNP1	Testis	8496
SLSVRHPEY	HLA-A01:01	KLK4	Prostate	4016	RGDDANRNY	HLA-B46:01	TNP1	Testis	8497
VSEEVCSKL	HLA-A01:01	KLK4	Prostate	4017	TSRKLKSH	HLA-B46:01	TNP1	Testis	8498
VSESDTIRS	HLA-A01:01	KLK4	Prostate	4018	ANRNYRSH	HLA-B46:01	TNP1	Testis	8499
KLDESVSES	HLA-A01:01	KLK4	Prostate	4019	DANRNYRSH	HLA-B46:01	TNP1	Testis	8500
FTEWIEKT	HLA-A01:01	KLK4	Prostate	4020	KSRSPHKGV	HLA-C01:02	TNP1	Testis	8501
SEEVCSKLY	HLA-A01:01	KLK4	Prostate	4021	ANRNYRSHL	HLA-C01:02	TNP1	Testis	8502
ESDTIRSIS	HLA-A01:01	KLK4	Prostate	4022	MSTSRKLKSHGM	HLA-C01:02	TNP1	Testis	8503
FLGYLILGV	HLA-A02:01	KLK4	Prostate	4023	RSPHKGVKR	HLA-C01:02	TNP1	Testis	8504
LLANDLMLI	HLA-A02:01	KLK4	Prostate	4024	RSPHKGVK	HLA-C01:02	TNP1	Testis	8505
FQNSYTIGL	HLA-A02:01	KLK4	Prostate	4025	KSHGMRRSK	HLA-C01:02	TNP1	Testis	8506
QMVEASLSV	HLA-A02:01	KLK4	Prostate	4026	KSRSPHKGV	HLA-C03:04	TNP1	Testis	8507
MLIKLDESV	HLA-A02:01	KLK4	Prostate	4027	MSTSRKLKSHGM	HLA-C03:04	TNP1	Testis	8508
VLQCVNVSV	HLA-A02:01	KLK4	Prostate	4028	RGDDANRNY	HLA-C03:04	TNP1	Testis	8509
LLANGRMPTV	HLA-A02:01	KLK4	Prostate	4029	DANRNYRSHL	HLA-C03:04	TNP1	Testis	8510
SQMVEASLSV	HLA-A02:01	KLK4	Prostate	4030	DANRNYRSH	HLA-C03:04	TNP1	Testis	8511
YLILGVAGSL	HLA-A02:01	KLK4	Prostate	4031	ANRNYRSHL	HLA-C03:04	TNP1	Testis	8512
WFLGYLILGV	HLA-A02:01	KLK4	Prostate	4032	KLKSHGMRR	HLA-C04:01	TNP1	Testis	8513
RMPTVLQCV	HLA-A02:01	KLK4	Prostate	4033	KSRSPHKGV	HLA-C04:01	TNP1	Testis	8514
FLGYLILGVA	HLA-A02:01	KLK4	Prostate	4034	RGDDANRNY	HLA-C04:01	TNP1	Testis	8515
YLILGVAGSLV	HLA-A02:01	KLK4	Prostate	4035	RGDDANRN	HLA-C04:01	TNP1	Testis	8516
LMLIKLDESV	HLA-A02:01	KLK4	Prostate	4036	NRNYRSHL	HLA-C04:01	TNP1	Testis	8517
VLQCVNVSVV	HLA-A02:01	KLK4	Prostate	4037	SRKLKSHGM	HLA-C07:01	TNP1	Testis	8518
PLLANDLMLI	HLA-A02:01	KLK4	Prostate	4038	KRKYRKGNL	HLA-C07:01	TNP1	Testis	8519
GLLANGRMPTV	HLA-A02:01	KLK4	Prostate	4039	YRKGNLKSR	HLA-C07:01	TNP1	Testis	8520
YNRPLLANDLML	HLA-A02:01	KLK4	Prostate	4040	KRGGSKRKY	HLA-C07:01	TNP1	Testis	8521
TVLQCVNVSV	HLA-A02:01	KLK4	Prostate	4041	KRGDDANRNY	HLA-C07:01	TNP1	Testis	8522
NELFCSGVLV	HLA-A02:01	KLK4	Prostate	4042	RRSKSRSP	HLA-C07:01	TNP1	Testis	8523
KLYDPLYHPS	HLA-A02:01	KLK4	Prostate	4043	SRKLKSHGM	HLA-C07:02	TNP1	Testis	8524
MENELFCSGVLV	HLA-A02:01	KLK4	Prostate	4044	KRKYRKGNL	HLA-C07:02	TNP1	Testis	8525
RPLLANDLML	HLA-A02:01	KLK4	Prostate	4045	YRKGNLKSR	HLA-C07:02	TNP1	Testis	8526

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
ILGVAGSLV	HLA-A02:01	KLK4	Prostate	4046	KRGGSKRKY	HLA-C07:02	TNP1	Testis	8527
MPTVLQCVNVSV	HLA-A02:01	KLK4	Prostate	4047	NRNYRSHL	HLA-C07:02	TNP1	Testis	8528
YLILGVAGS	HLA-A02:01	KLK4	Prostate	4048	SRSPHKGVK	HLA-C07:02	TNP1	Testis	8529
ELFCSGVLV	HLA-A02:01	KLK4	Prostate	4049	WLDVQVSNTY	HLA-A01:01	TPD52L3	Testis	8530
KLYDPLYHPSM	HLA-A02:01	KLK4	Prostate	4050	RTETSVGTY	HLA-A01:01	TPD52L3	Testis	8531
KLYDPLYHP	HLA-A02:01	KLK4	Prostate	4051	ARTETSVGTY	HLA-A01:01	TPD52L3	Testis	8532
KLDESVSES	HLA-A02:01	KLK4	Prostate	4052	LTEPEQREL	HLA-A01:01	TPD52L3	Testis	8533
LLANDLMLIKL	HLA-A02:01	KLK4	Prostate	4053	KLGLTALVGL	HLA-A02:01	TPD52L3	Testis	8534
GLGLHSLEA	HLA-A02:01	KLK4	Prostate	4054	KLEAEIVTL	HLA-A02:01	TPD52L3	Testis	8535
PLLANDLML	HLA-A02:01	KLK4	Prostate	4055	GLMGTIKSKV	HLA-A02:01	TPD52L3	Testis	8536
YTIGLGLHSL	HLA-A02:01	KLK4	Prostate	4056	KLTKLEAEI	HLA-A02:01	TPD52L3	Testis	8537
YLQGLVSFG	HLA-A02:01	KLK4	Prostate	4057	ALSTMGTLI	HLA-A02:01	TPD52L3	Testis	8538
KLYDPLYH	HLA-A02:01	KLK4	Prostate	4058	GLIFNKYTL	HLA-A02:01	TPD52L3	Testis	8539
GLLANECL	HLA-A02:01	KLK4	Prostate	4059	TLICRKLGGV	HLA-A02:01	TPD52L3	Testis	8540
YLQGLVSF	HLA-A02:01	KLK4	Prostate	4060	RSFEGLMGTI	HLA-A02:01	TPD52L3	Testis	8541
CLVSGWGLL	HLA-A02:01	KLK4	Prostate	4061	KLGLTALV	HLA-A02:01	TPD52L3	Testis	8542
TIGLGLHSL	HLA-A02:01	KLK4	Prostate	4062	ALVGLRQNL	HLA-A02:01	TPD52L3	Testis	8543
VLSAAHCFQK	HLA-A03:01	KLK4	Prostate	4063	KLGGVKKSA	HLA-A02:01	TPD52L3	Testis	8544
LLANDLMLIK	HLA-A03:01	KLK4	Prostate	4064	GLTALVGL	HLA-A02:01	TPD52L3	Testis	8545
YLQGLVSFGK	HLA-A03:01	KLK4	Prostate	4065	TKLEAEIVTL	HLA-A02:01	TPD52L3	Testis	8546
LSAAHCFQK	HLA-A03:01	KLK4	Prostate	4066	RSFEGLIFNK	HLA-A03:01	TPD52L3	Testis	8547
SMFCAGGGHDQK	HLA-A03:01	KLK4	Prostate	4067	STMGTLICRK	HLA-A03:01	TPD52L3	Testis	8548
WVLSAAHCFQK	HLA-A03:01	KLK4	Prostate	4068	VTLRHVLAAK	HLA-A03:01	TPD52L3	Testis	8549
KLYDPLYH	HLA-A03:01	KLK4	Prostate	4069	GLMGTIKSK	HLA-A03:01	TPD52L3	Testis	8550
LANDLMLIK	HLA-A03:01	KLK4	Prostate	4070	RSFEGLMGTIK	HLA-A03:01	TPD52L3	Testis	8551
QWVLSAAHCFQK	HLA-A03:01	KLK4	Prostate	4071	STMGTLICRK	HLA-A11:01	TPD52L3	Testis	8552
PLLANDLMLIK	HLA-A03:01	KLK4	Prostate	4072	RSFEGLIFNK	HLA-A11:01	TPD52L3	Testis	8553
KLYDPLYHP	HLA-A03:01	KLK4	Prostate	4073	STMGTLICR	HLA-A11:01	TPD52L3	Testis	8554
VVSEEVCSK	HLA-A03:01	KLK4	Prostate	4074	TFRSFEGLIF	HLA-A24:02	TPD52L3	Testis	8555
NPWGWFLGY	HLA-A03:01	KLK4	Prostate	4075	SFEGLIFNKYTL	HLA-A24:02	TPD52L3	Testis	8556
ATAGNPWGW	HLA-A03:01	KLK4	Prostate	4076	SFEGLMGTI	HLA-A24:02	TPD52L3	Testis	8557
SVSESDTIR	HLA-A03:01	KLK4	Prostate	4077	TYESHSTSEL	HLA-A24:02	TPD52L3	Testis	8558
SVVSEEVCSK	HLA-A03:01	KLK4	Prostate	4078	KKSATFRSF	HLA-A24:02	TPD52L3	Testis	8559
LSAAHCFQK	HLA-A11:01	KLK4	Prostate	4079	KTKLTKLEA	HLA-A30:01	TPD52L3	Testis	8560
VLSAAHCFQK	HLA-A11:01	KLK4	Prostate	4080	RSFEGLIFNK	HLA-A30:01	TPD52L3	Testis	8561
SVVSEEVCSK	HLA-A11:01	KLK4	Prostate	4081	KTSAALSTM	HLA-A30:01	TPD52L3	Testis	8562
LLANDLMLIK	HLA-A11:01	KLK4	Prostate	4082	VSNTYVKQK	HLA-A30:01	TPD52L3	Testis	8563
LANDLMLIK	HLA-A11:01	KLK4	Prostate	4083	RSFEGLIFN	HLA-A30:01	TPD52L3	Testis	8564
VVSEEVCSK	HLA-A11:01	KLK4	Prostate	4084	STMGTLICR	HLA-A33:03	TPD52L3	Testis	8565
YLQGLVSFGK	HLA-A11:01	KLK4	Prostate	4085	HVLAAKERR	HLA-A33:03	TPD52L3	Testis	8566
LQGLVSFGK	HLA-A11:01	KLK4	Prostate	4086	LSTMGTLICR	HLA-A33:03	TPD52L3	Testis	8567
SMFCAGGGHDQK	HLA-A11:01	KLK4	Prostate	4087	GVKKSATFR	HLA-A33:03	TPD52L3	Testis	8568
WVLSAAHCFQK	HLA-A11:01	KLK4	Prostate	4088	EDLTEPEQR	HLA-A33:03	TPD52L3	Testis	8569

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
GVPGVYTNLCK	HLA-A11:01	KLK4	Prostate	4089	EAEIVTLR	HLA-A33:03	TPD52L3	Testis	8570
SVSESDTIR	HLA-A11:01	KLK4	Prostate	4090	MPHARTETSV	HLA-B07:02	TPD52L3	Testis	8571
ATAGNPWGW	HLA-A11:01	KLK4	Prostate	4091	YVKQKTSAAL	HLA-B07:02	TPD52L3	Testis	8572
GVAGSLVSG	HLA-A11:01	KLK4	Prostate	4092	MPHARTETS	HLA-B07:02	TPD52L3	Testis	8573
CKFTEWIEK	HLA-A11:01	KLK4	Prostate	4093	NPKGEGSRI	HLA-B07:02	TPD52L3	Testis	8574
GYLQGLVSF	HLA-A24:02	KLK4	Prostate	4094	SAALSTMGTL	HLA-B07:02	TPD52L3	Testis	8575
NGYLQGLVSF	HLA-A24:02	KLK4	Prostate	4095	YVKQKTSAAL	HLA-B08:01	TPD52L3	Testis	8576
PWGWFLGYLI	HLA-A24:02	KLK4	Prostate	4096	YVKQKTSAA	HLA-B08:01	TPD52L3	Testis	8577
ICNGYLQGLVSF	HLA-A24:02	KLK4	Prostate	4097	ELKTKLTKL	HLA-B08:01	TPD52L3	Testis	8578
LYDPLYHPSMF	HLA-A24:02	KLK4	Prostate	4098	ELKRKLGL	HLA-B08:01	TPD52L3	Testis	8579
VYTNLCKFTEW	HLA-A24:02	KLK4	Prostate	4099	LIFNKYTL	HLA-B08:01	TPD52L3	Testis	8580
CNGYLQGLVSF	HLA-A24:02	KLK4	Prostate	4100	RSFEGLMGTI	HLA-B13:02	TPD52L3	Testis	8581
GWFLGYLIL	HLA-A24:02	KLK4	Prostate	4101	AEIVTLRHV	HLA-B13:02	TPD52L3	Testis	8582
KLYDPLYHPSMF	HLA-A24:02	KLK4	Prostate	4102	LDVQVSNTYV	HLA-B13:02	TPD52L3	Testis	8583
ALVMENELF	HLA-A24:02	KLK4	Prostate	4103	ALSTMGTLI	HLA-B13:02	TPD52L3	Testis	8584
SYTIGLGLHSL	HLA-A24:02	KLK4	Prostate	4104	KLEAEIVTL	HLA-B13:02	TPD52L3	Testis	8585
SYTIGLGL	HLA-A24:02	KLK4	Prostate	4105	NLSKSWLDV	HLA-B13:02	TPD52L3	Testis	8586
LYDPLYHPSM	HLA-A24:02	KLK4	Prostate	4106	KTSAALSTM	HLA-B46:01	TPD52L3	Testis	8587
SYTIGLGLH	HLA-A24:02	KLK4	Prostate	4107	YVKQKTSAA	HLA-B46:01	TPD52L3	Testis	8588
VYTNLCKFTE	HLA-A24:02	KLK4	Prostate	4108	AALSTMGTL	HLA-B46:01	TPD52L3	Testis	8589
LSAAHCFQK	HLA-A30:01	KLK4	Prostate	4109	TSVGTYESH	HLA-B46:01	TPD52L3	Testis	8590
TIRSISIAS	HLA-A30:01	KLK4	Prostate	4110	RSFEGLIF	HLA-B46:01	TPD52L3	Testis	8591
VLSAAHCFQK	HLA-A30:01	KLK4	Prostate	4111	KTSAALSTM	HLA-C01:02	TPD52L3	Testis	8592
LANDLMLIK	HLA-A30:01	KLK4	Prostate	4112	AALSTMGTL	HLA-C01:02	TPD52L3	Testis	8593
ASLSVRHPE	HLA-A30:01	KLK4	Prostate	4113	YVKQKTSAAL	HLA-C01:02	TPD52L3	Testis	8594
RSISIASQCPTA	HLA-A30:01	KLK4	Prostate	4114	TEPEQREL	HLA-C01:02	TPD52L3	Testis	8595
AAHCFQNSY	HLA-A30:01	KLK4	Prostate	4115	ESHSTSEL	HLA-C01:02	TPD52L3	Testis	8596
LVHPQWVLS	HLA-A30:01	KLK4	Prostate	4116	YESHSTSEL	HLA-C01:02	TPD52L3	Testis	8597
LYHPSMPCA	HLA-A30:01	KLK4	Prostate	4117	AALSTMGTL	HLA-C03:04	TPD52L3	Testis	8598
KFTEWIEK	HLA-A30:01	KLK4	Prostate	4118	KTSAALSTM	HLA-C03:04	TPD52L3	Testis	8599
VVSEEVCSK	HLA-A30:01	KLK4	Prostate	4119	SAALSTMGTL	HLA-C03:04	TPD52L3	Testis	8600
RSISIASQC	HLA-A30:01	KLK4	Prostate	4120	LTEPEQREL	HLA-C03:04	TPD52L3	Testis	8601
SVVSEEVCSK	HLA-A30:01	KLK4	Prostate	4121	YESHSTSEL	HLA-C03:04	TPD52L3	Testis	8602
CKFTEWIEK	HLA-A30:01	KLK4	Prostate	4122	YESHSTSEL	HLA-C04:01	TPD52L3	Testis	8603
LCKFTEWIEK	HLA-A30:01	KLK4	Prostate	4123	FRSFEGLIF	HLA-C04:01	TPD52L3	Testis	8604
ASLSVRHPEY	HLA-A30:01	KLK4	Prostate	4124	SFEGLMGTI	HLA-C04:01	TPD52L3	Testis	8605
GVPGVYTNL	HLA-A30:01	KLK4	Prostate	4125	TYESHSTSEL	HLA-C04:01	TPD52L3	Testis	8606
SVRHPEYNR	HLA-A30:01	KLK4	Prostate	4126	SFEGLIFN	HLA-C04:01	TPD52L3	Testis	8607
SVRHPEYNR	HLA-A33:03	KLK4	Prostate	4127	KLEAEIVTL	HLA-C04:01	TPD52L3	Testis	8608
MVEASLSVR	HLA-A33:03	KLK4	Prostate	4128	FRSFEGLIF	HLA-C07:01	TPD52L3	Testis	8609
LSVRHPEYNR	HLA-A33:03	KLK4	Prostate	4129	KRKLGLTAL	HLA-C07:01	TPD52L3	Testis	8610
SGWGLLANGR	HLA-A33:03	KLK4	Prostate	4130	FRSFEGLM	HLA-C07:01	TPD52L3	Testis	8611
SLSVRHPEYNR	HLA-A33:03	KLK4	Prostate	4131	RSFEGLIF	HLA-C07:01	TPD52L3	Testis	8612

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
QMVEASLSVR	HLA-A33:03	KLK4	Prostate	4132	LTEPEQREL	HLA-C07:01	TPD52L3	Testis	8613
SVSESDTIR	HLA-A33:03	KLK4	Prostate	4133	KSATFRSF	HLA-C07:01	TPD52L3	Testis	8614
ASLSVRHPEYNR	HLA-A33:03	KLK4	Prostate	4134	FRSFEGLIF	HLA-C07:02	TPD52L3	Testis	8615
LSAAHCFQK	HLA-A33:03	KLK4	Prostate	4135	KRKLGLTAL	HLA-C07:02	TPD52L3	Testis	8616
EYNRPLLAN	HLA-A33:03	KLK4	Prostate	4136	TFRSFEGLM	HLA-C07:02	TPD52L3	Testis	8617
ESVSESDTIR	HLA-A33:03	KLK4	Prostate	4137	ARTETSVGTY	HLA-C07:02	TPD52L3	Testis	8618
EWIEKTVQA	HLA-A33:03	KLK4	Prostate	4138	FADFCMGMY	HLA-A01:01	TSHR	Thyroid	8619
EYNRPLLAND	HLA-A33:03	KLK4	Prostate	4139	SVDLYTHSEY	HLA-A01:01	TSHR	Thyroid	8620
TNLCKFTEW	HLA-A33:03	KLK4	Prostate	4140	SVDLYTHSEYY	HLA-A01:01	TSHR	Thyroid	8621
WFLGYLILG	HLA-A33:03	KLK4	Prostate	4141	DTETPLALAY	HLA-A01:01	TSHR	Thyroid	8622
HPQWVLSAA	HLA-B07:02	KLK4	Prostate	4142	VIDKDAFGGVY	HLA-A01:01	TSHR	Thyroid	8623
HPEYNRPLL	HLA-B07:02	KLK4	Prostate	4143	FLLALLPLV	HLA-A02:01	TSHR	Thyroid	8624
RHPEYNRPLL	HLA-B07:02	KLK4	Prostate	4144	FLMCNLAFA	HLA-A02:01	TSHR	Thyroid	8625
SPHSQPWQAAL	HLA-B07:02	KLK4	Prostate	4145	SLFSWLYRL	HLA-A02:01	TSHR	Thyroid	8626
QPWQAALVM	HLA-B07:02	KLK4	Prostate	4146	KMFPDLTKV	HLA-A02:01	TSHR	Thyroid	8627
SQPWQAALVM	HLA-B07:02	KLK4	Prostate	4147	ALLGNVFVL	HLA-A02:01	TSHR	Thyroid	8628
RPLLANDLM	HLA-B07:02	KLK4	Prostate	4148	CFLLALLPLV	HLA-A02:01	TSHR	Thyroid	8629
CPTAGNSCL	HLA-B07:02	KLK4	Prostate	4149	FLYAIFTKA	HLA-A02:01	TSHR	Thyroid	8630
RPLLANDLML	HLA-B07:02	KLK4	Prostate	4150	SLFSWLYRLPL	HLA-A02:01	TSHR	Thyroid	8631
NPWGWFLGYL	HLA-B07:02	KLK4	Prostate	4151	CMAPISFYA	HLA-A02:01	TSHR	Thyroid	8632
SPHSQPWQAA	HLA-B07:02	KLK4	Prostate	4152	KSLFSWLYRL	HLA-A02:01	TSHR	Thyroid	8633
RPLLANDL	HLA-B07:02	KLK4	Prostate	4153	RFLMCNLAFA	HLA-A02:01	TSHR	Thyroid	8634
HPQWVLSAA	HLA-B08:01	KLK4	Prostate	4154	SLLALLGNV	HLA-A02:01	TSHR	Thyroid	8635
LMLIKLDESV	HLA-B08:01	KLK4	Prostate	4155	SLLDVSQTSV	HLA-A02:01	TSHR	Thyroid	8636
LANGRMPTVL	HLA-B08:01	KLK4	Prostate	4156	ILNKPLITV	HLA-A02:01	TSHR	Thyroid	8637
YDPLYHPSMF	HLA-B08:01	KLK4	Prostate	4157	SLLVENVAV	HLA-A02:01	TSHR	Thyroid	8638
TIGLGLHSL	HLA-B08:01	KLK4	Prostate	4158	FLRIVVWFV	HLA-A02:01	TSHR	Thyroid	8639
HPEYNRPL	HLA-B08:01	KLK4	Prostate	4159	KLYNNGFTSV	HLA-A02:01	TSHR	Thyroid	8640
YLILGVAGSL	HLA-B08:01	KLK4	Prostate	4160	ALLGNVFV	HLA-A02:01	TSHR	Thyroid	8641
LANGRMPTV	HLA-B08:01	KLK4	Prostate	4161	ALAYIVFVL	HLA-A02:01	TSHR	Thyroid	8642
LLANGRMPTV	HLA-B08:01	KLK4	Prostate	4162	ITFAMRLDRK	HLA-A03:01	TSHR	Thyroid	8643
YLQGLVSF	HLA-B08:01	KLK4	Prostate	4163	WLYRLPLGRK	HLA-A03:01	TSHR	Thyroid	8644
NGRMPTVL	HLA-B08:01	KLK4	Prostate	4164	ALKELPLLK	HLA-A03:01	TSHR	Thyroid	8645
IGLGLHSL	HLA-B08:01	KLK4	Prostate	4165	KLDAVYLNK	HLA-A03:01	TSHR	Thyroid	8646
DLMLIKLD	HLA-B08:01	KLK4	Prostate	4166	ILLSKFGICK	HLA-A03:01	TSHR	Thyroid	8647
LIKLDESV	HLA-B08:01	KLK4	Prostate	4167	SLPPSTQTLK	HLA-A03:01	TSHR	Thyroid	8648
EWIEKTVQ	HLA-B08:01	KLK4	Prostate	4168	ITFAMRLDRK	HLA-A11:01	TSHR	Thyroid	8649
YLILGVAG	HLA-B08:01	KLK4	Prostate	4169	LILLTSHYK	HLA-A11:01	TSHR	Thyroid	8650
HPQWVLSA	HLA-B08:01	KLK4	Prostate	4170	KSLFSWLYR	HLA-A11:01	TSHR	Thyroid	8651
MENELFCSGVLV	HLA-B13:02	KLK4	Prostate	4171	AIFTKAFQR	HLA-A11:01	TSHR	Thyroid	8652
MENELFCSGV	HLA-B13:02	KLK4	Prostate	4172	AVSGKGFCK	HLA-A11:01	TSHR	Thyroid	8653
WGWFLGYLI	HLA-B13:02	KLK4	Prostate	4173	SSMQSLRQR	HLA-A11:01	TSHR	Thyroid	8654
SQMVEASLSV	HLA-B13:02	KLK4	Prostate	4174	KSLSFETQK	HLA-A11:01	TSHR	Thyroid	8655

peptide	allele	gene	cancer	SEQ
NELFCSGVLV	HLA-B13:02	KLK4	Prostate	4175
SESDTIRSI	HLA-B13:02	KLK4	Prostate	4176
GNPWGWFLGYLI	HLA-B13:02	KLK4	Prostate	4177
MENELFCSGVL	HLA-B13:02	KLK4	Prostate	4178
HCFQNSYTI	HLA-B13:02	KLK4	Prostate	4179
DQEPGSQMV	HLA-B13:02	KLK4	Prostate	4180
RMPTVLQCV	HLA-B13:02	KLK4	Prostate	4181
ELFCSGVLV	HLA-B13:02	KLK4	Prostate	4182
SQPWQAALV	HLA-B13:02	KLK4	Prostate	4183
FLGYLILGV	HLA-B13:02	KLK4	Prostate	4184
GQVGVPGV	HLA-B13:02	KLK4	Prostate	4185
YTIGLGLHSL	HLA-B46:01	KLK4	Prostate	4186
AAHCFQNSY	HLA-B46:01	KLK4	Prostate	4187
FQNSYTIGL	HLA-B46:01	KLK4	Prostate	4188
GQVGVPGVY	HLA-B46:01	KLK4	Prostate	4189
SAAHCFQNSY	HLA-B46:01	KLK4	Prostate	4190
QMVEASLSV	HLA-B46:01	KLK4	Prostate	4191
LANGRMPTV	HLA-B46:01	KLK4	Prostate	4192
YLILGVAGSL	HLA-B46:01	KLK4	Prostate	4193
LLANDLMLI	HLA-B46:01	KLK4	Prostate	4194
CGQVGVPGVY	HLA-B46:01	KLK4	Prostate	4195
TAGNPWGWF	HLA-B46:01	KLK4	Prostate	4196
YLQGLVSF	HLA-B46:01	KLK4	Prostate	4197
KLYDPLYH	HLA-B46:01	KLK4	Prostate	4198
SLSVRHPEY	HLA-B46:01	KLK4	Prostate	4199
TIRSISIAS	HLA-B46:01	KLK4	Prostate	4200
VSGWGLLAN	HLA-B46:01	KLK4	Prostate	4201
VSVVSEEV	HLA-B46:01	KLK4	Prostate	4202
SLVSGSCSQ	HLA-B46:01	KLK4	Prostate	4203
FQNSYTIGL	HLA-C01:02	KLK4	Prostate	4204
GVPGVYTNL	HLA-C01:02	KLK4	Prostate	4205
RMPTVLQCV	HLA-C01:02	KLK4	Prostate	4206
RHPEYNRPL	HLA-C01:02	KLK4	Prostate	4207
LANGRMPTV	HLA-C01:02	KLK4	Prostate	4208
NSYTIGLGL	HLA-C01:02	KLK4	Prostate	4209
YTIGLGLHSL	HLA-C01:02	KLK4	Prostate	4210
LLANDLMLI	HLA-C01:02	KLK4	Prostate	4211
TIGLGLHSL	HLA-C01:02	KLK4	Prostate	4212
QCPTAGNSCL	HLA-C01:02	KLK4	Prostate	4213
QCPTAGNSC	HLA-C01:02	KLK4	Prostate	4214
YDPLYHPSM	HLA-C01:02	KLK4	Prostate	4215
NRPLLANDL	HLA-C01:02	KLK4	Prostate	4216
KAPCGQVGV	HLA-C01:02	KLK4	Prostate	4217

peptide	allele	gene	cancer	SEQ
VYSTDIFFI	HLA-A24:02	TSHR	Thyroid	8656
HYKLNVPRF	HLA-A24:02	TSHR	Thyroid	8657
SYPSHCCAF	HLA-A24:02	TSHR	Thyroid	8658
LYAIFTKAF	HLA-A24:02	TSHR	Thyroid	8659
AYIVFVLTL	HLA-A24:02	TSHR	Thyroid	8660
IYVSIDVTL	HLA-A24:02	TSHR	Thyroid	8661
PYMTSIPVNAF	HLA-A24:02	TSHR	Thyroid	8662
IARNTWTLK	HLA-A30:01	TSHR	Thyroid	8663
KIRLRHACA	HLA-A30:01	TSHR	Thyroid	8664
AYRGQRVPPK	HLA-A30:01	TSHR	Thyroid	8665
RTIPSHAFS	HLA-A30:01	TSHR	Thyroid	8666
KLDAVYLNK	HLA-A30:01	TSHR	Thyroid	8667
GYKFLRIVV	HLA-A30:01	TSHR	Thyroid	8668
KNKYLTVIDK	HLA-A30:01	TSHR	Thyroid	8669
ALKELPLLK	HLA-A30:01	TSHR	Thyroid	8670
DIMGYKFLR	HLA-A33:03	TSHR	Thyroid	8671
YAIFTKAFQR	HLA-A33:03	TSHR	Thyroid	8672
EDIMGYKFLR	HLA-A33:03	TSHR	Thyroid	8673
AIFTKAFQR	HLA-A33:03	TSHR	Thyroid	8674
WYAITFAMR	HLA-A33:03	TSHR	Thyroid	8675
EHLKELLAR	HLA-A33:03	TSHR	Thyroid	8676
YVKIYITVR	HLA-A33:03	TSHR	Thyroid	8677
LPMDTETPL	HLA-B07:02	TSHR	Thyroid	8678
RPADLLQLVL	HLA-B07:02	TSHR	Thyroid	8679
IPSHAFSNL	HLA-B07:02	TSHR	Thyroid	8680
LPLGRKSLSF	HLA-B07:02	TSHR	Thyroid	8681
IPSLPPSTQTL	HLA-B07:02	TSHR	Thyroid	8682
APISFYAL	HLA-B07:02	TSHR	Thyroid	8683
RPADLLQL	HLA-B07:02	TSHR	Thyroid	8684
SLRQRKSVNAL	HLA-B08:01	TSHR	Thyroid	8685
YLNKNKYLTV	HLA-B08:01	TSHR	Thyroid	8686
TLKKLPLSL	HLA-B08:01	TSHR	Thyroid	8687
FSWLYRLPL	HLA-B08:01	TSHR	Thyroid	8688
DLLQLVLL	HLA-B08:01	TSHR	Thyroid	8689
TWTLKKLPL	HLA-B08:01	TSHR	Thyroid	8690
MRLDRKIRL	HLA-B08:01	TSHR	Thyroid	8691
TDIFFILEI	HLA-B13:02	TSHR	Thyroid	8692
TDFICMAPI	HLA-B13:02	TSHR	Thyroid	8693
ADFCMGMYLLLI	HLA-B13:02	TSHR	Thyroid	8694
FTDFICMAPI	HLA-B13:02	TSHR	Thyroid	8695
AQAYRGQRV	HLA-B13:02	TSHR	Thyroid	8696
RPADLLQLV	HLA-B13:02	TSHR	Thyroid	8697
KMFPDLTKV	HLA-B13:02	TSHR	Thyroid	8698

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
LANGRMPTVL	HLA-C01:02	KLK4	Prostate	4218	GQISEEYMQ	HLA-B13:02	TSHR	Thyroid	8699
FQNSYTIGL	HLA-C03:04	KLK4	Prostate	4219	YAFNGTKLDAVY	HLA-B46:01	TSHR	Thyroid	8700
LANGRMPTV	HLA-C03:04	KLK4	Prostate	4220	FTSYQGYAF	HLA-B46:01	TSHR	Thyroid	8701
YTIGLGLHSL	HLA-C03:04	KLK4	Prostate	4221	YAKVSICLPM	HLA-B46:01	TSHR	Thyroid	8702
LILGVAGSL	HLA-C03:04	KLK4	Prostate	4222	MTSIPVNAF	HLA-B46:01	TSHR	Thyroid	8703
NSYTIGLGL	HLA-C03:04	KLK4	Prostate	4223	LSYPSHCCAF	HLA-B46:01	TSHR	Thyroid	8704
QMVEASLSV	HLA-C03:04	KLK4	Prostate	4224	YAIFTKAF	HLA-B46:01	TSHR	Thyroid	8705
AALVMENEL	HLA-C03:04	KLK4	Prostate	4225	VAFVIVCCCY	HLA-B46:01	TSHR	Thyroid	8706
LANGRMPTVL	HLA-C03:04	KLK4	Prostate	4226	ALNSPLHQEY	HLA-B46:01	TSHR	Thyroid	8707
LVSGSCSQI	HLA-C03:04	KLK4	Prostate	4227	SLPPSTQTL	HLA-C01:02	TSHR	Thyroid	8708
AGNPWGWFL	HLA-C03:04	KLK4	Prostate	4228	MAPISFYAL	HLA-C01:02	TSHR	Thyroid	8709
TAGNPWGWFL	HLA-C03:04	KLK4	Prostate	4229	FSWLYRLPL	HLA-C01:02	TSHR	Thyroid	8710
LYDPLYHPSM	HLA-C04:01	KLK4	Prostate	4230	YAITFAMRL	HLA-C01:02	TSHR	Thyroid	8711
LYDPLYHPSMF	HLA-C04:01	KLK4	Prostate	4231	RLPLGRKSL	HLA-C01:02	TSHR	Thyroid	8712
FQNSYTIGL	HLA-C04:01	KLK4	Prostate	4232	LLPLGRKSL	HLA-C01:02	TSHR	Thyroid	8713
KLYDPLYHPSMF	HLA-C04:01	KLK4	Prostate	4233	YAITFAMRL	HLA-C03:04	TSHR	Thyroid	8714
RMPTVLQCV	HLA-C04:01	KLK4	Prostate	4234	ISFYALSAI	HLA-C03:04	TSHR	Thyroid	8715
SQPWQAALVM	HLA-C04:01	KLK4	Prostate	4235	HAFSNLPNI	HLA-C03:04	TSHR	Thyroid	8716
SQPWQAALV	HLA-C04:01	KLK4	Prostate	4236	FSWLYRLPL	HLA-C03:04	TSHR	Thyroid	8717
RHPEYNRPLL	HLA-C04:01	KLK4	Prostate	4237	YSTDIFFIL	HLA-C03:04	TSHR	Thyroid	8718
CFQNSYTIGL	HLA-C04:01	KLK4	Prostate	4238	LAYIVFVLTL	HLA-C03:04	TSHR	Thyroid	8719
ANDLMLIKL	HLA-C04:01	KLK4	Prostate	4239	FADFCMGMYL	HLA-C03:04	TSHR	Thyroid	8720
LYDPLYHP	HLA-C04:01	KLK4	Prostate	4240	VYSGPSLLL	HLA-C04:01	TSHR	Thyroid	8721
LFCSGVLV	HLA-C04:01	KLK4	Prostate	4241	FADFCMGMYL	HLA-C04:01	TSHR	Thyroid	8722
KLDESVSES	HLA-C04:01	KLK4	Prostate	4242	SYPSHCCAF	HLA-C04:01	TSHR	Thyroid	8723
YLQGLVSF	HLA-C04:01	KLK4	Prostate	4243	SLPPSTQTL	HLA-C04:01	TSHR	Thyroid	8724
VSEEVCSKL	HLA-C04:01	KLK4	Prostate	4244	MFPDLTKVY	HLA-C04:01	TSHR	Thyroid	8725
KLDESVSE	HLA-C04:01	KLK4	Prostate	4245	FFEEQEDEI	HLA-C04:01	TSHR	Thyroid	8726
FQNSYTIGL	HLA-C07:01	KLK4	Prostate	4246	IFNTGLKMF	HLA-C04:01	TSHR	Thyroid	8727
GRMPTVLQCV	HLA-C07:01	KLK4	Prostate	4247	FYNLSKVTHI	HLA-C04:01	TSHR	Thyroid	8728
VRHPEYNRPL	HLA-C07:01	KLK4	Prostate	4248	VFVLLILL	HLA-C04:01	TSHR	Thyroid	8729
NRPLLANDL	HLA-C07:01	KLK4	Prostate	4249	MRLDRKIRL	HLA-C07:01	TSHR	Thyroid	8730
NSYTIGLGL	HLA-C07:01	KLK4	Prostate	4250	IRNTRNLTY	HLA-C07:01	TSHR	Thyroid	8731
LANGRMPTV	HLA-C07:01	KLK4	Prostate	4251	LRHACAIMV	HLA-C07:01	TSHR	Thyroid	8732
NRPLLANDLM	HLA-C07:01	KLK4	Prostate	4252	YKLNVPRFL	HLA-C07:01	TSHR	Thyroid	8733
RHPEYNRPL	HLA-C07:01	KLK4	Prostate	4253	MRPADLLQL	HLA-C07:01	TSHR	Thyroid	8734
SQPWQAALV	HLA-C07:01	KLK4	Prostate	4254	HNMEDVYEL	HLA-C07:01	TSHR	Thyroid	8735
GRMPTVLQC	HLA-C07:01	KLK4	Prostate	4255	HNNAHYYVF	HLA-C07:01	TSHR	Thyroid	8736
AGNPWGWFL	HLA-C07:01	KLK4	Prostate	4256	KRMAVLIF	HLA-C07:01	TSHR	Thyroid	8737
ANGRMPTVL	HLA-C07:01	KLK4	Prostate	4257	MRPADLLQL	HLA-C07:02	TSHR	Thyroid	8738
SESDTIRSI	HLA-C07:01	KLK4	Prostate	4258	IRNTRNLTY	HLA-C07:02	TSHR	Thyroid	8739
NPWGWFLGY	HLA-C07:01	KLK4	Prostate	4259	MRLDRKIRL	HLA-C07:02	TSHR	Thyroid	8740
SYTIGLGL	HLA-C07:01	KLK4	Prostate	4260	SYPSHCCAF	HLA-C07:02	TSHR	Thyroid	8741

peptide	allele	gene	cancer	SEQ
TEWIEKTVQ	HLA-C07:01	KLK4	Prostate	4261
FQNSYTIGL	HLA-C07:02	KLK4	Prostate	4262
RHPEYNRPL	HLA-C07:02	KLK4	Prostate	4263
LYDPLYHPSM	HLA-C07:02	KLK4	Prostate	4264
VRHPEYNRPL	HLA-C07:02	KLK4	Prostate	4265
VHPQWVLSA	HLA-C07:02	KLK4	Prostate	4266
RHPEYNRPLL	HLA-C07:02	KLK4	Prostate	4267
NRPLLANDL	HLA-C07:02	KLK4	Prostate	4268
YNRPLLANDL	HLA-C07:02	KLK4	Prostate	4269
GYLQGLVSF	HLA-C07:02	KLK4	Prostate	4270
YDPLYHPSM	HLA-C07:02	KLK4	Prostate	4271
SYTIGLGL	HLA-C07:02	KLK4	Prostate	4272
VRHPEYNR	HLA-C07:02	KLK4	Prostate	4273
YLQGLVSF	HLA-C07:02	KLK4	Prostate	4274
SSDDKSKSNDPK	HLA-A01:01	LELP1	Testis	4275
SNDPKTEPK	HLA-A01:01	LELP1	Testis	4276
KSNDPKTEPK	HLA-A01:01	LELP1	Testis	4277
SSDDKSKS	HLA-A01:01	LELP1	Testis	4278
SSDDKSKSN	HLA-A01:01	LELP1	Testis	4279
SSDDKSKSND	HLA-A01:01	LELP1	Testis	4280
KLLQRCFEKC	HLA-A02:01	LELP1	Testis	4281
LLQRCFEKC	HLA-A02:01	LELP1	Testis	4282
CLKKLLQRC	HLA-A02:01	LELP1	Testis	4283
CQPSCLKKLL	HLA-A02:01	LELP1	Testis	4284
KLLQRCFEK	HLA-A02:01	LELP1	Testis	4285
CLPCPSQSPS	HLA-A02:01	LELP1	Testis	4286
CQPSCLKKL	HLA-A02:01	LELP1	Testis	4287
CLPCPSQSP	HLA-A02:01	LELP1	Testis	4288
KLLQRCFEKCPW	HLA-A02:01	LELP1	Testis	4289
KCQPSCLKKL	HLA-A02:01	LELP1	Testis	4290
KCPSSCPHA	HLA-A02:01	LELP1	Testis	4291
SCLKKLLQR	HLA-A02:01	LELP1	Testis	4292
KLLQRCFEK	HLA-A03:01	LELP1	Testis	4293
KKLLQRCFEK	HLA-A03:01	LELP1	Testis	4294
KSNDPKTEPK	HLA-A03:01	LELP1	Testis	4295
RCFEKCPWEK	HLA-A03:01	LELP1	Testis	4296
KCQPSCLKK	HLA-A03:01	LELP1	Testis	4297
SSCPPQPCTK	HLA-A11:01	LELP1	Testis	4298
KSNDPKTEPK	HLA-A11:01	LELP1	Testis	4299
KLLQRCFEK	HLA-A11:01	LELP1	Testis	4300
RCFEKCPWEK	HLA-A11:01	LELP1	Testis	4301
SCLKKLLQR	HLA-A11:01	LELP1	Testis	4302
KLLQRCFEKCPW	HLA-A24:02	LELP1	Testis	4303
AYIVFVLTL	HLA-C07:02	TSHR	Thyroid	8742
HNNAHYYVF	HLA-C07:02	TSHR	Thyroid	8743
IYVSIDVTL	HLA-C07:02	TSHR	Thyroid	8744
YQDWQQNLY	HLA-A01:01	TSPAN10	Melanoma	8745
ASYQDWQQNLY	HLA-A01:01	TSPAN10	Melanoma	8746
VSAVSLAGY	HLA-A01:01	TSPAN10	Melanoma	8747
LLDQVQLGL	HLA-A01:01	TSPAN10	Melanoma	8748
FLSNFPFSL	HLA-A02:01	TSPAN10	Melanoma	8749
FLSNFPFSLL	HLA-A02:01	TSPAN10	Melanoma	8750
FLLDQVQLGL	HLA-A02:01	TSPAN10	Melanoma	8751
IFLSNFPFSL	HLA-A02:01	TSPAN10	Melanoma	8752
FLVLEAVAGA	HLA-A02:01	TSPAN10	Melanoma	8753
ALAIGLWGL	HLA-A02:01	TSPAN10	Melanoma	8754
SLLGLLALA	HLA-A02:01	TSPAN10	Melanoma	8755
YLIFLSNFPFSL	HLA-A02:01	TSPAN10	Melanoma	8756
GLLALAIGL	HLA-A02:01	TSPAN10	Melanoma	8757
FLLDQVQL	HLA-A02:01	TSPAN10	Melanoma	8758
ALGGLVVSA	HLA-A02:01	TSPAN10	Melanoma	8759
GLALGGLVV	HLA-A02:01	TSPAN10	Melanoma	8760
SLAGYLGAL	HLA-A02:01	TSPAN10	Melanoma	8761
AIGLWGLAVK	HLA-A03:01	TSPAN10	Melanoma	8762
SLSPGSSCVK	HLA-A03:01	TSPAN10	Melanoma	8763
VVSAVSLAGY	HLA-A03:01	TSPAN10	Melanoma	8764
ALAIGLWGLAVK	HLA-A03:01	TSPAN10	Melanoma	8765
RLLGALAAR	HLA-A03:01	TSPAN10	Melanoma	8766
SLSPGSSCVK	HLA-A11:01	TSPAN10	Melanoma	8767
AIGLWGLAVK	HLA-A11:01	TSPAN10	Melanoma	8768
VVSAVSLAGY	HLA-A11:01	TSPAN10	Melanoma	8769
AIAVVLLQG	HLA-A11:01	TSPAN10	Melanoma	8770
AVAGALVVA	HLA-A11:01	TSPAN10	Melanoma	8771
KYLIFLSNF	HLA-A24:02	TSPAN10	Melanoma	8772
KYLIFLSNFPF	HLA-A24:02	TSPAN10	Melanoma	8773
VKYLIFLSNF	HLA-A24:02	TSPAN10	Melanoma	8774
SYQDWQQNLYF	HLA-A24:02	TSPAN10	Melanoma	8775
SYQDWQQNL	HLA-A24:02	TSPAN10	Melanoma	8776
AARLLGALA	HLA-A30:01	TSPAN10	Melanoma	8777
AARRGAAYG	HLA-A30:01	TSPAN10	Melanoma	8778
RGFSGGILA	HLA-A30:01	TSPAN10	Melanoma	8779
SYQDWQQNL	HLA-A30:01	TSPAN10	Melanoma	8780
RFLLDQVQL	HLA-A30:01	TSPAN10	Melanoma	8781
DQCGFGVLR	HLA-A33:03	TSPAN10	Melanoma	8782
CGPPLRRWLR	HLA-A33:03	TSPAN10	Melanoma	8783
RLLGALAAR	HLA-A33:03	TSPAN10	Melanoma	8784

