METHOD OF TREATING ALVELOR BONE LOSS THROUGH THE USE OF ANTI-SCLEROSTIN ANTIBODIES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of priority to U.S. Provisional Application No. 61/580,964, filed December 28, 2011. The disclosure of the priority application is incorporated herein by reference in its entirety.

TECHNICAL FIELD OF THE INVENTION

[0002] The invention generally relates to methods of using sclerostin inhibitors to treat alveolar bone loss.

INCORPORATION BY REFERENCE OF MATERIAL SUBMITTED ELECTRONICALLY

[0003] Incorporated by reference in its entirety is a computer-readable nucleotide/amino acid sequence listing submitted concurrently herewith and identified as follows: ASCII (text) file named "46570_SeqListing.txt," 805,989 bytes, created on December 7, 2012.

INCORPORATION BY REFERENCE

[0004] The following applications are hereby incorporated by reference in their entirety: U.S. Patent Application No. 11/410,540, filed April 25, 2006, which claims priority to U.S. Provisional Patent Application No. 60/792,645, filed April 17, 2006, U.S. Provisional Patent Application No. 60/782,244, filed March 13, 2006, U.S. Provisional Patent Application No. 60/776,847, filed February 24, 2006, and U.S. Provisional Patent Application No. 60/677,583, filed May 3, 2005; and U.S. Patent Application No. 11/411,003 (issued as U.S. Patent No. 7,592,429), filed April 25, 2006, which claims priority to U.S. Provisional Patent Application No. 60/792,645, filed April 17, 2006, U.S. Provisional Patent Application No. 60/782,244, filed March 13, 2006, U.S. Provisional Patent Application No. 60/776,847, filed February 24, 2006, and U.S. Provisional Patent Application No. 60/677,583, filed May 3, 2005. The following applications also are hereby incorporated by reference: U.S. Patent Application No. 12/212,327, filed September 17, 2008, which claims priority to U.S. Provisional Patent Application No. 60/973,024, filed September 17, 2007; and U.S. Patent Application No 12/811,171, filed June 29, 2010, which is a U.S. National Phase Application pursuant to 35 U.S.C. § 371 of International Patent Application No. PCT/US08/86864, filed on December 15, 2008, which claims priority to U.S. Provisional Patent Application No. 61/013,917, filed December 14, 2007.

BACKGROUND OF THE INVENTION

[0005] Periodontal infections and gingival inflammations are known to be major causes of periodontal diseases. Both are chronic inflammatory diseases, and as they progress, the periodontal tissue is destroyed and the alveolar bone is reduced due to bone resorption causing loss of tooth support in some cases. In addition, the alveolar bone may become defective due to perforations caused by surgical treatments or apical lesions from progressed dental caries.

SUMMARY OF THE INVENTION

[0006] The invention is directed to methods of using a sclerostin inhibitor to enhance alveolar bone. In one aspect, described herein is a method of treating alveolar bone loss in a subject comprising administering a sclerostin inhibitor (e.g., an anti-sclerostin antibody or antibody fragment) in an amount effective to decrease the distance between the cement-enamel junction and the alveolar bone crest, optionally at a dose from about 5 mg to about 1,000 mg per week. In one embodiment, the sclerostin inhibitor is administered twice a week for the duration of the treatment period. In another embodiment, the sclerostin inhibitor is administered once a week for the duration of the treatment period.

[0007] The treatment period can be at least about 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks, 7 weeks, 8 weeks, 9 weeks, 10 weeks, 11 weeks, 12 weeks, 3 months, 13 weeks, 14 weeks, 15 weeks, 16 weeks, 4 months, 17 weeks, 18 weeks, 19 weeks, 20 weeks, 5 months, 21 weeks, 22 weeks, 23 weeks, 24 weeks, 6 months, 25 weeks, 26 weeks, 27 weeks 28 weeks, 7 months, 29 weeks, 30 weeks, 31 weeks or longer (e.g., 8 months, 9 months, 10 months, 11 months, 1 year, 15 months, 18 months or longer). In some embodiments, the treatment period is about 6-12 weeks. In some embodiments, the treatment period is 4-12 weeks, or about 1-3 months. In some embodiments, the treatment period is about 12-20 weeks, or about 3-5 months. In some embodiments, the treatment period is about 20-32 weeks, or about 5-8 months. In some embodiments, the treatment period is about 24-36 weeks, or about 6-9 months. In some embodiments, the treatment period is no more than about 28 weeks. In some embodiments, the treatment period is about 1 year. In some or any embodiments, the treatment period is no more than about 18 months.