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
CQPSCLKKL	HLA-A24:02	LELP1	Testis	4304	DSLEHTLR	HLA-A33:03	TSPAN10	Melanoma	8785
LLQRCFEKCPW	HLA-A24:02	LELP1	Testis	4305	HYQDDPDLR	HLA-A33:03	TSPAN10	Melanoma	8786
KCPAPPKCL	HLA-A24:02	LELP1	Testis	4306	TPKKGPAPSL	HLA-B07:02	TSPAN10	Melanoma	8787
KCQPSCLKKL	HLA-A24:02	LELP1	Testis	4307	LPADPMLGLAL	HLA-B07:02	TSPAN10	Melanoma	8788
SCPPQPCTK	HLA-A24:02	LELP1	Testis	4308	SPGVQACSL	HLA-B07:02	TSPAN10	Melanoma	8789
KSKSNDPKTEPK	HLA-A30:01	LELP1	Testis	4309	LPADPMLGL	HLA-B07:02	TSPAN10	Melanoma	8790
KSNDPKTEPK	HLA-A30:01	LELP1	Testis	4310	APSLSPGSSC	HLA-B07:02	TSPAN10	Melanoma	8791
CTKPCPPK	HLA-A30:01	LELP1	Testis	4311	LLAARLLGAL	HLA-B08:01	TSPAN10	Melanoma	8792
RCFEKCPWEK	HLA-A30:01	LELP1	Testis	4312	ALAARRGAA	HLA-B08:01	TSPAN10	Melanoma	8793
KCQPSCLKK	HLA-A30:01	LELP1	Testis	4313	FLSNFPFSL	HLA-B08:01	TSPAN10	Melanoma	8794
SSCPPQPCTK	HLA-A30:01	LELP1	Testis	4314	DAAQRVVYL	HLA-B08:01	TSPAN10	Melanoma	8795
ESKCQPSCLK	HLA-A33:03	LELP1	Testis	4315	PPETKHQAL	HLA-B08:01	TSPAN10	Melanoma	8796
CLKKLLQR	HLA-A33:03	LELP1	Testis	4316	DPMLGLAL	HLA-B08:01	TSPAN10	Melanoma	8797
SCLKKLLQR	HLA-A33:03	LELP1	Testis	4317	LEAVAGALV	HLA-B13:02	TSPAN10	Melanoma	8798
PSCLKKLLQR	HLA-A33:03	LELP1	Testis	4318	LEAVAGALVV	HLA-B13:02	TSPAN10	Melanoma	8799
QPSCLKKLL	HLA-B07:02	LELP1	Testis	4319	LAFLVLEAV	HLA-B13:02	TSPAN10	Melanoma	8800
CPAPPKCL	HLA-B07:02	LELP1	Testis	4320	GLALGGLVV	HLA-B13:02	TSPAN10	Melanoma	8801
CPHACPPPC	HLA-B07:02	LELP1	Testis	4321	GLWGLAVKG	HLA-B13:02	TSPAN10	Melanoma	8802
CPSQSPSSC	HLA-B07:02	LELP1	Testis	4322	RLDADAAQRV	HLA-B13:02	TSPAN10	Melanoma	8803
CLKKLLQRCF	HLA-B08:01	LELP1	Testis	4323	LAARRGAAY	HLA-B46:01	TSPAN10	Melanoma	8804
ESKCQPSCL	HLA-B08:01	LELP1	Testis	4324	FLSNFPFSL	HLA-B46:01	TSPAN10	Melanoma	8805
CPWEKCPA	HLA-B08:01	LELP1	Testis	4325	LAARLLGAL	HLA-B46:01	TSPAN10	Melanoma	8806
CPAPPKCL	HLA-B08:01	LELP1	Testis	4326	FSLLGLLAL	HLA-B46:01	TSPAN10	Melanoma	8807
QPSCLKKLL	HLA-B08:01	LELP1	Testis	4327	SSCVKYLIF	HLA-B46:01	TSPAN10	Melanoma	8808
QPSCLKKL	HLA-B08:01	LELP1	Testis	4328	VHRPPTSGC	HLA-B46:01	TSPAN10	Melanoma	8809
CESKCQPSCL	HLA-B13:02	LELP1	Testis	4329	TLRVAIAHY	HLA-B46:01	TSPAN10	Melanoma	8810
CESKCQPSC	HLA-B13:02	LELP1	Testis	4330	FLSNFPFSL	HLA-C01:02	TSPAN10	Melanoma	8811
LQRCFEKCPW	HLA-B13:02	LELP1	Testis	4331	LSNFPFSLL	HLA-C01:02	TSPAN10	Melanoma	8812
CQPSCLKKL	HLA-B13:02	LELP1	Testis	4332	YLEGCGPPL	HLA-C01:02	TSPAN10	Melanoma	8813
CLKKLLQRC	HLA-B13:02	LELP1	Testis	4333	SSPGVQACSL	HLA-C01:02	TSPAN10	Melanoma	8814
CQPSCLKK	HLA-B13:02	LELP1	Testis	4334	NFPFSLLGL	HLA-C01:02	TSPAN10	Melanoma	8815
LQRCFEKCPW	HLA-B46:01	LELP1	Testis	4335	ADPMLGLAL	HLA-C01:02	TSPAN10	Melanoma	8816
CLKKLLQRCF	HLA-B46:01	LELP1	Testis	4336	LAASCGYAI	HLA-C03:04	TSPAN10	Melanoma	8817
CQPSCLKKL	HLA-B46:01	LELP1	Testis	4337	FSLLGLLAL	HLA-C03:04	TSPAN10	Melanoma	8818
KSNDPKTEP	HLA-B46:01	LELP1	Testis	4338	LAARLLGAL	HLA-C03:04	TSPAN10	Melanoma	8819
SSDDKSKSN	HLA-B46:01	LELP1	Testis	4339	YAIAVVLL	HLA-C03:04	TSPAN10	Melanoma	8820
HACPPPCPP	HLA-B46:01	LELP1	Testis	4340	LSNFPFSLL	HLA-C03:04	TSPAN10	Melanoma	8821
CQPSCLKKL	HLA-C01:02	LELP1	Testis	4341	YQDDPDLRF	HLA-C04:01	TSPAN10	Melanoma	8822
KCPAPPKCL	HLA-C01:02	LELP1	Testis	4342	FLSNFPFSL	HLA-C04:01	TSPAN10	Melanoma	8823
CQPSCLKKLL	HLA-C01:02	LELP1	Testis	4343	YQDWQQNLY	HLA-C04:01	TSPAN10	Melanoma	8824
KCPSSCPHAC	HLA-C01:02	LELP1	Testis	4344	NFPFSLLGL	HLA-C04:01	TSPAN10	Melanoma	8825
CQPSCLKKL	HLA-C03:04	LELP1	Testis	4345	GYAIAVVLL	HLA-C04:01	TSPAN10	Melanoma	8826
CPHACPPPC	HLA-C03:04	LELP1	Testis	4346	LRRWLRANL	HLA-C07:01	TSPAN10	Melanoma	8827

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
CPSQSPSSC	HLA-C03:04	LELP1	Testis	4347	FLSNFPFSL	HLA-C07:01	TSPAN10	Melanoma	8828
HACPPPCPP	HLA-C03:04	LELP1	Testis	4348	HRPPTSGCL	HLA-C07:01	TSPAN10	Melanoma	8829
KCPAPPKCL	HLA-C03:04	LELP1	Testis	4349	RGFSGGILAF	HLA-C07:01	TSPAN10	Melanoma	8830
SSDDKSKSN	HLA-C03:04	LELP1	Testis	4350	CLGPVPRED	HLA-C07:01	TSPAN10	Melanoma	8831
CQPSCLKKL	HLA-C04:01	LELP1	Testis	4351	SYQDWQQNL	HLA-C07:02	TSPAN10	Melanoma	8832
CFEKCPWEK	HLA-C04:01	LELP1	Testis	4352	FLSNFPFSL	HLA-C07:02	TSPAN10	Melanoma	8833
CQPSCLKKLL	HLA-C04:01	LELP1	Testis	4353	HRPPTSGCL	HLA-C07:02	TSPAN10	Melanoma	8834
SNDPKTEP	HLA-C04:01	LELP1	Testis	4354	KKGPAPSL	HLA-C07:02	TSPAN10	Melanoma	8835
KCPAPPKCL	HLA-C04:01	LELP1	Testis	4355	SSCPAFLRY	HLA-A01:01	UBQLN3	Testis	8836
CQPSCLKKL	HLA-C07:01	LELP1	Testis	4356	YTDIMDPML	HLA-A01:01	UBQLN3	Testis	8837
LKKLLQRCF	HLA-C07:01	LELP1	Testis	4357	RSSCPAFLRY	HLA-A01:01	UBQLN3	Testis	8838
CQPSCLKKLL	HLA-C07:01	LELP1	Testis	4358	LTGLSRLGLAY	HLA-A01:01	UBQLN3	Testis	8839
KSNDPKTEP	HLA-C07:01	LELP1	Testis	4359	YTDIMDPMLN	HLA-A01:01	UBQLN3	Testis	8840
SNDPKTEP	HLA-C07:01	LELP1	Testis	4360	YTDIMDPMLNAV	HLA-A01:01	UBQLN3	Testis	8841
KSNDPKTE	HLA-C07:01	LELP1	Testis	4361	RLYDYLQQL	HLA-A02:01	UBQLN3	Testis	8842
CQPSCLKKL	HLA-C07:02	LELP1	Testis	4362	IMDPMLNAV	HLA-A02:01	UBQLN3	Testis	8843
LKKLLQRCF	HLA-C07:02	LELP1	Testis	4363	FLSPPFLHML	HLA-A02:01	UBQLN3	Testis	8844
CQPSCLKKLL	HLA-C07:02	LELP1	Testis	4364	SLMRQHVSV	HLA-A02:01	UBQLN3	Testis	8845
KCPAPPKCL	HLA-C07:02	LELP1	Testis	4365	FLHMLQDLV	HLA-A02:01	UBQLN3	Testis	8846
SCPPQPCTK	HLA-C07:02	LELP1	Testis	4366	IRLYDYLQQL	HLA-A02:01	UBQLN3	Testis	8847
SKCQPSCL	HLA-C07:02	LELP1	Testis	4367	LLWFMPCLA	HLA-A02:01	UBQLN3	Testis	8848
EVDPTSHSY	HLA-A01:01	MAGEA11	Lung squam.	4368	LLLWFMPCL	HLA-A02:01	UBQLN3	Testis	8849
LTQNWVQEKY	HLA-A01:01	MAGEA11	Lung squam.	4369	FLSPPFLHM	HLA-A02:01	UBQLN3	Testis	8850
ETSKMKVLEY	HLA-A01:01	MAGEA11	Lung squam.	4370	GLLTGLSRL	HLA-A02:01	UBQLN3	Testis	8851
IIDLVHLLL	HLA-A01:01	MAGEA11	Lung squam.	4371	VQDPHLIKV	HLA-A02:01	UBQLN3	Testis	8852
KIIDLVHLL	HLA-A02:01	MAGEA11	Lung squam.	4372	GLGDSANRV	HLA-A02:01	UBQLN3	Testis	8853
KVLEYIANA	HLA-A02:01	MAGEA11	Lung squam.	4373	GLLSNTGLV	HLA-A02:01	UBQLN3	Testis	8854
LLFGIDVKEV	HLA-A02:01	MAGEA11	Lung squam.	4374	VLATEAPRL	HLA-A02:01	UBQLN3	Testis	8855
VMWEVLSIMGV	HLA-A02:01	MAGEA11	Lung squam.	4375	QLHENPQSL	HLA-A02:01	UBQLN3	Testis	8856
VLWGPITQI	HLA-A02:01	MAGEA11	Lung squam.	4376	RLYDYLQQLH	HLA-A03:01	UBQLN3	Testis	8857
FLFGEPKRL	HLA-A02:01	MAGEA11	Lung squam.	4377	LIKVTVKTPK	HLA-A03:01	UBQLN3	Testis	8858
ILHDKIIDLV	HLA-A02:01	MAGEA11	Lung squam.	4378	APVQDPHLIK	HLA-A03:01	UBQLN3	Testis	8859
VMWEVLSIM	HLA-A02:01	MAGEA11	Lung squam.	4379	GLSRLGLAYR	HLA-A03:01	UBQLN3	Testis	8860
FLWGPRAHA	HLA-A02:01	MAGEA11	Lung squam.	4380	RLYDYLQQL	HLA-A03:01	UBQLN3	Testis	8861
ILHDKIIDL	HLA-A02:01	MAGEA11	Lung squam.	4381	RLLLWFMPC	HLA-A03:01	UBQLN3	Testis	8862
GLLIIVLGV	HLA-A02:01	MAGEA11	Lung squam.	4382	GLSRLGLAY	HLA-A03:01	UBQLN3	Testis	8863
ALREEGEGV	HLA-A02:01	MAGEA11	Lung squam.	4383	RSSCPAFLR	HLA-A11:01	UBQLN3	Testis	8864
FLFGEPKRLL	HLA-A02:01	MAGEA11	Lung squam.	4384	APVQDPHLIK	HLA-A11:01	UBQLN3	Testis	8865
IDLVHLLLRK	HLA-A03:01	MAGEA11	Lung squam.	4385	TDTCTIQQLK	HLA-A11:01	UBQLN3	Testis	8866
LLLRKYRVK	HLA-A03:01	MAGEA11	Lung squam.	4386	SSCPAFLRY	HLA-A11:01	UBQLN3	Testis	8867
GLGCSPASIK	HLA-A03:01	MAGEA11	Lung squam.	4387	SVAGGIESR	HLA-A11:01	UBQLN3	Testis	8868
RLLTQNWVQEK	HLA-A03:01	MAGEA11	Lung squam.	4388	PVQDPHLIK	HLA-A11:01	UBQLN3	Testis	8869
RKYRVKGLITK	HLA-A03:01	MAGEA11	Lung squam.	4389	RFPNFLGII	HLA-A24:02	UBQLN3	Testis	8870

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
KIIDLVHLLLR	HLA-A03:01	MAGEA11	Lung squam.	4390	IYPADGPPAF	HLA-A24:02	UBQLN3	Testis	8871
SIMGVYAGR	HLA-A11:01	MAGEA11	Lung squam.	4391	RVPFAPLSF	HLA-A24:02	UBQLN3	Testis	8872
LTQNWVQEK	HLA-A11:01	MAGEA11	Lung squam.	4392	TYLQGTASAL	HLA-A24:02	UBQLN3	Testis	8873
KAEMLGSVIK	HLA-A11:01	MAGEA11	Lung squam.	4393	MYTDIMDPML	HLA-A24:02	UBQLN3	Testis	8874
RVIMPLFQR	HLA-A11:01	MAGEA11	Lung squam.	4394	PLPNPPPEVF	HLA-A24:02	UBQLN3	Testis	8875
VYAGREHFLF	HLA-A24:02	MAGEA11	Lung squam.	4395	GFPDQPSSL	HLA-A24:02	UBQLN3	Testis	8876
LWGPITQIF	HLA-A24:02	MAGEA11	Lung squam.	4396	RNRFPNFLGI	HLA-A30:01	UBQLN3	Testis	8877
VLWGPITQIF	HLA-A24:02	MAGEA11	Lung squam.	4397	KGRSSCPAFL	HLA-A30:01	UBQLN3	Testis	8878
NYEDYFPEI	HLA-A24:02	MAGEA11	Lung squam.	4398	RSMGFLNREA	HLA-A30:01	UBQLN3	Testis	8879
VYAGREHFL	HLA-A24:02	MAGEA11	Lung squam.	4399	LSRLGLAYR	HLA-A30:01	UBQLN3	Testis	8880
KYRVKGLITK	HLA-A30:01	MAGEA11	Lung squam.	4400	PVQDPHLIK	HLA-A30:01	UBQLN3	Testis	8881
MSKVSTMFS	HLA-A30:01	MAGEA11	Lung squam.	4401	RLYDYLQQL	HLA-A30:01	UBQLN3	Testis	8882
RVKGLITKA	HLA-A30:01	MAGEA11	Lung squam.	4402	RQIEQGLQV	HLA-A30:01	UBQLN3	Testis	8883
RVKGLITK	HLA-A30:01	MAGEA11	Lung squam.	4403	GVRDGLTVHL	HLA-A30:01	UBQLN3	Testis	8884
LTQNWVQEK	HLA-A30:01	MAGEA11	Lung squam.	4404	LSRLGLAYR	HLA-A33:03	UBQLN3	Testis	8885
SIMGVYAGR	HLA-A33:03	MAGEA11	Lung squam.	4405	QVLATEAPR	HLA-A33:03	UBQLN3	Testis	8886
LSIMGVYAGR	HLA-A33:03	MAGEA11	Lung squam.	4406	IMRQTLEFLR	HLA-A33:03	UBQLN3	Testis	8887
WVQEKYLVYR	HLA-A33:03	MAGEA11	Lung squam.	4407	MANPRALQALR	HLA-A33:03	UBQLN3	Testis	8888
EYIANANGR	HLA-A33:03	MAGEA11	Lung squam.	4408	SVAGGIESR	HLA-A33:03	UBQLN3	Testis	8889
EDYFPEIFR	HLA-A33:03	MAGEA11	Lung squam.	4409	DAPDIRNR	HLA-A33:03	UBQLN3	Testis	8890
RPADLTRVIM	HLA-B07:02	MAGEA11	Lung squam.	4410	QLKEEISQR	HLA-A33:03	UBQLN3	Testis	8891
RPADLTRVI	HLA-B07:02	MAGEA11	Lung squam.	4411	ESVAIKGR	HLA-A33:03	UBQLN3	Testis	8892
RPADLTRVIMPL	HLA-B07:02	MAGEA11	Lung squam.	4412	YPRSLRPDGM	HLA-B07:02	UBQLN3	Testis	8893
APYGPQLQW	HLA-B07:02	MAGEA11	Lung squam.	4413	SPAYPRSL	HLA-B07:02	UBQLN3	Testis	8894
SPSPPQSPQ	HLA-B07:02	MAGEA11	Lung squam.	4414	LPQGSPAPV	HLA-B07:02	UBQLN3	Testis	8895
LLRKYRVKGL	HLA-B08:01	MAGEA11	Lung squam.	4415	LPSPAYPRSL	HLA-B07:02	UBQLN3	Testis	8896
HLLLRKYRV	HLA-B08:01	MAGEA11	Lung squam.	4416	FPALDSAEL	HLA-B07:02	UBQLN3	Testis	8897
LRKYRVKGL	HLA-B08:01	MAGEA11	Lung squam.	4417	YPADGPPAF	HLA-B07:02	UBQLN3	Testis	8898
FPTVRPADL	HLA-B08:01	MAGEA11	Lung squam.	4418	LPNPPPEVF	HLA-B07:02	UBQLN3	Testis	8899
ILHDKIIDL	HLA-B08:01	MAGEA11	Lung squam.	4419	NPQSLGTYL	HLA-B07:02	UBQLN3	Testis	8900
SGLLIIVL	HLA-B08:01	MAGEA11	Lung squam.	4420	SLMRQHVSV	HLA-B08:01	UBQLN3	Testis	8901
MQLLFGIDV	HLA-B13:02	MAGEA11	Lung squam.	4421	VIKRQHRAM	HLA-B08:01	UBQLN3	Testis	8902
WEVLSIMGV	HLA-B13:02	MAGEA11	Lung squam.	4422	LMRQHVSV	HLA-B08:01	UBQLN3	Testis	8903
REASVCMQL	HLA-B13:02	MAGEA11	Lung squam.	4423	LVIKRQHRAM	HLA-B08:01	UBQLN3	Testis	8904
VLWGPITQI	HLA-B13:02	MAGEA11	Lung squam.	4424	DPHLIKVTV	HLA-B08:01	UBQLN3	Testis	8905
SQDILHDKI	HLA-B13:02	MAGEA11	Lung squam.	4425	ILKDPDSL	HLA-B08:01	UBQLN3	Testis	8906
GLLIIVLGV	HLA-B13:02	MAGEA11	Lung squam.	4426	TGLVRQLVL	HLA-B08:01	UBQLN3	Testis	8907
FQSTERAPY	HLA-B46:01	MAGEA11	Lung squam.	4427	DGPPAFSL	HLA-B08:01	UBQLN3	Testis	8908
HSYVLVTSL	HLA-B46:01	MAGEA11	Lung squam.	4428	RQIEQGLQV	HLA-B13:02	UBQLN3	Testis	8909
LVTSLNLSY	HLA-B46:01	MAGEA11	Lung squam.	4429	RDGLTVHLVI	HLA-B13:02	UBQLN3	Testis	8910
FSPTAMDAIF	HLA-B46:01	MAGEA11	Lung squam.	4430	RDGLTVHLV	HLA-B13:02	UBQLN3	Testis	8911
TSKMKVLEY	HLA-B46:01	MAGEA11	Lung squam.	4431	LSFSPTAAI	HLA-B13:02	UBQLN3	Testis	8912
ILHDKIIDL	HLA-B46:01	MAGEA11	Lung squam.	4432	LESIPGGYNV	HLA-B13:02	UBQLN3	Testis	8913

peptide	allele	gene	cancer	SEQ	peptide	allele	gene	cancer	SEQ
FSPTAMDAI	HLA-C01:02	MAGEA11	Lung squam.	4433	RLYDYLQQL	HLA-B13:02	UBQLN3	Testis	8914
SMPKSGLLI	HLA-C01:02	MAGEA11	Lung squam.	4434	VQDPHLIKV	HLA-B13:02	UBQLN3	Testis	8915
AMDAIFGSL	HLA-C01:02	MAGEA11	Lung squam.	4435	HLIKVTVKT	HLA-B13:02	UBQLN3	Testis	8916
RDPTSYPSL	HLA-C01:02	MAGEA11	Lung squam.	4436	FSVTDTCTI	HLA-B46:01	UBQLN3	Testis	8917
RAPYGPQL	HLA-C01:02	MAGEA11	Lung squam.	4437	FLSPPFLHM	HLA-B46:01	UBQLN3	Testis	8918
YVLVTSLNL	HLA-C03:04	MAGEA11	Lung squam.	4438	LSFSPTAAI	HLA-B46:01	UBQLN3	Testis	8919
HSYVLVTSL	HLA-C03:04	MAGEA11	Lung squam.	4439	AAMANPRAL	HLA-B46:01	UBQLN3	Testis	8920
EAAFFSSTL	HLA-C03:04	MAGEA11	Lung squam.	4440	VAIKGRSSC	HLA-B46:01	UBQLN3	Testis	8921
TAMDAIFGSL	HLA-C03:04	MAGEA11	Lung squam.	4441	AAIPGIPEP	HLA-B46:01	UBQLN3	Testis	8922
AAFFSSTL	HLA-C03:04	MAGEA11	Lung squam.	4442	QLHENPQSL	HLA-B46:01	UBQLN3	Testis	8923
YEDYFPEIF	HLA-C04:01	MAGEA11	Lung squam.	4443	YPADGPPAF	HLA-B46:01	UBQLN3	Testis	8924
GTDPACYEF	HLA-C04:01	MAGEA11	Lung squam.	4444	SVPEFVTQL	HLA-C01:02	UBQLN3	Testis	8925
AMDAIFGSL	HLA-C04:01	MAGEA11	Lung squam.	4445	LSPPFLHML	HLA-C01:02	UBQLN3	Testis	8926
IDLVHLLL	HLA-C04:01	MAGEA11	Lung squam.	4446	YLQGTASAL	HLA-C01:02	UBQLN3	Testis	8927
IFREASVCM	HLA-C04:01	MAGEA11	Lung squam.	4447	FLSPPFLHM	HLA-C01:02	UBQLN3	Testis	8928
FREASVCMQL	HLA-C07:01	MAGEA11	Lung squam.	4448	SIPGGYNVL	HLA-C01:02	UBQLN3	Testis	8929
ERAPYGPQL	HLA-C07:01	MAGEA11	Lung squam.	4449	NLPDLVSGL	HLA-C01:02	UBQLN3	Testis	8930
LRKYRVKGL	HLA-C07:01	MAGEA11	Lung squam.	4450	PSPAYPRSL	HLA-C01:02	UBQLN3	Testis	8931
KSGLLIIVL	HLA-C07:01	MAGEA11	Lung squam.	4451	AAMANPRAL	HLA-C03:04	UBQLN3	Testis	8932
RITGGEQVL	HLA-C07:01	MAGEA11	Lung squam.	4452	LSFSPTAAI	HLA-C03:04	UBQLN3	Testis	8933
VYAGREHFL	HLA-C07:02	MAGEA11	Lung squam.	4453	FSVTDTCTI	HLA-C03:04	UBQLN3	Testis	8934
FREASVCMQL	HLA-C07:02	MAGEA11	Lung squam.	4454	FSLGLLTGL	HLA-C03:04	UBQLN3	Testis	8935
IFREASVCM	HLA-C07:02	MAGEA11	Lung squam.	4455	FLSPPFLHM	HLA-C03:04	UBQLN3	Testis	8936
ERAPYGPQL	HLA-C07:02	MAGEA11	Lung squam.	4456	KAHPDQLVL	HLA-C03:04	UBQLN3	Testis	8937
SYVLVTSL	HLA-C07:02	MAGEA11	Lung squam.	4457	LATEAPRLL	HLA-C03:04	UBQLN3	Testis	8938
LTQDLVQENY	HLA-A01:01	MAGEA12	Melanoma	4458	FPDQPSSLM	HLA-C04:01	UBQLN3	Testis	8939
LVQENYLEY	HLA-A01:01	MAGEA2; MAGEA12	Melanoma	4459	MYTDIMDPM	HLA-C04:01	UBQLN3	Testis	8940
LLTQDLVQENY	HLA-A01:01	MAGEA12	Melanoma	4460	YTDIMDPML	HLA-C04:01	UBQLN3	Testis	8941
VVEVVRIGHLY	HLA-A01:01	MAGEA12	Melanoma	4461	FLSPPFLHM	HLA-C04:01	UBQLN3	Testis	8942
MAELVHFLLLKY	HLA-A01:01	MAGEA12	Melanoma	4462	LYDYLQQL	HLA-C04:01	UBQLN3	Testis	8943
KMAELVHFL	HLA-A02:01	MAGEA12	Melanoma	4463	IMDPMLNAV	HLA-C04:01	UBQLN3	Testis	8944
KMAELVHFLL	HLA-A02:01	MAGEA12	Melanoma	4464	VRDGLTVHL	HLA-C04:01	UBQLN3	Testis	8945
FLWGPRALV	HLA-A02:01	MAGEA12	Melanoma	4465	VFPALDSAEL	HLA-C04:01	UBQLN3	Testis	8946
RKMAELVHFL	HLA-A02:01	MAGEA12	Melanoma	4466	IRNRFPNFL	HLA-C07:01	UBQLN3	Testis	8947
TLVEVTLREV	HLA-A02:01	MAGEA12	Melanoma	4467	NRFPNFLGI	HLA-C07:01	UBQLN3	Testis	8948
YLQLVFGIEV	HLA-A02:01	MAGEA2; MAGEA12	Melanoma	4468	GRSSCPAFL	HLA-C07:01	UBQLN3	Testis	8949
KMAELVHFLLL	HLA-A02:01	MAGEA12	Melanoma	4469	RLYDYLQQL	HLA-C07:01	UBQLN3	Testis	8950
KIWEELSVL	HLA-A02:01	MAGEA12	Melanoma	4470	IRLYDYLQQL	HLA-C07:01	UBQLN3	Testis	8951
LSRKMAELVHFL	HLA-A02:01	MAGEA12	Melanoma	4471	VRDGLTVHL	HLA-C07:01	UBQLN3	Testis	8952
GLLGDNQIV	HLA-A02:01	MAGEA12	Melanoma	4472	IRSQDRVL	HLA-C07:01	UBQLN3	Testis	8953
ALVETSYVKV	HLA-A02:01	MAGEA12	Melanoma	4473	SIPGGYNVL	HLA-C07:01	UBQLN3	Testis	8954

peptide	allele	gene	cancer	SEQ
GLLIIVLAI	HLA-A02:01	MAGEA2; MAGEA12	Melanoma	4474
FGIEVVEVV	HLA-A02:01	MAGEA2; MAGEA12	Melanoma	4475
KMAELVHFLLLK	HLA-A03:01	MAGEA12	Melanoma	4476
AELVHFLLLK	HLA-A03:01	MAGEA12	Melanoma	4477
TSFQVALSRK	HLA-A03:01	MAGEA12	Melanoma	4478
RALVETSYVK	HLA-A03:01	MAGEA12	Melanoma	4479
GLLGDNQIVPK	HLA-A03:01	MAGEA12	Melanoma	4480
LLGDNQIVPK	HLA-A03:01	MAGEA12	Melanoma	4481

peptide	allele	gene	cancer	SEQ
KAHPDQLVL	HLA-C07:01	UBQLN3	Testis	8955
IRNRFPNFL	HLA-C07:02	UBQLN3	Testis	8956
NRFPNFLGI	HLA-C07:02	UBQLN3	Testis	8957
RLYDYLQQL	HLA-C07:02	UBQLN3	Testis	8958
MYTDIMDPM	HLA-C07:02	UBQLN3	Testis	8959
NRVPFAPLSF	HLA-C07:02	UBQLN3	Testis	8960
MRQHVSVPEF	HLA-C07:02	UBQLN3	Testis	8961
NRVPFAPL	HLA-C07:02	UBQLN3	Testis	8962

Table 1B - Tumor Epitope Sequences

Epitope	Target	Sample	HLA class	MS validation	Allele (MS)	Allele (predicted)	Cancer
AYSEKVTEF	KLK2	MDAPCa2b	I	X	HLA-C*06:02	HLA-A24:02	Prostate
GLWTGGKDTCGV	KLK2	MDAPCa2b	I			HLA-A02:01	Prostate
HPEDTGQVF	KLK3	MDAPCa2b, human prostate	I	X	HLA-C*07:01 HLA-C*04:01	HLA-C07:01	Prostate
HPEYNRPLL	KLK4	MDAPCa2b, human prostate, breast cancer	I	X	HLA-C*07:01 HLA-B*07:02	HLA-B07:02	Prostate
QRVPVSHSF	KLK2	MDAPCa2b, human prostate	I	X	HLA-C*07:01 HLA-C*07:02	HLA-A24:02	Prostate
SESDTIRSI	KLK4	mantle cell lymphoma, breast cancer	I			HLA-B13:02	Prostate
SLFHPEDTGQV	KLK3	MDAPCa2b	I			HLA-A02:01	Prostate
SLQCVSLHL	KLK2	MDAPCa2b, human prostate	I			HLA-A02:01	Prostate
VILLGRHSL	KLK3	PXD004023	I			HLA-B08:01	Prostate
VLVHPQWVL	KLK3	MDAPCa2b	I			HLA-A02:01	Prostate
LFHPEDTGQVF	KLK3	Human prostate	I	X	HLA-A*24:02	HLA-A24:02	Prostate
RPRSLQCVSL	KLK2	Human prostate	I			HLA-B07:02	Prostate
GYLQGLVSF	KLK4	Human prostate	I	X	HLA-A*24:02	HLA-A24:02	Prostate
IRNKSVILL	KLK3	Human prostate	I	X	HLA-C*06:02 HLA-C*07:02	HLA-C07:01	Prostate
KLQCVDLHV	KLK3	Human prostate	I	X	HLA-A*02:01	HLA-A02:01	Prostate
LLANGRMPTV	KLK4	Human prostate	I	X	HLA-A*02:01	HLA-A02:01	Prostate
LRPGDDSTL	KLK3	Human prostate	I	X	HLA-C*07:02	HLA-C07:02	Prostate
MPALPMVL	KLK3	Human prostate	I	X	HLA-B*07:02	HLA-B07:02	Prostate
NRPLLANDL	KLK4	Human prostate	I	X	HLA-C*06:02 HLA-C*07:02	HLA-C01:02	Prostate
SLQCVSLHL	KLK2	Human prostate	I	X	HLA-A*02:01	HLA-A02:01	Prostate
TWIAPPLQV	KLK3	Human prostate	I	X	HLA-C*04:01	HLA-A02:01	Prostate
VFQVSHSF	KLK3	Human prostate	I	X	HLA-C*07:02	HLA-A24:02	Prostate
YSEKVTEFML	KLK2	Human prostate	I	X	HLA-A*01:01	HLA-A01:01	Prostate

LLSHGAVIEV	ANKRD30A	CD165, HCC1500, CAMA1	I	X	HLA-A*02:01	HLA-A02:01	Breast
SIPTKALEL	ANKRD30A	B721, A375, CAMA1, HCC1500	I			HLA-C01:02	Breast
SQYSGQLKV	ANKRD30A	B721	I			HLA-B13:02	Breast
SVPNKALEL	ANKRD30A	B721, A375	I	X	HLA-C*04:01	HLA-C01:02	Breast
SLSKILDTV	ANKRD30A	CAMA1, HCC1500	I	X	HLA-A*02:01	HLA-A02:01	Breast
SIPTKALEL	ANKRD30A	CAMA1	I	X	HLA-C*04:01	HLA-C01:02	Breast
SLDQKLFQL	ANKRD30A	CAMA1, HCC1500	I	X	HLA-A*02:01	HLA-A02:01	Breast
SVPNKALEL	ANKRD30A	HCC1500	I			HLA-C01:02	Breast
DSLFFLRGR	PRAME	expi293	I			HLA-A33:03	Lung squam.; Melanoma; Ovarian; Uterine
ELFSYLIEK	PRAME	Human melanoma, expi293	I			HLA-A03:01	Lung squam.; Melanoma; Ovarian; Uterine
FYDPEPILC	PRAME	Jurkat	I			HLA-C04:01	Lung squam.; Melanoma; Ovarian; Uterine
ISISALQSL	PRAME	A375	I			HLA-C03:04	Lung squam.; Melanoma; Ovarian; Uterine
ITDDQLLAL	PRAME	A375	I			HLA-A01:01	Lung squam.; Melanoma; Ovarian; Uterine
KRKKNVLRL	PRAME	Human melanoma	I			HLA-C07:01	Lung squam.; Melanoma; Ovarian; Uterine
LQSLLQHLI	PRAME	Human melanoma	I			HLA-B13:02	Lung squam.; Melanoma; Ovarian; Uterine
LSHIHASSY	PRAME	Human melanoma	I			HLA-B46:01	Lung squam.; Melanoma; Ovarian; Uterine
PYLGQMINL	PRAME	Human melanoma, A375, expi293	I			HLA-A24:02	Lung squam.; Melanoma; Ovarian; Uterine

QLLALLPSL	PRAME	H1	I			HLA-A02:01	Lung squam.; Melanoma; Ovarian; Uterine
SFYGNSISI	PRAME	expi293	I			HLA-C07:01	Lung squam.; Melanoma; Ovarian; Uterine
SLLQHLIGL	PRAME	Expi293, MDAPCa2b, A375, human melanoma, JEKO, ovarian carcinoma, H1, LNZ308, JY, Hek293, HeLa, Roja, THP1	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.; Melanoma; Ovarian; Uterine
SPSVSQLSVL	PRAME	Human melanoma, lung cancer, JY, H1, A375	I			HLA-B07:02	Lung squam.; Melanoma; Ovarian; Uterine
SPYLGQMINL	PRAME	melanoma	I			HLA-B07:02	Lung squam.; Melanoma; Ovarian; Uterine
TSPRRLVEL	PRAME	Human melanoma, A375	I			HLA-C01:02	Lung squam.; Melanoma; Ovarian; Uterine
VLYPVPLESY	PRAME	Human melanoma, lung cancer	I			HLA-A03:01	Lung squam.; Melanoma; Ovarian; Uterine
VSPEPLQAL	PRAME	A375	I			HLA-C01:02	Lung squam.; Melanoma; Ovarian; Uterine
YLHARLREL	PRAME	Human melanoma, expi293	I			HLA-B08:01	Lung squam.; Melanoma; Ovarian; Uterine
RLDQLLRHV	PRAME	Human melanoma	I			HLA-A02:01	Lung squam.; Melanoma; Ovarian; Uterine
EVDPASNTY	MAGEA4	GBM, A375	I	X	HLA-A*01:01	HLA-A01:01	Lung squam.
GVYDGREHTV	MAGEA4	GBM, OvCa13, Breast tumor, Lung tumor, A375, MSV000082648	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.
KEVDPASNTY	MAGEA4	OvCa114, A375, Lung tumor	I			HLA-A01:01	Lung squam.

KVDELAHFL	MAGEA4	A375	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.
QIFPKTGL	MAGEA4	A375	I			HLA-B08:01	Lung squam.
QSPQGASAL	MAGEA4	A375	I			HLA-C01:02	Lung squam.
SALPTTISF	MAGEA4	Lung tumor	I			HLA-B46:01	Lung squam.
TVYGEPRKL	MAGEA4	Human melanoma, A375	I			HLA-C07:01	Lung squam.
VYGEPRKL	MAGEA4	A375	I			HLA-C07:02	Lung squam.
YPSLREAAL	MAGEA4	A375	I			HLA-B07:02	Lung squam.
ALLEEEEGV	MAGEA4	A375	I			HLA-A02:01	Lung squam.
KVLEHVVRV	MAGEA4	A375	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.

Table 1C - Tumor Epitope Sequences

Epitope	Target	Sample	HLA class	MS validation	Allele (MS)	Allele (predicted)	Cancer
AYSEKVTEF	KLK2	MDAPCa2b	I	X	HLA-C*06:02	HLA-A24:02	Prostate
HPEDTGQVF	KLK3	MDAPCa2b, human prostate	I	X	HLA-C*07:01 HLA-C*04:01	HLA-C07:01	Prostate
HPEYNRPLL	KLK4	MDAPCa2b, human prostate, breast cancer	I	X	HLA-C*07:01 HLA-B*07:02	HLA-B07:02	Prostate
QRVPVSHSF	KLK2	MDAPCa2b, human prostate	I	X	HLA-C*07:01 HLA-C*07:02	HLA-A24:02	Prostate
LFHPEDTGQVF	KLK3	Human prostate	I	X	HLA-A*24:02	HLA-A24:02	Prostate
GYLQGLVSF	KLK4	Human prostate	I	X	HLA-A*24:02	HLA-A24:02	Prostate
IRNKSVILL	KLK3	Human prostate	I	X	HLA-C*06:02 HLA-C*07:02	HLA-C07:01	Prostate
KLQCVDLHV	KLK3	Human prostate	I	X	HLA-A*02:01	HLA-A02:01	Prostate
LLANGRMPTV	KLK4	Human prostate	I	X	HLA-A*02:01	HLA-A02:01	Prostate
LRPGDDSTL	KLK3	Human prostate	I	X	HLA-C*07:02	HLA-C07:02	Prostate
MPALPMVL	KLK3	Human prostate	I	X	HLA-B*07:02	HLA-B07:02	Prostate
NRPLLANDL	KLK4	Human prostate	I	X	HLA-C*06:02 HLA-C*07:02	HLA-C01:02	Prostate
SLQCVSLHL	KLK2	Human prostate	I	X	HLA-A*02:01	HLA-A02:01	Prostate
TWIAPPLQV	KLK3	Human prostate	I	X	HLA-C*04:01	HLA-A02:01	Prostate

VFQVSHSF	KLK3	Human prostate	I	X	HLA-C*07:02	HLA-A24:02	Prostate
YSEKVTEFML	KLK2	Human prostate	I	X	HLA-A*01:01	HLA-A01:01	Prostate
LLSHGAVIEV	ANKRD30A	CD165, HCC1500, CAMA1	I	X	HLA-A*02:01	HLA-A02:01	Breast
SVPNKALEL	ANKRD30A	B721, A375	I	X	HLA-C*04:01	HLA-C01:02	Breast
SLSKILDTV	ANKRD30A	CAMA1, HCC1500	I	X	HLA-A*02:01	HLA-A02:01	Breast
SIPTKALEL	ANKRD30A	CAMA1	I	X	HLA-C*04:01	HLA-C01:02	Breast
SLDQKLFQL	ANKRD30A	CAMA1, HCC1500	I	X	HLA-A*02:01	HLA-A02:01	Breast
SLLQHLIGL	PRAME	Expi293, MDAPCa2b, A375, human melanoma, JEKO, ovarian carcinoma, H1, LNZ308, JY, Hek293, HeLa, Roja, THP1	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.; Melanoma; Ovarian; Uterine
EVDPASNTY	MAGEA4	GBM, A375	I	X	HLA-A*01:01	HLA-A01:01	Lung squam.
GVYDGREHTV	MAGEA4	GBM, OvCa13, Breast tumor, Lung tumor, A375, MSV000082648	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.
KVDELAHFL	MAGEA4	A375	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.
KVLEHVVRV	MAGEA4	A375	I	X	HLA-A*02:01	HLA-A02:01	Lung squam.

[00246] In aspects, provided herein are compositions comprising tissue-specific antigens. In some embodiments, the compositions comprise antigenic peptides, including tissue-specific antigens. In some embodiments, the tissue-specific antigens comprise tumor epitope sequence(s) as provided herein. In some embodiments, also provided herein are compositions comprising polynucleotides that code for the tissue-specific antigens.

[00247] In some embodiments, the size of the antigenic peptides provided herein comprise, but is not limited to, about 8, about 9, about 10, about 11, about 12, about 13, about 14, about 15, about 16, about 17, about 18, about 19, about 20, about 21, about 22, about 23, about 24, about 25, about 26, about 27, about 28, about 29, about 30, about 31, about 32, about 33, about 34, about 35, about 36, about 37, about 38, about 39, about 40, about 41, about 42, about 43, about 44, about 45, about 46, about 47, about 48, about

49, about 50, about 60, about 70, about 80, about 90, about 100, about 110, about 120 or greater amino molecule residues, and any range derivable therein.

[00248] In some embodiments, the antigenic peptides are equal to or less than 50 amino acids. In some embodiments, the antigenic peptides are equal to about 20 to about 30 amino acids. A longer peptide can be designed in several ways. For example, when the HLA-binding regions are predicted or known, a longer peptide can consist of either: individual binding peptides with an extension of 0-10 amino acids toward the N- and C-terminus of each corresponding gene product. A longer peptide can also consist of a concatenation of some or all of the binding peptides with extended sequences for each.

[00249] The antigenic peptides and polypeptides can bind to or can be predicted to bind to an HLA protein. The antigenic peptide can have or can be predicted to have an IC50 of about less than 1000 nM, about less than 500 nM, about less than 250 nM, about less than 200 nM, about less than 150 nM, about less than 100 nM, or about less than 50 nM. In some embodiments, the antigenic peptides do not induce an autoimmune response and/or invoke immunological tolerance when administered to a subject.

Identification of Tissue-Specific Antigen

[00250] In some aspects, the present disclosure provides methods of identifying tissue-specific antigens. In some embodiments, the tissue-specific antigen can be a tumor tissue specific epitope sequence.

[00251] In some embodiments, the methods provided herein comprise identifying an epitope sequence, which binds to or is predicted to bind to a protein encoded by a MHC allele expressed by a human subject, and is encoded by a tissue-specific antigen epitope gene that has an expression level in a tumor from a target tissue that is at least 2 fold greater than an expression level of the tissue-specific antigen epitope gene in each tissue of a plurality of non-target tissues that are different than the target tissue.

[00252] In some embodiments, the methods provided herein comprise identifying an epitope gene that has a higher expression level in a target tissue than in a non-target tissue. For example, the methods can comprise identifying an epitope gene that has a higher expression level in human pancreatic tissue than in human breast tissue, human lung tissue, or other human essential tissues. In some cases, the expression level in human pancreatic tissue can be at least 2 fold higher than in human breast tissue. In some embodiments, the step of identifying an epitope gene that has a higher expression level in a target tissue than in a non-target tissue comprises comparing expression level of the epitope gene in the target tissue versus in the non-target tissue. The comparison can be done by looking up the expression level of the epitope gene, at mRNA transcript or protein level, or both, profiled in compiled datasets, like TCGA (portal.gdc.cancer.gov/, last accessed September 2018), GTEX (gtexportal.org/home/, last accessed September 2018), GENT (medicalgenome.kribb.re.kr/GENT/, last accessed September 2018), The Human Protein Atlas (proteinatlas.org/, last accessed September 2018), Expression Atlas (ebi.ac.uk/gxa/home, last accessed September 2018), BioXpress (hive.biochemistry.gwu.edu/tools/bioxpress, last accessed September 2018), MERAV (merav.wi.mit.edu, last accessed September 2018), Global Cancer Map

(globalcancermap.com/, last accessed September 2018), and CGAP (cgap.nci.nih.gov/, last accessed September 2018). Alternatively, the comparison can be done by experimental methods for assessing gene expression level, such as, but not limited to, techniques for assessing mRNA transcripts level like real time RT-PCR (real time-polymerase chain reaction), microarray, Northern blot, ISH (in situ hybridization), and RNA-seq (RNA sequencing), and techniques for assessing protein expression level like mass spectrometry, protein array, peptide array, immunostaining, and Western blot. Alternatively, the comparison can be done by: 1) first looking up profiled expression level in complied datasets, such as those discussed above; and 2) then experimentally validating the expression level in the tissues of interest.

[00253] In some embodiments, the methods provided herein comprise identifying a tumor epitope gene that has a higher expression level in a tumor from a target tissue than in each tissue of a plurality of non-target tissues that are different than the target tissue. For example, a prostate tumor is from prostate tissue, the methods provided herein can comprise identifying a tumor epitope gene that has a higher expression level in the prostate tumor than in each of a plurality of non-target tissues that are different than prostate, such as, but not limited to, brain, colon, lung, heart, and bone marrow.

[00254] In some embodiments, the methods provided herein comprise identifying a tumor epitope gene that has a higher expression level in a tumor from a target tissue than in an essential tissue. In some embodiments, the target tissue is a non-essential tissue. In some embodiments, an essential tissue comprises brain, colon, heart, bone marrow, or lung. In some embodiments, a non-essential tissue comprises thyroid, pancreas, adrenal, fallopian, prostate, breast, ovary, or cervix.

[00255] As provided herein, the tissue from which a tumor is derived from can be termed as target tissue, and other tissues or in some cases, essential tissues, can be termed as off-target tissues. In some embodiments, the methods provided herein comprise identifying tissue-specific antigen based on its absolute expression level in target tissue and off-target tissues. The expression level can be, in some cases, evaluated by RNA-seq reads. In some cases, the expression level can be expressed in units like "transcripts per million" (TPM) by which it can mean that the gene of interest has certain number of mRNA transcripts over one million total mRNA transcripts in a tissue of concern. In some embodiments, TPM can denominate protein coding mRNA transcripts, and non-protein coding genes are excluded for consideration. In some embodiments, the methods provided herein comprise identifying epitope sequence that is encoded by a tumor epitope gene that has an expression level of at least about 100 TPM in the target tissue, and has an expression level of at most about 5 TPM in off-target tissues. In some embodiments, the expression level of the epitope gene in the target tissue can be at least 10 TPM, at least 20 TPM, at least 30 TPM, at least 40 TPM, at least 50 TPM, at least 60 TPM, at least 70 TPM, at least 80 TPM, at least 90 TPM, at least 100 TPM, at least 110 TPM, at least 120 TPM, at least 130 TPM, at least 140 TPM, at least 150 TPM, at least 200 TPM, at least 300 TPM, at least 400 TPM, at least 500 TPM, at least 600 TPM, at least 700 TPM, at least 800 TPM, at least 1000 TPM, at least 2000 TPM, at least 3000 TPM, at least 5000

TPM, at least 10^4 TPM, or greater. In some embodiments, the expression level of the epitope gene in off-target tissues can be at most 1000 TPM, at most 500 TPM, at most 100 TPM, at most 50 TPM, at most 20 TPM, at most 10 TPM, at most 9 TPM, at most 8 TPM, at most 7 TPM, at most 6 TPM, at most 5 TPM, at most 4 TPM, at most 3 TPM, at most 2 TPM, at most 1 TPM, at most 0.9 TPM, at most 0.8 TPM, at most 0.7 TPM, at most 0.6 TPM, at most 0.5 TPM, at most 0.4 TPM, at most 0.3 TPM, at most 0.2 TPM, at most 0.1 TPM, at most 0.050 TPM, at most 0.02 TPM, at most 0.010 TPM, at most 0.005 TPM, at most 0.002 TPM, at most 0.001 TPM, or lower.

[00256] In some embodiments, the methods comprise use of a computer algorithm to screen for tissue-specific epitope genes as provided herein. The computer algorithm can be constructed to access and examine available database containing expression data of a number of genes in different types of tissues. The computer algorithm can also be constructed to extract and compare the expression data as provided by various database, in order to identify genes of interest, e.g., tissue-specific genes, e.g., tissue-specific tumor epitope genes. In some embodiments, the computer algorithm can be constructed to report and display the screening results as can be viewed, extracted, and/or further processed by other computer algorithms. For example, the computer algorithm as provided herein can comprise different modules, among which there is one or more modules for identifying tissue-specific genes as provided herein, and there is also one or more modules for identifying epitope sequences from the identified tissue-specific genes.

[00257] In some embodiments, the methods provided herein comprise identifying an epitope sequence that can bind to or can be predicted to bind to a protein encoded by a MHC allele. In some embodiments, the MHC allele is expressed by a human subject. In some embodiments, the identification of epitope sequence that can bind to or can be predicted to bind to a protein encoded by a MHC allele expressed by a human subject is based on MHC binding affinity prediction, for example by one or more prediction algorithms. In some embodiments, the identification is based on experimental validation as will be discussed below. In some embodiments, the identification is based on both algorithm prediction and experimental validation. In some embodiments, the computer algorithms applicable to the subject matter include, but not limited to, evolutionary algorithms, artificial neural network-based algorithms, algorithms involving ant colony, hidden Markov models, support vector machines, and motif search, and any combination thereof. The computer algorithm can be based on convolutional neural networks (artificial intelligence or deep learning). The algorithms applicable the subject matter can be based on any appropriate prediction models. Non-limiting exemplary affinity prediction programs, tools, or online resources can include NetMHC, NetMHCIIpan, SVRMHC, DeepMHC, BiodMHC, sNebula, MHCPred, EpiToolKit, FRED, NNAlign, ProPred, HLA-DR4Pred, EpiTOP, CTLPred, TEPITOPEpan, SMM-align, ICES, GPS-MBA, EpiJen, PREDIVAC, EpicCapo, Epitopemap, ARB, EpiDOCK, HLArestrictor, MULTIPRED, MHCcluster, IMS (Immunogenetic Management Software), PAAQD, MHC2Pred, TEpredict, TepiTool,

MMBPred, MHCMIR, HLAV3D, MHCBench, FDR4, LIGAP, MHC, HLAPred, HLA, POPISK, BiodMHC, MultiRTA, and MHC-BPS.

[00258] In some embodiments, the methods provided herein comprise identifying an epitope sequence that can bind to or can be predicted to bind to a protein encoded by a MHC allele and can be or can be predicted to be presented by an antigen-presenting cell. In some embodiments, the MHC allele is expressed by a human subject. In some embodiments, the antigen-presenting cell is a human antigen-presenting cell. The identification of affinity binding to MHC allele and presentation by APC can be based on prediction algorithms, experimental validation, or both.

Therapeutic Methods and Compositions

[00259] Provided herein is a therapeutic composition comprising a peptide identified according to the method disclosed herein or a peptide as provided herein. Also provided herein is a method of providing an anti-tumor immunity in a mammal comprising administering to the mammal a polynucleic acid comprising a sequence encoding a peptide identified according to a method described herein. Provided herein is a method of providing an anti-tumor immunity in a mammal comprising administering to the mammal an effective amount of a peptide with a sequence of a peptide identified according to a method described herein. Provided herein is a method of providing an anti-tumor immunity in a mammal comprising administering to the mammal a cell comprising a peptide comprising the sequence of a peptide identified according to a method described herein. Provided herein is a method of providing an anti-tumor immunity in a mammal comprising administering to the mammal a cell comprising a polynucleic acid comprising a sequence encoding a peptide comprising the sequence of peptide identified according to a method described herein. In some embodiments, the cell presents the peptide as an HLA-peptide complex.

[00260] Provided herein is a therapeutic composition comprising a polynucleotide that comprises a sequence coding for a peptide identified according to the method disclosed herein or a peptide as provided herein. Also provided herein is a method of treating a disease or disorder in a subject, the method comprising administering to the subject a polynucleic acid comprising a sequence encoding a peptide identified according to a method described herein or a peptide as provided herein.

[00261] Provided herein is a method of treating a disease or disorder in a subject, the method comprising administering to the subject an effective amount of a peptide comprising the sequence of a peptide identified according to a method described herein or a peptide as provided herein. Provided herein is a method of treating a disease or disorder in a subject, the method comprising administering to the subject a cell comprising a peptide comprising the sequence of a peptide identified according to a method described herein or a peptide as provided herein. Provided herein is a method of treating a disease or disorder in a subject, the method comprising administering to the subject a cell comprising a polynucleic acid comprising a sequence encoding a peptide comprising the sequence of a peptide identified according to a method described herein or a peptide as provided herein. In some embodiments, wherein the disease or

disorder is cancer. In some embodiments, the method further comprises administering an immune checkpoint inhibitor to the subject.

[00262] In some embodiments the present invention is directed to a therapeutic or pharmaceutical composition, e.g., a vaccine composition capable of raising a tissue-specific antigen response (e.g., a humoral or cell-mediated immune response). In some embodiments, the pharmaceutical composition comprises antigen therapeutic (e.g., peptides, polynucleotides, TCR, CAR, cells containing TCR or CAR, dendritic cell containing polypeptide, dendritic cell containing polynucleotide, antibody, etc.) described herein corresponding to tissue-specific antigen identified herein.

[00263] In some embodiments, a pharmaceutical composition provided herein comprises at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one tissue-specific antigen peptide sequence provided herein. In some embodiments, the T cells are prepared by incubating FMS-like tyrosine kinase 3 receptor ligand (FLT3L) with a population of immune cells from a biological sample and incubating at least one T cell of the biological sample with an APC presenting the at least one tissue-specific antigen peptide sequence.

[00264] A person skilled in the art will be able to select antigenic therapeutics by testing, for example, the generation of T cells in vitro as well as their efficiency and overall presence, the proliferation, affinity and expansion of certain T cells for certain peptides, and the functionality of the T cells, e.g. by analyzing the IFN-γ production or tumor killing by T cells. The most efficient peptides can then combined as an immunogenic composition.

[00265] In some embodiments of the present invention the different antigenic peptides and/or polypeptides are selected so that one pharmaceutical composition comprises antigenic peptides and/or polypeptides capable of associating with different MHC molecules, such as different MHC class I molecule. In some embodiments, a pharmaceutical composition comprises antigenic peptides and/or polypeptides capable of associating with the most frequently occurring MHC class I molecules. Hence, immunogenic compositions described herein comprise different peptides capable of associating with at least 2, at least 3, or at least 4 MHC class I or class II molecules.

[00266] In some embodiments, a pharmaceutical composition described herein is capable of raising a specific cytotoxic T cells response, specific helper T cell response, or a B cell response.

[00267] In some embodiments, a pharmaceutical composition described herein can further comprise an adjuvant and/or a carrier. Examples of useful adjuvants and carriers are given herein below. Polypeptides and/or polynucleotides in the composition can be associated with a carrier such as e.g. a protein or an antigen-presenting cell such as e.g. a dendritic cell (DC) capable of presenting the peptide to a T cell or a B cell. In further embodiments, DC-binding peptides are used as carriers to target the antigenic peptides and polynucleotides encoding the tissue-specific antigen peptides to dendritic cells (Sioud et al. FASEB J 27: 3272-3283 (2013)).

[00268] In embodiments, the antigenic polypeptides or polynucleotides of the present disclosure can be provided as antigen presenting cells (e.g., dendritic cells) containing such polypeptides or polynucleotides. In other embodiments, such antigen presenting cells are used to stimulate T cells for use in patients.

[00269] In some embodiments, the antigen presenting cells are dendritic cells. In related embodiments, the dendritic cells are autologous dendritic cells that are pulsed with the antigenic peptide or nucleic acid. The antigenic peptide can be any suitable peptide that gives rise to an appropriate T cell response. T cell therapy using autologous dendritic cells pulsed with peptides from a tumor associated antigen is disclosed in Murphy et al. (1996) The Prostate 29, 371-380 and Tjua et al. (1997) The Prostate 32, 272-278. In some embodiments, the T cell is a CTL. In some embodiments, the T cell is a HTL.

[00270] Thus, one embodiment of the present invention provides a pharmaceutical composition containing at least one antigen presenting cell (e.g., a dendritic cell) that is pulsed or loaded with one or more antigenic polypeptides or polynucleotides described herein. In embodiments, such APCs are autologous (e.g., autologous dendritic cells). Alternatively, peripheral blood mononuclear cells (PBMCs) isolated from a patient can be loaded with antigenic peptides or polynucleotides ex vivo. In related embodiments, such APCs or PBMCs are injected back into the patient.

[00271] The polynucleotide of the present disclosure can be any suitable polynucleotide that is capable of transducing the dendritic cell, thus resulting in the presentation of a tissue-specific antigenic peptide and induction of immunity. In some embodiments, the polynucleotide can be naked DNA that is taken up by the cells by passive loading. In another embodiment, the polynucleotide is part of a delivery vehicle, for example, a liposome, virus like particle, plasmid, or expression vector. In another embodiment, the polynucleotide is delivered by a vector-free delivery system, for example, high performance electroporation and high-speed cell deformation). In embodiments, such antigen presenting cells (APCs) (e.g., dendritic cells) or peripheral blood mononuclear cells (PBMCs) are used to stimulate a T cell (e.g., an autologous T cell). In related embodiments, the T cell is a CTL. In other related embodiments, the T cell is an HTL. Such T cells are then injected into the patient. In some embodiments, CTL is injected into the patient. In some embodiments, HTL is injected into the patient. In some embodiments, both CTL and HTL are injected into the patient. Administration of either therapeutic can be performed simultaneously or sequentially and in any order.

[00272] In aspects, the present disclosure provides therapeutic compositions comprising immune cells, e.g., T cells that target tissue-specific antigens as provided herein, and methods of generating the compositions. In some embodiments, T cells are stimulated with one or more of the antigens described herein *ex vivo*. In some embodiments, the T cells that have been induced to recognize and target the tissue-specific antigens *ex vivo* are infused into the patient. In some embodiments, the infused T cells are from the patient himself/herself. In some embodiments, the infused T cells are from another subject.

[00273] In aspects, the present disclosure provides therapeutic compositions comprising TCRs that target the tissue-specific antigens provided herein and methods for generating the compositions. The TCRs provided herein can recognize one or more specific antigens. For instance, in some cases, the TCRs can be engineered to be bi-specific. In some cases, the TCRs can recognize one particular antigen specifically. In some cases, the TCRs can recognize one particular antigen specifically. In some embodiments, TCRs recognizing one or more of the tissue-specific antigens are identified *a priori*, for example, from a healthy donor. In some embodiments, the TCR(s) are knocked into T cells from the patient or other subject, e.g., the T cells are genetically modified to express the TCR(s) that are identified as recognizing one or more of the tissue-specific antigens. In some embodiments, the genetically modified T cells are infused into the patient.

[00274] In aspects, the present disclosure provides a method of discovering a TCR that recognizes an epitope, e.g., tissue-specific antigen. In some embodiments, the method comprises obtaining a T cell from a donor, and contacting the T cell with an antigen peptide in complex with an HLA of an APC from the donor. In some embodiments, the contacting can induce proliferation of the T cell. In some embodiments, the method further comprising determining a sequence of a TCR that recognizes the antigen peptide. In some embodiments, the donor is known to have zero or reduced immune tolerance to a tissue of origin of the antigen peptide. Without wishing to be bound to a certain theory, a subject, e.g., a human, can normally develop immune tolerance to proteins or peptides that are encoded by almost all normal genes (e.g., wild-type genes) of the subject in a healthy somatic tissue. However, in some cases, when a tissue of the same species is heterologous to the subject, the subject can have zero or low immune tolerance to proteins or peptides that are normally expressed in such tissue, for instance, a female human being can have low to none immune tolerance to human prostate-specific peptides (e.g., peptides specifically expressed in human prostate), and a male human being can have low to none immune tolerance to human ovary-specific peptides (e.g., peptides specifically expressed in human ovary). In some other cases, when a subject's immune system is deficient in developing immune tolerance to one or more of its own tissues, the subject can also have low to none immune tolerance to peptides specifically expressed in the one or more tissues, for instance, a type I diabetic subject can have autoimmunity against pancreas-specific peptide.

[00275] In some embodiments of the method of TCR discovery provided herein, the donor is a female subject, and the antigen peptide is specific to a tissue selected from the group consisting of: Bulbourethral gland, epididymis, penis, prostate, scrotum, seminal vesicle, testicle. In some embodiments, the donor is a female subject, and the antigen peptide is specific to prostate. In some embodiments, the donor is a male subject, and the antigen peptide is specific to a tissue selected from the group consisting of: Bartholin's gland, fallopian tube, ovary, Skene's gland, uterus, cervix, vagina, and any combination thereof. In some embodiments, the donor is a male subject, and the antigen peptide is specific to ovary. In some embodiments, the TCR discovered by contacting prostate-specific antigen peptide with T cells from female

subject can be used for treatment of prostate cancer. In some embodiments, the TCR discovered by contacting ovary-specific antigen peptide with T cells from male subject can be used for treatment of ovarian cancer.

[00276] In some embodiments, the donor is a Type I diabetes patient, and the antigen peptide is specific to pancreas. In some embodiments, the TCR discovered by contacting pancreas-specific antigen peptide with T cells from Type I diabetic subject can be used for treatment of pancreas cancer. In some embodiments, the donor has auto-immune thyroid condition, and the antigen peptide is specific to thyroid. In some embodiments, the TCR discovered by contacting thyroid-specific antigen peptide with T cells from a subject with auto-immune thyroid condition can be used for treatment of thyroid cancer.

[00277] In aspects, the present disclosure provides therapeutic compositions comprising antibodies or functional part thereof that target the tissue-specific antigens provided herein and methods for generating the compositions. The antibodies provided herein can recognize one or more specific antigens. In some cases, the antibody as described herein can recognize one particular antigen specifically. In some embodiments, antibodies provided herein can find particular use for its specific binding to tissue-specific antigens that are expressed on cell surface. In some embodiments, antibodies provided herein can find particular use for its specific binding to tissue-specific antigens that are secreted outside of cells. In some embodiments, the antibodies can be isolated, recombinant, or purified for the therapeutic composition. Production of antibodies or functional part thereof can be carried out by techniques available to one skilled in the art. In some embodiments, antibodies can be produced by hybridomas or by such B cell culture. They can be harvested and for instance used for anticancer therapy. In some embodiments, they can be humanized before use in order to reduce side-effects.

[00278] The pharmaceutical compositions (e.g., immunogenic compositions) described herein for therapeutic treatment are intended for parenteral, topical, nasal, oral or local administration. In some embodiments, the pharmaceutical compositions described herein are administered parenterally, e.g., intravenously, subcutaneously, intradermally, or intramuscularly. In embodiments, the composition can be administered intratumorally. The compositions can be administered at the site of surgical excision to induce a local immune response to the tumor. In some embodiments, described herein are compositions for parenteral administration which comprise a solution of the antigenic peptides and immunogenic compositions are dissolved or suspended in an acceptable carrier, for example, an aqueous carrier. A variety of aqueous carriers can be used, e.g., water, buffered water, 0.9% saline, 0.3% glycine, hyaluronic acid and the like. These compositions can be sterilized by conventional, well known sterilization techniques, or can be sterile filtered. The resulting aqueous solutions can be packaged for use as is, or lyophilized, the lyophilized preparation being combined with a sterile solution prior to administration. The compositions can contain pharmaceutically acceptable auxiliary substances as required to approximate physiological conditions, such as pH adjusting and buffering agents, tonicity adjusting agents, wetting agents and the

like, for example, sodium acetate, sodium lactate, sodium chloride, potassium chloride, calcium chloride, sorbitan monolaurate, triethanolamine oleate, etc.

[00279] The concentration of antigenic peptides and polynucleotides described herein in the pharmaceutical formulations can vary widely, i.e., from less than about 0.1%, usually at or at least about 2% to as much as 20% to 50% or more by weight, and will be selected by fluid volumes, viscosities, etc., according to the particular mode of administration selected.

[00280] The antigenic peptides and polynucleotides described herein can also be administered via liposomes, which target the peptides to a particular cells tissue, such as lymphoid tissue. Liposomes are also useful in increasing the half-life of the peptides. Liposomes include emulsions, foams, micelles, insoluble monolayers, liquid crystals, phospholipid dispersions, lamellar layers and the like. In these preparations the peptide to be delivered is incorporated as part of a liposome, alone or in conjunction with a molecule which binds to, e.g., a receptor prevalent among lymphoid cells, such as monoclonal antibodies which bind to the DEC205 antigen, or with other therapeutic or immunogenic compositions. Thus, liposomes filled with a desired peptide or polynucleotide described herein can be directed to the site of lymphoid cells, where the liposomes then deliver the selected therapeutic/immunogenic polypeptide/polynucleotide compositions. Liposomes can be formed from standard vesicle-forming lipids, which generally include neutral and negatively charged phospholipids and a sterol, for example, cholesterol. The selection of lipids is generally guided by consideration of, e.g., liposome size, acid lability and stability of the liposomes in the blood stream. A variety of methods are available for preparing liposomes, as described in, e.g., Szoka et al., Ann. Rev. Biophys. Bioeng. 9; 467 (1980), U.S. Pat. Nos. 4,235,871, 4,501,728, 4,501,728, 4,837,028, and 5,019,369.

[00281] For targeting to the immune cells, an antigenic polypeptides or polynucleotides to be incorporated into the liposome for cell surface determinants of the desired immune system cells. A liposome suspension containing a peptide can be administered intravenously, locally, topically, etc. in a dose which varies according to, inter alia, the manner of administration, the polypeptide or polynucleotide being delivered, and the stage of the disease being treated.

[00282] In some embodiments, antigenic polypeptides and polynucleotides are targeted to dendritic cells. In some embodiments, the antigenic polypeptides and polynucleotides are target to dendritic cells using the markers DEC205, XCR1, CD197, CD80, CD86, CD123, CD209, CD273, CD283, CD289, CD184, CD85h, CD85j, CD85k, CD85d, CD85g, CD85a, TSLP receptor, Clec9a or CD1a.

[00283] For solid compositions, conventional or nanoparticle nontoxic solid carriers can be used which include, for example, pharmaceutical grades of mannitol, lactose, starch, magnesium stearate, sodium saccharin, talcum, cellulose, glucose, sucrose, magnesium carbonate, and the like. For oral administration, a pharmaceutically acceptable nontoxic composition is formed by incorporating any of the normally employed excipients, such as those carriers previously listed, and generally 10-95% of active ingredient,

that is, one or more antigenic polypeptides or polynucleotides described herein at a concentration of 25%-75%.

[00284] For aerosol administration, the antigenic polypeptides or polynucleotides can be supplied in finely divided form along with a surfactant and propellant. Representative of such agents are the esters or partial esters of fatty acids containing from 6 to 22 carbon atoms, such as caproic, octanoic, lauric, palmitic, stearic, linoleic, linolenic, olesteric and oleic acids with an aliphatic polyhydric alcohol or its cyclic anhydride. Mixed esters, such as mixed or natural glycerides can be employed. The surfactant can constitute 0.1%-20% by weight of the composition, or 0.25-5%. The balance of the composition can be propellant. A carrier can also be included as desired, as with, e.g., lecithin for intranasal delivery.

[00285] Additional methods for delivering the antigenic polynucleotides described herein are also known in the art. For instance, the nucleic acid can be delivered directly, as "naked DNA". This approach is described, for instance, in Wolff et al., Science 247: 1465-1468 (1990) as well as U.S. Pat. Nos. 5,580,859 and 5,589,466. The nucleic acids can also be administered using ballistic delivery as described, for instance, in U.S. Pat. No. 5,204,253. Particles comprised solely of DNA can be administered. Alternatively, DNA can be adhered to particles, such as gold particles.

[00286] For therapeutic or immunization purposes, mRNA encoding the antigenic peptides, or peptide binding agents can also be administered to the patient. In some embodiments, the mRNA is self-amplifying RNA. In a further embodiment, the self-amplifying RNA is a part of a synthetic lipid nanoparticle formulation (Geall et al., Proc Natl Acad Sci U S A. 109: 14604–14609 (2012)).

[00287] The nucleic acids can also be delivered complexed to cationic compounds, such as cationic lipids. Lipid-mediated gene delivery methods are described, for instance, in WO 96/18372, WO 93/24640; Mannino & Gould-Fogerite, BioTechniques 6(7): 682-691 (1988); U.S. Pat. No. 5,279,833; WO 91/06309; and Felgner et al., Proc. Natl. Acad. Sci. USA 84: 7413-7414 (1987).

[00288] The antigenic peptides and polypeptides described herein can also be expressed by attenuated viruses, such as vaccinia or fowlpox. This approach involves the use of vaccinia virus as a vector to express nucleotide sequences that encode the peptide described herein. Upon introduction into an acutely or chronically infected host or into a noninfected host, the recombinant vaccinia virus expresses the immunogenic peptide, and thereby elicits a host CTL response. Vaccinia vectors and methods useful in immunization protocols are described in, e.g., U.S. Pat. No. 4,722,848. Another vector is BCG (Bacille Calmette Guerin). BCG vectors are described in Stover et al. (Nature 351:456-460 (1991)). A wide variety of other vectors useful for therapeutic administration or immunization of the peptides described herein will be apparent to those skilled in the art from the description herein.

[00289] Adjuvants are any substance whose admixture into the pharmaceutical composition increases or otherwise modifies the immune response to the therapeutic agent. Carriers are scaffold structures, for example a polypeptide or a polysaccharide, to which a tissue-specific antigenic polypeptide or

polynucleotide, is capable of being associated. Optionally, adjuvants are conjugated covalently or non-covalently to the polypeptides or polynucleotides described herein.

[00290] The ability of an adjuvant to increase the immune response to an antigen is typically manifested by a significant increase in immune-mediated reaction, or reduction in disease symptoms. For example, an increase in humoral immunity can be manifested by a significant increase in the titer of antibodies raised to the antigen, and an increase in T cell activity can be manifested in increased cell proliferation, or cellular cytotoxicity, or cytokine secretion. An adjuvant can also alter an immune response, for example, by changing a primarily humoral or T helper 2 response into a primarily cellular, or T helper 1 response.

[00291] Suitable adjuvants are known in the art (see, WO 2015/095811) and include, but are not limited to poly(I:C), poly-ICLC, STING agonist, 1018 ISS, aluminium salts, Amplivax, AS15, BCG, CP-870,893, CpG7909, CyaA, dSLIM, GM-CSF, IC30, IC31, Imiquimod, ImuFact IMP321, IS Patch, ISS, ISCOMATRIX, JuvImmune, LipoVac, MF59, monophosphoryl lipid A, Montanide IMS 1312, Montanide ISA 206, Montanide ISA 50V, Montanide ISA-51, OK-432, OM-174, OM-197-MP-EC, ONTAK, PepTel®. vector system, PLG microparticles, resiquimod, SRL172, virosomes and other virus-like particles, YF-17D, VEGF trap, R848, beta-glucan, Pam3Cys, Pam3CSK4, Aquila's QS21 stimulon (Aquila Biotech, Worcester, Mass., USA) which is derived from saponin, mycobacterial extracts and synthetic bacterial cell wall mimics, and other proprietary adjuvants such as Ribi's Detox. Quil or Superfos. Adjuvants also include incomplete Freund's or GM-CSF. Several immunological adjuvants (e.g., MF59) specific for dendritic cells and their preparation have been described previously (Dupuis M, et al., Cell Immunol. 1998; 186(1):18-27; Allison A C; Dev Biol Stand. 1998; 92:3-11) (Mosca et al. Frontiers in Bioscience, 2007; 12:4050-4060) (Gamvrellis et al. Immunol & Cell Biol. 2004; 82: 506-516). Also cytokines can be used. Several cytokines have been directly linked to influencing dendritic cell migration to lymphoid tissues (e.g., TNF-alpha), accelerating the maturation of dendritic cells into efficient antigen-presenting cells for T-lymphocytes (e.g., GM-CSF, PGE1, PGE2, IL-1, IL-1b, IL-4, IL-6 and CD40L) (U.S. Pat. No. 5,849,589 incorporated herein by reference in its entirety) and acting as immunoadjuvants (e.g., IL-12) (Gabrilovich D I, et al., J Immunother Emphasis Tumor Immunol. 1996 (6):414-418).

[00292] CpG immunostimulatory oligonucleotides have also been reported to enhance the effects of adjuvants in a vaccine setting. Without being bound by theory, CpG oligonucleotides act by activating the innate (non-adaptive) immune system via Toll-like receptors (TLR), mainly TLR9. CpG triggered TLR9 activation enhances antigen-specific humoral and cellular responses to a wide variety of antigens, including peptide or protein antigens, live or killed viruses, dendritic cell immunogenic pharmaceutical compositions, autologous cellular immunogenic pharmaceutical compositions and polysaccharide conjugates in both prophylactic and therapeutic immunogenic pharmaceutical compositions. Importantly, it enhances dendritic cell maturation and differentiation, resulting in enhanced activation of TH1 cells and strong cytotoxic T-lymphocyte (CTL) generation, even in the absence of CD4 T cell help. The TH1 bias induced

by TLR9 stimulation is maintained even in the presence of adjuvants such as alum or incomplete Freund's adjuvant (IFA) that normally promote a TH2 bias. CpG oligonucleotides show even greater adjuvant activity when formulated or co-administered with other adjuvants or in formulations such as microparticles, nano particles, lipid emulsions or similar formulations, which are especially necessary for inducing a strong response when the antigen is relatively weak. They also accelerate the immune response and enabled the antigen doses to be reduced with comparable antibody responses to the full-dose immunogenic pharmaceutical composition without CpG in some experiments (Arthur M. Krieg, Nature Reviews, Drug Discovery, 5, June 2006, 471-484). U.S. Pat. No. 6,406,705 B1 describes the combined use of CpG oligonucleotides, non-nucleic acid adjuvants and an antigen to induce an antigen-specific immune response. A commercially available CpG TLR9 antagonist is dSLIM (double Stem Loop Immunomodulator) by Mologen (Berlin, GERMANY), which is a component of the pharmaceutical composition described herein. Other TLR binding molecules such as RNA binding TLR 7, TLR 8 and/or TLR 9 can also be used.

[00293] Other examples of useful adjuvants include, but are not limited to, chemically modified CpGs (e.g. CpR, Idera), polyICLC, Poly(I:C)(e.g. polyi:CI2U), non-CpG bacterial DNA or RNA, ssRNA40 for TLR8, as well as immunoactive small molecules and antibodies such as cyclophosphamide, sunitinib, bevacizumab, celebrex, NCX-4016, sildenafil, tadalafil, vardenafil, sorafinib, XL-999, CP-547632, pazopanib, AZD2171, ipilimumab, tremelimumab, and SC58175, which can act therapeutically and/or as an adjuvant. The amounts and concentrations of adjuvants and additives useful in the context of the present invention can readily be determined by the skilled artisan without undue experimentation. Additional adjuvants include colony-stimulating factors, such as Granulocyte Macrophage Colony Stimulating Factor (GM-CSF, sargramostim).

[00294] In some embodiments, a pharmaceutical composition according to the present invention comprises more than one different adjuvants. Furthermore, the invention encompasses a therapeutic composition comprising any adjuvant substance including any of the above or combinations thereof. It is also contemplated that the antigenic therapeutic (e.g., a humoral or cell-mediated immune response). In some embodiments, the pharmaceutical composition comprises tissue-specific antigen therapeutics (e.g., peptides, polynucleotides, TCR, CAR, cells containing TCR or CAR, dendritic cell containing polypeptide, dendritic cell containing polynucleotide, antibody, etc.) and the adjuvant can be administered separately in any appropriate sequence.

[00295] A carrier can be present independently of an adjuvant. The function of a carrier can for example be to increase the molecular weight of in particular mutant in order to increase their activity or immunogenicity, to confer stability, to increase the biological activity, or to increase serum half-life. Furthermore, a carrier can aid presenting peptides to T cells. The carrier can be any suitable carrier known to the person skilled in the art, for example a protein or an antigen presenting cell. A carrier protein could

be but is not limited to keyhole limpet hemocyanin, serum proteins such as transferrin, bovine serum albumin, human serum albumin, thyroglobulin or ovalbumin, immunoglobulins, or hormones, such as insulin or palmitic acid. In some embodiments, the carrier comprises a human fibronection type III domain (Koide et al. Methods Enzymol. 2012;503:135-56). For immunization of humans, the carrier must be a physiologically acceptable carrier acceptable to humans and safe. However, tetanus toxoid and/or diptheria toxoid are suitable carriers In some embodiments of the invention. Alternatively, the carrier can be dextrans for example sepharose.

[00296] In some embodiments, the polypeptides can be synthesized as multiply linked peptides as an alternative to coupling a polypeptide to a carrier to increase immunogenicity. Such molecules are also known as multiple antigenic peptides (MAPS).

[00297] Tissue-specific antigens as described herein that induce an immune response can be used as a composition when combined with an acceptable carrier or excipient. Such compositions are useful for in vitro or in vivo analysis or for administration to a subject in vivo or ex vivo for treating a subject with a disease.

[00298] Thus, pharmaceutical compositions can include, in addition to active ingredient, a pharmaceutically acceptable excipient, carrier, buffer, stabilizer or other materials well known to those skilled in the art. Such materials should be non-toxic and should not interfere with the efficacy of the active ingredient. The precise nature of the carrier or other material will depend on the route of administration.

[00299] Pharmaceutical formulations comprising a protein of interest, e.g., a tissue-specific antigen described herein, can be prepared for storage by mixing the antigen having the desired degree of purity with optional physiologically acceptable carriers, excipients or stabilizers (Remington's Pharmaceutical Sciences 16th edition, Oslo, A. Ed. (1980)), in the form of lyophilized formulations or aqueous solutions. Acceptable carriers, excipients, or stabilizers are those that are non-toxic to recipients at the dosages and concentrations employed, and include buffers such as phosphate, citrate, and other organic acids; antioxidants including ascorbic acid and methionine; preservatives (such as octadecyldimethylbenzyl ammonium chloride; hexamethonium chloride; benzalkonium chloride, benzethonium chloride; phenol, butyl or benzyl alcohol; alkyl parabens such as methyl or propyl paraben; catechol; resorcinol; cyclohexanol; 3-pentanol; and m-cresol); low molecular weight (less than about 10 residues) polypeptides; proteins, such as serum albumin, gelatin, or immunoglobulins; hydrophilic polymers such as polyvinylpyrrolidone; amino acids such as glycine, glutamine, asparagine, histidine, arginine, or lysine; monosaccharides, disaccharides, and other carbohydrates including glucose, mannose, or dextrins; chelating agents such as EDTA; sugars such as sucrose, mannitol, trehalose or sorbitol; salt-forming counter-ions such as sodium; metal complexes (e.g., Zn-protein complexes); and/or non-ionic surfactants such as TWEEN®, PLURONICS® or polyethylene glycol (PEG).

[00300] Acceptable carriers are physiologically acceptable to the administered patient and retain the therapeutic properties of the compounds with/in which it is administered. Acceptable carriers and their formulations are generally described in, for example, Remington' pharmaceutical Sciences (18th Edition, ed. A. Gennaro, Mack Publishing Co., Easton, PA 1990). One exemplary carrier is physiological saline. A pharmaceutically acceptable carrier is a pharmaceutically acceptable material, composition or vehicle, such as a liquid or solid filler, diluent, excipient, solvent or encapsulating material, involved in carrying or transporting the subject compounds from the administration site of one organ, or portion of the body, to another organ, or portion of the body, or in an in vitro assay system. Acceptable carriers are compatible with the other ingredients of the formulation and not injurious to a subject to whom it is administered. Nor should an acceptable carrier alter the specific activity of the tissue-specific antigens.

[00301] In one aspect, provided herein are pharmaceutically acceptable or physiologically acceptable compositions including solvents (aqueous or non-aqueous), solutions, emulsions, dispersion media, coatings, isotonic and absorption promoting or delaying agents, compatible with pharmaceutical administration. Pharmaceutical compositions or pharmaceutical formulations therefore refer to a composition suitable for pharmaceutical use in a subject. The pharmaceutical compositions and formulations include an amount of a tissue-specific antigen as provided herein (or polynucleotide encoding the tissue-specific antigen) and a pharmaceutically or physiologically acceptable carrier. Compositions can be formulated to be compatible with a particular route of administration (i.e., systemic or local). Thus, compositions include carriers, diluents, or excipients suitable for administration by various routes.

[00302] In some embodiments, a composition further comprises an acceptable additive in order to improve the stability of the tissue-specific antigen in the composition and/or to control the release rate of the composition. Acceptable additives do not alter the specific activity of the tissue-specific antigens. Exemplary acceptable additives include, but are not limited to, a sugar such as mannitol, sorbitol, glucose, xylitol, trehalose, sorbose, sucrose, galactose, dextran, dextrose, fructose, lactose and mixtures thereof. Acceptable additives can be combined with acceptable carriers and/or excipients such as dextrose. Alternatively, exemplary acceptable additives include, but are not limited to, a surfactant such as polysorbate 20 or polysorbate 80 to increase stability of the peptide and decrease gelling of the solution. The surfactant can be added to the composition in an amount of 0.01% to 5% of the solution. Addition of such acceptable additives increases the stability and half-life of the composition in storage.

[00303] The pharmaceutical composition can be administered, for example, by injection. Compositions for injection include aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, or phosphate buffered saline (PBS). The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof.

Fluidity can be maintained, for example, by the use of a coating such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Antibacterial and antifungal agents include, for example, parabens, chlorobutanol, phenol, ascorbic acid and thimerosal. Isotonic agents, for example, sugars, polyalcohols such as manitol, sorbitol, and sodium chloride can be included in the composition. The resulting solutions can be packaged for use as is, or lyophilized; the lyophilized preparation can later be combined with a sterile solution prior to administration. For intravenous, injection, or injection at the site of affliction, the active ingredient will be in the form of a parenterally acceptable aqueous solution which is pyrogen-free and has suitable pH, isotonicity and stability. Those of relevant skill in the art are well able to prepare suitable solutions using, for example, isotonic vehicles such as Sodium Chloride Injection, Ringer's Injection, Lactated Ringer's Injection. Preservatives, stabilizers, buffers, antioxidants and/or other additives can be included, as needed. Sterile injectable solutions can be prepared by incorporating an active ingredient in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization. Generally, dispersions are prepared by incorporating the active ingredient into a sterile vehicle which contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, the preferred methods of preparation are vacuum drying and freeze drying which yields a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

[00304] Compositions can be conventionally administered intravenously, such as by injection of a unit dose, for example. For injection, an active ingredient can be in the form of a parenterally acceptable aqueous solution which is substantially pyrogen-free and has suitable pH, isotonicity and stability. One can prepare suitable solutions using, for example, isotonic vehicles such as Sodium Chloride Injection, Ringer's Injection, Lactated Ringer's Injection. Preservatives, stabilizers, buffers, antioxidants and/or other additives can be included, as required. Additionally, compositions can be administered via aerosolization.

[00305] In some embodiments, the composition is lyophilized, for example, to increase shelf-life in storage. When the compositions are considered for use in medicaments or any of the methods provided herein, it is contemplated that the composition can be substantially free of pyrogens such that the composition will not cause an inflammatory reaction or an unsafe allergic reaction when administered to a human patient. Testing compositions for pyrogens and preparing compositions substantially free of pyrogens are well understood to one or ordinary skill of the art and can be accomplished using commercially available kits.

[00306] Acceptable carriers can contain a compound that stabilizes, increases or delays absorption, or increases or delays clearance. Such compounds include, for example, carbohydrates, such as glucose, sucrose, or dextrans; low molecular weight proteins; compositions that reduce the clearance or hydrolysis of peptides; or excipients or other stabilizers and/or buffers. Agents that delay absorption include, for

example, aluminum monostearate and gelatin. Detergents can also be used to stabilize or to increase or decrease the absorption of the pharmaceutical composition, including liposomal carriers. To protect from digestion the compound can be complexed with a composition to render it resistant to acidic and enzymatic hydrolysis, or the compound can be complexed in an appropriately resistant carrier such as a liposome.

[00307] The compositions can be administered in a manner compatible with the dosage formulation, and in a therapeutically effective amount. The quantity to be administered depends on the subject to be treated, capacity of the subject's immune system to utilize the active ingredient, and degree of binding capacity desired. Precise amounts of active ingredient required to be administered depend on the judgment of the practitioner and are peculiar to each individual. Suitable regimes for initial administration and booster shots are also variable, but are typified by an initial administration followed by repeated doses at one or more hour intervals by a subsequent injection or other administration. Alternatively, continuous intravenous infusions sufficient to maintain concentrations in the blood are contemplated.

[00308] Peptide-based immunogenic pharmaceutical compositions can be formulated using any of the well-known techniques, carriers, and excipients as suitable and as understood in the art. The polypeptides can be a cocktail of multiple polypeptides containing the same sequence, or a cocktail of multiple copies of different polypeptides. The peptides can be modified, such as for example by lipidation, or attachment to a carrier protein. Lipidation can be the covalent attachment of a lipid group to a polypeptide. Lipidated peptides, or lipidated polypeptides, can stabilize structures and can enhance efficacy of the treatment.

[00309] Lipidation can be classified into several different types, such as N-myristoylation, palmitoylation, GPI-anchor addition, prenylation, and several additional types of modifications. N-myristoylation is the covalent attachment of myristate, a C14 saturated acid, to a glycine residue. Palmitoylation is thioester linkage of long-chain fatty acids (C16) to cysteine residues. GPI-anchor addition is glycosyl-phosphatidylinositol (GPI) linkage via amide bond. Prenylation is the thioether linkage of an isoprenoid lipid (e.g. farnesyl (C-15), geranylgeranyl (C-20)) to cysteine residues. Additional types of modifications can include attachment of S-diacylglycerol by a sulfur atom of cysteines, O-octanoyl conjugation via serine or threonine residues, S-archaeol conjugation to cysteine residues, and cholesterol attachment.

[00310] Fatty acids for generating a lipidated peptides can include C2 to C30 saturated, monounsaturated, or polyunsaturated fatty acyl groups. Exemplary fatty acids can include palmitoyl, myristoyl, stearoyl and decanoyl groups. In some instances, a lipid moiety that has adjuvant property is attached to a polypeptide of interest to elicit or enhance immunogenicity in the absence of an extrinsic adjuvant. A lipidated peptide or lipopeptide can be referred to as a self-adjuvant lipopeptide. Any of the fatty acids described above and elsewhere herein can elicit or enhance immunogenicity of a polypeptide of interest. A fatty acid that can elicit or enhance immunogenicity can include palmitoyl, myristoyl, stearoyl, lauroyl, octanoyl, and decanoyl groups.

[00311] Polypeptides such as naked peptides or lipidated peptides can be incorporated into a liposome. Sometimes, lipidated peptides can be incorporated into a liposome. For example, the lipid portion of the lipidated peptide can spontaneously integrate into the lipid bilayer of a liposome. Thus, a lipopeptide can be presented on the "surface" of a liposome.