[0008] In some or any embodiments, the distance between the cement-enamel junction and the alveolar bone crest is decreased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment distance by six weeks after initiation of treatment. In

some or any embodiments, the distance between the cement-enamel junction and the alveolar bone crest is decreased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some embodiments, the distance between the cement-enamel junction and the alveolar bone crest is restored to the pre-disease state by six weeks after initiation of treatment. In some embodiments, the distance between the cement-enamel junction and the alveolar bone crest is less than or equal to about 2 mm (e.g., about 2 mm, about 1.9 mm, about 1.8 mm, about 1.7 mm, about 1.6 mm, about 1.5 mm, about 1.4 mm, about 1.3 mm, about 1.2 mm, about 1.1 mm or about 1 mm) by six weeks after initiation of treatment.

[0009] In some or any embodiments, the alveolar bone height is increased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment alveolar bone height by six weeks after initiation of treatment. In some or any embodiments, the alveolar bone height is increased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some embodiments, the alveolar bone height is restored to pre-disease state alveolar bone height by six weeks after initiation of treatment.

[0010] In some or any embodiments, the alveolar bone height is increased by at least 0.1 mm (e.g., at least about 0.1 mm, about 0.2 mm, about 0.3 mm, about 0.4 mm, about 0.5 mm, about 0.6 mm, about 0.7 mm, about 0.8 mm, about 0.9 mm, about 1 mm, about 1.5 mm, about 2 mm, about 2.5 mm, about 3 mm, about 3.5 mm, about 4 mm, about 4.5 mm, about 5 mm, about 5.5 mm, about 6 mm, about 6.5 mm, about 7 mm, about 7.5 mm, about 8 mm, about 8.5 mm, about 9 mm, about 9.5, or about 10 mm) or more compared to pre-treatment alveolar bone height or compared to a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment.

[0011] In some or any embodiments, the alveolar bone density is increased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment alveolar bone density or compared to a control subject (i.e., a subject with advanced periodontal disease that did not

receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some embodiments, the alveolar bone density is restored to pre-disease state by six weeks after initiation of treatment.

[0012] In some or any embodiments, the alveolar bone volume fraction (BVF) is increased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment alveolar BVF or compared to a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment.

[0013] In some or any embodiments, the methods described herein may further comprise measuring the bone mineral density of the alveolar bone prior to the administration of the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) to identify subjects in need of treatment with the sclerostin inhibitor. Subjects presenting with alveolar bone density measurements of less than about 750 Hounsfield Units (e.g., about 750 HU, about 700 HU, about 650 HU, about 600 HU, about 550 HU, about 500 HU, about 450 HU, about 400 HU or less) are identified as subjects in need of treatment with the anti-sclerostin antibody or antibody fragment.

[0014] The alveolar bone loss for treatment by the methods described herein includes, but is not limited to, alveolar bone loss associated with periodontitis (e.g., advanced periodontal disease), tooth loss, tooth extraction, denture wearing, oral surgery, osteolmyelitis, osteoradionecrosis, developmental deformities (e.g., defects at birth such as missing portions of the teeth, facial bones or jaw), sinus deficiencies, misalignment, or trauma (e.g., avulsed tooth or jaw fracture). In some embodiments, the subject to be treated is suffering from advanced periodontitis.

[0015] In some embodiments, the alveolar bone loss is produced by removal of sections of bone containing a tumor (e.g. benign tumor). Exemplary benign bone tumors include, but are not limited to, osteoma, osteoid osteoma, osteoblastoma, osteochondroma, enchondroma, chonrdomyxoid fibroma, aneurysmal bone cyst, unicameral bone cyst, fibrous dysplasia of bone, and giant cell tumor of the bone.

[0016] In some or any embodiments, the sclerostin inhibitor (e.g. anti-sclerostin antibody or antibody fragment) is administered in combination with the use of materials that support the regrowth of bone such as bone graft, bone dust, bone chips, demineralized bone matrix, bone scaffolds, prosthesis, metal stabilizers, or bone scaffold substances comprising one or

more of polymers, ceramics, cement and calcium phosphates-based bone-graft substitutes. Many variations of such materials are known in the art.