[00312] Exemplary liposomes suitable for incorporation in the formulations include, and are not limited to, multilamellar vesicles (MLV), oligolamellar vesicles (OLV), unilamellar vesicles (UV), small unilamellar vesicles (SUV), medium-sized unilamellar vesicles (MUV), large unilamellar vesicles (LUV), giant unilamellar vesicles (GUV), multivesicular vesicles (MVV), single or oligolamellar vesicles made by reverse-phase evaporation method (REV), multilamellar vesicles made by the reverse-phase evaporation method (MLV-REV), stable plurilamellar vesicles (SPLV), frozen and thawed MLV (FATMLV), vesicles prepared by extrusion methods (VET), vesicles prepared by French press (FPV), vesicles prepared by fusion (FUV), dehydration-rehydration vesicles (DRV), and bubblesomes (BSV).

[00313] Depending on the method of preparation, liposomes can be unilamellar or multilamellar, and can vary in size with diameters ranging from about 0.02 μm to greater than about 10 μm. Liposomes can adsorb many types of cells and then release an incorporated agent (e.g., a peptide described herein). In some cases, the liposomes fuse with the target cell, whereby the contents of the liposome then empty into the target cell. A liposome can be endocytosed by cells that are phagocytic. Endocytosis can be followed by intralysosomal degradation of liposomal lipids and release of the encapsulated agents.

[00314] The liposomes provided herein can also comprise carrier lipids. In some embodiments the carrier lipids are phospholipids. Carrier lipids capable of forming liposomes include, but are not limited to dipalmitoylphosphatidylcholine (DPPC), phosphatidylcholine (PC; lecithin), phosphatidic acid (PA), phosphatidylglycerol (PG), phosphatidylethanolamine (PE), phosphatidylserine (PS). Other suitable phospholipids further include distearoylphosphatidylcholine (DSPC), dimyristoylphosphatidylcholine (DMPC), dipalmitoylphosphatidyglycerol (DPPG), distearoylphosphatidyglycerol (DSPG), dimyristoylphosphatidylglycerol (DMPG), dipalmitoylphosphatidic acid (DPPA); dimyristoylphosphatidic acid (DMPA), distearoylphosphatidic acid (DSPA), dipalmitoylphosphatidylserine (DPPS), dimyristoylphosphatidylserine (DMPS), distearoylphosphatidylserine (DSPS), dipalmitoylphosphatidyethanolamine (DPPE), dimyristoylphosphatidylethanolamine (DMPE), distearoylphosphatidylethanolamine (DSPE) and the like, or combinations thereof. In some embodiments, the liposomes further comprise a sterol (e.g., cholesterol) which modulates liposome formation. The carrier lipids can be any known non-phosphate polar lipids.

[00315] A pharmaceutical composition can be encapsulated within liposomes using well-known technology. Biodegradable microspheres can also be employed as carriers for the pharmaceutical compositions of this invention.

[00316] The pharmaceutical composition can be administered in liposomes or microspheres (or microparticles). Methods for preparing liposomes and microspheres for administration to a patient are well known to those of skill in the art. Essentially, material is dissolved in an aqueous solution, the appropriate phospholipids and lipids added, along with surfactants if required, and the material dialyzed or sonicated, as necessary.

[00317] Microspheres formed of polymers or proteins are well known to those skilled in the art, and can be tailored for passage through the gastrointestinal tract directly into the blood stream. Alternatively, the compound can be incorporated and the microspheres, or composite of microspheres, implanted for slow release over a period of time ranging from days to months.

[00318] A polypeptide can also be attached to a carrier protein for delivery. The carrier protein can be an immunogenic carrier element and can be attached by any recombinant technology. Exemplary carrier proteins include Mariculture keyhole limpet hemocyanin (mcKLH), PEGylated mcKLH, Blue Carrier* Proteins, bovine serum albumin (BSA), cationized BSA, ovalbumin, and bacterial proteins such as tetanus toxoid (TT).

[00319] A polypeptide can also be prepared as multiple antigenic peptides (MAPs). Peptides may be attached at the N-terminus or the C-terminus to small non-immunogenic cores. Peptides built upon this core can offer highly localized peptide density. The core can be a dendritic core residue or matrix composed of bifunctional units. Suitable core molecules for constructing MAPs can include ammonia, ethylenediamine, aspartic acid, glutamic acid, and lysine. For example, a lysine core molecule can be attached via peptide bonds through each of its amino groups to two additional lysines.

[00320] A polypeptide can be chemically synthesized, or recombinantly expressed in a cell system or a cell-free system. A peptide can be synthesized, such as by a liquid-phase synthesis, a solid-phase synthesis, or by microwave assisted peptide synthesis. A polypeptide can be modified, such as for example, by acylation, alkylation, amidation, arginylation, polyglutamylation, polyglycylation, butyrylation, gamma-carboxylation, glycosylation, malonylation, hydroxylation, iodination, nucleotide addition (e.g. ADP-ribosylation), oxidation, phosphorylation, adenylylation, propionylation, S-glutathionylation, S-nitrosylation, succinylation, sulfation, glycation, palmitoylation, myristoylation, isoprenylation or prenylation (e.g. farnesylation or geranylgeranylation), glypiation, lipoylation, attachement of flavin moiety (e.g. FMN or FAD), attachment of heme C, phosphopantetheinylation, retinylidene Schiff base formation, diphthamide formation, ethanolamine phosphoglycerol attachment, hypusine formuation, biotinylation, pegylation, ISGylation, SUMUylation, ubiquitination, Neddylation, Pupylation, citrullination, deamidation, eliminylation, carbamylation, or a combination thereof.

[00321] After generation of a polypeptide, the polypeptide can be subjected to one or more rounds of purification steps to remove impurities. The purification step can be a chromatographic step utilizing separation methods such as affinity-based, size-exclusion based, ion-exchange based, or the like. In some

cases, the polypeptide is at most 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 99%, 99.9%, or 100% pure or without the presence of impurities. In some cases, the polypeptide is at least 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 99%, 99.9%, or 100% pure or without the presence of impurities.

[00322] A polypeptide can include natural amino acids, unnatural amino acids, or a combination thereof. An amino acid residue can refer to a molecule containing both an amino group and a carboxyl group. Suitable amino acids include, without limitation, both the D- and L-isomers of the naturally-occurring amino acids, as well as non-naturally occurring amino acids prepared by organic synthesis or other metabolic routes. The term amino acid, as used herein, includes, without limitation, α-amino acids, natural amino acids, non-natural amino acids, and amino acid analogs.

[00323] The term "α-amino acid" can refer to a molecule containing both an amino group and a carboxyl group bound to a carbon which is designated the α-carbon.

[00324] The term "β-amino acid" can refer to a molecule containing both an amino group and a carboxyl group in a β configuration.

[00325] "Naturally occurring amino acid" can refer to any one of the twenty amino acids commonly found in peptides synthesized in nature, and known by the one letter abbreviations A, R, N, C, D, Q, E, G, H, I, L, K, M, F, P, S, T, W, Y and V. A table showing a summary of the properties of natural amino acids can be found, e.g., in U.S. Patent Application Publication No. 20130123169, which is herein incorporated by reference.

[00326] A peptide provided herein can comprise one or more hydrophobic, polar, or charged amino acids. "Hydrophobic amino acids" include small hydrophobic amino acids and large hydrophobic amino acids. "Small hydrophobic amino acid" can be glycine, alanine, proline, and analogs thereof. "Large hydrophobic amino acids" can be valine, leucine, isoleucine, phenylalanine, methionine, tryptophan, and analogs thereof. "Polar amino acids" can be serine, threonine, asparagine, glutamine, cysteine, tyrosine, and analogs thereof. "Charged amino acids" can be lysine, arginine, histidine, aspartate, glutamate, and analogs thereof.

[00327] A peptide provided herein can comprise one or more amino acid analogs. An "amino acid analog" can be a molecule which is structurally similar to an amino acid and which can be substituted for an amino acid in the formation of a peptidomimetic macrocycle Amino acid analogs include, without limitation, β-amino acids and amino acids where the amino or carboxy group is substituted by a similarly reactive group (e.g., substitution of the primary amine with a secondary or tertiary amine, or substitution of the carboxy group with an ester).

[00328] A peptide provided herein can comprises one or more non-natural amino acids. A "non-natural amino acid" can be an amino acid which is not one of the twenty amino acids commonly found in peptides synthesized in nature, and known by the one letter abbreviations A, R, N, C, D, Q, E, G, H, I, L, K, M, F, P, S, T, W, Y and V. Non-natural amino acids or amino acid analogs include structures disclosed, e.g., in U.S. Patent Application Publication No. 20130123169, which is herein incorporated by reference.

[00329] Amino acid analogs can include β-amino acid analogs. Examples of β-amino acid analogs and analogs of alanine, valine, glycine, leucine, arginine, lysine, aspartic acids, glutamic acids, cysteine, methionine, phenylalanine, tyrosine, proline, serine, threonine, and tryptophan can include structures disclosed, e.g., in U.S. Patent Application Publication No. 20130123169, which is herein incorporated by reference.

[00330] Amino acid analogs can be racemic. In some instances, the D isomer of the amino acid analog is used. In some cases, the L isomer of the amino acid analog is used. In some instances, the amino acid analog comprises chiral centers that are in the R or S configuration. Sometimes, the amino group(s) of a β-amino acid analog is substituted with a protecting group, e.g., tert-butyloxycarbonyl (BOC group), 9-fluorenylmethyloxycarbonyl (FMOC), tosyl, and the like. Sometimes, the carboxylic acid functional group of a β-amino acid analog is protected, e.g., as its ester derivative. In some cases, the salt of the amino acid analog is used.

[00331] A "non-essential" amino acid residue can be a residue that can be altered from the wild-type sequence of a polypeptide without abolishing or substantially altering its essential biological or biochemical activity (e.g., receptor binding or activation). An "essential" amino acid residue can be a residue that, when altered from the wild-type sequence of the polypeptide, results in abolishing or substantially abolishing the polypeptide's essential biological or biochemical activity.

[00332] A "conservative amino acid substitution" can be one in which the amino acid residue is replaced with an amino acid residue having a similar side chain. Families of amino acid residues having similar side chains have been defined in the art. These families can include amino acids with basic side chains (e.g., K, R, H), acidic side chains (e.g., D, E), uncharged polar side chains (e.g., G, N, Q, S, T, Y, C), nonpolar side chains (e.g., A, V, L, I, P, F, M, W), beta-branched side chains (e.g., T, V, I) and aromatic side chains (e.g., Y, F, W, H). Thus, a predicted nonessential amino acid residue in a polypeptide, for example, can be replaced with another amino acid residue from the same side chain family. Other examples of acceptable substitutions can be substitutions based on isosteric considerations (e.g. norleucine for methionine) or other properties (e.g. 2-thienylalanine for phenylalanine, or 6-Cl-tryptophan for tryptophan).

[00333] Nucleic acid-based immunogenic pharmaceutical compositions can also be administered to a subject. Nucleic acid-based immunogenic pharmaceutical compositions can be formulated using any of the well-known techniques, carriers, and excipients as suitable and as understood in the art. The nucleic acid can be DNA, genomic DNA or cDNA, RNA, or a hybrid, where the nucleic acid may contain combinations of deoxyribo- and ribo-nucleotides, and combinations of bases including uracil, adenine, thymine, cytosine, guanine, inosine, xanthine hypoxanthine, isocytosine and isoguanine. Nucleic acids can be obtained by chemical synthesis methods or by recombinant methods. The immunogenic pharmaceutical composition can be a DNA-based immunogenic pharmaceutical composition, an RNA-based immunogenic pharmaceutical composition, a hybrid DNA/RNA based immunogenic pharmaceutical composition, or a

hybrid nucleic acid/peptide based immunogenic pharmaceutical composition. The peptide can be a peptide derived from a peptide in Table 1A, Table 1B, Table 1C or Table 2, a peptide that has a sequence that is at least 40%, 50%, 60%, 70%, 80%, 90%, 95%, or more in sequence homology to a peptide in Table 1A, Table 1B, Table 1C or Table 2, or a peptide that has a sequence that is at most 40%, 50%, 60%, 70%, 80%, 90%, 95%, or less in sequence homology to a peptide in Table 1A, Table 1B, Table 1C or Table 2.

[00334] A nucleic acid described herein can contain phosphodiester bonds, although in some cases, as outlined below (for example in the construction of primers and probes such as label probes), nucleic acid analogs are included that can have alternate backbones, comprising, for example, phosphoramide, phosphorothioate, O-methylphosphoroamidite linkages, and peptide nucleic acid backbones and linkages. Other analog nucleic acids include those with bicyclic structures including locked nucleic acids, positive backbones and non-ribose backbones. Nucleic acids containing one or more carbocyclic sugars are also included within the definition of nucleic acids. Locked nucleic acids (LNAs) are also included within the definition of nucleic acid analogs. LNAs are a class of nucleic acid analogues in which the ribose ring is "locked" by a methylene bridge connecting the 2'-O atom with the 4'-C atom. These modifications of the ribose-phosphate backbone can be done to increase the stability and half-life of such molecules in physiological environments. For example, PNA:DNA and LNA-DNA hybrids can exhibit higher stability and thus can be used in some embodiments. The nucleic acids can be single stranded or double stranded, as specified, or contain portions of both double stranded or single stranded sequence. Depending on the application, the nucleic acids can be DNA (including, e.g., genomic DNA, mitochondrial DNA, and cDNA), RNA (including, e.g., mRNA and rRNA) or a hybrid, where the nucleic acid contains any combination of deoxyribo- and ribo-nucleotides, and any combination of bases, including uracil, adenine, thymine, cytosine, guanine, inosine, xathanine hypoxathanine, isocytosine, isoguanine, etc.

[00335] A nucleic acid–based immunogenic pharmaceutical compositions can be in the form of a vector. A vector can be a circular plasmid or a linear nucleic acid. A circular plasmid or linear nucleic acid can be capable of directing expression of a particular nucleotide sequence in an appropriate subject cell. A vector can have a promoter operably linked to the polypeptide-encoding nucleotide sequence, which can be operably linked to termination signals. A vector can contain sequences required for proper translation of the nucleotide sequence. The vector comprising the nucleotide sequence of interest can be chimeric, meaning that at least one of its components can be heterologous with respect to at least one of its other components. The expression of the nucleotide sequence in an expression cassette can be under the control of a constitutive promoter or of an inducible promoter, which can initiate transcription only when the host cell is exposed to some particular internal or external stimulus.

[00336] The vector can be a plasmid. A plasmid can be useful for transfecting cells with nucleic acid encoding the polypeptide, and the transformed host cells can be cultured and maintained under conditions wherein expression of the polypeptide takes place.

[00337] A plasmid can comprise a nucleic acid sequence that encodes one or more of the various polypeptides disclosed herein. A single plasmid can contain coding sequence for a single polypeptide, or coding sequence for more than one polypeptide. Sometimes, the plasmid can further comprise coding sequence that encodes an adjuvant, such as an immune stimulating molecule, such as a cytokine.

[00338] A plasmid can further comprise an initiation codon, which can be upstream of the coding sequence, and a stop codon, which can be downstream of the coding sequence. The initiation and termination codon can be in frame with the coding sequence. A plasmid can also comprise a promoter that is operably linked to the coding sequence, and an enhancer upstream of the coding sequence. The enhancer can be human actin, human myosin, human hemoglobin, human muscle creatine or a viral enhancer such as one from CMV, FMDV, RSV or EBV.

[00339] A plasmid can also comprise a mammalian origin of replication in order to maintain the plasmid extrachromosomally and produce multiple copies of the plasmid in a cell. A plasmid can also comprise a regulatory sequence, which can be well suited for gene expression in a cell into which the plasmid is administered. The coding sequence can comprise a codon that can allow more efficient transcription of the coding sequence in the host cell.

[00340] The nucleic acid based immunogenic pharmaceutical compositions can also be a linear nucleic acid immunogenic pharmaceutical composition, or linear expression cassette, that is capable of being efficiently delivered to a subject via electroporation and expressing one or more polypeptides disclosed herein.

[00341] Cell-based immunogenic pharmaceutical compositions can also be administered to a subject. For example, an antigen presenting cell (APC) based immunogenic pharmaceutical composition can be formulated using any of the well-known techniques, carriers, and excipients as suitable and as understood in the art. APCs include monocytes, monocyte-derived cells, macrophages, and dendritic cells. Sometimes, an APC based immunogenic pharmaceutical composition can be a dendritic cell-based immunogenic pharmaceutical composition.

[00342] A dendritic cell-based immunogenic pharmaceutical composition can be prepared by any methods well known in the art. In some cases, dendritic cell-based immunogenic pharmaceutical compositions can be prepared through an ex vivo or in vivo method. The ex vivo method can comprise the use of autologous DCs pulsed ex vivo with the polypeptides described herein, to activate or load the DCs prior to administration into the patient. The in vivo method can comprise targeting specific DC receptors using antibodies coupled with the polypeptides described herein. The DC-based immunogenic pharmaceutical composition can further comprise DC activators such as TLR3, TLR-7-8, and CD40 agonists. The DC-based immunogenic pharmaceutical composition can further comprise adjuvants, and a pharmaceutically acceptable carrier.

[00343] An adjuvant can be used to enhance the immune response (humoral and/or cellular) elicited in a patient receiving the immunogenic pharmaceutical composition. Sometimes, adjuvants can elicit a Th1-type response. Other times, adjuvants can elicit a Th2-type response. A Th1-type response can be characterized by the production of cytokines such as IFN-γ as opposed to a Th2-type response which can be characterized by the production of cytokines such as IL-4, IL-5 and IL-10.

[00344] In some aspects, lipid-based adjuvants, such as MPLA and MDP, can be used with the immunogenic pharmaceutical compositions disclosed herein. Monophosphoryl lipid A (MPLA), for example, is an adjuvant that causes increased presentation of liposomal antigen to specific T Lymphocytes. In addition, a muramyl dipeptide (MDP) can also be used as a suitable adjuvant in conjunction with the immunogenic pharmaceutical formulations described herein.

[00345] Adjuvant can also comprise stimulatory molecules such as cytokines. Non-limiting examples of cytokines include: CCL20, a-interferon(IFN- a), β-interferon (IFN-β), γ- interferon, platelet derived growth factor (PDGF), TNFa, TNFp, GM-CSF, epidermal growth factor (EGF), cutaneous T cell-attracting chemokine (CTACK), epithelial thymus-expressed chemokine (TECK), mucosae-associated epithelial chemokine (MEC), IL-12, IL-15,, IL-28, MHC, CD80, CD86, IL-1, IL-2, IL-4, IL-5, IL-6, IL-10, IL-18, MCP-1, MIP-la, MIP-1-, IL-8, L- selectin, P-selectin, E-selectin, CD34, GlyCAM-1, MadCAM-1, LFA-1, VLA-1, Mac-1, pl50.95, PECAM, ICAM-1, ICAM-2, ICAM-3, CD2, LFA-3, M-CSF, G-CSF, mutant forms of IL-18, CD40, CD40L, vascular growth factor, fibroblast growth factor, IL-7, nerve growth factor, vascular endothelial growth factor, Fas, TNF receptor, Fit, Apo-1, p55, WSL-1, DR3, TRAMP, Apo-3, AIR, LARD, NGRF, DR4, DRS, KILLER, TRAIL-R2, TRICK2, DR6, Caspase ICE, Fos, c-jun, Sp-1, Ap-1, Ap-2, p38, p65Rel, MyD88, IRAK, TRAF6, IkB, Inactive NIK, SAP K, SAP-I, JNK, interferon response genes, NFkB, Bax, TRAIL, TRAILrec, TRAILrecDRC5, TRAIL-R3, TRAIL-R4, RANK, RANK LIGAND, Ox40, Ox40 LIGAND, NKG2D, MICA, MICB, NKG2A, NKG2B, NKG2C, NKG2E, NKG2F, TAPI, and TAP2.

[00346] Additional adjuvants include: MCP-1, MIP-la, MIP-lp, IL-8, RANTES, L-selectin, P-selectin, E-selectin, CD34, GlyCAM-1, MadCAM-1, LFA-1, VLA-1, Mac-1, pl50.95, PECAM, ICAM-1, ICAM-2, ICAM-3, CD2, LFA-3, M-CSF, G-CSF, IL-4, mutant forms of IL-18, CD40, CD40L, vascular growth factor, fibroblast growth factor, IL-7, IL-22, nerve growth factor, vascular endothelial growth factor, Fas, TNF receptor, Fit, Apo-1, p55, WSL-1, DR3, TRAMP, Apo-3, AIR, LARD, NGRF, DR4, DR5, KILLER, TRAIL-R2, TRICK2, DR6, Caspase ICE, Fos, c-jun, Sp-1, Ap-1, Ap-2, p38, p65Rel, MyD88, IRAK, TRAF6, IkB, Inactive NIK, SAP K, SAP-1, JNK, interferon response genes, NFkB, Bax, TRAIL, TRAILrec, TRAILrecDRC5, TRAIL-R3, TRAIL-R4, RANK, RANK LIGAND, Ox40, Ox40 LIGAND, NKG2D, MICA, MICB, NKG2A, NKG2B, NKG2C, NKG2E, NKG2F, TAP1, TAP2 and functional fragments thereof.

[00347] In some aspects, an adjuvant can be a modulator of a toll like receptor. Examples of modulators of toll-like receptors include TLR-9 agonists and are not limited to small molecule modulators of toll-like receptors such as Imiquimod. Other examples of adjuvants that are used in combination with an immunogenic pharmaceutical composition described herein can include and are not limited to saponin, CpG ODN and the like. Sometimes, an adjuvant is selected from bacteria toxoids, polyoxypropylene-polyoxyethylene block polymers, aluminum salts, liposomes, CpG polymers, oil-in-water emulsions, or a combination thereof. Sometimes, an adjuvant is an oil-in-water emulsion. The oil-in-water emulsion can include at least one oil and at least one surfactant, with the oil(s) and surfactant(s) being biodegradable (metabolisable) and biocompatible. The oil droplets in the emulsion can be less than 5 μm in diameter, and can even have a sub-micron diameter, with these small sizes being achieved with a microfluidiser to provide stable emulsions. Droplets with a size less than 220 nm can be subjected to filter sterilization.

[00348] In some instances, an immunogenic pharmaceutical composition can include carriers and excipients (including but not limited to buffers, carbohydrates, mannitol, proteins, polypeptides or amino acids such as glycine, antioxidants, bacteriostats, chelating agents, suspending agents, thickening agents and/or preservatives), water, oils including those of petroleum, animal, vegetable or synthetic origin, such as peanut oil, soybean oil, mineral oil, sesame oil and the like, saline solutions, aqueous dextrose and glycerol solutions, flavoring agents, coloring agents, detackifiers and other acceptable additives, adjuvants, or binders, other pharmaceutically acceptable auxiliary substances as required to approximate physiological conditions, such as pH buffering agents, tonicity adjusting agents, emulsifying agents, wetting agents and the like. Examples of excipients include starch, glucose, lactose, sucrose, gelatin, malt, rice, flour, chalk, silica gel, sodium stearate, glycerol monostearate, talc, sodium chloride, dried skim milk, glycerol, propylene, glycol, water, ethanol and the like. In another instances, the pharmaceutical preparation is substantially free of preservatives. In other instances, the pharmaceutical preparation can contain at least one preservative. It will be recognized that, while any suitable carrier known to those of ordinary skill in the art can be employed to administer the pharmaceutical compositions described herein, the type of carrier will vary depending on the mode of administration.

[00349] An immunogenic pharmaceutical composition can include preservatives such as thiomersal or 2-phenoxyethanol. In some instances, the immunogenic pharmaceutical composition is substantially free from (e.g. <10 μg/ml) mercurial material e.g. thiomersal-free. α-Tocopherol succinate may be used as an alternative to mercurial compounds.

[00350] For controlling the tonicity, a physiological salt such as sodium salt can be included in the immunogenic pharmaceutical composition. Other salts can include potassium chloride, potassium dihydrogen phosphate, disodium phosphate, and/or magnesium chloride, or the like.

[00351] An immunogenic pharmaceutical composition can have an osmolality of between 200 mOsm/kg and 400 mOsm/kg, between 240-360 mOsm/kg, or within the range of 290-310 mOsm/kg.

[00352] An immunogenic pharmaceutical composition can comprise one or more buffers, such as a Tris buffer; a borate buffer; a succinate buffer; a histidine buffer (particularly with an aluminum hydroxide adjuvant); or a citrate buffer. Buffers, in some cases, are included in the 5-20 mM range.

[00353] The pH of the immunogenic pharmaceutical composition can be between about 5.0 and about 8.5, between about 6.0 and about 8.0, between about 6.5 and about 7.5, or between about 7.0 and about 7.8.

[00354] An immunogenic pharmaceutical composition can be sterile. The immunogenic pharmaceutical composition can be non-pyrogenic e.g. containing <1 EU (endotoxin unit, a standard measure) per dose, and can be <0.1 EU per dose. The composition can be gluten free.

[00355] An immunogenic pharmaceutical composition can include detergent e.g. a polyoxyethylene sorbitan ester surfactant (known as 'Tweens'), or an octoxynol (such as octoxynol-9 (Triton X-100) or t-octylphenoxypolyethoxyethanol). The detergent can be present only at trace amounts. The immunogenic pharmaceutical composition can include less than 1 mg/mL of each of octoxynol-10 and polysorbate 80. Other residual components in trace amounts can be antibiotics (e.g. neomycin, kanamycin, polymyxin B).

[00356] An immunogenic pharmaceutical composition can be formulated as a sterile solution or suspension, in suitable vehicles, well known in the art. The pharmaceutical compositions can be sterilized by conventional, well-known sterilization techniques, or can be sterile filtered. The resulting aqueous solutions can be packaged for use as is, or lyophilized, the lyophilized preparation being combined with a sterile solution prior to administration.

[00357] An immunogenic pharmaceutical composition can be formulated with one or more pharmaceutically acceptable salts. Pharmaceutically acceptable salts can include those of the inorganic ions, such as, for example, sodium, potassium, calcium, magnesium ions, and the like. Such salts can include salts with inorganic or organic acids, such as hydrochloric acid, hydrobromic acid, phosphoric acid, nitric acid, sulfuric acid, methanesulfonic acid, p-toluenesulfonic acid, acetic acid, fumaric acid, succinic acid, lactic acid, mandelic acid, malic acid, citric acid, tartaric acid or maleic acid. In addition, if the agent(s) contain a carboxy group or other acidic group, it can be converted into a pharmaceutically acceptable addition salt with inorganic or organic bases. Examples of suitable bases include sodium hydroxide, potassium hydroxide, ammonia, cyclohexylamine, dicyclohexyl-amine, ethanolamine, diethanolamine, triethanolamine, and the like.

[00358] Pharmaceutical compositions comprising, for example, an active agent such as a peptide, a nucleic acid, an antibody or fragments thereof, and/or an APC described herein, in combination with one or more adjuvants can be formulated to comprise certain molar ratios. For example, molar ratios of about 99:1 to about 1:99 of an active agent such as a peptide, a nucleic acid, an antibody or fragments thereof, and/or an APC described herein, in combination with one or more adjuvants can be used. In some instances, the range of molar ratios of an active agent such as a peptide, a nucleic acid, an antibody or fragments

thereof, and/or an APC described herein, in combination with one or more adjuvants can be selected from about 80:20 to about 20:80; about 75:25 to about 25:75, about 70:30 to about 30:70, about 66:33 to about 33:66, about 60:40 to about 40:60; about 50:50; and about 90:10 to about 10:90. The molar ratio of an active agent such as a peptide, a nucleic acid, an antibody or fragments thereof, and/or an APC described herein, in combination with one or more adjuvants can be about 1:9, and in some cases can be about 1:1. The active agent such as a peptide, a nucleic acid, an antibody or fragments thereof, and/or an APC described herein, in combination with one or more adjuvants can be formulated together, in the same dosage unit e.g., in one vial, suppository, tablet, capsule, an aerosol spray; or each agent, form, and/or compound can be formulated in separate units, e.g., two vials, suppositories, tablets, two capsules, a tablet and a vial, an aerosol spray, and the like.

[00359] In some instances, an immunogenic pharmaceutical composition can be administered with an additional agent. The choice of the additional agent can depend, at least in part, on the condition being treated. The additional agent can include, for example, any agents having a therapeutic effect for a pathogen infection (e.g. viral infection), including, e.g., drugs used to treat inflammatory conditions such as an NSAID, e.g., ibuprofen, naproxen, acetaminophen, ketoprofen, or aspirin. As another example, formulations can additionally contain one or more supplements, such as vitamin C, E or other anti-oxidants.

[00360] A pharmaceutical composition comprising an active agent such as a peptide, a nucleic acid, an antibody or fragments thereof, and/or an APC described herein, in combination with one or more adjuvants can be formulated in conventional manner using one or more physiologically acceptable carriers, comprising excipients, diluents, and/or auxiliaries, e.g., which facilitate processing of the active agents into preparations that can be administered. Proper formulation can depend at least in part upon the route of administration chosen. The agent(s) described herein can be delivered to a patient using a number of routes or modes of administration, including oral, buccal, topical, rectal, transdermal, transmucosal, subcutaneous, intravenous, and intramuscular applications, as well as by inhalation.

[00361] The active agents can be formulated for parenteral administration (e.g., by injection, for example bolus injection or continuous infusion) and can be presented in unit dose form in ampoules, pre-filled syringes, small volume infusion or in multi-dose containers with an added preservative. The compositions can take such forms as suspensions, solutions, or emulsions in oily or aqueous vehicles, for example solutions in aqueous polyethylene glycol.

[00362] For injectable formulations, the vehicle can be chosen from those known in art to be suitable, including aqueous solutions or oil suspensions, or emulsions, with sesame oil, corn oil, cottonseed oil, or peanut oil, as well as elixirs, mannitol, dextrose, or a sterile aqueous solution, and similar pharmaceutical vehicles. The formulation can also comprise polymer compositions which are biocompatible, biodegradable, such as poly(lactic-co-glycolic)acid. These materials can be made into micro or nanospheres, loaded with drug and further coated or derivatized to provide superior sustained release

performance. Vehicles suitable for periocular or intraocular injection include, for example, suspensions of therapeutic agent in injection grade water, liposomes and vehicles suitable for lipophilic substances. Other vehicles for periocular or intraocular injection are well known in the art.

[00363] In some instances, pharmaceutical composition is formulated in accordance with routine procedures as a pharmaceutical composition adapted for intravenous administration to human beings. Typically, compositions for intravenous administration are solutions in sterile isotonic aqueous buffer. Where necessary, the composition can also include a solubilizing agent and a local anesthetic such as lidocaine to ease pain at the site of the injection. Generally, the ingredients are supplied either separately or mixed together in unit dosage form, for example, as a dry lyophilized powder or water free concentrate in a hermetically sealed container such as an ampoule or sachette indicating the quantity of active agent. Where the composition is to be administered by infusion, it can be dispensed with an infusion bottle containing sterile pharmaceutical grade water or saline. Where the composition is administered by injection, an ampoule of sterile water for injection or saline can be provided so that the ingredients can be mixed prior to administration.

[00364] When administration is by injection, the active agent can be formulated in aqueous solutions, specifically in physiologically compatible buffers such as Hanks solution, Ringer's solution, or physiological saline buffer. The solution can contain formulatory agents such as suspending, stabilizing and/or dispersing agents. Alternatively, the active compound can be in powder form for constitution with a suitable vehicle, e.g., sterile pyrogen-free water, before use. In another embodiment, the pharmaceutical composition does not comprise an adjuvant or any other substance added to enhance the immune response stimulated by the peptide. In another embodiment, the pharmaceutical composition comprises a substance that inhibits an immune response to the peptide.

[00365] In addition to the formulations described previously, the active agents can also be formulated as a depot preparation. Such long acting formulations can be administered by implantation or transcutaneous delivery (for example subcutaneously or intramuscularly), intramuscular injection or use of a transdermal patch. Thus, for example, the agents can be formulated with suitable polymeric or hydrophobic materials (for example as an emulsion in an acceptable oil) or ion exchange resins, or as sparingly soluble derivatives, for example, as a sparingly soluble salt.

[00366] In cases, pharmaceutical compositions comprising one or more agents exert local and regional effects when administered topically or injected at or near particular sites of infection. Direct topical application, e.g., of a viscous liquid, solution, suspension, dimethylsulfoxide (DMSO)-based solutions, liposomal formulations, gel, jelly, cream, lotion, ointment, suppository, foam, or aerosol spray, can be used for local administration, to produce for example local and/or regional effects. Pharmaceutically appropriate vehicles for such formulation include, for example, lower aliphatic alcohols, polyglycols (e.g., glycerol or polyethylene glycol), esters of fatty acids, oils, fats, silicones, and the like. Such preparations can also

include preservatives (e.g., p-hydroxybenzoic acid esters) and/or antioxidants (e.g., ascorbic acid and tocopherol). See also Dermatological Formulations: Percutaneous absorption, Barry (Ed.), Marcel Dekker Incl, 1983. In another embodiment, local/topical formulations comprising a transporter, carrier, or ion channel inhibitor are used to treat epidermal or mucosal viral infections.

[00367] Pharmaceutical compositions can contain a cosmetically or dermatologically acceptable carrier. Such carriers are compatible with skin, nails, mucous membranes, tissues and/or hair, and can include any conventionally used cosmetic or dermatological carrier meeting these requirements. Such carriers can be readily selected by one of ordinary skill in the art. In formulating skin ointments, an agent or combination of agents can be formulated in an oleaginous hydrocarbon base, an anhydrous absorption base, a water-in-oil absorption base, an oil-in-water water-removable base and/or a water-soluble base. Examples of such carriers and excipients include, but are not limited to, humectants (e.g., urea), glycols (e.g., propylene glycol), alcohols (e.g., ethanol), fatty acids (e.g., oleic acid), surfactants (e.g., isopropyl myristate and sodium lauryl sulfate), pyrrolidones, glycerol monolaurate, sulfoxides, terpenes (e.g., menthol), amines, amides, alkanes, alkanols, water, calcium carbonate, calcium phosphate, various sugars, starches, cellulose derivatives, gelatin, and polymers such as polyethylene glycols.

[00368] Ointments and creams can, for example, be formulated with an aqueous or oily base with the addition of suitable thickening and/or gelling agents. Lotions can be formulated with an aqueous or oily base and will in general also containing one or more emulsifying agents, stabilizing agents, dispersing agents, suspending agents, thickening agents, or coloring agents. The construction and use of transdermal patches for the delivery of pharmaceutical agents is well known in the art. Such patches can be constructed for continuous, pulsatile, or on demand delivery of pharmaceutical agents.

[00369] Lubricants which can be used to form pharmaceutical compositions and dosage forms can include, but are not limited to, calcium stearate, magnesium stearate, mineral oil, light mineral oil, glycerin, sorbitol, mannitol, polyethylene glycol, other glycols, stearic acid, sodium lauryl sulfate, talc, hydrogenated vegetable oil (e.g., peanut oil, cottonseed oil, sunflower oil, sesame oil, olive oil, corn oil, and soybean oil), zinc stearate, ethyl oleate, ethyl laureate, agar, or mixtures thereof. Additional lubricants include, for example, a syloid silica gel, a coagulated aerosol of synthetic silica, or mixtures thereof. A lubricant can optionally be added, in an amount of less than about 1 weight percent of the pharmaceutical composition.

[00370] The pharmaceutical compositions can be in any form suitable for topical application, including aqueous, aqueous-alcoholic or oily solutions, lotion or serum dispersions, aqueous, anhydrous or oily gels, emulsions obtained by dispersion of a fatty phase in an aqueous phase (O/W or oil in water) or, conversely, (W/O or water in oil), microemulsions or alternatively microcapsules, microparticles or lipid vesicle dispersions of ionic and/or nonionic type. These compositions can be prepared according to conventional methods. The amounts of the various constituents of the compositions are those conventionally used in the art. These compositions in particular constitute protection, treatment or care creams, milks, lotions, gels or

foams for the face, for the hands, for the body and/or for the mucous membranes, or for cleansing the skin. The compositions can also consist of solid preparations constituting soaps or cleansing bars.

[00371] Pharmaceutical compositions can contain adjuvants such as hydrophilic or lipophilic gelling agents, hydrophilic or lipophilic active agents, preserving agents, antioxidants, solvents, fragrances, fillers, sunscreens, odor-absorbers and dyestuffs. The amounts of these various adjuvants are those conventionally used in the fields considered and, for example, are from about 0.01% to about 20% of the total weight of the composition. Depending on their nature, these adjuvants can be introduced into the fatty phase, into the aqueous phase and/or into the lipid vesicles.

[00372] In instances relating to topical/local application, the pharmaceutical compositions can include one or more penetration enhancers. For example, the formulations can comprise suitable solid or gel phase carriers or excipients that increase penetration or help delivery of agents or combinations of agents of the invention across a permeability barrier, e.g., the skin. Many of these penetration-enhancing compounds are known in the art of topical formulation, and include, e.g., water, alcohols (e.g., terpenes like methanol, ethanol, 2-propanol), sulfoxides (e.g., dimethyl sulfoxide, decylmethyl sulfoxide, tetradecylmethyl sulfoxide), pyrrolidones (e.g., 2-pyrrolidone, N-methyl-2-pyrrolidone, N-(2-hydroxyethyl)pyrrolidone), laurocapram, acetone, dimethylacetamide, dimethylformamide, tetrahydrofurfuryl alcohol, L-α-amino acids, anionic, cationic, amphoteric or nonionic surfactants (e.g., isopropyl myristate and sodium lauryl sulfate), fatty acids, fatty alcohols (e.g., oleic acid), amines, amides, clofibric acid amides, hexamethylene lauramide, proteolytic enzymes, α-bisabolol, d-limonene, urea and N,N-diethyl-m-toluamide, and the like. Additional examples include humectants (e.g., urea), glycols (e.g., propylene glycol and polyethylene glycol), glycerol monolaurate, alkanes, alkanols, ORGELASE, calcium carbonate, calcium phosphate, various sugars, starches, cellulose derivatives, gelatin, and/or other polymers. In another embodiment, the pharmaceutical compositions will include one or more such penetration enhancers.

[00373] The pharmaceutical compositions for local/topical application can include one or more antimicrobial preservatives such as quaternary ammonium compounds, organic mercurials, p-hydroxy benzoates, aromatic alcohols, chlorobutanol, and the like.

[00374] The pharmaceutical compositions can be formulated into aerosol solutions, suspensions or dry powders. The aerosol can be administered through the respiratory system or nasal passages. For example, one skilled in the art will recognize that a composition of the present invention can be suspended or dissolved in an appropriate carrier, e.g., a pharmaceutically acceptable propellant, and administered directly into the lungs using a nasal spray or inhalant. For example, an aerosol formulation comprising a transporter, carrier, or ion channel inhibitor can be dissolved, suspended or emulsified in a propellant or a mixture of solvent and propellant, e.g., for administration as a nasal spray or inhalant. Aerosol formulations can contain any acceptable propellant under pressure, such as a cosmetically or dermatologically or pharmaceutically acceptable propellant, as conventionally used in the art.

[00375] An aerosol formulation for nasal administration is generally an aqueous solution designed to be administered to the nasal passages in drops or sprays. Nasal solutions can be similar to nasal secretions in that they are generally isotonic and slightly buffered to maintain a pH of about 5.5 to about 6.5, although pH values outside of this range can additionally be used. Antimicrobial agents or preservatives can also be included in the formulation.

[00376] An aerosol formulation for inhalations and inhalants can be designed so that the agent or combination of agents is carried into the respiratory tree of the subject when administered by the nasal or oral respiratory route. Inhalation solutions can be administered, for example, by a nebulizer. Inhalations or insufflations, comprising finely powdered or liquid drugs, can be delivered to the respiratory system as a pharmaceutical aerosol of a solution or suspension of the agent or combination of agents in a propellant, e.g., to aid in disbursement. Propellants can be liquefied gases, including halocarbons, for example, fluorocarbons such as fluorinated chlorinated hydrocarbons, hydrochlorofluorocarbons, and hydrochlorocarbons, as well as hydrocarbons and hydrocarbon ethers.

[00377] Halocarbon propellants can include fluorocarbon propellants in which all hydrogens are replaced with fluorine, chlorofluorocarbon propellants in which all hydrogens are replaced with chlorine and at least one fluorine, hydrogen-containing fluorocarbon propellants, and hydrogen-containing chlorofluorocarbon propellants. Hydrocarbon propellants useful in the invention include, for example, propane, isobutane, n-butane, pentane, isopentane and neopentane. A blend of hydrocarbons can also be used as a propellant. Ether propellants include, for example, dimethyl ether as well as the ethers. An aerosol formulation of the invention can also comprise more than one propellant. For example, the aerosol formulation can comprise more than one propellant from the same class, such as two or more fluorocarbons; or more than one, more than two, more than three propellants from different classes, such as a fluorohydrocarbon and a hydrocarbon. Pharmaceutical compositions of the present invention can also be dispensed with a compressed gas, e.g., an inert gas such as carbon dioxide, nitrous oxide or nitrogen.

[00378] Aerosol formulations can also include other components, for example, ethanol, isopropanol, propylene glycol, as well as surfactants or other components such as oils and detergents. These components can serve to stabilize the formulation and/or lubricate valve components.

[00379] The aerosol formulation can be packaged under pressure and can be formulated as an aerosol using solutions, suspensions, emulsions, powders and semisolid preparations. For example, a solution aerosol formulation can comprise a solution of an agent of the invention such as a transporter, carrier, or ion channel inhibitor in (substantially) pure propellant or as a mixture of propellant and solvent. The solvent can be used to dissolve the agent and/or retard the evaporation of the propellant. Solvents can include, for example, water, ethanol and glycols. Any combination of suitable solvents can be use, optionally combined with preservatives, antioxidants, and/or other aerosol components.

[00380] An aerosol formulation can be a dispersion or suspension. A suspension aerosol formulation can comprise a suspension of an agent or combination of agents of the instant invention, e.g., a transporter, carrier, or ion channel inhibitor, and a dispersing agent. Dispersing agents can include, for example, sorbitan trioleate, oleyl alcohol, oleic acid, lecithin and corn oil. A suspension aerosol formulation can also include lubricants, preservatives, antioxidant, and/or other aerosol components.

[00381] An aerosol formulation can similarly be formulated as an emulsion. An emulsion aerosol formulation can include, for example, an alcohol such as ethanol, a surfactant, water and a propellant, as well as an agent or combination of agents of the invention, e.g., a transporter, carrier, or ion channel. The surfactant used can be nonionic, anionic or cationic. One example of an emulsion aerosol formulation comprises, for example, ethanol, surfactant, water and propellant. Another example of an emulsion aerosol formulation comprises, for example, vegetable oil, glyceryl monostearate and propane.

[00382] The pharmaceutical compounds can be formulated for administration as suppositories. A low melting wax, such as a mixture of triglycerides, fatty acid glycerides, Witepsol S55 (trademark of Dynamite Nobel Chemical, Germany), or cocoa butter is first melted and the active component is dispersed homogeneously, for example, by stirring. The molten homogeneous mixture is then poured into convenient sized molds, allowed to cool, and to solidify.

[00383] The pharmaceutical compositions can be formulated for vaginal administration. Pessaries, tampons, creams, gels, pastes, foams or sprays containing in addition to the active ingredient such carriers as are known in the art to be appropriate.

[00384] The pharmaceutical compositions can be attached releasably to biocompatible polymers for use in sustained release formulations on, in or attached to inserts for topical, intraocular, periocular, or systemic administration. The controlled release from a biocompatible polymer can be utilized with a water soluble polymer to form a instillable formulation, as well. The controlled release from a biocompatible polymer, such as for example, PLGA microspheres or nanospheres, can be utilized in a formulation suitable for intra ocular implantation or injection for sustained release administration, as well. Any suitable biodegradable and biocompatible polymer can be used.

Production of Tissue-specific Antigens

[00385] The present disclosure is based, at least in part, on the ability to present the immune system of the patient with one or more tissue-specific antigens. One of skill in the art from this disclosure and the knowledge in the art will appreciate that there are a variety of ways in which to produce such tissue-specific antigens. In general, such tissue-specific antigens can be produced either *in vitro* or *in vivo*. Tissue-specific antigens can be produced *in vitro* as peptides or polypeptides, which can then be formulated into a vaccine or pharmaceutical composition and administered to a subject. As described in further detail herein, such *in vitro* production can occur by a variety of methods known to one of skill in the art such as, for example, peptide synthesis or expression of a peptide/polypeptide from a DNA or RNA molecule in any of a variety

of bacterial, eukaryotic, or viral recombinant expression systems, followed by purification of the expressed peptide/polypeptide. Alternatively, tissue-specific antigens can be produced *in vivo* by introducing molecules (*e.g.*, DNA, RNA, viral expression systems, and the like) that encode tissue-specific antigens into a subject, whereupon the encoded tissue-specific antigens are expressed. The methods of *in vitro* and *in vivo* production of antigens are also further described herein as they relate to pharmaceutical compositions and methods of delivery of the therapy.

[00386] *In Vitro Peptide / Polypeptide Synthesis*

[00387] Proteins or peptides of the present disclosure, e.g., tissue-specific antigenic peptides, e.g., tissue-specific antigens comprising tumor epitope sequence as provided herein, can be made by any technique known to those of skill in the art, including the expression of proteins, polypeptides or peptides through standard molecular biological techniques, the isolation of proteins or peptides from natural sources, *in vitro* translation, or the chemical synthesis of proteins or peptides.

[00388] Peptides of the present disclosure can be readily synthesized chemically utilizing reagents that are free of contaminating bacterial or animal substances (Merrifield RB: Solid phase peptide synthesis. I. The synthesis of a tetrapeptide. J. Am. Chem. Soc.85:2149-54, 1963). In some embodiments, antigenic peptides of the present disclosure are prepared by (1) parallel solid-phase synthesis on multi-channel instruments using uniform synthesis and cleavage conditions; (2) purification over a RP-HPLC column with column stripping; and re-washing, but not replacement, between peptides; followed by (3) analysis with a limited set of the most informative assays. The Good Manufacturing Practices (GMP) footprint can be defined around the set of peptides for an individual patient, thus requiring suite changeover procedures only between syntheses of peptides for different patients.

[00389] Alternatively, a nucleic acid (*e.g.*, a polynucleotide) encoding an antigenic peptide of the present disclosure can be used to produce the antigenic peptide *in vitro*. The polynucleotide can be, *e.g.*, DNA, cDNA, PNA, CNA, RNA, either single- and/or double-stranded, or native or stabilized forms of polynucleotides, such as *e.g.* polynucleotides with a phosphorothiate backbone, or combinations thereof and it can contain introns so long as it codes for the peptide. In one embodiment *in vitro* translation is used to produce the peptide. Many exemplary systems exist that one skilled in the art could utilize (*e.g.*, Retic Lysate IVT Kit, Life Technologies, Waltham, MA). An expression vector capable of expressing a polypeptide can also be prepared. Expression vectors for different cell types are well known in the art and can be selected without undue experimentation. Generally, the DNA is inserted into an expression vector, such as a plasmid, in proper orientation and correct reading frame for expression. If necessary, the DNA can be linked to the appropriate transcriptional and translational regulatory control nucleotide sequences recognized by the desired host (*e.g.*, bacteria), although such controls are generally available in the expression vector. The vector is then introduced into the host bacteria for cloning using standard techniques

(see, *e.g.*, Sambrook et al. (1989) Molecular Cloning, A Laboratory Manual, Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y.).

[00390] Expression vectors comprising the isolated polynucleotides, as well as host cells containing the expression vectors, are also contemplated. The antigenic peptides can be provided in the form of RNA or cDNA molecules encoding the desired antigenic peptides. One or more antigenic peptides of the disclosure can be encoded by a single expression vector.

[00391] In some embodiments, the polynucleotides can comprise the coding sequence for the tissue-specific antigenic peptide fused in the same reading frame to a polynucleotide which aids, for example, in expression and/or secretion of a polypeptide from a host cell (*e.g.*, a leader sequence which functions as a secretory sequence for controlling transport of a polypeptide from the cell). The polypeptide having a leader sequence is a preprotein and can have the leader sequence cleaved by the host cell to form the mature form of the polypeptide.

[00392] In some embodiments, the polynucleotides can comprise the coding sequence for the antigenic peptide of the present disclosure fused in the same reading frame to a marker sequence that allows, for example, for purification of the encoded polypeptide, which can then be incorporated into a personalized vaccine or immunogenic composition. For example, the marker sequence can be a hexa-histidine tag supplied by a pQE-9 vector to provide for purification of the mature polypeptide fused to the marker in the case of a bacterial host, or the marker sequence can be a hemagglutinin (HA) tag derived from the influenza hemagglutinin protein when a mammalian host (*e.g.*, COS-7 cells) is used. Additional tags include, but are not limited to, Calmodulin tags, FLAG tags, Myc tags, S tags, SBP tags, Softag 1, Softag 3, V5 tag, Xpress tag, Isopeptag, SpyTag, Biotin Carboxyl Carrier Protein (BCCP) tags, GST tags, fluorescent protein tags (*e.g.*, green fluorescent protein tags), maltose binding protein tags, Nus tags, Strep-tag, thioredoxin tag, TC tag, Ty tag, and the like.

[00393] In some embodiments, the polynucleotides can comprise the coding sequence for one or more of the tissue-specific antigenic peptides fused in the same reading frame to create a single concatamerized antigenic peptide construct capable of producing multiple antigenic peptides.

[00394] In some embodiments, isolated nucleic acid molecules having a nucleotide sequence at least 60% identical, at least 65% identical, at least 70% identical, at least 75% identical, at least 80% identical, at least 85% identical, at least 90% identical, at least 95% identical, or at least 96%, 97%, 98% or 99% identical to a polynucleotide encoding a tissue-specific antigenic peptide of the present disclosure, can be provided.

[00395] Isolated tissue-specific antigenic peptides described herein can be produced *in vitro* (*e.g.*, in the laboratory) by any suitable method known in the art. Such methods range from direct protein synthetic methods to constructing a DNA sequence encoding isolated polypeptide sequences and expressing those sequences in a suitable transformed host. In some embodiments, a DNA sequence is constructed using recombinant technology by isolating or synthesizing a DNA sequence encoding a wild-type protein of

interest. Optionally, the sequence can be mutagenized by site-specific mutagenesis to provide functional analogs thereof. See, *e.g.* Zoeller et al., Proc. Nat'l. Acad. Sci. USA 81:5662-5066 (1984) and U.S. Pat. No.4,588,585.

[00396] In some embodiments, a DNA sequence encoding a polypeptide as provided herein would be constructed by chemical synthesis using an oligonucleotide synthesizer. Such oligonucleotides can be designed based on the amino acid sequence of the desired polypeptide and selecting those codons that are favored in the host cell in which the recombinant polypeptide of interest is produced. Standard methods can be applied to synthesize an isolated polynucleotide sequence encoding an isolated polypeptide of interest. For example, a complete amino acid sequence can be used to construct a back-translated gene. Further, a DNA oligomer containing a nucleotide sequence coding for the particular isolated polypeptide can be synthesized. For example, several small oligonucleotides coding for portions of the desired polypeptide can be synthesized and then ligated. The individual oligonucleotides typically contain 5' or 3' overhangs for complementary assembly

[00397] Once assembled (*e.g.*, by synthesis, site-directed mutagenesis, or another method), the polynucleotide sequences encoding a particular isolated polypeptide can be inserted into an expression vector and optionally operatively linked to an expression control sequence appropriate for expression of the protein in a desired host. Proper assembly can be confirmed by nucleotide sequencing, restriction mapping, and expression of a biologically active polypeptide in a suitable host. As well known in the art, in order to obtain high expression levels of a transfected gene in a host, the gene can be operatively linked to transcriptional and translational expression control sequences that are functional in the chosen expression host.

[00398] Recombinant expression vectors can be used to amplify and express DNA encoding the tissue-specific antigenic peptides described herein. Recombinant expression vectors are replicable DNA constructs which have synthetic or cDNA-derived DNA fragments encoding a tissue-specific antigenic peptide or a bioequivalent analog operatively linked to suitable transcriptional or translational regulatory elements derived from mammalian, microbial, viral or insect genes. A transcriptional unit generally comprises an assembly of (1) a genetic element or elements having a regulatory role in gene expression, for example, transcriptional promoters or enhancers, (2) a structural or coding sequence which is transcribed into mRNA and translated into protein, and (3) appropriate transcription and translation initiation and termination sequences, as described in detail herein. Such regulatory elements can include an operator sequence to control transcription. The ability to replicate in a host, usually conferred by an origin of replication, and a selection gene to facilitate recognition of transformants can additionally be incorporated. DNA regions are operatively linked when they are functionally related to each other. For example, DNA for a signal peptide (secretory leader) is operatively linked to DNA for a polypeptide if it is expressed as a precursor which participates in the secretion of the polypeptide; a promoter is operatively

linked to a coding sequence if it controls the transcription of the sequence; or a ribosome binding site is operatively linked to a coding sequence if it is positioned so as to permit translation. Generally, operatively linked means contiguous, and in the case of secretory leaders, means contiguous and in reading frame. Structural elements intended for use in yeast expression systems include a leader sequence enabling extracellular secretion of translated protein by a host cell. Alternatively, where recombinant protein is expressed without a leader or transport sequence, it can include an N-terminal methionine residue. This residue can optionally be subsequently cleaved from the expressed recombinant protein to provide a final product.

[00399] Useful expression vectors for producing polypeptides of the present disclosure in eukaryotic hosts, especially mammals or humans include, for example, vectors comprising expression control sequences from SV40, bovine papilloma virus, adenovirus and cytomegalovirus. Useful expression vectors for bacterial hosts include known bacterial plasmids, such as plasmids from Escherichia coli, including pCR 1, pBR322, pMB9 and their derivatives, wider host range plasmids, such as M13 and filamentous single-stranded DNA phages.

[00400] Suitable host cells for expression of a polypeptide of the present disclosure can include prokaryotes, yeast, insect or higher eukaryotic cells under the control of appropriate promoters. Prokaryotes include gram negative or gram positive organisms, for example E. coli or bacilli. Higher eukaryotic cells include established cell lines of mammalian origin. Cell-free translation systems could also be employed. Appropriate cloning and expression vectors for use with bacterial, fungal, yeast, and mammalian cellular hosts are well known in the art (see Pouwels et al., Cloning Vectors: A Laboratory Manual, Elsevier, N.Y., 1985).

[00401] Various mammalian or insect cell culture systems can also be employed to express recombinant protein as provided herein. Expression of recombinant proteins in mammalian cells can be performed because such proteins are generally correctly folded, appropriately modified and completely functional. Examples of suitable mammalian host cell lines include the COS-7 lines of monkey kidney cells, described by Gluzman (Cell 23:175, 1981), and other cell lines capable of expressing an appropriate vector including, for example, L cells, C127, 3T3, Chinese hamster ovary (CHO), 293, HeLa and BHK cell lines. Mammalian expression vectors can comprise nontranscribed elements such as an origin of replication, a suitable promoter and enhancer linked to the gene to be expressed, and other 5' or 3' flanking nontranscribed sequences, and 5' or 3' nontranslated sequences, such as necessary ribosome binding sites, a polyadenylation site, splice donor and acceptor sites, and transcriptional termination sequences. Baculovirus systems for production of heterologous proteins in insect cells are reviewed by Luckow and Summers, Bio/Technology 6:47 (1988).

[00402] The proteins as provided herein produced by a transformed host can be purified according to any suitable method. Such standard methods include chromatography (*e.g.*, ion exchange, affinity and sizing

column chromatography, and the like), centrifugation, differential solubility, or by any other standard technique for protein purification. Affinity tags such as hexahistidine, maltose binding domain, influenza coat sequence, glutathione-S-transferase, and the like can be attached to the protein to allow easy purification by passage over an appropriate affinity column. Isolated proteins can also be physically characterized using such techniques as proteolysis, nuclear magnetic resonance and x-ray crystallography. For example, supernatants from systems which secrete recombinant protein into culture media can be first concentrated using a commercially available protein concentration filter, for example, an Amicon or Millipore Pellicon ultrafiltration unit. Following the concentration step, the concentrate can be applied to a suitable purification matrix. Alternatively, an anion exchange resin can be employed, for example, a matrix or substrate having pendant diethylaminoethyl (DEAE) groups. The matrices can be acrylamide, agarose, dextran, cellulose or other types commonly employed in protein purification. Alternatively, a cation exchange step can be employed. Suitable cation exchangers include various insoluble matrices comprising sulfopropyl or carboxymethyl groups. Finally, one or more reversed-phase high performance liquid chromatography (RP-HPLC) steps employing hydrophobic RP-HPLC media, *e.g.*, silica gel having pendant methyl or other aliphatic groups, can be employed to further purify a cancer stem cell protein-Fc composition. Some or all of the foregoing purification steps, in various combinations, can also be employed to provide a homogeneous recombinant protein.

[00403] Recombinant protein as described herein produced in bacterial culture can be isolated, for example, by initial extraction from cell pellets, followed by one or more concentration, salting-out, aqueous ion exchange or size exclusion chromatography steps. High performance liquid chromatography (HPLC) can be employed for final purification steps. Microbial cells employed in expression of a recombinant protein can be disrupted by any convenient method, including freeze-thaw cycling, sonication, mechanical disruption, or use of cell lysing agents.

[00404] *In Vivo* Peptide / Polypeptide Synthesis

[00405] The present disclosure also contemplates the use of nucleic acid molecules as vehicles for delivering antigenic peptides/polypeptides to the subject in need thereof, *in vivo*, in the form of, *e.g.*, DNA/RNA vaccines (see, *e.g.*, WO2012/159643, and WO2012/159754, hereby incorporated by reference in their entireties).

[00406] In some embodiments, antigens can be administered to a patient in need thereof by use of a plasmid. These are plasmids which usually consist of a strong viral promoter to drive the *in vivo* transcription and translation of the gene (or complementary DNA) of interest (Mor, et al., (1995). The Journal of Immunology 155 (4): 2039–2046). Intron A can sometimes be included to improve mRNA stability and hence increase protein expression (Leitner, et al. (1997).The Journal of Immunology 159 (12): 6112–6119). Plasmids also include a strong polyadenylation/transcriptional termination signal, such as bovine growth hormone or rabbit beta-globulin polyadenylation sequences (Alarcon et al., (1999). Adv.

Parasitol. Advances in Parasitology 42: 343–410; Robinson et al., (2000). Adv. Virus Res. Advances in Virus Research 55: 1–74; Böhmet al., (1996). Journal of Immunological Methods 193 (1): 29–40.). Multicistronic vectors are sometimes constructed to express more than one immunogen, or to express an immunogen and an immunostimulatory protein (Lewis et al., (1999). Advances in Virus Research (Academic Press) 54: 129–88).

[00407] In some embodiments, plasmids can be introduced into animal tissues by a number of different methods. Among others, two approaches can be injection of DNA in saline, using a standard hypodermic needle, and gene gun delivery. Injection in saline can be normally conducted intramuscularly (IM) in skeletal muscle, or intradermally (ID), with DNA being delivered to the extracellular spaces. This can be assisted by electroporation by temporarily damaging muscle fibers with myotoxins such as bupivacaine; or by using hypertonic solutions of saline or sucrose (Alarcon et al., (1999). Adv. Parasitol. Advances in Parasitology 42: 343–410). Immune responses to this method of delivery can be affected by many factors, including needle type, needle alignment, speed of injection, volume of injection, muscle type, and age, sex and physiological condition of the animal being injected(Alarcon et al., (1999). Adv. Parasitol. Advances in Parasitology 42: 343–410).

[00408] Gene gun delivery, also useful for the present disclosure, can ballistically accelerate plasmid DNA (pDNA) that has been adsorbed onto gold or tungsten microparticles into the target cells, using compressed helium as an accelerant (Alarcon et al., (1999). Adv. Parasitol. Advances in Parasitology 42: 343–410; Lewis et al., (1999). Advances in Virus Research (Academic Press) 54: 129–88).

[00409] Alternative delivery methods can include aerosol instillation of naked DNA on mucosal surfaces, such as the nasal and lung mucosa, (Lewis et al., (1999). Advances in Virus Research (Academic Press) 54: 129–88) and topical administration of pDNA to the eye and vaginal mucosa (Lewis et al., (1999) Advances in Virus Research (Academic Press) 54: 129–88). Mucosal surface delivery can be achieved using cationic liposome-DNA preparations, biodegradable microspheres, attenuated Shigella or Listeria vectors for oral administration to the intestinal mucosa, and recombinant adenovirus vectors. DNA or RNA can also be delivered to cells following mild mechanical disruption of the cell membrane, temporarily permeabilizing the cells. Such a mild mechanical disruption of the membrane can be accomplished by gently forcing cells through a small aperture (*Ex vivo* Cytosolic Delivery of Functional Macromolecules to Immune Cells, Sharei et al, PLOS ONE | DOI:10.1371/journal.pone.0118803 April 13, 2015).

[00410] In some embodiments, a vaccine or pharmaceutical composition comprising tissue specific antigen can include separate DNA plasmids encoding, for example, one or more antigenic peptides/polypeptides as identified according to the disclosure. As discussed herein, the exact choice of expression vectors can depend upon the peptide/polypeptides to be expressed, and is well within the skill of the ordinary artisan. The expected persistence of the DNA constructs (*e.g.*, in an episomal, non-

replicating, non-integrated form in the muscle cells) is expected to provide an increased duration of protection.

[00411] One or more antigenic peptides of the present disclosure can be encoded and expressed *in vivo* using a viral based system (*e.g.*, an adenovirus system, an adeno associated virus (AAV) vector, a poxvirus, or a lentivirus). In one embodiment, the vaccine or pharmaceutical composition can include a viral based vector for use in a human patient in need thereof, such as, for example, an adenovirus (see, *e.g.*, Baden et al. First-in-human evaluation of the safety and immunogenicity of a recombinant adenovirus serotype 26 HIV-1 Env vaccine (IPCAVD 001). J Infect Dis.2013 Jan 15;207(2):240-7, hereby incorporated by reference in its entirety). Plasmids that can be used for adeno associated virus, adenovirus, and lentivirus delivery have been described previously (see *e.g.*, U.S. Patent Nos. 6,955,808 and 6,943,019, and U.S. Patent application No. 20080254008, hereby incorporated by reference).

[00412] The peptides and polypeptides of the disclosure can also be expressed by a vector, *e.g.*, a nucleic acid molecule as herein-discussed, *e.g.*, RNA or a DNA plasmid, a viral vector such as a poxvirus, *e.g.*, orthopox virus, avipox virus, or adenovirus, AAV or lentivirus. This approach involves the use of a vector to express nucleotide sequences that encode the peptide of the disclosure. Upon introduction into an acutely or chronically infected host or into a noninfected host, the vector can express the immunogenic peptide, and thereby can elicit a host CTL response.

[00413] Among vectors that can be used in the practice of the disclosure, integration in the host genome of a cell is possible with retrovirus gene transfer methods, often resulting in long term expression of the inserted transgene. In some embodiments, the retrovirus is a lentivirus. Additionally, high transduction efficiencies have been observed in many different cell types and target tissues. The tropism of a retrovirus can be altered by incorporating foreign envelope proteins, expanding the potential target population of target cells. A retrovirus can also be engineered to allow for conditional expression of the inserted transgene, such that only certain cell types are infected by the lentivirus. Cell type specific promoters can be used to target expression in specific cell types. Lentiviral vectors are retroviral vectors (and hence both lentiviral and retroviral vectors can be used in the practice of the disclosure). Moreover, lentiviral vectors are able to transduce or infect non-dividing cells and typically produce high viral titers. Selection of a retroviral gene transfer system can therefore depend on the target tissue. Retroviral vectors are comprised of cis-acting long terminal repeats with packaging capacity for up to 6-10 kb of foreign sequence. The minimum cis-acting LTRs are sufficient for replication and packaging of the vectors, which are then used to integrate the desired nucleic acid into the target cell to provide permanent expression. Widely used retroviral vectors that can be used in the practice of the disclosure include those based upon murine leukemia virus (MuLV), gibbon ape leukemia virus (GaLV), Simian Immunodeficiency virus (SIV), human immunodeficiency virus (HIV), and combinations thereof (see, *e.g.*, Buchscher et al., (1992) J. Virol. 66:2731-2739; Johann et al., (1992) J. Virol.66:1635-1640; Sommnerfelt et al., (1990) Virol.176:58-

59; Wilson et al., (1998) J. Virol.63:2374-2378; Miller et al., (1991) J. Virol.65:2220-2224; PCT/US94/05700).

[00414] Also useful in the practice of the disclosure is a minimal non-primate lentiviral vector, such as a lentiviral vector based on the equine infectious anemia virus (EIAV) (see, *e.g.*, Balagaan, (2006) J Gene Med; 8: 275– 285, Published online 21 November 2005 in Wiley InterScience (interscience.wiley.com). DOI: 10.1002/jgm.845). The vectors can have cytomegalovirus (CMV) promoter driving expression of the target gene. Accordingly, the disclosure contemplates amongst vector(s) useful in the practice of the disclosure: viral vectors, including retroviral vectors and lentiviral vectors.

[00415] Lentiviral vectors have been disclosed as in the treatment for Parkinson's Disease, see, *e.g.*, US Patent Publication No. 20120295960 and US Patent Nos. 7303910 and 7351585. Lentiviral vectors have also been disclosed for delivery to the Brain, see, *e.g.*, US Patent Publication Nos. US20110293571; US20040013648, US20070025970, US20090111106 and US Patent No. US7259015. In another embodiment lentiviral vectors are used to deliver vectors to the brain of those being treated for a disease, e.g., glioma. As to lentivirus vector systems useful in the practice of the disclosure, mention is made of US Patents Nos. 6428953, 6165782, 6013516, 5994136, 6312682, and 7,198,784, and documents cited therein. In an embodiment herein the delivery is via an lentivirus. Zou et al. administered about 10 μL of a recombinant lentivirus having a titer of 1 x 10^9 transducing units (TU)/mL by an intrathecal catheter. These sort of dosages can be adapted or extrapolated to use of a retroviral or lentiviral vector in the present disclosure. For transduction in tissues such as the brain, it is necessary to use very small volumes, so the viral preparation is concentrated by ultracentrifugation. Other methods of concentration such as ultrafiltration or binding to and elution from a matrix can be used. In other embodiments the amount of lentivirus administered can be 1x10^5 or about 1x10^5 plaque forming units (PFU), 5x10^5 or about 5x10^5 PFU, 1x10^6 or about 1.x10^6 PFU, 5x10^6 or about 5x10^6 PFU, 1x10^7 or about 1x107PFU, 5x10^7 or about 5x10^7 PFU, 1x10^8 or about 1x10^8 PFU, 5x10^8 or about 5x10^8 PFU, 1x10^9 or about 1x10^9PFU, 5x10^9 or about 5x10^9 PFU, 1x10^{10} or about 1x10^{10} PFU or 5x10^{10} or about 5x10^{10} PFU as total single dosage for an average human of 75 kg or adjusted for the weight and size and species of the subject. One of skill in the art can determine suitable dosage. Suitable dosages for a virus can be determined empirically.

[00416] Also useful in the practice of the disclosure is an adenovirus vector. One advantage is the ability of recombinant adenoviruses to efficiently transfer and express recombinant genes in a variety of mammalian cells and tissues *in vitro* and *in vivo*, resulting in the high expression of the transferred nucleic acids. Further, the ability to productively infect quiescent cells, expands the utility of recombinant adenoviral vectors. In addition, high expression levels ensure that the products of the nucleic acids will be expressed to sufficient levels to generate an immune response (see *e.g.*, U.S. Patent No.7,029,848, hereby incorporated by reference). As to adenovirus vectors useful in the practice of the disclosure, mention is made of US Patent No.6,955,808. The adenovirus vector used can be selected from the group consisting of

the Ad5, Ad35, Ad11, C6, and C7 vectors. The sequence of the Adenovirus 5 ("Ad5") genome has been published. (Chroboczek, J., Bieber, F., and Jacrot, B. (1992) The Sequence of the Genome of Adenovirus Type 5 and Its Comparison with the Genome of Adenovirus Type 2, Virology 186, 280-285; the contents if which is hereby incorporated by reference). Ad35 vectors are described in U.S. Pat. Nos.6,974,695, 6,913,922, and 6,869,794. Ad11 vectors are described in U.S. Pat. No. 6,913,922. C6 adenovirus vectors are described in U.S. Pat. Nos. 6,780,407; 6,537,594; 6,309,647; 6,265,189; 6,156,567; 6,090,393; 5,942,235 and 5,833,975. C7 vectors are described in U.S. Pat. No. 6,277,558. Adenovirus vectors that are E1-defective or deleted, E3- defective or deleted, and/or E4-defective or deleted can also be used. Certain adenoviruses having mutations in the E1 region have improved safety margin because E1-defective adenovirus mutants are replication-defective in non-permissive cells, or, at the very least, are highly attenuated. Adenoviruses having mutations in the E3 region can have enhanced the immunogenicity by disrupting the mechanism whereby adenovirus down-regulates MHC class I molecules. Adenoviruses having E4 mutations can have reduced immunogenicity of the adenovirus vector because of suppression of late gene expression. Such vectors can be particularly useful when repeated re-vaccination utilizing the same vector is desired. Adenovirus vectors that are deleted or mutated in E1, E3, E4, E1 and E3, and E1 and E4 can be used in accordance with the present disclosure. Furthermore, "gutless" adenovirus vectors, in which all viral genes are deleted, can also be used in accordance with the present disclosure. Such vectors require a helper virus for their replication and require a special human 293 cell line expressing both E1a and Cre, a condition that does not exist in natural environment. Such "gutless" vectors are non-immunogenic and thus the vectors can be inoculated multiple times for re-vaccination. The "gutless" adenovirus vectors can be used for insertion of heterologous inserts/genes such as the transgenes of the present disclosure, and can even be used for co-delivery of a large number of heterologous inserts/genes. In some embodiments, the delivery is via an adenovirus, which can be at a single booster dose. In some embodiments, the adenovirus is delivered via multiple doses. In terms of *in vivo* delivery, AAV is advantageous over other viral vectors due to low toxicity and low probability of causing insertional mutagenesis because it doesn't integrate into the host genome. AAV has a packaging limit of 4.5 or 4.75 Kb. Constructs larger than 4.5 or 4.75 Kb result in significantly reduced virus production. There are many promoters that can be used to drive nucleic acid molecule expression. AAV ITR can serve as a promoter and is advantageous for eliminating the need for an additional promoter element. For ubiquitous expression, the following promoters can be used: CMV, CAG, CBh, PGK, SV40, Ferritin heavy or light chains, etc. For brain expression, the following promoters can be used: SynapsinI for all neurons, CaMKIIalpha for excitatory neurons, GAD67 or GAD65 or VGAT for GABAergic neurons, etc. Promoters used to drive RNA synthesis can include: Pol III promoters such as U6 or H1. The use of a Pol II promoter and intronic cassettes can be used to express guide RNA (gRNA). With regard to AAV vectors useful in the practice of the disclosure, mention is made of US Patent Nos. 5658785, 7115391, 7172893, 6953690, 6936466,

6924128, 6893865, 6793926, 6537540, 6475769 and 6258595, and documents cited therein. As to AAV, the AAV can be AAV1, AAV2, AAV5 or any combination thereof. One can select the AAV with regard to the cells to be targeted; *e.g.*, one can select AAV serotypes 1, 2, 5 or a hybrid capsid AAV1, AAV2, AAV5 or any combination thereof for targeting brain or neuronal cells; and one can select AAV4 for targeting cardiac tissue. AAV8 is useful for delivery to the liver. In some embodiments the delivery is via an AAV. The dosage can be adjusted to balance the therapeutic benefit against any side effects.

[00417] In some embodiments, effectively activating a cellular immune response for a vaccine or pharmaceutical composition can be achieved by expressing the relevant antigens in a vaccine or pharmaceutical composition in a non-pathogenic microorganism. Well-known examples of such microorganisms are Mycobacterium bovis BCG, Salmonella and Pseudomonas (See, U.S. Patent No.6,991,797, hereby incorporated by reference in its entirety).

[00418] In some embodiments, a Poxvirus is used in the vaccine or immunogenic composition. These include orthopoxvirus, avipox, vaccinia, MVA, NYVAC, canarypox, ALVAC, fowlpox, TROVAC, etc. (see *e.g.*, Verardi et al., Hum Vaccin Immunother. 2012 Jul;8(7):961-70; and Moss, Vaccine. 2013; 31(39): 4220–4222). Poxvirus expression vectors were described in 1982 and quickly became widely used for vaccine development as well as research in numerous fields. Advantages of the vectors include simple construction, ability to accommodate large amounts of foreign DNA and high expression levels. Information concerning poxviruses that can be used in the practice of the disclosure, such as Chordopoxvirinae subfamily poxviruses (poxviruses of vertebrates), for instance, orthopoxviruses and avipoxviruses, *e.g.*, vaccinia virus (*e.g.*, Wyeth Strain, WR Strain (*e.g.*, ATCC® VR-1354), Copenhagen Strain, NYVAC, NYVAC.1, NYVAC.2, MVA, MVA-BN), canarypox virus (*e.g.*, Wheatley C93 Strain, ALVAC), fowlpox virus (*e.g.*, FP9 Strain, Webster Strain, TROVAC), dovepox, pigeonpox, quailpox, and raccoon pox, inter alia, synthetic or non- naturally occurring recombinants thereof, uses thereof, and methods for making and using such recombinants can be found in scientific and patent literature.

[00419] In some embodiments, the vaccinia virus is used in the vaccine or pharmaceutical composition to express a tissue-specific antigen. (Rolph et al., Recombinant viruses as vaccines and immunological tools. Curr Opin Immunol 9:517-524, 1997). The recombinant vaccinia virus is able to replicate within the cytoplasm of the infected host cell and the polypeptide of interest can therefore induce an immune response. Moreover, Poxviruses have been widely used as vaccine or pharmaceutical composition vectors because of their ability to target encoded antigens for processing by the major histocompatibility complex class I pathway by directly infecting immune cells, in particular antigen-presenting cells, but also due to their ability to self-adjuvant.

[00420] In some embodiments, ALVAC is used as a vector in a vaccine or immunogenic composition. ALVAC is a canarypox virus that can be modified to express foreign transgenes and has been used as a method for vaccination against both prokaryotic and eukaryotic antigens (Horig H, Lee DS, Conkright W,

et al. Phase I clinical trial of a recombinant canarypoxvirus (ALVAC) vaccine expressing human carcinoembryonic antigen and the B7.1 co-stimulatory molecule. Cancer Immunol Immunother 2000;49:504–14; von Mehren M, Arlen P, Tsang KY, et al. Pilot study of a dual gene recombinant avipox vaccine containing both carcinoembryonic antigen (CEA) and B7.1 transgenes in patients with recurrent CEA-expressing adenocarcinomas. Clin Cancer Res 2000;6:2219–28; Musey L, Ding Y, Elizaga M, et al. HIV-1 vaccination administered intramuscularly can induce both systemic and mucosal T cell immunity in HIV-1-uninfected individuals. J Immunol 2003;171:1094–101; Paoletti E. Applications of pox virus vectors to vaccination: an update. Proc Natl Acad Sci U S A 1996;93:11349–53; U.S. Patent No.7,255,862). In a phase I clinical trial, an ALVAC virus expressing the tissue-specific antigen CEA showed an excellent safety profile and resulted in increased CEA-specific T-cell responses in selected patients; objective clinical responses, however, were not observed (Marshall JL, Hawkins MJ, Tsang KY, et al. Phase I study in cancer patients of a replication-defective avipox recombinant vaccine that expresses human carcinoembryonic antigen. J Clin Oncol 1999;17:332–7).

[00421] In some embodiments, a Modified Vaccinia Ankara (MVA) virus can be used as a viral vector for an antigen vaccine or immunogenic composition. MVA is a member of the Orthopoxvirus family and has been generated by about 570 serial passages on chicken embryo fibroblasts of the Ankara strain of Vaccinia virus (CVA) (for review see Mayr, A., et al., Infection 3, 6-14, 1975). As a consequence of these passages, the resulting MVA virus contains 31 kilobases less genomic information compared to CVA, and is highly host-cell restricted (Meyer, H. et al., J. Gen. Virol. 72, 1031-1038, 1991). MVA is characterized by its extreme attenuation, namely, by a diminished virulence or infectious ability, but still holds an excellent immunogenicity. When tested in a variety of animal models, MVA was proven to be avirulent, even in immuno-suppressed individuals. Moreover, MVA-BN®-HER2 is a candidate immunotherapy designed for the treatment of HER-2-positive breast cancer and is currently in clinical trials. (Mandl et al., Cancer Immunol Immunother. Jan 2012; 61(1): 19–29). Methods to make and use recombinant MVA has been described (*e.g.*, see U.S. Patent Nos. 8,309,098 and 5,185,146 hereby incorporated in its entirety).

[00422] In some embodiments, recombinant viral particles of the vaccine or pharmaceutical composition are administered to patients in need thereof.

Modification to Peptide / Polypeptide

[00423] In some embodiments, the present disclosure includes modified antigenic peptides. A modification can include a covalent chemical modification that does not alter the primary amino acid sequence of the antigenic peptide itself. Modifications can produce peptides with desired properties, for example, prolonging the *in vivo* half-life, increasing the stability, reducing the clearance, altering the immunogenicity or allergenicity, enabling the raising of particular antibodies, cellular targeting, antigen uptake, antigen processing, MHC affinity, MHC stability, or antigen presentation. Changes to an antigenic peptide that can be carried out include, but are not limited to, conjugation to a carrier protein, conjugation

to a ligand, conjugation to an antibody, PEGylation, polysialylation HESylation, recombinant PEG mimetics, Fc fusion, albumin fusion, nanoparticle attachment, nanoparticulate encapsulation, cholesterol fusion, iron fusion, acylation, amidation, glycosylation, side chain oxidation, phosphorylation, biotinylation, the addition of a surface active material, the addition of amino acid mimetics, or the addition of unnatural amino acids.

[00424] In some embodiments, the present disclosure also includes various modifications to overcome issues associated with short plasma half- life or susceptibility to protease degradation, including conjugating or linking the polypeptide sequence to any of a variety of non-proteinaceous polymers, *e.g.*, polyethylene glycol (PEG), polypropylene glycol, or polyoxyalkylenes (see, for example, typically via a linking moiety covalently bound to both the protein and the nonproteinaceous polymer, *e.g.*, a PEG). Such PEG conjugated biomolecules have been shown to possess clinically useful properties, including better physical and thermal stability, protection against susceptibility to enzymatic degradation, increased solubility, longer *in vivo* circulating half-life and decreased clearance, reduced immunogenicity and antigenicity, and reduced toxicity.

[00425] PEGs suitable for conjugation to a polypeptide sequence are generally soluble in water at room temperature, and have the general formula $R(O\text{-}CH_2\text{-}CH_2)nO\text{-}R$, where R is hydrogen or a protective group such as an alkyl or an alkanol group, and where n is an integer from 1 to 1000. When R is a protective group, it generally has from 1 to 8 carbons. The PEG conjugated to the polypeptide sequence can be linear or branched. Branched PEG derivatives, "star-PEGs" and multi-armed PEGs are contemplated by the present disclosure.

[00426] The present disclosure also contemplates compositions of conjugates wherein the PEGs have different n values and thus the various different PEGs are present in specific ratios. For example, some compositions comprise a mixture of conjugates where n=l, 2, 3 and 4. In some compositions, the percentage of conjugates where n=l is 18-25%, the percentage of conjugates where n=2 is 50-66%, the percentage of conjugates where n=3 is 12-16%, and the percentage of conjugates where n=4 is up to 5%. Such compositions can be produced by reaction conditions and purification methods know in the art. For example, cation exchange chromatography can be used to separate conjugates, and a fraction is then identified which contains the conjugate having, for example, the desired number of PEGs attached, purified free from unmodified protein sequences and from conjugates having other numbers of PEGs attached.

[00427] PEG can be bound to a polypeptide of the present disclosure via a terminal reactive group (a "spacer"). The spacer is, for example, a terminal reactive group which mediates a bond between the free amino or carboxyl groups of one or more of the polypeptide sequences and polyethylene glycol. The PEG having the spacer which can be bound to the free amino group includes N-hydroxysuccinylimide polyethylene glycol which can be prepared by activating succinic acid ester of polyethylene glycol with N-hydroxy succinylimide. Another activated polyethylene glycol which can be bound to a free amino group

is 2,4-bis(O-methoxypolyethyleneglycol)-6-chloro-s-triazine which can be prepared by reacting polyethylene glycol monomethyl ether with cyanuric chloride. The activated polyethylene glycol which is bound to the free carboxyl group includes polyoxyethylenediamine.

[00428] Conjugation of one or more of the polypeptide sequences of the present disclosure to PEG having a spacer can be carried out by various conventional methods. For example, the conjugation reaction can be carried out in solution at a pH of from 5 to 10, at temperature from 4°C to room temperature, for 30 minutes to 20 hours, utilizing a molar ratio of reagent to protein of from 4: 1 to 30: 1. Reaction conditions can be selected to direct the reaction towards producing predominantly a desired degree of substitution. In general, low temperature, low pH (*e.g.*, pH=5), and short reaction time tend to decrease the number of PEGs attached, whereas high temperature, neutral to high pH (*e.g.*, pH>7), and longer reaction time tend to increase the number of PEGs attached. Various means known in the art can be used to terminate the reaction. In some embodiments the reaction is terminated by acidifying the reaction mixture and freezing at, *e.g.*, -20°C.

[00429] The present disclosure also contemplates the use of PEG mimetics. Recombinant PEG mimetics have been developed that retain the attributes of PEG (*e.g.*, enhanced serum half- life) while conferring several additional advantageous properties. By way of example, simple polypeptide chains (comprising, for example, Ala, Glu, Gly, Pro, Ser and Thr) capable of forming an extended conformation similar to PEG can be produced recombinantly already fused to the peptide or protein drug of interest (*e.g.*, Amunix's XTEN technology; Mountain View, CA). This obviates the need for an additional conjugation step during the manufacturing process. Moreover, established molecular biology techniques enable control of the side chain composition of the polypeptide chains, allowing optimization of immunogenicity and manufacturing properties.

[00430] Glycosylation can affect the physical properties of proteins and can also be important in protein stability, secretion, and subcellular localization. The present disclosure also includes compositions comprising polypeptides with glycosylation modification. Proper glycosylation can be important for biological activity. In fact, some genes from eukaryotic organisms, when expressed in bacteria (*e.g.*, E. coli) which lack cellular processes for glycosylating proteins, yield proteins that are recovered with little or no activity by virtue of their lack of glycosylation. Addition of glycosylation sites can be accomplished by altering the amino acid sequence. The alteration to the polypeptide can be made, for example, by the addition of, or substitution by, one or more serine or threonine residues (for O-linked glycosylation sites) or asparagine residues (for N-linked glycosylation sites). The structures of N-linked and O- linked oligosaccharides and the sugar residues found in each type can be different. One type of sugar that is commonly found on both is N-acetylneuraminic acid (hereafter referred to as sialic acid). Sialic acid is usually the terminal residue of both N-linked and O-linked oligosaccharides and, by virtue of its negative

charge, may confer acidic properties to the glycoprotein. Embodiments of the present disclosure comprise the generation and use of N-glycosylation variants.

[00431] The polypeptide sequences of the present disclosure can optionally be altered through changes at the DNA level, particularly by mutating the DNA encoding the polypeptide at preselected bases such that codons are generated that will translate into the desired amino acids. Another means of increasing the number of carbohydrate moieties on the polypeptide is by chemical or enzymatic coupling of glycosides to the polypeptide. Removal of carbohydrates can be accomplished chemically or enzymatically, or by substitution of codons encoding amino acid residues that are glycosylated. Chemical deglycosylation techniques are known, and enzymatic cleavage of carbohydrate moieties on polypeptides can be achieved by the use of a variety of endo- and exo-glycosidases.

[00432] Additional suitable components and molecules for conjugation include, for example, molecules for targeting to the lymphatic system, thyroglobulin; albumins such as human serum albumin (HAS); tetanus toxoid; Diphtheria toxoid; polyamino acids such as poly(D-lysine:D-glutamic acid); VP6 polypeptides of rotaviruses; influenza virus hemagglutinin, influenza virus nucleoprotein; Keyhole Limpet Hemocyanin (KLH); and hepatitis B virus core protein and surface antigen; or any combination of the foregoing.

[00433] Fusion of albumin to one or more polypeptides of the present disclosure can, for example, be achieved by genetic manipulation, such that the DNA coding for HSA, or a fragment thereof, is joined to the DNA coding for the one or more polypeptide sequences. Thereafter, a suitable host can be transformed or transfected with the fused nucleotide sequences in the form of, for example, a suitable plasmid, so as to express a fusion polypeptide. The expression can be effected *in vitro* from, for example, prokaryotic or eukaryotic cells, or *in vivo* from, for example, a transgenic organism. In some embodiments of the present disclosure, the expression of the fusion protein is performed in mammalian cell lines, for example, CHO cell lines. Transformation is used broadly herein to refer to the genetic alteration of a cell resulting from the direct uptake, incorporation and expression of exogenous genetic material (exogenous DNA) from its surroundings and taken up through the cell membrane(s). Transformation occurs naturally in some species of bacteria, but it can also be effected by artificial means in other cells. Furthermore, albumin itself can be modified to extend its circulating half-life. Fusion of the modified albumin to one or more polypeptides can be attained by the genetic manipulation techniques described above or by chemical conjugation; the resulting fusion molecule has a half- life that exceeds that of fusions with non-modified albumin. (See WO2011/051489). Several albumin-binding strategies have been developed as alternatives for direct fusion, including albumin binding through a conjugated fatty acid chain (acylation). Because serum albumin is a transport protein for fatty acids, these natural ligands with albumin - binding activity have been used for half-life extension of small protein therapeutics. For example, insulin detemir (LEVEMIR),

an approved product for diabetes, comprises a myristyl chain conjugated to a genetically-modified insulin, resulting in a long- acting insulin analog.

[00434] Another type of modification provided by the present disclosure is to conjugate (*e.g.*, link) one or more additional components or molecules at the N- and/or C-terminus of a polypeptide sequence as provided herein, such as another protein (*e.g.*, a protein having an amino acid sequence heterologous to the subject protein), or a carrier molecule. Thus, an exemplary polypeptide sequence can be provided as a conjugate with another component or molecule.

[00435] In some embodiments, a conjugate modification as provided herein can result in a polypeptide sequence that retains activity with an additional or complementary function or activity of the second molecule. For example, a polypeptide sequence can be conjugated to a molecule, *e.g.*, to facilitate solubility, storage, *in vivo* or shelf half-life or stability, reduction in immunogenicity, delayed or controlled release *in vivo*, etc. Other functions or activities include a conjugate that reduces toxicity relative to an unconjugated polypeptide sequence, a conjugate that targets a type of cell or organ more efficiently than an unconjugated polypeptide sequence, or a drug to further counter the causes or effects associated with a disorder or disease as set forth herein (*e.g.*, diabetes).

[00436] A polypeptide as provided herein can also be conjugated to large, slowly metabolized macromolecules such as proteins; polysaccharides, such as sepharose, agarose, cellulose, cellulose beads; polymeric amino acids such as polyglutamic acid, polylysine; amino acid copolymers; inactivated virus particles; inactivated bacterial toxins such as toxoid from diphtheria, tetanus, cholera, leukotoxin molecules; inactivated bacteria; and dendritic cells.

[00437] Additional candidate components and molecules for conjugation to the polypeptide sequence of the present disclosure can include those suitable for isolation or purification. Particular non-limiting examples include binding molecules, such as biotin (biotin-avidin specific binding pair), an antibody, a receptor, a ligand, a lectin, or molecules that comprise a solid support, including, for example, plastic or polystyrene beads, plates or beads, magnetic beads, test strips, and membranes. Purification methods such as cation exchange chromatography can be used to separate conjugates by charge difference, which effectively separates conjugates into their various molecular weights. The content of the fractions obtained by cation exchange chromatography can be identified by molecular weight using conventional methods, for example, mass spectroscopy, SDS-PAGE, or other known methods for separating molecular entities by molecular weight.

[00438] In some embodiments, the amino- or carboxyl- terminus of a polypeptide sequence of the present disclosure can be fused with an immunoglobulin Fc region (*e.g.*, human Fc) to form a fusion conjugate (or fusion molecule). Fc fusion conjugates have been shown to increase the systemic half-life of biopharmaceuticals, and thus the biopharmaceutical product can require less frequent administration.