[0017] In some or any embodiments, the method comprises administering a standard of care therapy for the treatment of the periodontal disease to the subject prior to administering the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment). For example, in some embodiments, the standard of care therapy for the treatment of periodontal disease is a therapeutic, including but not limited to, Periostat® and/or chemically modified tetracycline-3 (CMT-3). In some embodiments, the standard of care therapy comprises oral irrigation and/or scaling and supra- and/or sub-gingival debridement (e.g., removal of microbial plaque and calculus) of the affected area of the subject. In some embodiments, the standard of care comprises performing oral irrigation and/or scaling and debridement of the affected area in combination with Periostat and/or CMT-3 prior to administration of the sclerostin inhibitor. In some embodiments, the method comprises administering the standard of care therapy concurrently with the administration of the sclerostin inhibitor. In other embodiments, the standard of care therapy is administered sequentially. For example, the standard of care therapy can be administered 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 1 week, 2 weeks, 3 weeks, 4 weeks, 6 weeks, 8 weeks, 10 weeks, 12 weeks or more prior to administering the sclerostin inhibitor to the subject. In preferred embodiments, the periodontal disease progression in the subject is slowed, halted or reversed prior to administration of the sclerostin inhibitor.

[0018] In some or any embodiments, the method further comprises administering an antibiotic, such as an antibiotic selected from the group consisting of amoxicillin, tetracycline hydrochloride, doxycycline, minocycline, azithromycin, roxithromycin, moxifloxacin, ciprofloxacin and metronidazole. In some embodiments, the method comprises administering the antibiotic to the subject prior to administering or after administering the sclerostin inhibitor to the subject. In other embodiments, the method comprises administering the antibiotic to the subject concurrently with the administration of the sclerostin inhibitor.

[0019] In some or any embodiments, the method further comprises administering a second bone-enhancing therapeutic for the treatment of decreased bone mineral density or bone fracture. Many therapeutics of this type are known in the art. In some embodiments, the bone-enhancing therapeutic is selected from the group consisting of an anti-resorptive drug, a bone-forming agent, an estrogen receptor modulator (including, but not limited to, raloxifene, bazedoxifene and lasofoxifene) and a drug that has an inhibitory effect on osteoclasts. In some embodiments, the second bone-enhancing agent is selected from the group consisting

of, a bisphosphonate (including, but not limited to, alendronate sodium (FOSAMAX®), risedronate, ibandronate sodium (BONIVA®) and zoledronic acid (RECLAST®)), an estrogen or estrogen analogue, a calcium source, Tibolone, calcitonin, a calcitriol and hormone replacement therapy. In some embodiments, the second bone-enhancing agent includes, but is not limited to parathyroid hormone (PTH) or a peptide fragment thereof, PTH-related protein (PTHrp), bone morphogenetic protein, osteogenin, NaF, a PGE_2 agonist, a statin, an anti-DKK1 antibody or inhibitor, an anti-RANK ligand (RANKL) antibody (e.g., PROLIA®) or RANKL inhibitor, strontium ranelate, vitamin D, or a vitamin D derivative or mimic thereof. In some embodiments, the second bone-enhancing agent is Forteo® (Teriparatide, or recombinant human parathyroid hormone analog (1-34)) or Preotact® (parathyroid hormone). In some or any embodiments, the bone-enhancing agent is Protelos®.

[0020] In some embodiments, the second bone-enhancing agent is administered concurrently with the sclerostin inhibitor (e.g., for a length of time within the treatment period). In other embodiments, the second bone-enhancing agent is administered for a length of time once the treatment period with the sclerostin inhibitor has ended (i.e., for a maintenance period). In such embodiments, the second bone-enhancing agent is administered for a maintenance period of about 1 week to about 5 years.

[0021] The method may further comprise subsequently administering one or more amounts of a sclerostin inhibitor effective to maintain bone mineral density, optionally for a maintenance period of at least about 12 weeks, 6 months, 1 year, 2 years, 3 years, 4 years, 5 years or longer (e.g., over the lifetime of the subject) after the treatment period has ended.

[0022] Periodontal disease treatment plans may also include supportive follow-up therapy after active treatment is completed. Supportive follow-up therapies include, but are not limited to mechanical debridement, reinforcement of oral hygiene (e.g., regular professional cleanings, daily brushing and flossing) and administration of antibiotics.