[00439] Fc can bind to the neonatal Fc receptor (FcRn) in endothelial cells that line the blood vessels, and, upon binding, the Fc fusion molecule can be protected from degradation and re- released into the circulation, keeping the molecule in circulation longer. This Fc binding can be the mechanism by which endogenous IgG retains its long plasma half-life. More recent Fc-fusion technology links a single copy of a biopharmaceutical to the Fc region of an antibody to optimize the pharmacokinetic and pharmacodynamic properties of the biopharmaceutical as compared to traditional Fc-fusion conjugates.

[00440] The present disclosure also contemplates the use of other modifications, currently known or developed in the future, of the polypeptides to improve one or more properties. One such method for prolonging the circulation half-life, increasing the stability, reducing the clearance, or altering the immunogenicity or allergenicity of a polypeptide of the present disclosure can involve modification of the polypeptide sequences by hesylation, which utilizes hydroxyethyl starch derivatives linked to other molecules in order to modify the molecule's characteristics. Various aspects of hesylation are described in, for example, U.S. Patent Appln. Nos. 2007/0134197 and 2006/0258607.

[00441] In some aspects, a peptide derivative such as a tissue-specific antigen provided herein can comprise an affinity enhanced tissue-specific antigen. Such an affinity enhanced tissue-specific antigen can comprise one or more substitutions or modifications that provide enhanced immunogenicity compared to an unmodified versions of the tissue-specific antigen.

[00442] For example, an affinity enhanced tissue-specific antigen can be prepared or derived from a parent peptide, wherein affinity enhanced tissue-specific antigen contains a non-natural amino acid substituted in place of a naturally occurring amino acid residue at one or more primary anchor positions, for example at one primary anchor position, or at two primary anchor positions.

[00443] A parent peptide can be an MHCI restricted antigen and the peptide derivative can be a MHCI restricted antigen that binds at least the same MHCI molecule as the parent peptide, e.g., if the parent peptide binds HLA-A*0201, then the peptide derivative also binds HLA-A*0201. In addition, the peptide derivative may be able to trigger an expansion of T-cells that are able to bind the parent peptide when it is complexed with MHCI.

[00444] The peptide derivatives may also have increased immunogenicity in comparison to the parent peptide. In some embodiments, the peptide derivative exhibits at least one, or at least two, or at least three, or at least four, or all five of the following properties.

[00445] A first property is that the peptide derivative generates a T-cell immune response that is greater than the T-cell immune response generated by the parent peptide. In one embodiment, the parent peptide generates a detectable T-cell immune response, but the peptide derivative generates a T-cell immune response which is greater than the T-cell immune response generated by the parent peptide. In another embodiment, the parent peptide does not generate a detectable T-cell immune response, whereas the

peptide derivative generates a T-cell immune response that can be detected. In additional embodiments, the immune response may be T-cell lysis of target cells, cytokine release, and/or T-cell degranulation.

[00446] A second property is that the peptide derivative binds to MHCI with an affinity that is higher than the affinity with which the parent peptide binds to MHCI, i.e., the peptide derivative has a lower K_D than the parent peptide.

[00447] A third property is that the affinity of T-cell receptors for the complex formed between MHCI and a peptide derivative is higher than the affinity of T-cell receptors for the complex formed between MHCI and the parent peptide. This increased affinity may be determined using a tetramer assay (Laugel, B., et al., 2007, J. Biol. Chem. 282, 23799-23810; Holmberg, K., et al., 2003, J. Immunol. 171, 2427-2434; Yee, C., et al., 1999, J. Immunol. 162, 2227-2234).

[00448] A fourth property is that a complex formed between MHCI and a peptide derivative is more stable (i.e., has a slower off-rate) than a complex formed between MHCI and the parent peptide.

[00449] A fifth property is that the peptide derivative of triggers an expansion of a broader number of T-cell clones that recognize the parent peptide than are triggered by the parent peptide.

[00450] Method of Manufacturing antigen specific T cells for therapy:

[00451] Provided herein are methods for antigen specific T cell manufacturing. Provided herein are methods of preparing T cell compositions, such as therapeutic T cell compositions. For example, a method can comprise expanding or inducing antigen specific T cells. Preparing (e.g., inducing or expanding) T cells can also refer to manufacturing T cells, and broadly encompasses procedures to isolate, stimulate, culture, induce, and/or expand any type of T cells (e.g., $CD4^+$ T cells and $CD8^+$ T cells). In one aspect, provided herein is a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating an APC with a population of immune cells from a biological sample depleted of cells expressing CD14 and/or CD25. In some embodiments, the method comprises preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating an APC with a population of immune cells from a biological sample depleted of cells expressing CD11b and/or CD19. In some embodiments, the method comprises incubating an APC with a population of immune cells from a biological sample depleted of cells expressing any CD11b and/or CD19 and/or CD14 and/or CD25 or any combination thereof.

[00452] In a second aspect, provided here is a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating a FMS-like tyrosine kinase 3 receptor ligand (FLT3L)-stimulated APC with a population of immune cells from a biological sample.

[00453] In a third aspect, provided herein is a method of preparing a pharmaceutical composition comprising at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one

antigen peptide sequence, the method comprising: incubating FMS-like tyrosine kinase 3 receptor ligand (FLT3L) with a population of immune cells from a biological sample for a first time period; and thereafter incubating at least one T cell of the biological sample with an APC.

[00454] In a fourth aspect, provided herein is a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating a population of immune cells from a biological sample with one or more APC preparations for one or more separate time periods of less than 28 days from incubating the population of immune cells with a first APC preparation of the one or more APC preparations, wherein at least one antigen specific memory T cell is expanded, or at least one antigen specific naïve T cell is induced.

[00455] In a fifth aspect, provided herein is a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating a population of immune cells from a biological sample with 3 or less APC preparations for 3 or less separate time periods, wherein at least one antigen specific memory T cell is expanded or at least one antigen specific naïve T cell is induced.

[00456] In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a biological sample with one or more APC preparations for one or more separate time periods, thereby stimulating T cells to become antigen specific T cells, wherein a percentage of antigen specific T cells is at least about 0.00001%, 0.00002%, 0.00005%, 0.0001%, 0.0005%, 0.001%, 0.005%, 0.01%, 0.05%, 0.1%, 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90% or 95% of total $CD4^+$ T cells, total $CD8^+$ T cells, total T cells or total immune cells. In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a biological sample with 3 or less APC preparations for 3 or less separate time periods, thereby stimulating T cells to become antigen specific T cells. In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a biological sample with 2 or less APC preparations for 2 or less separate time periods, thereby stimulating T cells to become antigen specific T cells.

[00457] In some embodiments, provided herein is a method that comprises incubating a population of immune cells from a biological sample with one or more APC preparations for one or more separate time periods, thereby stimulating T cells to become antigen specific T cells, wherein the APC preparation is a PBMC cell population from which cells expressing one or more cell surface markers are depleted prior to antigen loading of the APC population. In some embodiments, CD14+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD25+ cells are depleted prior to antigen loading of

an APC population. In some embodiments, CD11b+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD19+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD3+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD25+ cells and CD14+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD11b+ and CD25+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD11b+ and CD14+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD11b+, CD14+ and CD25+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD11b+, and CD19+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD11b+, CD19+ and CD25+ cells are depleted prior to antigen loading of an APC population. In some embodiments, CD11b+, CD14+, CD19+ and CD25+ cells are depleted prior to antigen loading of an APC population. In some embodiments, the method comprises adding to any of the depleted APC population described above, an APC enriched cell PBMC-derived population that are depleted of CD3+ cell. In some embodiments, the APC enriched cell PBMC-derived population is depleted of CD3+ and cells depleted of any one or more of CD11b+, CD14+, CD19+, or CD25+.

[00458] In some embodiments, a biological sample comprises peripheral blood mononuclear cells (PBMCs). In some embodiments, the method comprises adding to a PBMC sample, a composition comprising one or more antigenic peptides or nucleic acids encoding the same, thereby loading the APCs within the PBMCs with antigens for antigen presentation to T cells in the PBMC.

[00459] In some embodiments, a method comprises: (a) obtaining a biological sample from a subject comprising at least one antigen presenting cell (APC); (b) enriching cells expressing CD11c from the biological sample, thereby obtaining a $CD11c^+$ cell enriched sample; (c) incubating the $CD11c^+$ cell enriched sample with at least one cytokine or growth factor for a first time period; (d) incubating at least one peptide with the $CD11c^+$ enriched sample of (c) for a second time period, thereby obtaining an APC peptide loaded sample; (e) incubating the APC peptide loaded sample with one or more cytokines or growth factors for a third time period, thereby obtaining a matured APC sample; (f) incubating APCs of the matured APC sample with a CD11b and/or CD14 and/or CD25 depleted sample comprising PBMCs for a fourth time period; (g) incubating the PBMCs with APCs of a matured APC sample for a fifth time period; (h) incubating the PBMCs with APCs of a matured APC sample for a sixth time period; and (i) administering at least one T cell of the PBMCs to a subject in need thereof.

[00460] In some embodiments, a method comprises: (a) obtaining a biological sample from a subject comprising at least one antigen presenting cell (APC); (b) enriching cells expressing CD14 from the biological sample, thereby obtaining a $CD14^+$ cell enriched sample; (c) incubating the $CD14^+$ cell enriched sample with at least one cytokine or growth factor for a first time period; (d) incubating at least one peptide with the $CD14^+$ enriched sample of (c) for a second time period, thereby obtaining an APC peptide loaded

sample; (e) incubating the APC peptide loaded sample with one or more cytokines or growth factors for a third time period, thereby obtaining a matured APC sample; (f) incubating APCs of the matured APC sample with a CD14 and/or CD25 depleted sample comprising PBMCs for a fourth time period; (g) incubating the PBMCs with APCs of a matured APC sample for a fifth time period; (h) incubating the PBMCs with APCs of a matured APC sample for a sixth time period; and (i) administering at least one T cell of the PBMCs to a subject in need thereof.

[00461] In some embodiments, a method comprises: (a) obtaining a biological sample from a subject comprising at least one APC and at least one PBMC; (b) depleting cells expressing CD11b and/or CD19 from the biological sample, thereby obtaining a CD11b and/or CD19 cell depleted sample; (c) incubating the CD11b and/or CD19 cell depleted sample with FLT3L for a first time period; (d) incubating at least one peptide with the CD11b and/or CD19 cell depleted sample of (c) for a second time period, thereby obtaining an APC peptide loaded sample; (e) incubating the APC peptide loaded sample with the at least one PBMC for a third time period, thereby obtaining a first stimulated PBMC sample; (f) incubating a PBMC of the first stimulated PBMC sample with an APC of a matured APC sample for a fourth time period, thereby obtaining a second stimulated PBMC sample; (g) incubating a PBMC of the second stimulated PBMC sample with an APC of a matured APC sample for a fifth time period, thereby obtaining a third stimulated PBMC sample; (h) administering at least one T cell of the third stimulated PBMC sample to a subject in need thereof.

[00462] In some embodiments, a method comprises: (a) obtaining a biological sample from a subject comprising at least one APC and at least one PBMC; (b) depleting cells expressing CD11b and/or CD19 and/or CD14 and/or CD25 from the biological sample, thereby obtaining a CD11b and/or CD19 cell depleted sample; (c) incubating the CD11b and/or CD19 and/or CD14 and/or CD25 cell depleted sample with FLT3L for a first time period; (d) incubating at least one peptide with the CD11b and/or CD19 and/or CD14 and/or CD25 cell depleted sample of (c) for a second time period, thereby obtaining an APC peptide loaded sample; (e) incubating the APC peptide loaded sample with the at least one PBMC for a third time period, thereby obtaining a first stimulated PBMC sample; (f) incubating a PBMC of the first stimulated PBMC sample with an APC of a matured APC sample for a fourth time period, thereby obtaining a second stimulated PBMC sample; (g) incubating a PBMC of the second stimulated PBMC sample with an APC of a matured APC sample for a fifth time period, thereby obtaining a third stimulated PBMC sample; (h) administering at least one T cell of the third stimulated PBMC sample to a subject in need thereof.

[00463] In some embodiments, a method comprises: (a) obtaining a biological sample from a subject comprising at least one APC and at least one PBMC; (b) depleting cells expressing CD14 and/or CD25 from the biological sample, thereby obtaining a CD14 and/or CD25 cell depleted sample; (c) incubating the CD14 and/or CD25 cell depleted sample with FLT3L for a first time period; (d) incubating at least one peptide with the CD14 and/or CD25 cell depleted sample of (c) for a second time period, thereby obtaining

an APC peptide loaded sample; (e) incubating the APC peptide loaded sample with the at least one PBMC for a third time period, thereby obtaining a first stimulated PBMC sample; (f) incubating a PBMC of the first stimulated PBMC sample with an APC of a matured APC sample for a fourth time period, thereby obtaining a second stimulated PBMC sample; (g) incubating a PBMC of the second stimulated PBMC sample with an APC of a matured APC sample for a fifth time period, thereby obtaining a third stimulated PBMC sample; (h) administering at least one T cell of the third stimulated PBMC sample to a subject in need thereof.

[00464] In some embodiments, a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating an APC with a population of immune cells from a biological sample depleted of cells expressing CD14 and/or CD25.

[00465] In some embodiments, provided herein is a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating a population of immune cells from a biological sample with one or more APC preparations for one or more separate time periods of less than 28 days from incubating the population of immune cells with a first APC preparation of the one or more APC preparations, wherein at least one antigen specific memory T cell is expanded, or at least one antigen specific naïve T cell is induced. In some embodiments, provided herein is a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising incubating a population of immune cells from a biological sample with 3 or less APC preparations for 3 or less separate time periods, wherein at least one antigen specific memory T cell is expanded or at least one antigen specific naïve T cell is induced.

[00466] In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises contacting a population of immune cells (e.g., PBMCs) to APCs. In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells (e.g., PBMCs) with APCs for a time period. In some embodiments, the population of immune cells is from a biological sample. In some embodiments, the population of immune cells is from a sample (e.g., a biological sample) depleted of CD14 expressing cells. In some embodiments, the population of immune cells is from a sample (e.g., a biological sample) depleted of CD25 expressing cells. In some embodiments, the population of immune cells is from a sample (e.g., a biological sample) depleted of CD14 expressing cells and CD25 expressing cells.

[00467] In some embodiments, a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a FMS-like tyrosine kinase 3 receptor ligand (FLT3L)-stimulated APC with a population of immune cells from a biological sample. In some embodiments, provided herein is a method of preparing a pharmaceutical

composition comprising at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence, the method comprising: incubating FMS-like tyrosine kinase 3 receptor ligand (FLT3L) with a population of immune cells from a biological sample for a first time period; and thereafter incubating at least one T cell of the biological sample with an APC.

[00468] In some embodiments, a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises contacting a population of immune cells from a sample (e.g., a biological sample) with FMS-like tyrosine kinase 3 receptor ligand (FLT3L). In some embodiments, a method of preparing at least one antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises contacting a population of immune cells from a sample (e.g., a biological sample) with FMS-like tyrosine kinase 3 receptor ligand (FLT3L)-stimulated APCs. In some embodiments, a method of preparing at least one antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a sample (e.g., a biological sample) with FMS-like tyrosine kinase 3 receptor ligand (FLT3L)-stimulated APCs. In some embodiments, a method of preparing a pharmaceutical composition comprising at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating FMS-like tyrosine kinase 3 receptor ligand (FLT3L) with a population of immune cells from a biological sample (e.g., for a time period); and then contacting T cells of the biological sample to APCs. In some embodiments, a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises contacting a population of immune cells from a sample (e.g., a biological sample) to one or more APC preparations. In some embodiments, a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a sample (e.g., a biological sample) to one or more APC preparations for one or more separate time periods. In some embodiments, a method of preparing at least one antigen specific T cell comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a sample (e.g., a biological sample) to one or more APC preparations for 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 separate time periods. In some embodiments, the one or more separate time periods is less than 28 days calculated from incubating the population of immune cells with a first APC preparation of the one or more APC preparations.

[00469] In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells to APCs for a time period, wherein the population of immune cells is from a biological sample comprising PBMCs. In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells

to APCs for a time period, wherein the population of immune cells is from a biological sample depleted of CD14 and/or CD25 expressing cells.

[00470] In some embodiments, a method of preparing antigen specific T cells comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a biological sample with FMS-like tyrosine kinase 3 receptor ligand (FLT3L)-stimulated APCs for a time period.

[00471] In some embodiments, a method of preparing a pharmaceutical composition comprising antigen specific T cells comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating FMS-like tyrosine kinase 3 receptor ligand (FLT3L) with a population of immune cells from a biological sample; and then contacting T cells of the biological sample with APCs.

[00472] In some embodiments, a method of preparing antigen specific T cells comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a biological sample with one or more APC preparations for one or more separate time periods, thereby inducing or expanding antigen specific T cells, wherein the one or more separate time periods is less than 28 days calculated from incubating the population of immune cells with a first APC preparation of the one or more APC preparations. In some embodiments, incubating a population of immune cells from a biological sample with one or more APC preparations for one or more separate time periods is performed in a medium containing IL-7, IL-15, or a combination thereof. In some embodiments, the medium further comprises an indoleamine 2,3-dioxygenase-1 (IDO) inhibitor, an anti-PD-1 antibody, IL-12, or a combination thereof. The IDO inhibitor can be epacadostat, navoximod, 1-Methyltryptophan, or a combination thereof. In some embodiments, the IDO inhibitor may increase the number of antigen-specific $CD8^+$ cells. In some embodiments, the IDO inhibitor may maintain the functional profile of memory $CD8^+$ T cell responses. The PD-1 antibody may increase the absolute number of antigen-specific memory CD8+ T cell responses. The PD-1 antibody may increase proliferation rate of the cells treated with such antibody. The additional of IL-12 can result in an increase of antigen-specific cells and/or an increase in the frequency of $CD8^+$ T cells.

[00473] In some embodiments, a method of preparing antigen specific T cells comprising a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells comprising from a biological sample with one or more APC preparations for one or more separate time periods, thereby expanding or inducing antigen specific T cells, wherein a percentage of antigen specific T cells, antigen specific $CD4^+$ T cells, or antigen specific $CD8^+$ T cells is at least about 0.00001%, 0.00002%, 0.00005%, 0.0001%, 0.0005%, 0.001%, 0.005%, 0.01%, 0.05%, 0.1%, 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90% or 95% of total T cells, total $CD4^+$ T cells, total $CD8^+$ T cells, total immune cells, or total cells.

[00474] In some embodiments, a method of preparing antigen specific T cells comprises a T cell receptor (TCR) specific to at least one antigen peptide sequence comprises incubating a population of immune cells from a biological sample with 3 or less APC preparations for 3 or less separate time periods, thereby stimulating T cells to become antigen specific T cells.

[00475] In some embodiments, the population of immune cells is from a biological sample depleted of CD14 and/or CD25 expressing cells. In some embodiments, the APCs are FMS-like tyrosine kinase 3 receptor ligand (FLT3L)-stimulated APCs. In some embodiments, the APCs comprise one or more APC preparations. In some embodiments, the APC preparations comprise 3 or less APC preparations. In some embodiments, the APC preparations are incubated with the immune cells sequentially within one or more separate time periods.

[00476] In some embodiments, the biological sample is from a subject. In some embodiments, the subject is a human. For example, the subject can be a patient or a donor. In some embodiments, the subject has a disease or disorder. In some embodiments, the disease or disorder is cancer. In some embodiments, the antigen specific T cells comprise $CD4^+$ and/or $CD8^+$ T cells. In some embodiments, the antigen specific T cells comprise CD4 enriched T cells and/or CD8 enriched T cells. For example, a $CD4^+$ T cell and/or $CD8^+$ T cell can be isolated from, enriched from, or purified from a biological sample from a subject comprising PBMCs. In some embodiments, the antigen specific T cells are naïve $CD4^+$ and/or naïve $CD8^+$ T cells. In some embodiments, the antigen specific T cells are memory $CD4^+$ and/or memory $CD8^+$ T cells.

[00477] In some embodiments, the at least one antigen peptide sequence comprises a mutation selected from (A) a point mutation and the cancer antigen peptide binds to the HLA protein of the subject with an IC_{50} less than 500 nM and a greater affinity than a corresponding wild-type peptide, (B) a splice-site mutation, (C) a frameshift mutation, (D) a read-through mutation, (E) a gene-fusion mutation, and combinations thereof. In some embodiments, each of the at least one antigen peptide sequence binds to a protein encoded by an HLA allele expressed by the subject. In some embodiments, each of the at least one antigen peptide sequence comprises a mutation that is not present in non-cancer cells of the subject. In some embodiments, each of the at least one antigen peptide sequences is encoded by an expressed gene of the subject's cancer cells. In some embodiments, one or more of the at least one antigen peptide sequence has a length of from 8-50 naturally occurring amino acids. In some embodiments, the at least one antigen peptide sequence comprises a plurality of antigen peptide sequences. In some embodiments, the plurality of antigen peptide sequences comprises from 2-50, 3-50, 4-50, 5-5-, 6-50, 7-50, 8-50, 9-50, or 10-50 antigen peptide sequences.

[00478] In some embodiments, the APCs comprise APCs loaded with one or more antigen peptides comprising one or more of the at least one antigen peptide sequence. In some embodiments, the APCs are autologous APCs or allogenic APCs. In some embodiments, the APCs comprise dendritic cells (DCs).

[00479] In some embodiments, a method comprises depleting CD14 and/or CD25 expressing cells from the biological sample. In some embodiments, depleting $CD14^+$ cells comprises contacting a CD14 binding agent to the APCs. In some embodiments, the APCs are derived from $CD14^+$ monocytes. In some embodiments, the APCs are enriched from the biological sample. For example, an APC can be isolated from, enriched from, or purified from a biological sample from a subject comprising PBMCs.

[00480] In some embodiments, the APCs are stimulated with one or more cytokines or growth factors. In some embodiments, the one or more cytokines or growth factors comprise GM-CSF, IL-4, FLT3L, or a combination thereof. In some embodiments, the one or more cytokines or growth factors comprise IL-4, IFN-γ, LPS, GM-CSF, TNF-α, IL-1β, PGE1, IL-6, IL-7 or a combination thereof.

[00481] In some embodiments, the APCs are from a second biological sample. In some embodiments, the second biological sample is from the same subject.

[00482] In some embodiments, a percentage of antigen specific T cells in the method is at least about 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific T cells in the method is from about 0.1% to about 5%, from about 5 % to 10%, from about 10% to 15%, from about 15% to 20%, from about 20% to 25%, from about 25% to 30%, from about 30% to 35%, from about 35% to about 40%, from about 40% to about 45%, from about 45% to about 50%, from about 50% to about 55%, from about 55% to about 60%, from about 60% to 65%, or from about 65% to about 70% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific $CD8^+$ T cells in the method is at least about 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific naïve $CD8^+$ T cells in the method is at least about 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific memory $CD8^+$ T cells in the method is at least about 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific $CD4^+$ T cells in the method is at least about 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific $CD4^+$ T cells in the method is at least about 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20% of total T cells or total immune cells. In some embodiments, a percentage of antigen specific T cells in the biological sample is at most about 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20%. In some embodiments, a percentage of antigen specific $CD8^+$ T cells in the biological sample is at most about 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20%. In some embodiments, a percentage of antigen specific naïve $CD8^+$ T cells in the biological

sample is at most about 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20%. In some embodiments, a percentage of antigen specific memory $CD8^+$ T cells in the biological sample is at most about 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20%. In some embodiments, a percentage of antigen specific $CD4^+$ T cells in the biological sample is at most about 0.5%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, or 20%.

[00483] In some embodiments, a biological sample is freshly obtained from a subject or is a frozen sample.

[00484] In some embodiments, a method comprises incubating one or more of the APC preparations with a first medium comprising at least one cytokine or growth factor for a first time period. In some embodiments, the first time period is at lease 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or 17, or 18 days. In some embodiments, the first time period is no more than 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, or 18 days. In some embodiments, the first time period is at least 1, 2 3, 4, 5, 6, 7, 8, or 9 days. In some embodiments, the first time period is no more than 3, 4, 5, 6, 7, 8, 9, or 10 days. In some embodiments, the at least one cytokine or growth factor comprises GM-CSF, IL-4, FLT3L, TNF-α, IL-1β, PGE1, IL-6, IL-7, IFN-γ, LPS, IFN-α, R848, LPS, ss-rna40, poly I:C, or any combination thereof.

[00485] In some embodiments, a method comprises incubating one or more of the APC preparations with at least one peptide for a second time period. In some embodiments, the second time period is no more than 1 hour.

[00486] In some embodiments, a method comprises incubating one or more of the APC preparations with a second medium comprising one or more cytokines or growth factors for a third time period, thereby obtaining matured APCs. In some embodiments, the one or more cytokines or growth factors comprises GM-CSF (granulocyte macrophage colony-stimulating factor), IL-4, FLT3L, IFN-γ, LPS, TNF-α, IL-1β, PGE1, IL-6, IL-7, IFN-α, R848 (resiquimod), LPS, ss-rna40, poly I:C, CpG, or a combination thereof. In some embodiments, the third time period is no more than 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, or 18 days. In some embodiments, the third time period is at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or 17 days. In some embodiments, the third time period is no more than 2, 3, 4, or 5 days. In some embodiments, the third time period is at least 1, 2, 3, or 4 days.

[00487] In some embodiment, the method further comprises removing the one or more cytokines or growth factors of the second medium after the third time period and before a start of the fourth time period.

[00488] Antigen loaded PBMCs for T cell induction in vitro

[00489] In some embodiments, the methods provided herein comprise isolating PBMCs from a human blood sample, and directly loading the PBMCs with antigens. PBMCs directly contacted with antigens can readily take up antigens by phagocytosis and present antigens to T cells that may be in the culture or added to the culture. In some embodiments, the methods provided herein comprise isolating PBMCs from a

human blood sample, and nucleofecting or electroporating a polynucleotide, such as an mRNA, that encodes one or more antigens into the PBMCs. In some embodiments, antigens delivered to PBMCs, instead of antigen presenting cells maturing to DCs, provides a great advantage in terms of time and manufacturing efficiency. The PBMCs may be further depleted of one or more cell types. In some embodiments, the PBMCs may be depleted of CD3+ cells for an initial period of antigen loading and the CD3+ cells returned to the culture for the PBMCs to stimulate the CD3+ T cells. In some embodiments, the PBMCs may be depleted of CD25+ cells. In some embodiments, the PBMCs may be depleted of CD14+ cells. In some embodiments, the PBMCs may be depleted of CD19+ cells. In some embodiments, the PBMCs may be depleted of both CD14 and CD25 expressing cells. In some embodiments, CD11b+ cells are depleted from the PBMC sample before antigen loading. In some embodiments, CD11b+ and CD25+ cells are depleted from the PBMC sample before antigen loading.

[00490] In some embodiments, the PBMCs isolated from a human blood sample may be handled as minimally as possible prior to loading with antigens. Increased handling of PBMCs, for example freezing and thawing cells, multiple cell depletion steps, etc., may impair cell health and viability.

[00491] In some embodiments, the PBMCs are allogeneic to the subject of therapy. In some embodiments the PBMCs are allogeneic to the subject of adoptive cell therapy with antigen specific T cells.

[00492] In some embodiments, the PBMCs are HLA-matched for the subject of therapy. In some embodiments, the PBMCs are allogeneic, and matched for the subject's HLA subtypes, whereas the CD3+ T cells are autologous. The PBMCs are loaded with the respective antigens (e.g. derived from analysis of a peptide presentation analysis platform such as RECON), cocultured with subject's PBMC comprising T cells in order to stimulate antigen specific T cells.

[00493] In some embodiments, mRNA is used as the immunogen for uptake and antigen presenting. One advantage of using mRNA over peptide antigens to load PBMCs is that RNA is self adjuvanting, and does not require additional adjuvants. Another advantage of using mRNA is that the peptides are processed and presented endogenously. In some embodiments, the mRNA comprises shortmer constructs, encoding 9-10 amino acid peptides comprising an epitope. In some embodiments, the mRNA comprises longmer constructs, encoding bout 25 amino acid peptides. In some embodiments, the mRNA comprises a concatenation of multiple epitopes. In some embodiments, the concatemers may comprise one or more epitopes from the same antigenic protein. In some embodiments, the concatemers may comprise one or epitopes from several different antigenic proteins. Several embodiments are described in the Examples section. Antigen loading of PBMCs by antigen loading may comprise various mechanisms of delivery ad incorporation of nucleic acid into the PBMCs. In some embodiments, the delivery or mechanism of incorporation includes transfection, electroporation, nucleofection, chemical delivery, for example, lipid encapsulated or liposome mediated delivery.

[00494] Use of antigen loaded PBMCs to stimulate T cells saves the maturation time required in a method that generates DCs from a PBMC sample prior to T cell stimulation. In some embodiments, use of antigen loaded PBMCs, for example, mRNA loaded PBMCs as APCs reduces the total manufacturing time by 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 days. In some embodiments, use of antigen loaded PBMCs as APCs reduces the total manufacturing time by 3 days. In some embodiments, use of antigen loaded PBMCs as APCs reduces the total manufacturing time by 4 days. In some embodiments, use of antigen loaded PBMCs as APCs reduces the total manufacturing time by 5 days. In some embodiments, use of antigen loaded PBMCs as APCs reduces the total manufacturing time by 6 days. In some embodiments, use of antigen loaded PBMCs as APCs reduces the total manufacturing time by 7 days.

[00495] In some embodiments, use of mRNA as antigen may be preferred because it is easy to design and manufacture nucleic acids, and transfect the PBMCs. In some embodiments, mRNA loaded PBMCs can stimulate T cells and generate higher antigen specific T cells. In some embodiments, mRNA loaded PBMCs can stimulate T cells and generate higher yield of antigen specific T cells. In some embodiments, mRNA loaded PBMCs can stimulate T cells and generate antigen specific T cells that have higher representation of the input antigens, i.e., reactive to diverse antigens. In some embodiments, mRNA loaded PBMCs can stimulate T cells that have at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or more antigen reactivity in the pool of expanded cells. In some embodiments, the mRNA loaded PBMCs can stimulate T cells that have at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or more antigen reactivity than conventional antigen loaded APCs (such as peptide loaded DCs).

EXAMPLES

[00496] The examples provided below are for illustrative purposes only and do not to limit the scope of the claims provided herein.

Example 1. Identification of tissue-specific gene expression and tissue-specific antigen

[00497] Examples 1 and 2 exemplify the methods of identification of tissue-specific antigen or epitope sequence according to some embodiments of the present disclosure. Here, systematic efforts were taken to discover tissue-specific antigens capable of eliciting a TCR-mediated response.

[00498] As a first step, gene expression in cancer and non-cancer tissue types profiled in the TCGA and GTEX data sets was screened through by a bioinformatic program. Each tissue type was categorized as essential or non-essential. All tumor tissues were considered non-essential whereas normal tissues could be considered essential (e.g. brain, colon, etc.) or non-essential (e.g. ovary, prostate, thyroid, etc). This process uncovered a small set of genes whose expression profile was restricted in the desired way. FIGS 1-72 are boxplots illustrating expression levels of these genes ANKRD30A, COL10A1, CTCFL, PPIAL4G, POTEE, DLL3, MMP13, SSX1, DCAF4L2, MAGEA4, MAGEA11, MAGEC2, MAGEA12, PRAME, CLDN6, EPYC, KLK3, KLK2, KLK4, TGM4, POTEG, RLN1, POTEH, SLC45A2, TSPAN10,

PAGE5, CSAG1, PRDM7, TG, TSHR, RSPH6A, SCXB, HIST1H4K, ALPPL2, PRM2, PRM1, TNP1, LELP1, HMGB4, AKAP4, CETN1, UBQLN3, ACTL7A, ACTL9, ACTRT2, PGK2, C2orf53, KIF2B, ADAD1, SPATA8, CCDC70, TPD52L3, ACTL7B, DMRTB1, SYCN, CELA2A, CELA2B, PNLIPRP1, CTRC, AMY2A, SERPINI2, RBPJL, AQP12A, IAPP, KIRREL2, G6PC2, AQP12B, CYP11B1, CYP11B2, STAR, CYP11A1, and MC2R in a number of different normal tissues and tumors, respectively.

[00499] As illustrated in the plots, these gene were identified as specific to the respective tissues as indicated on the top of each plot.

[00500] Next, the sequences of the genes identified in the first step were scanned through by the same bioinformatic program to find short peptide sequences with high likelihood of being presented on a common MHC I allele. Table 1A summarizes the findings on tissue-specific antigens and their corresponding cancer type, in which the respective tissue-specific gene from which the respective tissue-specific antigen was identified has relatively high expression level.

[00501] To validate this exemplary approach, a bioinformatics approach was used to identify of tissue-specific antigens. Table 2 summarizes a list of tissue-specific antigens ranked based on use of two different exemplary algorithms that predict binding affinity of the peptides to HLA molecules. As can be seen in Table 2, for each peptide, their rank ranges by both programs were comparable. The total number of peptides in the data set was 8,962.

Table 2 – Predictions of candidate tissue-specific antigens using two different algorithms

Peptide Sequence	Allele	Rank range peptides fall within (algorithm 1)	Rank range peptides fall within (algorithm 2)
YAITFAMRL	HLA-C03:04	0001-0100	0001-0100
SLYEHLVNL	HLA-A02:01	0001-0100	0001-0100
HTYPFGWYQK	HLA-A11:01	0001-0100	0001-0100
FAINSEMFL	HLA-C03:04	0001-0100	0001-0100
RPAPPGRYL	HLA-B07:02	0001-0100	0001-0100
FVISGVLTL	HLA-C03:04	0001-0100	0001-0100
SSLYSYFQK	HLA-A11:01	0050-0150	0050-0150
RLFFRVCLK	HLA-A03:01	0050-0150	0050-0150
VLTSGIVFV	HLA-A02:01	0150-0250	0150-0250
YAGNNMHSL	HLA-C03:04	0200-0300	0200-0300
RLFRTKTWK	HLA-A03:01	0250-0350	0250-0350
VASDMMVSL	HLA-C03:04	0300-0400	0300-0400
YRKPGISLL	HLA-C07:02	0350-0450	0350-0450

Peptide Sequence	Allele	Rank range peptides fall within (algorithm 1)	Rank range peptides fall within (algorithm 2)
RLYFGTSGY	HLA-A03:01	0400-0500	0400-0500
FIANLPPEL	HLA-C03:04	0400-0500	0400-0500
SYPPLHEWAF	HLA-A24:02	0450-0550	0450-0550
FAGILTTVL	HLA-C03:04	0550-0650	0550-0650
VLDGLDVLL	HLA-A02:01	0800-0900	0800-0900
YRYLCISHL	HLA-C07:02	1100-1200	1100-1200
YMIPAKTLVQV	HLA-A02:01	1100-1200	1100-1200
CVDAEGMEVY	HLA-A01:01	1300-1400	1300-1400
HLMQKFEKV	HLA-A02:01	1350-1450	1350-1450
IAHDLRLLL	HLA-C03:04	1550-1650	1550-1650
VTLPPFMCNK	HLA-A03:01	1650-1750	1650-1750
SSFSTTINY	HLA-A11:01	1800-1900	1800-1900
LSDQAVLAL	HLA-C03:04	1850-1950	1850-1950
FLQQPEDLV	HLA-A02:01	2000-2100	2000-2100
NYLSLPRPR	HLA-A33:03	2100-2200	2100-2200
LYRDTGLVK	HLA-A30:01	2150-2250	2150-2250
FSGNQVWRY	HLA-A01:01	2150-2250	2150-2250
MRLCWAWEL	HLA-C07:01	2350-2450	2350-2450
YAYASGNL	HLA-C03:04	2450-2550	2450-2550
DIFIVYDTR	HLA-A33:03	2600-2700	2600-2700
STFTETTLY	HLA-A01:01	2600-2700	2600-2700
AMILPSSSL	HLA-C03:04	2750-2850	2750-2850
TMDDDTAVLV	HLA-A02:01	2750-2850	2750-2850
TFFFDPENF	HLA-A24:02	2800-2900	2800-2900
RLHDGIADI	HLA-A02:01	2850-2950	2850-2950
YRAYYTFLNF	HLA-C07:02	3100-3200	3100-3200
SYKSFESDK	HLA-A30:01	3200-3300	3200-3300
AYYTFLNFM	HLA-C07:02	3250-3350	3250-3350
GPQNDGKQL	HLA-B07:02	3500-3600	3500-3600
NIKHHYCYV	HLA-A30:01	3500-3600	3500-3600
NRGQRLLAF	HLA-C07:02	3500-3600	3500-3600
APDMSRML	HLA-B07:02	4300-4400	4300-4400

Peptide Sequence	Allele	Rank range peptides fall within (algorithm 1)	Rank range peptides fall within (algorithm 2)
IYAGNNMHSLL	HLA-A24:02	4400-4500	4400-4500
RALGFEPRK	HLA-A03:01	4400-4500	4400-4500
VPNKALEL	HLA-B07:02	4450-4550	4450-4550
SAWSPTLPL	HLA-C01:02	4600-4700	4600-4700
SSCPPQPCTK	HLA-A30:01	4600-4700	4600-4700
GPGSGPLLRL	HLA-B07:02	4700-4800	4700-4800
SVSESDTIR	HLA-A33:03	4800-4900	4800-4900
SVVQVAKATGK	HLA-A11:01	4950-5050	4950-5050
FQQELALLK	HLA-A03:01	5150-5250	5150-5250
RALCVIALLV	HLA-B13:02	5200-5300	5200-5300
LTSGIVFVI	HLA-B13:02	5300-5400	5300-5400
LAFLVLEAV	HLA-B13:02	5350-5450	5350-5450
FTREFLGAL	HLA-B46:01	5600-5700	5600-5700
DRRCQLNIL	HLA-C07:01	5750-5850	5750-5850
RLFDDDETGKI	HLA-A02:01	6200-6300	6200-6300
AAMANPRAL	HLA-B46:01	6250-6350	6250-6350
LFHPEDTGQVF	HLA-A24:02	6450-6550	6450-6550
QLSEEQNTGI	HLA-A02:01	6550-6650	6550-6650
FTSFQYPEF	HLA-B46:01	6600-6700	6600-6700
LSDYKEKQILK V	HLA-A01:01	6950-7050	6950-7050
LAIPLTDVKF	HLA-B46:01	6950-7050	6950-7050
PSCLKKLLQR	HLA-A33:03	7200-7300	7200-7300
CQPSCLKKL	HLA-C07:01	7250-7350	7250-7350
FSRAVAAKW	HLA-B46:01	7300-7400	7300-7400
HRDFSGHPNF	HLA-C04:01	7350-7450	7350-7450
MSATTVSSL	HLA-C04:01	7550-7650	7550-7650
KLLQRCFEK	HLA-A02:01	7800-7900	7800-7900
KLGFKVTLP	HLA-A02:01	7800-7900	7800-7900
GVACKGREQL	HLA-A02:01	8200-8300	8200-8300
ACWPAFTVL	HLA-A24:02	8300-8400	8300-8400
RHNVICQLL	HLA-B07:02	8300-8400	8300-8400

Peptide Sequence	Allele	Rank range peptides fall within (algorithm 1)	Rank range peptides fall within (algorithm 2)
RAMRCCRPRYRP	HLA-B13:02	8450-8550	8450-8550
RHNVICQL	HLA-B07:02	8600-8700	8600-8700
SKSRSPHKGV	HLA-A02:01	8750-8850	8750-8850
RYYRQRQRS	HLA-A02:01	8800-8900	8800-8900
SCQTRRRAM	HLA-A02:01	8850-8950	8850-8950

Example 2. Confirmation of HLA-binding Affinity and Immunogenicity

[00502] The following example demonstrates quantification of binding affinities of HLA class I and class II peptides (HLA binding assays), and test of the ability of each test peptide to expand T cells (immunogenicity assays). Experimental protocol described below are exemplary and non-limiting, other protocols following similar principle can also be used to test HLA binding affinity and immunogenicity of the peptide as described herein.

[00503] HLA binding assays can be performed with peptides that are either motif-bearing or not motif-bearing. An exemplary detailed description of the protocol utilized to measure the binding stability of peptides to Class I MHC has been published (Harndahl et al. J Immunol Methods. 374:5-12, 2011). Briefly, synthetic genes encoding biotinylated MHC-I heavy and light chains are expressed in E. coli and purified from inclusion bodies using standard methods. The light chain (β2m) is radio-labeled with iodine (125I), and combined with the purified MHC-I heavy chain and peptide of interest at 18°C to initiate pMHC-I complex formation. These reactions are carried out in streptavidin coated microplates to bind th biotinylated MHC-I heavy chains to the surface and allow measurement of radiolabeled light chain to monitor complex formation. Dissociation is initiated by addition of higher concentrations of unlabled light-chain and incubation at 37°C. Stability is defined as the length of time in hours it takes for half of the complexes to dissociate, as measured by scintillation counts

[00504] Live cell/flow cytometry-based assays can also be used, e.g., an assay utilizing a TAP-deficient hybridoma cell line T2 (American Type Culture Collection (ATCC Accession No. CRL-1992), Manassas, Va.). TAP deficiency in this cell line leads to inefficient loading of MHCI in the ER and an excess of empty MHCIs. Salter and Cresswell, EMBO J. 5:943-49 (1986); Salter, Immunogenetics 21:235-46 (1985). Empty MHCIs are highly unstable and short-lived. When T2 cells are cultured at reduced temperatures, empty MHCIs appear transiently on the cell surface, where they can be stabilized by exogenous addition of MHCI-binding peptides. To perform this binding assay, peptide-receptive MHCIs were induced by culturing aliquots of 107 T2 cells overnight at 26 oC in serum free AIM-V medium alone, or in medium

containing escalating concentrations (0.1 to 100 μM) of peptide. Cells were then washed twice with PBS, and subsequently incubated with a fluorescent tagged HLA-A0201-specific monoclonal antibody, BB7.2, to quantify cell surface expression. Samples were acquired on a FACS Calibur instrument (Becton Dickinson) and the mean fluorescence intensity (MFI) determined using the accompanying Cellquest software.

[00505] Immunogenicity assays are used to test the ability of each test peptide to expand T cells. Mature professional APCs are prepared for these assays in the following way. Monocytes are enriched from healthy human donor PBMCs using a bead-based kit (Miltenyi). Enriched cells are plated in GM-CSF and IL-4 to induce immature DCs. After 5 days, immature DCs are incubated at 37°C with each peptide for 1 hour before addition of a cytokine maturation cocktail (GM-CSF, IL-1β, IL-4, IL-6, TNFα, PGE1β). Cells are incubated at 37°C to mature DCs.

[00506] After maturation of DCs, PBMCs (either bulk or enriched for T cells) are added to mature dendritic cells with proliferation cytokines. Cultures are monitored for peptide-specific T cells using a combination of functional assays and/or tetramer staining. Parallel immunogenicity assays with the modified and parent peptides allow for comparisons of the relative efficiency with which the peptides expanded peptide-specific T cells.

[00507] *Tetramer Staining.* MHC tetramers are used to measure peptide-specific T cell expansion in the immunogenicity assays. For the assessment, tetramer is added to $1x10^5$ cells in PBS containing 1% FCS and 0.1% sodium azide (FACS buffer) according to manufacturer's instructions. Cells are incubated in the dark for 20 minutes at room temperature. Antibodies specific for T cell markers, such as CD8, are then added to a final concentration suggested by the manufacturer, and the cells are incubated in the dark at 4 °C for 20 minutes. Cells are washed with cold FACS buffer and resuspended in buffer containing 1% formaldehyde. Cells are acquired on a FACS Calibur (Becton Dickinson) instrument, and are analyzed by use of Cellquest software (Becton Dickinson). For analysis of tetramer positive cells, the lymphocyte gate is taken from the forward and side-scatter plots. Data are reported as the percentage of cells that were $CD8^+$/$Tetramer^+$.

[00508] *Intracellular cytokine staining.* In the absence of well-established tetramer staining to identify antigen-specific T cell populations, antigen-specificity can be estimated using assessment of cytokine production using well-established flow cytometry assays. Briefly, T cells are stimulated with the peptide of interest and compared to a control. After stimulation, production of cytokines by $CD4^+$ T cells (e.g., IFNγ and TNFα) are assessed by intracellular staining. These cytokines, especially IFNγ, used to identify stimulated cells.

[00509] *ELISPOT.* Peptide-specific T cells are functionally enumerated using the ELISPOT assay (BD Biosciences), which measures the release of IFNgamma from T cells on a single cell basis. Target cells (T2 or HLA-A0201 transfected C1Rs) were pulsed with 10 uM peptide for 1 hour at 37 °C, and washed three

times. $1x10^5$ peptide-pulsed targets are co-cultured in the ELISPOT plate wells with varying concentrations of T cells ($5x10^2$ to $2x10^3$) taken from the immunogenicity culture. Plates are developed according to the manufacturer's protocol, and analyzed on an ELISPOT reader (Cellular Technology Ltd.) with accompanying software. Spots corresponding to the number of IFNgamma-producing T cells are reported as the absolute number of spots per number of T cells plated. T cells expanded on modified peptides are tested not only for their ability to recognize targets pulsed with the modified peptide, but also for their ability to recognize targets pulsed with the parent peptide.

[00510] *CD107 staining.* CD107a and b are expressed on the cell surface of $CD8^+$ T cells following activation with cognate peptide. The lytic granules of T cells have a lipid bilayer that contains lysosomal-associated membrane glycoproteins ("LAMPs"), which include the molecules CD107a and b. When cytotoxic T cells are activated through the T cell receptor, the membranes of these lytic granules mobilize and fuse with the plasma membrane of the T cell. The granule contents are released, and this leads to the death of the target cell. As the granule membrane fuses with the plasma membrane, C107a and b are exposed on the cell surface, and therefore are markers of degranulation. Because degranulation as measured by CD107 a and b staining is reported on a single cell basis, the assay is used to functionally enumerate peptide-specific T cells. To perform the assay, peptide is added to HLA-A0201-transfected cells C1R to a final concentration of 20 μM, the cells were incubated for 1 hour at 37 °C, and washed three times. $1x10^5$ of the peptide-pulsed C1R cells were aliquoted into tubes, and antibodies specific for CD107 a and b are added to a final concentration suggested by the manufacturer (Becton Dickinson). Antibodies are added prior to the addition of T cells in order to "capture" the CD107 molecules as they transiently appear on the surface during the course of the assay. $1x10^5$ T cells from the immunogenicity culture are added next, and the samples were incubated for 4 hours at 37 °C. The T cells are further stained for additional cell surface molecules such as CD8 and acquired on a FACS Calibur instrument (Becton Dickinson). Data is analyzed using the accompanying Cellquest software, and results were reported as the percentage of $CD8^+$ CD107 a and b^+ cells.

[00511] *Cytotoxicity assays.* Cytotoxic activity is measured using a chromium release assay. Target T2 cells are labeled for 1 hour at 37 °C with $Na^{51}Cr$ and washed $5x10^3$ target T2 cells were then added to varying numbers of T cells from the immunogenicity culture. Chromium release is measured in supernatant harvested after 4 hours of incubation at 37°C. The percentage of specific lysis is calculated as:

Experimental release-spontaneous release/Total release-spontaneous release x 100.

Example 3. Selection of Tissue-specific Antigens for a Tumor-Specific Vaccine

[00512] This example illustrates the procedure for the selection of peptide epitopes for vaccine compositions of the invention. The peptides in the composition can be in the form of a nucleic acid sequence, either single or one or more sequences (i.e., minigene) that encodes peptide(s), or may be single and/or polyepitopic peptides.

[00513] Epitopes are selected which, upon administration, mimic immune responses that have been observed to be correlated with tumor clearance. For example, vaccine can include 1-2 epitopes that come from at least one tissue-specific antigen region. Epitopes from one region can be used in combination with epitopes from one or more additional tissue-specific antigen regions.

[00514] Epitopes can be selected, for example, that have a binding affinity of an IC_{50} of 500 nM or less for an HLA class I molecule, or for class II, an IC_{50} of 1000 nM or less.

[00515] When creating a polyepitopic compositions, e.g. a minigene, it is typically desirable to generate the smallest peptide possible that encompasses the epitopes of interest. The principles employed are similar, if not the same, as those employed when selecting a peptide comprising nested epitopes. Additionally, however, upon determination of the nucleic acid sequence to be provided as a minigene, the peptide sequence encoded thereby is analyzed to determine whether any "junctional epitopes" have been created. A junctional epitope is a potential HLA binding epitope, e.g., as predicted by motif analysis. Junctional epitopes are generally to be avoided because the recipient may bind to an HLA molecule and generate an immune response to that epitope, which is not present in a native protein sequence.

[00516] Peptide epitopes for inclusion in vaccine compositions are, for example, selected from those listed in the Tables. A vaccine composition comprised of selected peptides, when administered, is safe, efficacious, and elicits an immune response similar in magnitude of an immune response that inhibits tumor growth.

Example 4. Composition for Prophylactic or Therapeutic Uses

[00517] Immunogenic or vaccine compositions of the present disclosure are used to inhibit tumor growth. For example, a polyepitopic composition (or a nucleic acid comprising the same) containing multiple tissue-specific epitopes is administered to individuals having tumors. The dose of peptide for the immunization is from about 1 to about 50,000 μg, generally 100-5,000 μg, for a 70 kg patient. The initial administration may be followed by booster dosages at 4 weeks followed by evaluation of the magnitude of the immune response in the patient, by techniques that determine the presence of epitope-specific CTL populations in a PBMC sample. Additional booster doses are administered as required. The composition is found to be both safe and efficacious to inhibit tumor growth.

[00518] Alternatively, the polyepitopic composition can be administered as a nucleic acid, for example as RNA, in accordance with methodologies known in the art and disclosed herein.

[00519] Tissue-specific antigen binding agents, such as TCR or CARs can be administered in accordance with methodologies known in the art and disclosed herein. The binding agents can be administered as polynucleotides, for example DNA or RNA, encoding the binding agents as part of cellular therapy. Alternatively, the binding agents can be prepared as antibodies or fragments thereof capable of recognizing the specific peptide: MHC complex coupled to cytotoxic agents or T cell binding agents capable of re-directing patient T cells to tumor cells expressing the epitopes listed in the Tables.

[00520] Tissue-specific antigen peptides, polynucleotides, binding agents, or cells expressing these molecules can be delivered to the same patient via multiple methodologies known in the art, and can further be combined with other cancer therapies (e.g., chemotherapy, surgery, radiation, checkpoint inhibitors, etc.).

Example 5. Identification of tissue-specific antigen

[00521] This example illustrates an exemplary process for identification of tissue-specific antigen.

[00522] ***Step 1.*** RNA-Seq-based data were acquired from GTEx and TCGA. Expression was merged (by summation) to the gene symbol level (considering protein-coding genes only), and each sample was scaled such that its values summed to 1,000,000. These values represent transcripts per million (TPM).

[00523] ***Step 2.*** Genes were identified as being expressed highly in cancer and weakly expressed or absent in essential tissues. Implicitly, genes highly expressed in cancer and non-essential tissues (but not in essential tissues) were still considered as valid targets). The tissues listed in **Table 3A** were deemed as ESSENTIAL. The tissues in **Table 3B** were used to represent tumors.

Table 3A

From GTEx:	
Adipose - Subcutaneous	Colon - Transverse
Adipose - Visceral (Omentum)	Esophagus - Gastroesophageal Junction
Artery - Aorta	Esophagus - Mucosa
Artery - Coronary	Esophagus - Muscularis
Artery - Tibial	Heart - Atrial Appendage
Bladder	Heart - Left Ventricle
Brain - Amygdala	Kidney - Cortex
Brain - Anterior cingulate corte	Liver
Brain - Caudate (basal ganglia)	Lung
Brain - Cerebellar Hemisphere	Minor Salivary Gland
Brain - Cerebellum	Muscle - Skeletal
Brain - Cortex	Nerve - Tibial
Brain - Frontal Cortex (BA9)	Pituitary
Brain - Hippocampus	Skin - Not Sun Exposed (Suprapubic)
Brain - Hypothalamus	Skin - Sun Exposed (Lower leg)
Brain - Nucleus accumbens	Small Intestine - Terminal Ileum
Brain - Putamen (basal ganglia)	Spleen
Brain - Spinal cord (cervical c-1)	Stomach
Brain - Substantia nigra	Uterus
EBV-transformed lymphocytes	Vagina
Cells - Transformed fibroblasts	Whole Blood
Colon - Sigmoid	
From TCGA (non-tumor normal samples):	
Bladder	Liver
Brain	Skin
Colon	Stomach
Throat ("head and neck")	Non-smoker Lung
Kidney	

Table 3B

From GTEx (normal tissues used as surrogates for tumor tissues):	
Adrenal Gland	Testis
Pancreas	
From TCGA (tumor tissues):	
Bladder cancer	Liver cancer
Breast cancer	Lung adenocarcinoma
Cervical cancer	Lung squamous cell carcinoma
Colorectal cancer	Melanoma
Glioblastoma	Ovarian cancer
Glioma	Prostate cancer
Head&neck cancer	Stomach cancer
Kidney clear cell cancer	Thyroid cancer
Kidney papillary cancer	Uterine cancer

[00524] The following calculations were carried out to select candidate genes:

i. For each combination of essential tissue (tissues listed in Table 2A above) and gene, the 95th percentile value expression value was calculated across available samples (using quantile function in R, default parameters, as described in R Core Team (2015). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria). This was then summarized to a single value per gene using a max operation across different tissues, which was referred to as the "essential expression" of each gene. The initial set of candidate genes comprised all genes with essential expression less than 20 TPM.

ii. For each combination of tumor tissue (tissues listed in Table 2B above) and candidate gene, the 75th percentile expression value was calculated across available samples (also using quantile function in R). If this values was at least 10 times greater than the gene's essential expression, then the gene was considered as a candidate for the given tumor type.

[00525] ***Step 3.*** For each gene with suitably restricted expression, all the protein coding sequences of all distinct transcript isoforms (per the Gencode V19 annotation) were digested (in silico) into all possible peptides of lengths 8, 9, 10, 11, and 12. If a peptide was also found in the protein sequence of a gene with an essential score greater than 20 (as might happen in the case of gene paralogs pairs for which one gene has restricted expression and the other does not) then the peptide was excluded as a candidate. The remaining candidate peptides were scored for binding potential using NetMHCpan-v3.0 and RECON for the following HLA I alleles:

Table 4

HLA-A	***HLA-B***	***HLA-C***
HLA-A02:01	HLA-B07:02	HLA-C07:01
HLA-A01:01	HLA-B08:01	HLA-C07:02
HLA-A03:01	HLA-B13:02	HLA-C04:01
HLA-A24:02	HLA-B46:01	HLA-C01:02
HLA-A11:01	-	HLA-C07:02
HLA-A24:02	-	HLA-C03:04
HLA-A02:01	-	-
HLA-A33:03	-	-
HLA-A30:01	-	-

[00526] ***Step 4.*** For each combination of gene and allele, a peptide was considered to be a positive hit if its predicted binding (per NetMHCpan3.0 or RECON) placed it in the N top-scoring peptides. N was calculated as max(3,0.001*P), where P is the number of peptides evaluated for the given gene-allele combination.

Example 6. T cell manufacturing protocol 1

[00527] This example provides an example of T cell manufacturing protocol.

[00528] Materials:

DC media (Cellgenix)

CD14 microbeads, human, Miltenyi #130-050-201

Cytokines and/or growth factors

T cell media (AIM V + RPMI 1640 glutamax $^{+}$ serum + PenStrep)

Peptide stocks - 1 mM per peptide (HIV A02 – 5-10 peptides, HIV B07- 5-10 peptides, DOM - 4-8 peptides, PIN - 6-12 peptides)

Step 1: Monocyte Isolation for DC prep

1. Calculate the approximate number of PBMCs to thaw based on expected DC yield for each donor.
2. Thaw PBMCs and resuspend at ~$1x10^6$ - $1x10^8$ cells/mL in DC media.
3. Add benzonase (1:1000 dilution) and place in incubator with cap loosened.
4. Perform $CD14^+$ monocyte enrichment according to manufacturer protocol.
5. Plate enriched cells in 6-well plates at $1x10^5$ - $1x10^7$ per well in DC media with one or more cytokines and/or growth factors selected from GM-CSF, IL-4, FLT3L, TNF-α, IL-1β, PGE1, IL-6, IL-7, IFN-α, R848, LPS, ss-rna40, and polyI:C.

Step 2: Peptide loading and maturation

1. Count DCs and split the cells according to the experimental conditions in 15 mL tubes; 0.01-1 million cells per condition.
2. Spin @ 1200 rpm for 5 min and resuspend in 50 – 400 µL DC medium. Add peptide(s)and place in incubator with loosened cap for 0.5-3 hrs. Volumes were calculated for peptide pools at a concentration of 1 mM per peptide. A volume of each separate pool of A02 (5 peptides) and B07 (5 peptides) was added per well for a final concentration of 0.001 – 100 µM per peptide.
3. After 0.5 – 3 hrs add 200 µL to 1.5 mL of DC media containing maturation mix and transfer the cells to 24 well plate.

The maturation mix contains one or more cytokines selected from GM-CSF, IL-4, FLT3L, TNF-α, IL-1β, PGE1, IL-6, IL-7, IFN-α, R848, LPS, ss-rna40, and polyI:C.

Step 3: Setting up Long term stimulation (LTS) experiment

1. Carefully remove all media from the wells of the DC plates, transferring each well to a separate well in a 24-well deepwell block.
2. Wash each well with 0.5 – 3 mL T cell media and combine with DC media in the deepwell block.
3. Add 100 µL to 2 mL T cell media to each well.
4. Spin down DCs at 1200 rpm for 5 min.

5. Remove all supernatant, resuspend DCs in 100 µL to 2 mL T cell media and transfer back into the correct wells.
6. Thaw PBMCs in T cell media and resuspend at $0.5x10^6$ – $4x10^6$ cells/mL in T cell media with IL-7 and IL-15.
7. Add 0.5 – 3 mL of prepared PBMCs to each well.

Step 4: Feeding LTS

Check with glucose meter if the media is yellow. If glucose remains high, feed culture with IL-7 and IL-15 to the well. If glucose is low, expand the cells to 6 well plate (4 mL/well) and supplement with IL-15 and IL-7. If glucose is very low, expand to 6 mL/well in a 6-well plate.

Step 5: Feeding LTS

Feed cultures every 1-4 days, adding fresh IL-15/IL-7 and expanding the culture volume as needed when glucose concentration becomes low.

Step 6: Re-stimulation

Count T cells and repeat from step 3 on a new batch of peptide-loaded DCs. Freeze leftover cells for analysis.

Step 7: Feeding LTS

Feed cultures every -1-5 days.

Step 8: Re-stimulation

Count T cells and repeat from step 3 on a new batch of peptide-loaded DCs. Freeze leftover cells for analysis.

Step 9: Feeding LTS

Feed cultures every 1-5 days.

Step 10

Count T cells and freeze for analysis.

Example 7. T cell manufacturing protocol 2

[00529] This protocol can be an alternative to the protocol described in Example 6.

Materials:

AIM V media (Invitrogen)

Media 1 (RPMI 1640 glutamax + serum + PenStrep)

Media 2 (AIM V + RPMI 1640 glutamax + serum + PenStrep)

Procedure:

Step 1: Plate 4 million PBMCs in each well of 24 well plate with one or more cytokines in Media 2. The one or more cytokines are selected from GM-CSF, IL-4, FLT3L, TNF-α, IL-1β, PGE1, IL-6, IL-7, IFN-α, R848, LPS, ss-rna40, and polyI:C.

Step 2: Peptide loading and maturation in Media 2

1. Make stock peptide pool of interest (except for no peptide condition) at 0.001 – 100 μM for shortmers and 0.001 – 100 μM for longmers final concentration in respective wells and mix.
2. Incubate for 0.5 – 3 hr.
3. Make stock maturation cocktail and add to each well after incubation and mix. The maturation cocktail contains one or more cytokines selected from GM-CSF, IL-4, FLT3L, TNF-α, IL-1β, PGE1, IL-6, IL-7, IFN-α, R848, LPS, ss-rna40, and polyI:C.

Step 3: Add human serum to each well at a final concentration of 2.5-20% by volume and mix.

Step 4: Carefully replace 50-90% of the media with fresh Media 1 supplemented with IL-7 and IL-15 to a final concentration of 0.005-500 ng/mL each.

Step 5: Carefully replace 50-90% of the media with fresh Media 1 supplemented with IL-7 and IL-15 to a final concentration of 0.005-500 ng/mL each every 1-5 days.

In case the wells turn orange to yellow on non-feeding days (glucose readout in case of clear media), change 25-75% of existing media with fresh Media 1 and IL-7/IL-15.

Step 6: Count and freeze (or proceed to the following steps to carry the T cell simulation to step 8 and/or step 10 of protocol 1).

During the culturing steps from step 1 to step 6, peptide-loaded DCs can be prepared in parallel according to the procedures in protocol 1 "Step 1" and "Step 2".

Count T cells and stimulate T cells with a new batch of peptide-loaded DCs. Freeze leftover cells for analysis. The T cell stimulation procedure can be carried out according to the procedures in protocol 1 "Step 3".

Step 7: Count T cells and repeat T cell stimulation procedures in protocol 1 "step 3" on a new batch of peptide-loaded DCs. Freeze leftover cells for analysis.

Step 8: Count T cells and freeze for analysis.

Example 8. T cell manufacturing protocol 3

Materials:

AIM V media (Invitrogen)

Human FLT3L, preclinical CellGenix #1415-050 Stock 50 ng/μL

TNF-α, preclinical CellGenix #1406-050 Stock 10 ng/μL

IL-1β, preclinical CellGenix #1411-050 Stock 10 ng/μL

PGE1 or Alprostadil – Cayman from Czech republic Stock 0.5 μg/μL

R10 media- RPMI 1640 glutamax + 10% Human serum+ 1% PenStrep

20/80 Media- 18% AIM V + 72% RPMI 1640 glutamax + 10% Human Serum + 1% PenStrep

IL7 Stock 5 ng/μL

IL15 Stock 5 ng/μL

Procedure:

[00530] Step 1: Plate 5 million PBMCs (or cells of interest) in each well of 24 well plate with FLT3L in 2 mL AIM V media

[00531] Step 2: Peptide loading and maturation- in AIMV

1. Mix peptide pool of interest (except for no peptide condition) with PBMCs (or cells of interet) in respective wells.

2. Incubate for 1 hr.

3. Mix Maturation cocktail (including TNF-α, IL-1β, PGE1, and IL-7) to each well after incubation.

Step 3: Add human serum to each well at a final concentration of 10% by volume and mix.

Step 4: Replace the media with fresh RPMI+ 10% HS media supplemented with IL7 + IL15.

Step 5: Replace the media with fresh 20/80 media supplemented with IL7 + IL15 during the period of incubation every 1-6 days.

Step 6: Plate 5 million PBMCs (or cells of interest) in each well of new 6-well plate with FLT3L in 2 mL AIM V media

Step 7: Peptide loading and maturation for re-stimulation- (new plates)

1. Mix peptide pool of interest (except for no peptide condition) with PBMCs (or cells of interest) in respective wells

2. Incubate for 1 hr.

3. Mix Maturation cocktail to each well after incubation

Step 8: Re-stimulation:

1. Count first stimulation FLT3L cultures and add 5 million cultured cells to the new Re-stimulation plates.

2. Bring the culture volume to 5 mL (AIM V) and add 500 ul of Human serum (10% by volume)

Step 9: Remove 3 mL of the media and add 6 mL of RPMI+ 10% HS media supplemented with IL7 + IL15.

Step 10: Replace 75% of the media with fresh 20/80 media supplemented with IL7 + IL15.

Step 11: Repeat re-stimulation if needed.

Example 9. T cell induction protocol

[00532] T cell induction #1

Step 7	Autologous Cells Apheresis Bag #2
Step 8	$CD25^+$ depletion ($^+$/- $CD14^+$ depletion)
Step 8a	Add FLT3L
Step 9	Addition Patient Specific Peptides and incubation
Step 10	Incubation of depleted PMBCs with FLT3L and peptides

T cell induction #2

Step 11	T Cell Washing and Resuspension in T cell Media
Step 12	Incubation of T cells with Matured DC (from DC Derivation)

T cell induction #3

Step 11	T Cell Washing and Resuspension in T cell Media
Step 12	Incubation of T cells with Matured DC (from DC Derivation)

Harvest & cryopreservation

Step 15		T Cell Harvest	Release Testing: Mycoplasma
Step 1	Drug Substance (DS)	Wash and Suspension in Final Formulation	Release Testing: Sterility, Endotoxin, Cell Phenotype, TNC Count, Viability, Cell Concentration, Potency
Step 17	Drug Product (DP)	DS Fill and Cryopreservation Store in vapor phase of liquid nitrogen	

Example 10. T cell manufacturing

[00533] Provided herein is a T cell therapy where T cells primed and responsive against antigenic peptides specific for a tissue-specific epitope is administered to the subject. Provided herein are methods for generating tissue-specific epitope responsive T cells for the therapy. The method can comprise generating tissue-specific epitope responsive T cells *ex vivo* by priming T cells with APCs expressing tissue-specific T cell epitopes and expanding the activated T cells to obtain tissue-specific epitope responsive CD8+ and CD4+ including a population of these cells exhibiting memory phenotype (see, e.g., WO2019094642, incorporated by reference in its entirety). Target tissue-specific antigen responsive T cells are generated ex vivo and immunogenicity is validated using an in vitro antigen-specific T cell

assay. Mass spectrometry can be used to validate that cells that express the antigen of interest can process and present the peptides on the relevant HLA molecules. Additionally, the ability of these T cells to kill cells presenting the peptide is confirmed using a cytotoxicity assay.

Generation of target tumor cell antigen responsive T cells ex vivo

[00534] Materials:

AIM V media (Invitrogen)

Human FLT3L, preclinical CellGenix #1415-050 Stock 50 ng/μL

TNF-α, preclinical CellGenix #1406-050 Stock 10 ng/μL

IL-1β, preclinical CellGenix #1411-050 Stock 10 ng/μL

PGE1 or Alprostadil – Cayman from Czech republic Stock 0.5 μg/μL

R10 media- RPMI 1640 glutamax + 10% Human serum+ 1% PenStrep

20/80 Media- 18% AIM V + 72% RPMI 1640 glutamax + 10% Human Serum + 1% PenStrep

IL7 Stock 5 ng/μL

IL15 Stock 5 ng/μL

Procedure:

Step 1: Plate 5 million PBMCs (or cells of interest) in each well of 24 well plate with FLT3L in 2 mL AIM V media

Step 2: Peptide loading and maturation- in AIMV

1. Mix peptide pool of interest (except for no peptide condition) with PBMCs (or cells of interest) in respective wells.

2. Incubate for 1 hr.

3. Mix Maturation cocktail (including TNF-α, IL-1β, PGE1, and IL-7) to each well after incubation.

Step 3: Add human serum to each well at a final concentration of 10% by volume and mix.

Step 4: Replace the media with fresh RPMI+ 10% HS media supplemented with IL7 + IL15

Step 5: Replace the media with fresh 20/80 media supplemented with IL7 + IL15 during the period of incubation every 1-6 days.

Step 6: Plate 5 million PBMCs (or cells of interest) in each well of new 6-well plate with FLT3L in 2 ml AIM V media

Step 7: Peptide loading and maturation for re-stimulation- (new plates)

1. Mix peptide pool of interest (except for no peptide condition) with PBMCs (or cells of interest) in respective wells

2. Incubate for 1 hr.

3. Mix Maturation cocktail to each well after incubation

Step 8: Re-stimulation:

1. Count first stimulation FLT3L cultures and add 5 million cultured cells to the new Re-stimulation plates.

2. Bring the culture volume to 5 mL (AIM V) and add 500 µL of Human serum (10% by volume)

Step 9: Remove 3 mL of the media and add 6 mL of RPMI+ 10% HS media supplemented with IL7 + IL15.

Step 10: Replace 75% of the media with fresh 20/80 media supplemented with IL7 + IL15.

Step 11: Repeat re-stimulation if needed.

Analysis of antigen-specific induction

[00535] MHC tetramers are purchased or manufactured on-site according to methods known by one of ordinary skill and are used to measure peptide-specific T cell expansion in the immunogenicity assays. For the assessment, tetramer is added to 1 x 10^5 cells in PBS containing 1% FCS and 0.1% sodium azide (FACS buffer) according to manufacturer's instructions. Cells are incubated in the dark for 20 minutes at room temperature. Antibodies specific for T cell markers, such as CD8, are then added to a final concentration suggested by the manufacturer, and the cells are incubated in the dark at 4 °C for 20 minutes. Cells are washed with cold FACS buffer and resuspended in buffer containing 1% formaldehyde. Cells are acquired on a LSR Fortessa (Becton Dickinson) instrument and are analyzed by use of FlowJo software (Becton Dickinson). For analysis of tetramer positive cells, the lymphocyte gate is taken from the forward and side-scatter plots. Data are reported as the percentage of cells that were $CD8^+$/$tetramer^+$.

Evaluation of presentation of tissue-specific antigens

[00536] The affinity of the tissue-specific epitope s for HLA alleles and stability of the tissue-specific epitopes with the HLA alleles can be determined as described herein. An exemplary detailed description of the protocol utilized to measure the binding affinity of peptides to Class I MHC has been published (Sette et al, Mol. Immunol. 31(11):813-22, 1994). In brief, MHCI complexes were prepared and bound to radiolabeled reference peptides. Peptides were incubated at varying concentrations with these complexes for 2 days, and the amount of remaining radiolabeled peptide bound to MHCI was measured using size exclusion gel-filtration. The lower the concentration of test peptide needed to displace the reference radiolabeled peptide demonstrates a stronger affinity of the test peptide for MHCI. Peptides with affinities to MHCI <50nM are generally considered strong binders while those with affinities <150nM are considered intermediate binders and those <500nM are considered weak binders (Fritsch et al, 2014).

[00537] An exemplary detailed description of the protocol utilized to measure the binding stability of peptides to Class I MHC has been published (Harndahl et al. J Immunol Methods. 374:5-12, 2011). Briefly, synthetic genes encoding biotinylated MHC-I heavy and light chains are expressed in *E. coli* and purified from inclusion bodies using standard methods. The light chain (β2m) is radio-labeled with iodine (125I), and combined with the purified MHC-I heavy chain and peptide of interest at 18°C to initiate pMHC-I complex formation. These reactions are carried out in streptavidin coated microplates to bind the biotinylated MHC-I heavy chains to the surface and allow measurement of radiolabeled light chain to

monitor complex formation. Dissociation is initiated by addition of higher concentrations of unlabeled light-chain and incubation at 37°C. Stability is defined as the length of time in hours it takes for half of the complexes to dissociate, as measured by scintillation counts.

[00538] To assess whether antigens could be processed and presented from the larger polypeptide context, peptides eluted from HLA molecules isolated from cells expressing the genes of interest were analyzed by tandem mass spectrometry (MS/MS).

[00539] For analysis of presentation of tissue-specific antigens, cell lines are utilized that were lentivirally transduced to express the tissue-specific antigens. HLA molecules are either isolated based on the natural expression of the cell lines or the cell lines are lentivirally transduced or transiently transfected to express the HLA of interest. 293T cells are transduced with a lentiviral vector encoding various regions of a tissue-specific polypeptides. Greater than 50 million cells expressing peptides encoded by a tissue-specific polypeptide are cultured and peptides were eluted from HLA-peptide complexes using an acid wash. Eluted peptides are then analyzed by targeted MS/MS with parallel reaction monitoring (PRM).

HLA Class I Binding and Stability

[00540] A subset of the peptides used for affinity measurements are also used for stability measurements using the assay described. Less than 50 nM can be considered by the field as a strong binder, 50-150 nM can be considered an intermediate binder, 150-500 nM can be considered a weak binder, and greater than 500 nM can be considered a very weak binder.

[00541] Immunogenicity assays are used to test the ability of each test peptide to expand T cells. Mature professional APCs are prepared for these assays in the following way. Monocytes are enriched from healthy human donor PBMCs using a bead-based kit (Miltenyi). Enriched cells are plated in GM-CSF and IL-4 to induce immature DCs. After 5 days, immature DCs are incubated at 37°C with each peptide for 1 hour before addition of a cytokine maturation cocktail (GM-CSF, IL-1β, IL-4, IL-6, TNFα, PGE1β). Cells are incubated at 37°C to mature DCs.

Assessment of cytotoxic capacity of antigen-specific T cells in vitro

[00542] Cytotoxicity activity can be measured with the detection of cleaved Caspase 3 in target cells by Flow cytometry. Target cancer cells are engineered to express the tissue-specific peptide along and the proper MHC-I allele. Mock-transduced target cells (i.e. not expressing the tissue-specific peptide) are used as a negative control. The cells are labeled with CFSE to distinguish them from the stimulated PBMCs used as effector cells. The target and effector cells are co-cultured for 6 hours before being harvested. Intracellular staining is performed to detect the cleaved form of Caspase 3 in the CFSE-positive target cells. The percentage of specific lysis is calculated as: Experimental cleavage of Caspase 3/spontaneous cleavage of Caspase 3 (measured in the absence of the specific peptide expression) x 100.

[00543] In some examples, cytotoxicity activity is assessed by co-culturing induced T cells with a population of tissue-specific antigen-specific T cells with target cells expressing the corresponding HLA, and by determining the relative growth of the target cells, along with measuring the apoptotic marker Annexin V in the target cells specifically. Target cells are engineered to express the tissue-specific peptide or the tissue-specific peptide is exogenously loaded. Mock-transduced target cells (i.e. not expressing the tissue-specific peptide), target cells loaded with tissue-specific peptides, or target cells with no peptide loaded are used as a negative control. The cells are also transduced to stably express GFP allowing the tracking of target cell growth. The GFP signal or Annexin-V signal are measured over time with an IncuCyte S3 apparatus. Annexin V signal originating from effector cells is filtered out by size exclusion. Target cell growth and death is expressed as GFP and Annexin-V area (mm^2) over time, respectively.

Enrichment of target antigen activated T cells

[00544] Tissue-specific antigen responsive T cells may be further enriched. In this example, multiple avenues for enrichment of antigen responsive T cells are explored. After the initial stimulation of tissue-specific antigen-specific T cells, an enrichment procedure can be used prior to further expansion of these cells. As an example, stimulated cultures and pulsed with the same tissue-specific peptides used for the initial stimulation on day 13, and cells upregulating 4-1BB are enriched using Magnetic-Assisted Cell Separation (MACS; Miltenyi). These cells can then be further expanded, for example, using anti-CD3 and anti-CD28 microbeads and low-dose IL-2.

Immunogenicity assays for selected peptides

[00545] After maturation of DCs, PBMCs (either bulk or enriched for T cells) are added to mature dendritic cells with proliferation cytokines. Cultures are monitored for tissue-specific peptide-specific T cells using a combination of functional assays and/or tetramer staining. Parallel immunogenicity assays with the tissue-specific peptides allowed for comparisons of the relative efficiency with which the peptides expanded peptide-specific T cells. In some embodiments, the peptides elicit an immune response in the T cell culture comprises detecting an expression of a FAS ligand, granzyme, perforins, IFN, TNF, or a combination thereof in the T cell culture.

[00546] Immunogenicity can be measured by a tetramer assay. MHC tetramers are purchased or manufactured on-site, and are used to measure peptide-specific T cell expansion in the immunogenicity assays. For the assessment, tetramer is added to 1x10^5 cells in PBS containing 1% FCS and 0.1% sodium azide (FACS buffer) according to manufacturer's instructions. Cells are incubated in the dark for 20 minutes at room temperature. Antibodies specific for T cell markers, such as CD8, are then added to a final concentration suggested by the manufacturer, and the cells are incubated in the dark at 4 degrees Celsius for 20 minutes. Cells are washed with cold FACS buffer and resuspended in buffer containing 1% formaldehyde. Cells are acquired on a FACS Calibur (Becton Dickinson) instrument, and are

analyzed by use of Cellquest software (Becton Dickinson). For analysis of tetramer positive cells, the lymphocyte gate is taken from the forward and side-scatter plots. Data are reported as the percentage of cells that were $CD8^+$/$Tetramer^+$.

[00547] Immunogenicity can be measured by intracellular cytokine staining. In the absence of well-established tetramer staining to identify tissue-specific antigen-specific T cell populations, antigen-specificity can be estimated using assessment of cytokine production using well-established flow cytometry assays. Briefly, T cells are stimulated with the tissue-specific peptide of interest and compared to a control. After stimulation, production of cytokines by CD4+ T cells (e.g., IFNγ and TNFα) are assessed by intracellular staining. These cytokines, especially IFNγ, used to identify stimulated cells.

[00548] In some embodiments the immunogenicity is measured by measuring a protein or peptide expressed by the T cell, using ELISpot assay. Peptide-responsive T cells are functionally enumerated using the ELISpot assay (BD Biosciences), which measures the release of IFNγ from T cells on a single cell basis. Target cells are pulsed with 10 μM tissue-specific peptide for one hour at 37 degrees C, and washed three times. 1x10^5 peptide-pulsed targets are co-cultured in the ELISPOT plate wells with varying concentrations of T cells (5x10^2 to 2x10^3) taken from the immunogenicity culture. Plates are developed according to the manufacturer's protocol, and analyzed on an ELISPOT reader (Cellular Technology Ltd.) with accompanying software. Spots corresponding to the number of IFN gamma-producing T cells are reported as the absolute number of spots per number of T cells plated. T cells expanded on modified peptides are tested not only for their ability to recognize targets pulsed with the modified peptide, but also for their ability to recognize targets pulsed with the parent peptide.

[00549] CD107a and CD107b are expressed on the cell surface of CD8+ T cells following activation with tissue-specific peptide. The lytic granules of T cells have a lipid bilayer that contains lysosomal-associated membrane glycoproteins ("LAMPs"), which include the molecules CD107a and b. When cytotoxic T cells are activated through the T cell receptor, the membranes of these lytic granules mobilize and fuse with the plasma membrane of the T cell. The granule contents are released, and this leads to the death of the target cell. As the granule membrane fuses with the plasma membrane, C107a and b are exposed on the cell surface, and therefore are markers of degranulation. Because degranulation as measured by CD107a and b staining is reported on a single cell basis, the assay is used to functionally enumerate tissue-specific peptide-specific T cells. To perform the assay, peptide is added to HLA-transfected cells to a final concentration of 20 μM, the cells are incubated for 1 hour at 37 degrees C and washed three times. 1x10^5 of the peptide-pulsed cells were aliquoted into tubes, and antibodies specific for CD107a and b are added to a final concentration suggested by the manufacturer (Becton Dickinson). Antibodies are added prior to the addition of T cells in order to "capture" the CD107 molecules as they transiently appear on the surface during the course of the assay. 1x10^5 T cells from the immunogenicity culture are added next, and the samples were incubated for 4 hours at 37 degrees C. The T cells are

further stained for additional cell surface molecules such as CD8 and acquired on a FACS Calibur instrument (Becton Dickinson). Data is analyzed using the accompanying Cellquest software, and results are reported as the percentage of CD8+ CD107 a and b+ cells.

[00550] Cytotoxic activity is measured using a chromium release assay. Target T2 cells are labeled for 1 hour at 37 degrees C with $Na^{51}Cr$ and washed 5x10^3 target cells are then added to varying numbers of T cells from the immunogenicity culture. Chromium release is measured in supernatant harvested after 4 hours of incubation at 37 degrees C. The percentage of specific lysis is calculated as:

Experimental release-spontaneous release/Total release-spontaneous release x 100

[00551] Immunogenicity assays are carried out to assess whether each peptide can elicit a T cell response by tissue-specific antigen-specific expansion. A positive result demonstrates that a peptide can induce a T cell response. Several tissue-specific peptides are tested for their capacity to elicit CD8+ T cell responses with multimer readouts as described. Each positive result was measured with a second multimer preparation to avoid any preparation biases. In an exemplary assay, T cells were co-cultured with monocyte-derived dendritic cells loaded with tissue-specific epitope for 10 days. CD8+ T cells were analyzed for tissue-specific antigen-specificity for tissue-specific epitope using multimers (initial: BV421 and PE; validation: APC and BUV396).

[00552] While antigen-specific CD8+ T cell responses are readily assessed using well-established HLA Class I multimer technology, CD4+ T cell responses require a separate assay to evaluate because HLA Class II multimer technology is not well-established. In order to assess CD4+ T cell responses, T cells are re-stimulated with the tissue-specific peptide of interest. After stimulation, production of cytokines by CD4+ T cells (e.g., IFNγ and TNFα) are assessed by intracellular staining. These cytokines, especially IFNγ, used to identify stimulated cells.

Cell Expansion and Preparation

[00553] To prepare APCs, the following method is employed (a) obtain of autologous immune cells from the peripheral blood of the patient; enrich monocytes and dendritic cells in culture; load tissue-specific peptides and mature DCs.

T cell Induction (Protocol 1)

[00554] First induction: (a) Obtaining autologous T cells from an apheresis bag; (b) Depleting CD25+ cells and CD14+ cells, alternatively, depleting only CD25+ cells; (c) Washing the peptide loaded and mature DC cells, resuspending in the T cell culture media; (d) Incubating T cells with the matured DC.

[00555] Second induction: (a) Washing T cells, and resuspending in T cell media, and optionally evaluating a small aliquot from the cell culture to determine the cell growth, comparative growth and induction of T cell subtypes and antigen specificity and monitoring loss of cell population; (b) Incubating T cells with mature DC.

[00556] Third induction: (a) Washing T cells, and resuspending in T cell media, and optionally evaluating a small aliquot from the cell culture to determine the cell growth, comparative growth and induction of T cell subtypes and tissue-specific antigen specificity and monitoring loss of cell population; (b) Incubating T cells with mature DC.

[00557] To harvest peptide activated t cells and cryopreserve the T cells, the following method can be employed (a) Washing and resuspension of the final formulation comprising the activated T cells which are at an optimum cell number and proportion of cell types that constitutes the desired characteristics of the Drug Substance (DS). The release criteria testing include inter alia, Sterility, Endotoxin, Cell Phenotype, TNC Count, Viability, Cell Concentration, Potency; (b) Filling drug substance in suitable enclosed infusion bags; (c) Preservation until time of use.

Methods of functional characterization of the CD4+ and CD8+ tissue-specific antigen-specific T cells.

[00558] T cell manufacturing processes were developed to raise memory and de novo CD4+ and CD8+ T cell responses to tissue-specific antigens through multiple rounds of ex-vivo T cell stimulation, generating a tissue-specific antigen-reactive T cell product for use in adoptive cell therapy. Detailed characterization of the stimulated T cell product can be used to test the many potential variables these processes utilize.

[00559] To probe T cell functionality and/or specificity, an assay was developed to simultaneously detect tissue-specific antigen-specific T cell responses and characterize their magnitude and function. This assay employs the following steps. First T cell-APC co-cultures were used to elicit reactivity in tissue-specific antigen-specific T cells. Optionally, sample multiplexing using fluorescent cell barcoding is employed. To identify tissue-specific antigen-specific CD8+ T cells and to examine T cell functionality, staining of peptide-MHC multimers and multiparameter intracellular and/or cell surface cell marker staining were probed simultaneously using FACS analysis. The results of this streamlined assay demonstrated its application to study T cell responses induced from a healthy donor. Tissue-specific antigen-specific T cell responses induced toward peptides are identified in a donor. The magnitude, specificity and functionality of the induced T cell responses are also compared. Briefly, different T cell samples are barcoded with different fluorescent dyes at different concentrations (see, e.g., Example 19). Each sample receives a different concentration of fluorescent dye or combination of multiple dyes at different concentrations. Samples are resuspended in phosphate-buffered saline (PBS) and then fluorophores dissolved in DMSO (typically at 1:50 dilution) are added to a maximum final concentration of 5 μM. After labeling for 5 min at 37 °C, excess fluorescent dye is quenched by the addition of protein-containing medium (e.g. RPMI medium containing 10% pooled human type AB serum). Uniquely barcoded T cell cultures are challenged with autologous APC pulsed with the tissue-specific antigen peptides as described above.

[00560] The differentially labeled samples are combined into one FACS tube or well, and pelleted again if the resulting volume is greater than 100 μL. The combined, barcoded sample (typically 100 μL) is stained with surface marker antibodies including fluorochrome conjugated peptide-MHC multimers. After fixation and permeabilization, the sample is additionally stained intracellularly with antibodies targeting TNF-α and IFN-γ.

[00561] The cell marker profile and MHC tetramer staining of the combined, barcoded T cell sample are then analyzed simultaneously by flow cytometry on flow cytometer. Unlike other methods that analyze cell marker profiles and MHC tetramer staining of a T cell sample separately, the simultaneous analysis of the cell marker profile and MHC tetramer staining of a T cell sample described in this example provides information about the percentage of T cells that are both tissue-specific antigen specific and that have increased cell marker staining. Other methods that analyze cell marker profiles and MHC tetramer staining of a T cell sample, separately determine the percentage of T cells of a sample that are tissue-specific antigen specific, and separately determine the percentage of T cells that have increased cell marker staining, only allowing correlation of these frequencies.

[00562] The simultaneous analysis of the cell marker profile and MHC tetramer staining of a T cell sample described in this example does not rely on correlation of the frequency of tissue-specific antigen specific T cells and the frequency of T cells that have increased cell marker staining; rather, it provides a frequency of T cells that are both tissue-specific antigen specific and that have increased cell marker staining. The simultaneous analysis of the cell marker profile and MHC tetramer staining of a T cell sample described in this example allows for determination on a single cell level, those cells that are both tissue-specific antigen specific and that have increased cell marker staining.

[00563] To evaluate the success of a given induction process, a recall response assay may be used followed by a multiplexed, multiparameter flow cytometry panel analysis. A sample taken from an induction culture is labeled with a unique two-color fluorescent cell barcode. The labeled cells are incubated on tissue-specific antigen-loaded DCs or unloaded DCs overnight to stimulate a functional response in the tissue-specific antigen-specific cells. The next day, uniquely labeled cells are combined prior to antibody and multimer staining.

Exemplary materials for T cell culture are provided below:

[00564] Materials: AIM V media (Invitrogen)Human FLT3L; preclinical CellGenix #1415-050 Stock 50 ng/μL TNFα; preclinical CellGenix #1406-050 Stock 10 ng/μL; IL-1β, preclinical CellGenix #1411-050 Stock 10 ng/μL; PGE1 or Alprostadil – Cayman from Czech republic Stock 0.5 μg/μL; R10 media- RPMI 1640 glutamax + 10% Human serum+ 1% PenStrep; 20/80 Media- 18% AIM V + 72% RPMI 1640 glutamax + 10% Human Serum + 1% PenStrep; IL7 Stock 5 ng/μL; IL15 Stock 5 ng/μL; DC media (Cellgenix); CD14 microbeads, human, Miltenyi #130-050-201, Cytokines and/or growth factors, T cell

media (AIM V + RPMI 1640 glutamax + serum + PenStrep), Peptide stocks - 1 mM per peptide tissue-specific peptides).

Example 11. Discovery approach

[00565] In this example, a discovery approach for MHC-epitope and cognate TCRs for effective T cell therapeutics is described (**FIG. 73**).