[0023] In any of the embodiments disclosed herein, the sclerostin inhibitor is optionally a sclerostin binding agent (e.g., an anti-sclerostin antibody or antibody fragment). The use of a sclerostin binding agent disclosed in U.S. Patent Publication No. 2007/0110747 in any of the methods disclosed herein or for preparation of medicaments for administration according to any of the methods disclosed herein is specifically contemplated. One or more doses of the sclerostin inhibitor are administered in an amount and for a time effective to treat alveolar bone loss. In various embodiments, one or more doses comprising from about 50 milligrams

to about 1,000 milligrams of sclerostin inhibitor are administered per week to a subject (e.g., a human subject). For example, a dose of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) can comprise at least about 5 mg, 15 mg, 25 mg, 50 mg, about 60 mg, about 70 mg, about 80 mg, about 90 mg, about 100 mg, about 120 mg, about 150 mg, about 200 mg, about 240 mg, about 250 mg, about 280 mg, about 300 mg, about 350 mg, about 400 mg, about 420 mg, about 450 mg, about 500 mg, about 550 mg, about 600 mg, about 650 mg, about 700 mg, about 750 mg, about 800 mg, about 850 mg, about 900 mg, about 950 mg or up to about 1,000 mg of sclerostin inhibitor. Ranges between any and all of these endpoints are also contemplated, e.g. about 50 mg to about 80 mg, about 70 mg to about 140 mg, about 75 mg to about 100 mg, about 100 mg to about 150 mg, about 140 mg to about 210 mg, or about 150 mg to about 200 mg, or about 280 to about 410 mg. The dose is administered at any interval, such as multiple times a week (e.g., twice or three times per week), once a week, once every two weeks, once every three weeks, or once every four weeks. In some or any embodiments, a dose of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) ranging from about 120 mg to about 210 mg is administered twice a week. In some or any embodiments, a dose of about 140 mg of the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered twice a week.

[0024] In some embodiments, the one or more doses of sclerostin inhibitor can comprise between about 0.1 to about 50 milligrams (e.g., between about 5 and about 50 milligrams), or about 1 to about 100 milligrams, of sclerostin inhibitor per kilogram of body weight (mg/kg). For example, the dose of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) may comprise at least about 0.1 mg/kg, 0.5 mg/kg, 1 mg/kg, about 2 mg/kg, about 3 mg/kg, about 4 mg/kg, about 5 mg/kg, about 6 mg/kg, about 7 mg/kg, about 8 mg/kg, about 9 mg/kg, about 10 mg/kg, about 20 mg/kg, about 25 mg/kg, about 26 mg/kg, about 27 mg/kg, about 28 mg/kg, about 29 mg/kg, about 30 mg/kg, about 31 mg/kg, about 32 mg/kg, about 33 mg/kg, about 34 mg/kg, about 35 mg/kg, about 36 mg/kg, about 37 mg/kg, about 38 mg/kg, about 39 mg/kg, about 40 mg/kg, about 41 mg/kg, about 42 mg/kg, about 43 mg/kg, about 44 mg/kg, about 45 mg/kg, about 46 mg/kg, about 47 mg/kg, about 48 mg/kg, or about 49 mg/kg, or about 50 mg/kg, about 55 mg/kg, about 60 mg/kg, about 65 mg/kg, about 70 mg/kg, about 75 mg/kg, about 80 mg/kg, about 85 mg/kg, about 90 mg/kg, about 95 mg/kg, or up to about 100 mg/kg. Ranges between any and all of these endpoints are also contemplated, e.g., about 1 mg/kg to about 3 mg/kg, about 1 mg/kg to about 5 mg/kg, about 1 mg/kg to about 10 mg/kg, about 1 mg/kg to about 20 mg/kg, about 1 mg/kg to about 40 mg/kg, about 5 mg/kg to about 30 mg/kg, or about 5 mg/kg to about 20 mg/kg.