MHC-I peptide enrichment

[00566] Frozen cell pellets endogenously expressing MHC molecules (untagged) or biotin acceptor peptide (BAP)-tagged MHC molecules were lysed by pipetting and end-over-end rotation for twenty minutes using lysis buffer [20 mM Tris-Cl pH 8, 100 mM NaCl, 6 mM MgCl2, 1.5% (v/v) Triton X-100, 60 mM octyl B-D-glucopyranoside, 0.2 mM of 2-Iodoacetamide, 1 mM EDTA pH 8, 1 mM PMSF, 1X complete EDTA-free protease inhibitor cocktail (Roche)] plus benzonase nuclease for twenty minutes. Tissue samples were homogenized in lysis buffer plus benzonase nuclease. All lysates were cleared by centrifugation. Samples with untagged MHC molecules were subsequently incubated with GammaBind Plus Sepharose Beads (GE Healthcare) pre-charged with a pan-HLA A/B/C antibody (clone W6/32) overnight at 4C with end-over-end rotation. BAP-tagged samples were biotinylated with 0.56 μM biotin, 1mM ATP, and 1 μM BirA biotin ligase for 10 minutes, and subsequently incubated with High-Capacity NeutrAvidin Agarose resin for 30 minutes at 4° C with end-over-end rotation. Following enrichment, beads were washed 2x with wash buffer A [20 mM Tris-Cl pH 8, 100 mM, NaCl, 60 mM octyl B-D-glucopyranoside, 0.2 mM of 2-Iodoacetamide, 1 mM EDTA pH 8] and wash buffer B [10 mM Tris-Cl pH 8] using a positive pressure manifold. MHC molecules were eluted using 10% acetic acid and peptides were isolated using 10K molecular weight cut-off filtration following filter passivation with 1% bovine serum albumin (BSA). If required, samples were next reduced and alkylated using 5 mM Bond-Breaker TCEP solution at 60° C for 30 min followed by 15 mM 2-Iodacetamide for 30 min, protected from light. Samples were next acidified using 100% formic acid and desalted using 10 mg Sep-Pak tC18 μElution plates with peptide elutions at 15% acetonitrile and 50% acetonitrile, which were subsequently pooled. The volume of eluted peptides was reduced using vacuum centrifugation.

Discovery mass spectrometry MHC-peptide analysis

[00567] For discovery approach and analyses (unbiased identification of presented MHC-peptides), peptides were resuspended in 3% acetonitrile, 5% formic acid and analyzed using liquid chromatography-mass spectrometry with a data dependent acquisition (DDA) methodology.

Spectral searching of internal and published DDA datasets for class I MHC peptides

[00568] Raw mass spectra files generated in house or published datasets accessed using the PRoteomics IDEntifications (PRIDE) database repository or Mass Spectrometry Interactive Virtual Environment (MassIVE) database repository were searched using Spectrum Mill software package (version BI.07.04.210) against all UCSC Genome Browser genes (January 2018, *Homo sapiens*) and common

contaminants. Searches included oxidated methionine as a variable modification in all searches, and carboxymethylation of cystine residues as a variable modification when sample processing included cystine reduction and alkylation steps. A minimum scored peak intensity (SPI) of 50% & PSM FDR estimate <1% was used to filter results. All sequences between 7 and 17 amino acids in length were considered.

Targeted mass spectrometry MHC-peptide analysis

[00569] For targeted analyses, isolated MHC-I peptides were labeled using an isobaric labeling reagent from the tandem mass tag (TMT) 10-plex reagent set (Thermo Fisher). Dried peptides were resuspended in 50 mM HEPES buffer pH 8.5 and combined with 33.3 μg of TMT solubilized in 100% anhydrous acetonitrile. Peptides were incubated for 1 hour at room temperature after which the reaction was quenched with hydroxylamine. Peptides were subsequently dried by vacuum centrifugation, and resuspended in 3% acetonitrile, 5% formic acid. Prior to analysis, heavy isotope-labeled synthetic peptides corresponding to epitope targets of interest were labeled with Super Heavy TMT labeling reagent (Thermo Fisher) as - previously described. Dried, labeled synthetic peptides were resuspended in 3% acetonitrile, 5% formic acid and 100 fmol of each peptide was added to the isolated, TMT-10plex labeled enriched peptide mixture.

[00570] Peptides were analyzed using SureQuant targeted data acquisition strategy, where the heavy isotope labeled synthetic peptide serves as a trigger to guide the acquisition of spectrum corresponding to the light (unlabeled) endogenous MHC peptide using mass offset triggering and pseudo-spectral matching. All analyses were analyzed in Skyline, where the detection of an endogenous peptide was verified by matching retention times and spectral similarity between the heavy synthetic peptide and the light endogenous peptide (**FIG. 74**). Spectral similarity metrics include the dot product score and manual validation by comparing intensity distributions of 6 pre-selected product ions. Chromatographs of 6 characteristic fragment ions for the light (endogenous) and heavy isotope-labeled synthetic peptide sequence "HPEYNRPLL" derived from KLK4 (HLA*B-07:02, where the endogenous peptide was identified in a human prostate specimen) are shown. Matched chromatography retention times and a high dot product similarity score (0.992, calculated using Skyline software) of peptide fragment ions provide validation that this epitope is processed and presented on the HLA-B*07:02 molecule. Two exemplary spectrums showing spectral validation of endogenous peptides using targeted proteomics are shown in **FIG. 75**. Spectrum for the light (endogenous) HPEYNRPLL epitope identified on a human prostate specimen (left) and the corresponding heavy isotope-labeled synthetic peptide (right) are shown. B and Y fragment ions are shown, and display high spectral similarity, confirming detection of the endogenous epitope. For each peptide, the top 200 more intense ions were plotted, and corresponding mass error of highlighted b and y ions are plotted below spectrum plots.

NeoStim TCR identification protocol

[00571] In vitro T cell inductions were used to prime, enrich, and expand antigen specific T cells. Healthy human donor PMBCs were seeded into multiple wells of a GREX 24 well flask with FLT3-L in AIM-V

media (Invitrogen). Inducing peptides, TNF-α, IL-1β, PGE1, and IL-7 were added into wells after 24 hours. After an overnight incubation, human serum was added to the wells to a final concentration of 5%. The culture media was increased to 7 mL 48 hours following the addition of human serum, the added media contained 5% human serum, IL-7, and IL-15. The IL-7 and IL-15 concentration was maintained throughout the culture by supplementing the cultures with the cytokines every 48 – 72 hours.

[00572] On Day 13 of culture, the inducing peptides are reintroduced to the cultures for 24 hours. The cultures are then harvested and wells with the same inducing peptides were combined to achieve a total cell number >100e6. These pooled samples were then enriched for CD137 using the Miltenyi CD137 GMP MACS kit and LS columns with a 70um pre-separation filter.

[00573] Enriched cultures were then expanded in AIM-V media containing IL-2, IL-7, IL-15, human serum, anti-CD28 antibody, and in some cases, glucose, non-essential amino acids, and vitamins for 24 hours. In some cases, inducing peptides may have been added in an increasing peptide concentration for the three days following enrichment (days 15, 16, and 17 of the culture). On day 19 of the culture, the culture volume was increased to 6 mL via the addition of AIM-V media containing IL-2, IL-7, IL-15, human serum, glucose, non-essential amino acids, and vitamins.

[00574] The cultures were harvested on Day 26 following the start of the culture. Once harvested the cells were frozen in FBS supplemented with 10% DMSO or analyzed for multimer staining immediately after harvest. The frozen samples were moved to long term liquid nitrogen storage.

[00575] The cells were stained with CD14, CD16, CD19, CD8, and CD4 as linage markers and a suite of multimers loaded with the inducing peptides. Antigen specific cells were identified as CD14- CD16- CD19- CD4- CD8+ positive for the unique peptide fluorophores and negative for the other fluorophores

Multimer Results

[00576] FIG. 76 depicts exemplary flow cytometry plots of peptide-MHC multimer staining of target epitopes after naive T cell inductions in healthy donors with the indicated HLA-I molecules. Multimer positive populations and the percentage of multimer positive cells is shown. The top panel displays positive sample identifications using a combinatorial multimer analysis. The bottom panel displays results from a confirmation combinatorial analysis performed on frozen samples following the initial identification from the top panel. Multimer positive cells from analyses in the bottom panel are sorted for downstream TCR identification.

TCR Identification

[00577] FIG. 77 depicts graphs showing exemplary TCR clonotypes identified from the 10X genomics pipeline. Each graph originated from a single sorted, multimer positive, population. The samples in this case all contained two unique TCR clonotypes, identified by a paired alpha and beta sequence. In the case where the 10X genomics pipeline identified a clonotype that contained multiple of either alpha or beta sequences, all possible combinations were synthesized for antigen specificity and avidity.

Transfection and lentivirus production

[00578] Lentivirus encoding antigen-specific TCRs was prepared by the LV-MAX Lentiviral Production System supplied by Gibco using the protocol to produce Lentivirus in a 50 mL conical tube. Following the transient transfection, the lentivirus was tittered using Lenti-X GoStix from Takara and then concentrated 10 fold using Lenti-X Concentrator from Takara.

CD8 transduction of Jurkat cells

[00579] 2e6 CD8 Jurkat cells were plated in a 24 well plate in 1 mL RPMI supplemented with 10% FBS and 200 μL Lentiblast. Concentrated virus was added to the well, at GV ~40,000 add 100uL, adding at most 1 mL to each culture. The cells were spinfected at 2400rpm, 32C, for 45 minutes and incubated overnight. On the following day the plates were spun and either the media was changed to fresh RPMI with no virus, or the spinfection was repeated for a total of 2 times.

[00580] The cells were cultured for a total of 7 days in the 24 well plate before they were expanded to a GREX 24 flask and put under puro selection. Following 48 hours of selection, the cells were used for downstream analyses.

Jurkat TCR-pMHC Recognition Assay

[00581] The coculture is to be done at an effector to target ratio of 5:1. The target cell number can vary between 50,000 and 10,000 cells with an according number of effector cells to maintain the ratio. For adherent cells, the target cells are plated for between 2 hours and overnight before peptide is added. Peptides are serially diluted to a range between 10 μM and 0.1 nM final concentration and are added at least 1 hour prior to addition of Jurkat cells. Prior to addition to the coculture, Jurkat cells are washed and resuspended in RPMI supplemented with 10% FBS.

[00582] The cells were co-cultured overnight before harvest and staining for CD69 expression via flow using a CD8, CD3, and murine TCR constant antibodies as lineage markers for effector cells.

TCR avidity measurements

[00583] Target A375 cells or T2 cells were transduced to overexpress the allele of interest. A375 cells were plated at a density of 50k per well and T2 cells were plated at a density of 10K per well, and were peptide pulsed for 1 hour at a final concentration between 10e3 and 10e-1 nM. Cells were co-cultured with Jurkat effector cells transduced to express the TCR of interest overnight at a 5:1 effector:target ratio before harvest. Cells were stained for CD69 expression using flow cytometry with CD8, CD3, and murine TCR constant antibodies as cell linear markers for effector cells. Data is reported as percentage of CD69 positive cells among TCR-expressing Jurkat cells. **FIG. 78** depicts exemplary plots showing avidity of exemplary TCRs. The plots reflect the CD69 expression on transduced Jurkat cells (identified by the co-expression of murine TCR, CD8, and CD3) following an overnight coculture with a target cell line presenting the HLA and loaded with a variable amount of peptide. Of the seven TCRs tested, five of them show increased

expression of CD69 in a peptide dependent manner. The concentration required to achieve a 50% activation (EC50) is calculated from these plots and the results are shown on the plot.

[00584] The following Table 5 shows exemplary results of TCR discovery using the protocols above.

Table 5. TCR discovery results

Epitope	Allele	Gene	Reactive T cell population generated?
SLSKILDTV	A02:01	ANKRD30A	Y
LLSHGAVIEV	A02:01	ANKRD30A	Y
SLQCVSLHL	A02:01	KLK2	Y
VLVHPQWVL	A02:01	KLK2/3/4	Y
SLFHPEDTGQV	A02:01	KLK3	Y
HPEYNRPLL	B07:02	KLK4	Y
KIWEELSVLEV	A02:01	MAGEA3	Y
KVLEHVVRV	A02:01	MAGEA4	Y
GLSNLTHVL	A02:01	PRAME	Y
SLLQHLIGL	A02:01	PRAME	Y
PYLGQMINL	A24:02	PRAME	Y
SPSVSQLSVL	B07:02	PRAME	Y
MPMQDIKMIL	B07:02	PRAME	Y

A T cell population reactive to each of the above epitope:MHC complexes has been generated.

Endogenous TCR activity assay

[00585] MDA-PCa-2b cells were plated at 50K / well in F12K media. The next day the cultures were treated with a cocktail of interferon alpha, beta, and gamma all at 1 U/uL final concentration. The next day the cells were washed with RPMI supplemented with 10% FBS and Glutamax. The cultures were then pulsed with peptide at a final concentration of 2 μM for 1 hour before the addition of effector cells.

[00586] The cells were co-cultured overnight before harvest and staining for CD69 expression via flow using a CD8, CD3, and murine TCR constant antibodies as lineage markers for effector cells and HLA-B07 as a lineage marker for the target cells. **FIG. 79** depicts exemplary plots showing endogenous activity of two different exemplary TCRs. avidity of exemplary TCRs. the plots here reflect the activation of two different TCR sequences (hereafter named mTCR21-033 and mTCR-034) following a coculture with the cell line MDA-PCa-2b which is endogenous for both HLA-B07 and KLK4. These plots are showing an increase in activation of mTCR21-033, but not mTCR21-034 following a 24-hour treatment with a cocktail of interferons (IFN). The IFN treatment increases the expression of surface HLA on cell lines, and the increased surface expression of the HLA can provide more expression of HLA-B07 bound to the KLK4 epitope.

[00587] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

CLAIMS

WHAT IS CLAIMED IS:

1. A composition comprising:
   (a) a tissue-specific antigen peptide comprising an epitope sequence of a protein encoded by a gene selected from the group consisting of *ANKRD30A, COL10A1, CTCFL, PPIAL4G, POTEE, DLL3, MMP13, SSX1, DCAF4L2, MAGEA4, MAGEA11, MAGEC2, MAGEA12, PRAME, CLDN6, EPYC, KLK3, KLK2, KLK4, TGM4, POTEG, RLN1, POTEH, SLC45A2, TSPAN10, PAGE5, CSAG1, PRDM7, TG, TSHR, RSPH6A, SCXB, HIST1H4K, ALPPL2, PRM2, PRM1, TNP1, LELP1, HMGB4, AKAP4, CETN1, UBQLN3, ACTL7A, ACTL9, ACTRT2, PGK2, C2orf53, KIF2B, ADAD1, SPATA8, CCDC70, TPD52L3, ACTL7B, DMRTB1, SYCN, CELA2A, CELA2B, PNLIPRP1, CTRC, AMY2A, SERPINI2, RBPJL, AQP12A, IAPP, KIRREL2, G6PC2, AQP12B, CYP11B1, CYP11B2, STAR, CYP11A1,* and *MC2R*, wherein the protein is expressed by a cancer;
   (b) a polynucleotide encoding the tissue-specific antigen peptide;
   (c) one or more antigen presenting cells (APCs) presenting the tissue-specific antigen peptide;
   (d) a T cell receptor (TCR) or an antibody, or a functional part thereof that is specific to a complex of (i) the epitope sequence and (ii) a protein encoded by an HLA allele; or
   (e) a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR.
2. A composition comprising
   (a) a tissue-specific antigen peptide comprising an epitope sequence of a protein, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1-8962, wherein the protein is expressed by a cancer;
   (b) a polynucleotide encoding the tissue-specific antigen peptide;
   (c) one or more antigen presenting cells (APCs) presenting the tissue-specific antigen peptide;
   (d) a T cell receptor (TCR) or an antibody, or a functional part thereof that is specific to a complex of (i) the epitope sequence and (ii) a protein encoded by an HLA allele; or
   (e) a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR.
3. A composition comprising:
   (a) a tissue-specific antigen peptide comprising an epitope sequence of a protein, wherein the protein is expressed by a tumor of a target tissue;
   (b) a polynucleotide encoding the tissue-specific antigen peptide;
   (c) one or more antigen presenting cells (APCs) presenting the tissue-specific antigen peptide;

(d) a T cell receptor (TCR) or an antibody, or a functional part thereof that is specific to a complex of (i) the epitope sequence and (ii) a protein encoded by an HLA allele; or

(e) a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR;

wherein the epitope sequence binds to or is predicted to bind to a protein encoded by a protein encoded by an HLA allele expressed by a human subject, and wherein the protein is encoded by a tissue-specific antigen epitope gene that has an expression level in the target tissue that is at least 2 fold more than an expression level of the tissue-specific antigen gene in each tissue of a plurality of non-target tissues that are different than the target tissue.

4. The composition of any one of claims 1-3, wherein the protein comprises TSHR, TG, RSPH6A, SCXB, SSX1, or any combination thereof, and wherein the cancer comprises thyroid cancer.

5. The composition of any one of claims 1-4, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 6846-7061, 7359-7448, 7629-8099, and 8619-8744, and wherein the cancer comprises thyroid cancer.

6. The composition of any one of claims 1-3, wherein the protein comprises RBPJL, AQP12A, AQP12B, IAPP, CELA2A, CELA2B, AMY2A, CTRC, G6PC2, KIRREL2, PNLIPRP1, SERPINI2, SYNC, or any combination thereof, and wherein the cancer comprises pancreatic cancer.

7. The composition of any one of claims 1-3 and 6, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 720-814, 989-1182, 1373-1565, 2120-2211, 2920-3009, 3101-3196, 3320-3440, 5193-5284, 6487-6579, 7062-7150, and 7539-7628, and wherein the cancer comprises pancreatic cancer.

8. The composition of any one of claims 1-3, wherein the protein comprises CYP11A1, CYP11B1, CYP11B2, MC2R, STAR, or any combination thereof, and wherein the cancer comprises adrenal cancer.

9. The composition of any one of claims 1-3 and 8, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 22122523, 4817-4915, and 7449-7538, and wherein the cancer comprises adrenal cancer.

10. The composition of any one of claims 1-3, wherein the protein comprises ALPPL2, POTEE, PRAME, or any combination thereof, and wherein the cancer comprises uterine cancer.

11. The composition of any one of claims 1-3 and 10, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 627-719, 5285-5431, and 6085-6183, and wherein the cancer comprises uterine cancer.

12. The composition of any one of claims 1-3, wherein the protein comprises KLK2, KLK3, KLK4, POTEH, POTEG, TGM4, RLN1, POTEE, PPIAL4G or any combination thereof, and wherein the cancer comprises prostate cancer.
13. The composition of any one of claims 13 and 12, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 3441-4274, 5285-6084, 6580-6845, and 8100-8434, and wherein the cancer comprises prostate cancer.
14. The composition of any one of claims 1-3, wherein the protein comprises ANKRD30A, COL10A1, or a combination thereof and wherein the cancer comprises breast cancer.
15. The composition of any one of claims 1-3 and 14, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 815-988, and 1749-1867, and wherein the cancer comprises breast cancer.
16. The composition of any one of claims 1-3, wherein the protein comprises CTCFL, PRAME, CLDN6, EPYC, or any combination thereof, and wherein the cancer comprises ovarian cancer.
17. The composition of any one of claims 1-3 and 16, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1659-1748, 1964-2119, 2827-2919, and 6085-6183, and wherein the cancer comprises ovarian cancer.
18. The composition of any one of claims 1-3, wherein the protein comprises CTCFL, and wherein the cancer comprises cervical cancer.
19. The composition of any one of claims 1-3 and 18, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID NOs 1964-2119, and wherein the cancer comprises cervical cancer.
20. The composition of any one of claims 1-3, wherein the protein comprises POTEE, PPIAL4G, or a combination thereof, and wherein the cancer comprises colorectal cancer.
21. The composition of any one of claims 1-3 and 20, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 5285-5431, and 5996-6084, and wherein the cancer comprises colorectal cancer.
22. The composition of any one of claims 1-3, wherein the protein comprises DLL3, and wherein the cancer comprises glioma.
23. The composition of any one of claims 1-3 and 22, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 2619-2736, and wherein the cancer comprises glioma.
24. The composition of any one of claims 1-3, wherein the protein comprises MMP13, and wherein the cancer comprises head and neck cancer.

25. The composition of any one of claims 1-3 and 24, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 4916-5010, and wherein the cancer comprises head and neck cancer.
26. The composition of any one of claims 1-3, wherein the protein comprises DCAF4L2, SSX1, or a combination thereof, and wherein the cancer comprises liver cancer.
27. The composition of any one of claims 1-3 and 26, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 2524-2618, and 7359-7448, and wherein the cancer comprises liver cancer.
28. The composition of any one of claims 1-3, wherein the protein comprises SSX1, MAGEA4, PRAME, CSAG1, MAGEA12, MAGEA2, MAGEC2, PAGE5, PRDM7, SLC45A2, TSPAN10, or any combination thereof, and wherein the cancer comprises melanoma.
29. The composition of any one of claims 1-3 and 28, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 1868-1963, 4458-4550, 4551-4637, 4638-4728, 4729-4816, 5011-5100, 6085-6183, 6184-6307, 7151-7264, 7359-7448, and 8745-8835, and wherein the cancer comprises melanoma.
30. The composition of any one of claims 1-3, wherein the protein comprises MAGEA11, MAGEA4, PRAME, or any combination thereof, and wherein the cancer comprises lung squamous cell carcinoma.
31. The composition of any one of claims 1-3 and 30, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 4368-4457, 4638-4728, and 6085-6183, and wherein the cancer comprises lung squamous cell carcinoma.
32. The composition of any one of claims 1-3, wherein the protein comprises ACTL7A, ACTL7B, ACTL9, ACTRT2, ADAD1, AKAP4, C2orf53, CCDC70, CETN1, DMRTB1, HMGB4, KIF2B, LELP1, PGK2, PRM1, PRM2, SPATA8, TNP1, TPD52L3, UBQLN3, or any combination thereof, and wherein the cancer comprises testis cancer.
33. The composition of any one of claims 1-3 and 32, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of SEQ ID Nos 1-626, 1183-1372, 1566-1658, 2737-2826, 3010-3100, 3197-3319, 4275-4367, 5101-5192, 6308-6486, 7265-7358, 8435-8618, and 8836-8962, and wherein the cancer comprises testis cancer.
34. The composition of any one of claims 1-3, wherein the tissue-specific antigen peptide comprises an epitope sequence of a protein encoded by a gene selected from the group consisting of: ANKRD30A, DLL3, PRAME, CLDN6, EPYC, SLC45A2, TSPAN10, TSHR, LELP1, AQP12A, KIRREL2, G6PC2, AQP12B, and MC2R.

35. The composition of any one of claims 1-3, wherein the protein comprises KLK2, KLK3, KLK4, ANKRD30A, PRAME, MAGE4, or a combination thereof.
36. The composition of claim 35, wherein the protein comprises KLK2, KLK3 or KLK4; and wherein the cancer comprises prostate cancer.
37. The composition of any one of claims 1-3 and 36, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of AYSEKVTEF (SEQ ID NO: 3534), GLWTGGKDTCGV (SEQ ID NO: 3468), HPEDTGQVF (SEQ ID NO: 3988), HPEYNRPLL (SEQ ID NO: 4143), QRVPVSHSF (SEQ ID NO: 3544), SESDTIRSI (SEQ ID NO: 4176), SLFHPEDTGQV (SEQ ID NO: 3775), SLQCVSLHL (SEQ ID NO: 3456), VILLGRHSL (SEQ ID NO: 3891), VLVHPQWVL (SEQ ID NO: 3757), LFHPEDTGQVF (SEQ ID NO: 3827), RPRSLQCVSL (SEQ ID NO: 3578), GYLQGLVSF (SEQ ID NO: 4094), IRNKSVILL (SEQ ID NO: 3974), KLQCVDLHV (SEQ ID NO: 3740), LLANGRMPTV (SEQ ID NO: 4029), LRPGDDSTL (SEQ ID NO: 3767), MPALPMVL (SEQ ID NO: 3874), NRPLLANDL (SEQ ID NO: 4216), SLQCVSLHL (SEQ ID NO: 3456), TWIAPPLQV (SEQ ID NO: 3784), VFQVSHSF (SEQ ID NO: 3828) and YSEKVTEFML (SEQ ID NO: 3454).
38. The composition of any one of claims 1-3 and 36, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of AYSEKVTEF (SEQ ID NO: 3534), HPEDTGQVF (SEQ ID NO: 3988), HPEYNRPLL (SEQ ID NO: 4143), QRVPVSHSF (SEQ ID NO: 3544), LFHPEDTGQVF (SEQ ID NO: 3827), GYLQGLVSF (SEQ ID NO: 4094), IRNKSVILL (SEQ ID NO: 3974), KLQCVDLHV (SEQ ID NO: 3740), LLANGRMPTV (SEQ ID NO: 4029), LRPGDDSTL (SEQ ID NO: 3767), MPALPMVL (SEQ ID NO: 3874), NRPLLANDL (SEQ ID NO: 4216), SLQCVSLHL (SEQ ID NO: 3456), TWIAPPLQV (SEQ ID NO: 3784), VFQVSHSF (SEQ ID NO: 3828) and YSEKVTEFML (SEQ ID NO: 3454).
39. The composition of claim 35, wherein the protein comprises ANKRD30A; and wherein the cancer comprises breast cancer.
40. The composition of any one of claims 1-3 and 38, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of LLSHGAVIEV (SEQ ID NO: 831), SIPTKALEL (SEQ ID NO: 942), SQYSGQLKV (SEQ ID NO: 927), SVPNKALEL (SEQ ID NO: 941), SLSKILDTV (SEQ ID NO: 826) and SLDQKLFQL (SEQ ID NO: 827).
41. The composition of any one of claims 1-3 and 38, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of LLSHGAVIEV (SEQ ID NO: 831), SIPTKALEL (SEQ ID NO: 942), SVPNKALEL (SEQ ID NO: 941), SLSKILDTV (SEQ ID NO: 826) and SLDQKLFQL (SEQ ID NO: 827).

42. The composition of claim 35, wherein the protein comprises PRAME; and wherein the cancer comprises squamous cell lung cancer; melanoma; ovarian cancer, uterine cancer, or any combination thereof.
43. The composition of any one of claims 1-3 and 42, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of DSLFFLRGR (SEQ ID NO: 6132), ELFSYLIEK (SEQ ID NO: 6108), FYDPEPILC (SEQ ID NO: 6166), ISISALQSL (SEQ ID NO: 6161), ITDDQLLAL (SEQ ID NO: 6158), KRKKNVLRL (SEQ ID NO: 6173), LQSLLQHLI (SEQ ID NO: 6146), LSHIHASSY (SEQ ID NO: 6152), PYLGQMINL (SEQ ID NO: 6120), QLLALLPSL (SEQ ID NO: 6093), SFYGNSISI (SEQ ID NO: 6174), SLLQHLIGL (SEQ ID NO: 6095), SPSVSQLSVL (SEQ ID NO: 6139), SPYLGQMINL (SEQ ID NO: 6138), TSPRRLVEL (SEQ ID NO: 6159), VLYPVPLESY (SEQ ID NO: 6154), VSPEPLQAL (SEQ ID NO: 6156), YLHARLREL (SEQ ID NO:6157) and RLDQLLRHV (SEQ ID NO:6104).
44. The composition of any one of claims 1-3 and 42, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence of SLLQHLIGL (SEQ ID NO: 6095).
45. The composition of claim 35, wherein the protein comprises MAGE4; and wherein the cancer comprises squamous cell lung cancer.
46. The composition of any one of claims 1-3 and 45, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of EVDPASNTY (SEQ ID NO: 4638), GVYDGREHTV (SEQ ID NO: 4653), KEVDPASNTY (SEQ ID NO: 4640), KVDELAHFL (SEQ ID NO: 4648), QIFPKTGL (SEQ ID NO: 4692), QSPQGASAL (SEQ ID NO: 4707), SALPTTISF (SEQ ID NO: 4699),, TVYGEPRKL (SEQ ID NO: 4722), VYGEPRKL (SEQ ID NO: 4727), YPSLREAAL (SEQ ID NO: 4689), ALLEEEEGV (SEQ ID NO: 4698) and KVLEHVVRV (SEQ ID NO: 4697).
47. The composition of any one of claims 1-3 and 45, wherein the epitope sequence has from 70% to 100% sequence identity to a peptide sequence selected from the group consisting of EVDPASNTY (SEQ ID NO: 4638), GVYDGREHTV (SEQ ID NO: 4653), KVDELAHFL (SEQ ID NO: 4648) and KVLEHVVRV (SEQ ID NO: 4697).
48. The composition of any one of claims 3-47, wherein the target tissue is a non-essential tissue.
49. The composition of any one of claims 3-48, wherein each non-target tissue is an essential tissue.
50. The composition of any one of claims 1-49, wherein the tissue-specific antigen peptide is an isolated, purified, and/or synthetic peptide.
51. The composition of any one of claims 1-49, wherein the tissue-specific antigen peptide further comprises an accessory sequence flanking the epitope sequence.
52. The composition of any one of claims 1-51, wherein the polynucleotide comprises deoxyribonucleic acid (DNA).

53. The composition of any one of claims 1-52, wherein the polynucleotide comprises ribonucleic acid (RNA).
54. The composition of any one of claims 1-53, comprising a viral vector containing the polynucleotide.
55. The composition of claim 54, wherein the viral vector is an adenovirus viral vector, an adeno-associated virus (AAV) viral vector, a Herpes Simplex virus (HSV) viral vector, a Semliki Forest Virus (SFV) viral vector, a lentivirus viral vector, a retrovirus viral vector, a poxvirus viral vector, an alpha virus viral vector, a vaccinia virus viral vector, a hepatitis B virus (HBV) viral vector, a human papillomavirus viral vector, or a pseudotype thereof, or any combination thereof.
56. The composition of any one of claims 1-55, wherein the tissue-specific antigen peptide activates $CD8^+$ T cells, $CD4^+$ T cells, or both.
57. The composition of any one of claims 1-56, wherein the TCR is specific to the tissue-specific antigen peptide in a complex with a class I MHC protein or a class II MHC protein.
58. The composition of any one of claims 1-57, wherein the at least one antigen specific T cell expresses CD8 or CD4.
59. The composition of any one of claims 1-58, wherein the at least one antigen specific T cell comprise an exogenous polynucleotide encoding the TCR.
60. The composition of any one of claims 1-59, wherein the biological sample is from a subject with the cancer or a donor other than a subject with the cancer.
61. The composition of claim 60, wherein the donor has a natural immune response to the tissue-specific antigen peptide.
62. The composition of claim 60, wherein the cancer comprises prostate cancer, and wherein the donor is female.
63. The composition of any one of claims 1-62, wherein the protein is encoded by a tissue-specific antigen epitope gene that has an mRNA expression level in each non-target tissue of a plurality of non-target tissues that are different than a target tissue of the tumor that is at most about 5 mRNA transcripts per one million total mRNA transcripts in each respective non-target tissue.
64. The composition of any one of claims 1-63, wherein the protein is encoded by a tissue-specific antigen epitope gene that has an mRNA expression level in a target tissue that is at least about 100 mRNA transcripts per one million total mRNA transcripts in the target tissue.
65. A pharmaceutical composition comprising
    (a) the composition of any one of claims 1-64, and
    (b) a pharmaceutically acceptable carrier.
66. A method comprising identifying an epitope sequence, wherein the epitope sequence
    (a) binds to or is predicted to bind to a protein encoded by a MHC allele expressed by a human subject, and

(b) is encoded by a tissue-specific antigen epitope gene that has an expression level in a tumor from a target tissue that is at least 2 fold greater than an expression level of the tissue-specific antigen epitope gene in each tissue of a plurality of non-target tissues that are different than the target tissue

67. A method of preparing T cells comprising a T cell receptor (TCR) specific to a complex of (i) a epitope sequence of a tissue specific antigen peptide of a protein and (ii) a protein encoded by an HLA allele of a human subject, the method comprising: incubating T cells in the presence of antigen presenting cells (APCs) comprising the epitope sequence, wherein the APCs express the protein encoded by an HLA allele of a human subject.

68. The method of claim 67, wherein the APCs comprise a polypeptide comprising the epitope sequence or a polynucleotide encoding a polypeptide comprising the epitope sequence.

69. The method of claim 67 or 68, wherein the APCs are APCs from a human subject.

70. The method of any one of claims 67-69, wherein the T cells are T cells from a human subject.

71. The method of any one of claims 67-70, wherein the method further comprises administering the T cells to a human subject in need thereof.

72. A method of treatment, comprising:

administering a composition to a human subject in need thereof, wherein the composition comprises:

(a) a tissue-specific antigen peptide comprising an epitope sequence of a protein, wherein the epitope sequence is expressed by the tumor;

(b) a polynucleotide encoding the tissue-specific antigen peptide;

(c) one or more antigen presenting cells (APCs) presenting the tissue-specific antigen epitope sequence;

(d) a T cell receptor (TCR) specific to a complex of (i) the epitope sequence and (ii) a protein encoded by an HLA allele of a human subject; or

(e) a population of immune cells from a biological sample comprising at least one antigen specific T cell comprising the TCR;

wherein the epitope sequence binds to or is predicted to bind to a protein encoded by an HLA allele expressed by the human subject, and wherein the protein is encoded by a tissue-specific antigen epitope gene that has an expression level in the tumor that is at least 2 fold more than an expression level of the tissue-specific antigen gene in each tissue of a plurality of non-target tissues that are different than the target tissue.

73. The method of claim 66, 67 or 72, wherein each tissue of the plurality of tissues is an essential tissue.

74. The method of any one of claims 66, 67, 72 and 73, wherein the plurality of tissues comprise skeletal muscle, coronary artery, heart, adipose, uterus, vagina, skin, salivary gland, brain, lung, esophagus, stomach, colon, small intestine, nerve, or any combination thereof.

75. The method of any one of claims 66, 67 and 72-74, wherein each non-target tissue of the plurality of non-target tissues is a non-essential tissue.
76. The method of any one of claims 66, 67 and 72-75, wherein the MHC allele is a class I MHC allele or a class II MHC allele.
77. A method of treating a cancer, comprising: administering the composition of any one of claims 1-64 to a subject in need thereof.
78. The method of any one of claims 66-77, wherein the cancer comprises adrenal gland cancer, breast cancer, cervical cancer, colorectal cancer, fallopian tube cancer, glioma, head and neck cancer, liver cancer, squamous cell lung cancer, melanoma, ovarian cancer, pancreatic cancer, prostate cancer, testicular cancer, thyroid cancer, uterine cancer, or any combination thereof.
79. The method of claim 67, 72 or 77, wherein the protein comprises KLK2, KLK3, KLK4, ANKRD30A, PRAME, MAGE4, or a combination thereof.
80. The method of claim 79, wherein the protein comprises KLK2, KLK3 or KLK4; and wherein the cancer comprises prostate cancer.
81. The method of any one of claims 67, 72, 77 and 80, wherein
    (a) the epitope sequence is AYSEKVTEF (SEQ ID NO: 3534) and the human subject expresses a protein encoded by an HLA-C06:02 or HLA-A24:02 allele,
    (b) the epitope sequence is GLWTGGKDTCGV (SEQ ID NO: 3468) and the human subject expresses a protein encoded by an HLA-A02:01 allele,
    (c) the epitope sequence is HPEDTGQVF (SEQ ID NO: 3988) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-C07:01 allele,
    (d) the epitope sequence is HPEYNRPLL (SEQ ID NO: 4143) and the human subject expresses a protein encoded by an HLA-C*07:01 or HLA-B07:02 allele,
    (e) the epitope sequence is QRVPVSHSF (SEQ ID NO: 3544) and the human subject expresses a protein encoded by an HLA-C*07:01, HLA-C*07:02 or HLA-A24:02 allele,
    (f) the epitope sequence is SESDTIRSI (SEQ ID NO: 4176) and the human subject expresses a protein encoded by an HLA-B13:02 allele,
    (g) the epitope sequence is SLFHPEDTGQV (SEQ ID NO: 3775) and the human subject expresses a protein encoded by an HLA-A02:01 allele,
    (h) the epitope sequence is SLQCVSLHL (SEQ ID NO: 3456) and the human subject expresses a protein encoded by an HLA-A02:01 allele,
    (i) the epitope sequence is VILLGRHSL (SEQ ID NO: 3891) and the human subject expresses a protein encoded by an HLA-B08:01 allele,
    (j) the epitope sequence is VLVHPQWVL (SEQ ID NO: 3757) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(k) the epitope sequence is LFHPEDTGQVF (SEQ ID NO: 3827) and the human subject expresses a protein encoded by an HLA-A24:02 allele,

(l) the epitope sequence is RPRSLQCVSL (SEQ ID NO: 3578) and the human subject expresses a protein encoded by an HLA-B07:02 allele,

(m) the epitope sequence is GYLQGLVSF (SEQ ID NO: 4094) and the human subject expresses a protein encoded by an HLA-A24:02 allele,

(n) the epitope sequence is IRNKSVILL (SEQ ID NO: 3974) and the human subject expresses a protein encoded by an HLA-C*06:02, HLA-C*07:02 or HLA-C07:01 allele,

(o) the epitope sequence is KLQCVDLHV (SEQ ID NO: 3740) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(p) the epitope sequence is LLANGRMPTV (SEQ ID NO: 4029) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(q) the epitope sequence is LRPGDDSTL (SEQ ID NO: 3767) and the human subject expresses a protein encoded by an HLA-C07:02 allele,

(r) the epitope sequence is MPALPMVL (SEQ ID NO: 3874) and the human subject expresses a protein encoded by an HLA-B07:02 allele,

(s) the epitope sequence is NRPLLANDL (SEQ ID NO: 4216) and the human subject expresses a protein encoded by an HLA-C*06:02, HLA-C*07:02 or HLA-C01:02 allele,

(t) the epitope sequence is SLQCVSLHL (SEQ ID NO: 3456) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(u) the epitope sequence is TWIAPPLQV (SEQ ID NO: 3784) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-A02:01 allele,

(v) the epitope sequence is VFQVSHSF (SEQ ID NO: 3828) and the human subject expresses a protein encoded by an HLA-C*07:02 or HLA-A24:02 allele, or

(w) the epitope sequence is YSEKVTEFML (SEQ ID NO: 3454) and the human subject expresses a protein encoded by an HLA-A01:01 allele.

82. The method of claim 79, wherein the protein comprises ANKRD30A; and wherein the cancer comprises breast cancer.

83. The method of any one of claims 72, 77 and 82, wherein

(a) the epitope sequence is LLSHGAVIEV (SEQ ID NO: 831) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(b) the epitope sequence is SQYSGQLKV (SEQ ID NO: 927) and the human subject expresses a protein encoded by an HLA-B13:02 allele,

(c) the epitope sequence is SVPNKALEL (SEQ ID NO: 941) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-C01:02 allele,

(d) the epitope sequence is SLSKILDTV (SEQ ID NO: 826) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(e) the epitope sequence is SIPTKALEL (SEQ ID NO: 942) and the human subject expresses a protein encoded by an HLA-C*04:01 or HLA-C01:02 allele, or

(f) the epitope sequence is SLDQKLFQL (SEQ ID NO: 827) and the human subject expresses a protein encoded by an HLA-A02:01 allele.

84. The method of claim 79, wherein the protein comprises PRAME; and wherein the cancer comprises squamous cell lung cancer; melanoma; ovarian cancer, uterine cancer, or any combination thereof.

85. The method of any one of claims 72, 77 and 84, wherein

(a) the epitope sequence is DSLFFLRGR (SEQ ID NO: 6132) and the human subject expresses a protein encoded by an HLA-A33:03 allele,

(b) the epitope sequence is ELFSYLIEK (SEQ ID NO: 6108) and the human subject expresses a protein encoded by an HLA-A03:01 allele,

(c) the epitope sequence is FYDPEPILC (SEQ ID NO: 6166) and the human subject expresses a protein encoded by an HLA-C04:01 allele,

(d) the epitope sequence is ISISALQSL (SEQ ID NO: 6161) and the human subject expresses a protein encoded by an HLA-C03:04 allele,

(e) the epitope sequence is ITDDQLLAL (SEQ ID NO: 6158) and the human subject expresses a protein encoded by an HLA-A01:01 allele,

(f) the epitope sequence is KRKKNVLRL (SEQ ID NO: 6173) and the human subject expresses a protein encoded by an HLA-C07:01 allele,

(g) the epitope sequence is LQSLLQHLI (SEQ ID NO: 6146) and the human subject expresses a protein encoded by an HLA-B13:02 allele,

(h) the epitope sequence is LSHIHASSY (SEQ ID NO: 6152) and the human subject expresses a protein encoded by an HLA-B46:01 allele,

(i) the epitope sequence is PYLGQMINL (SEQ ID NO: 6120) and the human subject expresses a protein encoded by an HLA-A24:02 allele,

(j) the epitope sequence is QLLALLPSL (SEQ ID NO: 6093) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(k) the epitope sequence is SFYGNSISI (SEQ ID NO: 6174) and the human subject expresses a protein encoded by an HLA-C07:01 allele,

(l) the epitope sequence is SLLQHLIGL (SEQ ID NO: 6095) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(m) the epitope sequence is SPSVSQLSVL (SEQ ID NO: 6139) and the human subject expresses a protein encoded by an HLA-B07:02 allele,

(n) the epitope sequence is SPYLGQMINL (SEQ ID NO: 6138) and the human subject expresses a protein encoded by an HLA-B07:02 allele,

(o) the epitope sequence is TSPRRLVEL (SEQ ID NO: 6159) and the human subject expresses a protein encoded by an HLA-C01:02 allele,

(p) the epitope sequence is VLYPVPLESY (SEQ ID NO: 6154) and the human subject expresses a protein encoded by an HLA-A03:01 allele,

(q) the epitope sequence is VSPEPLQAL (SEQ ID NO: 6156) and the human subject expresses a protein encoded by an HLA-C01:02 allele,

(r) the epitope sequence is YLHARLREL (SEQ ID NO:6157) and the human subject expresses a protein encoded by an HLA-B08:01 allele, or

(s) the epitope sequence is RLDQLLRHV (SEQ ID NO:6104) and the human subject expresses a protein encoded by an HLA-A02:01 allele.

86. The method of claim 79, wherein the protein comprises MAGE4; and wherein the cancer comprises squamous cell lung cancer.

87. The method of any one of claims 72, 77 and 86, wherein

(a) the epitope sequence is EVDPASNTY (SEQ ID NO: 4638) and the human subject expresses a protein encoded by an HLA-A01:01 allele,

(b) the epitope sequence is GVYDGREHTV (SEQ ID NO: 4653) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(c) the epitope sequence is KEVDPASNTY (SEQ ID NO: 4640) and the human subject expresses a protein encoded by an HLA-A01:01 allele,

(d) the epitope sequence is KVDELAHFL (SEQ ID NO: 4648) and the human subject expresses a protein encoded by an HLA-A02:01 allele,

(e) the epitope sequence is QIFPKTGL (SEQ ID NO: 4692) and the human subject expresses a protein encoded by an HLA-B08:01 allele,

(f) the epitope sequence is QSPQGASAL (SEQ ID NO: 4707) and the human subject expresses a protein encoded by an HLA-C01:02 allele,

(g) the epitope sequence is SALPTTISF (SEQ ID NO: 4699) and the human subject expresses a protein encoded by an HLA-B46:01 allele,

(h) the epitope sequence is TVYGEPRKL (SEQ ID NO: 4722) and the human subject expresses a protein encoded by an HLA-C07:01 allele,

(i) the epitope sequence is VYGEPRKL (SEQ ID NO: 4727) and the human subject expresses a protein encoded by an HLA-C07:02 allele,

(j) the epitope sequence is YPSLREAAL (SEQ ID NO: 4689) and the human subject expresses a protein encoded by an HLA-B07:02 allele,

(k) the epitope sequence is ALLEEEEGV (SEQ ID NO: 4698) and the human subject expresses a protein encoded by an HLA-A02:01 allele, or

(l) the epitope sequence is KVLEHVVRV (SEQ ID NO: 4697) and the human subject expresses a protein encoded by an HLA-A02:01 allele.

88. A method comprising (a) contacting a T cell with an antigen peptide in complex with an HLA of an APC; and (b) determining a sequence of a TCR of the T cell that recognizes the antigen peptide in complex with the HLA, wherein the T cell is suspected to have zero or reduced immune tolerance to a tissue of origin of the antigen peptide.

89. The method of claim 88, wherein the T cell is from a female subject, and the antigen peptide is specific to a tissue selected from the group consisting of: Bulbourethral gland, epididymis, penis, prostate, scrotum, seminal vesicle, testicle.

90. The method of claim 88, wherein the T cell is from a female subject, and the antigen peptide is specific to prostate.

91. The method of claim 88, wherein the T cell is from a male subject, and the antigen peptide is specific to a tissue selected from the group consisting of: Bartholin's gland, fallopian tube, ovary, Skene's gland, uterus, cervix, vagina, and any combination thereof.

92. The method of claim 88, wherein the T cell is from a male subject, and the antigen peptide is specific to ovary.

93. The method of claim 88, wherein the T cell is from a Type I diabetes patient, and the antigen peptide is specific to pancreas.

94. The method of claim 88, wherein the T cell is from a subject that has auto-immune thyroid condition, and the antigen peptide is specific to thyroid.