[0025] Also described herein is the use of an effective amount of an anti-sclerostin inhibitor for treating alveolar bone loss in a subject, for example, in any of the amounts described above, such as from about 50 mg to about 1,000 mg per week, wherein one or more administrations of the sclerostin binding agent is carried out over a treatment period lasting at least 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks, 7 weeks, 8 weeks, 9 weeks, 10 weeks, 11 weeks, 12 weeks, 3 months, 13 weeks, 14 weeks, 15 weeks, 16 weeks, 4 months, 17 weeks, 18 weeks 19 weeks, 20 weeks, 5 months, 21 weeks, 22 weeks, 23 weeks, 24 weeks, 6 months, 25 weeks, 26 weeks, 27 weeks, 28 weeks, 7 months, 29 weeks, 30 weeks, 31 weeks or longer (e.g., 8 months, 9 months, 10 months, 11 months, 1 year, 15 months, 18 months or longer).

[0026] In some or any embodiments, the sclerostin inhibitor is administered subcutaneously. In other embodiments, the sclerostin inhibitor is administered locally to the jaw of the subject. In some or any embodiments, the sclerostin inhibitor is administered locally to the diseased gingival area of the subject. In some or any embodiments, the sclerostin inhibitor is administered to the periodontal pocket of the subject.

[0027] The sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) may be also used in the preparation of a medicament for administration to a subject with alveolar bone loss using any of the dosing and/or timing regimens described herein. Thus, the invention also contemplates sclerostin inhibitor for use according to any of the dosing and/or timing regimens described herein. Optionally, the sclerostin inhibitor is presented in a container, such as a single dose or multidose vial or syringe. The invention includes a container comprising anti-sclerostin antibody or fragment thereof and instructions for administering the antibody or fragment thereof for treating alveolar bone loss according to any of the dosing and/or timing regimens described herein.

[0028] In various embodiments, the sclerostin inhibitor is a sclerostin binding agent, e.g., an anti-sclerostin antibody or antibody fragment. Optionally, the anti-sclerostin antibody or antibody fragment cross-blocks the binding of at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24 to sclerostin and/or is cross-blocked from binding to sclerostin by at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24.

[0029] In some embodiments, the anti-sclerostin antibody comprises a CDR-H1 of SEQ ID NO:245, a CDR-H2 of SEQ ID NO:246, a CDR-H3 of SEQ ID NO:247, a CDR-L1 of SEQ ID NO:78, a CDR-L2 of SEQ ID NO:79 and a CDR-L3 of SEQ ID NO:80.

[0030] In one embodiment, the anti-sclerostin antibody comprises heavy chains comprising SEQ ID NO: 378 and light chains comprising SEQ ID NO: 376. In another embodiment, anti-sclerostin antibody has heavy chains of SEQ ID NO: 145 or SEQ ID NO: 392 and light chains of SEQ ID NO: 141.

[0031] In another embodiment, the anti-sclerostin antibody comprises CDRs of SEQ ID NOs: 20-25 of International Patent Publication No. WO 2008/115732 (SEQ ID NOs: 416-421), CDRs of SEQ ID NOs: 26-31 of International Patent Publication No. WO 2008/115732 (SEQ ID NOs: 422-427), CDRs of SEQ ID NOs: 32-37 of International Patent Publication No. WO 2008/115732 (SEQ ID NOs: 428-433), or CDRs of SEQ ID NOs: 4, 15, 26, 37, 48, and 59 of International Patent Publication No. WO 2009/047356 (SEQ ID NOs: 443, 454, 465, 476, 487, and 498, respectively). In yet another embodiment, the anti-sclerostin antibody comprises an amino acid sequence of at least one of SEQ ID NOs: 135-143, 153-161, or 171-179 of International Patent Publication No. WO 2010/130830 (SEQ ID NOs: 745-753, 763-771, 781-789, respectively).

[0032] Also contemplated are dental implants, matrices, gels and wound dressings comprising an anti-sclerostin antibody (or antibody fragment) described herein. In some embodiments, the dental implants, matrices, gels and wound dressings are coated with an anti-sclerostin antibody (or antibody fragment). In other embodiments, the anti-sclerostin antibody (or antibody fragment) is formulated with a carrier described herein and applied to a target area (i.e., diseased gingival area or diseased periodontal pocket of the subject), optionally prior to (or after) application of a dental implant, matrices or wound dressing. The anti-sclerostin antibody (or antibody fragment) can be applied by any means known in the art. In some embodiments, the sclerostin antibody (or antibody fragment) is administered to a target area by subcutaneous injection prior to the application of the dental implant, matrix or wound dressing. In other embodiments, the sclerostin antibody (or antibody fragment) is administered to the affected area by brushing or otherwise coating the affected area prior to the application of the dental implant, matrix or wound dressing.

[0033] In addition, the use of an anti-sclerostin antibody (or antibody fragment) in any of the methods disclosed herein or for preparation of medicaments for administration according to any of the methods disclosed herein is specifically contemplated. In this regard, the

invention includes an anti-sclerostin antibody for use in a method of treating alveolar bone loss in a subject, the method comprising administering an anti-sclerostin antibody (or antibody fragment) in an amount effective to decrease the distance between the cement-enamel junction and the alveolar bone crest, optionally at a dose from about 5 mg to about 1,000 mg per week.

[0034] The invention also includes the use of an anti-sclerostin antibody (or antibody fragment) in preparation of a medicament for treating alveolar bone loss in a subject in an amount effective to decrease the distance between the cement-enamel junction and the alveolar bone crest, wherein the anti-sclerostin antibody (or antibody fragment) is optionally at a dose from about 5 mg to about 1,000 mg per week.

[0035] The foregoing summary is not intended to define every aspect of the invention, and additional aspects are described in other sections, such as the Detailed Description. The entire document is intended to be related as a unified disclosure, and it should be understood that all combinations of features described herein are contemplated, even if the combination of features are not found together in the same sentence, or paragraph, or section of this document. With respect to aspects of the invention described or claimed with "a" or "an," it should be understood that these terms mean "one or more" unless context unambiguously requires a more restricted meaning. The term "or" should be understood to encompass items in the alternative or together, unless context unambiguously requires otherwise. If aspects of the invention are described as "comprising" a feature, embodiments also are contemplated "consisting of" or "consisting essentially of" the feature.

BRIEF DESCRIPTION OF THE FIGURES

[0036] Figure 1 is a chart listing amino acid sequences and sequence identifiers for amino acid sequences of various anti-sclerostin antibodies described herein. The sequence identifiers refer to amino acid sequences provided in the Sequence Listing submitted herewith. The amino acid sequences also are set forth in U.S. Patent Publication No. 2007/0110747 or International Patent Publication Nos. WO 2008/115732, WO 2009/047356, or WO 2010/130830, hereby incorporated by reference.

[0037] Figures 2A and 2B are graphs depicting the effect of system administration (measured at the 2-week and 4-week study endpoints) of an anti-sclerostin antibody on bone volume fraction (Figure 2A) and bone mineral density (Figure 2B) during experimental periodontitis.

[0038] Figures 3A and 3B are graphs depicting the effect of systemic administration (measured at the 4-, 7-, and 10-week study endpoints) of an anti-sclerostin antibody on bone volume fraction (Figure 3A) and bone mineral density (Figure 3B) after induction of experimental periodontitis.

[0039] Figure 4A-4C are graphs depicting the effect of administration of an anti-sclerostin antibody on the distance between cement-enamel junction and the bone crest (Figure 4A), and site specific measurements for the maxillary second molar at 7 weeks (Figure 4B) and 10 weeks (Figure 4C) after induction of experimental periodontitis.

DETAILED DESCRIPTION OF THE INVENTION

[0040] The invention is predicated, at least in part, on the discovery that sclerostin inhibitors can treat alveolar bone loss associated with, for example, periodontal disease. In this regard, the invention provides a method of treating alveolar bone loss. The method comprises administering to a subject (e.g., a mammal, such as a human) one or more doses of a sclerostin inhibitor, such as sclerostin binding agent (e.g., an anti-sclerostin antibody or antibody fragment), during a treatment period in an amount effect to decrease the distance between the cement-enamel junction and the alveolar bone crest. The materials and methods of the invention are superior to existing therapies whose therapeutic efficacy relies upon invasive surgical methods (e.g., bone grafts) to restore the alveolar bone of the subject to pre-disease conditions (e.g., height and/or density and/or three-dimensional bone mass).

[0041] The alveolar bone loss for treatment by the methods described herein includes, but is not limited to, alveolar bone loss associated with periodontitis, tooth loss, tooth extraction, denture wearing, oral surgery, osteolmyelitis, osteoradionecrosis, developmental deformaties (e.g., defects at birth such as missing portions of the teeth, facial bones or jaw), sinus deficiencies, misalignment or trauma (e.g., avulsed tooth or jaw fracture). In some embodiments, the subject to be treated is suffering from advanced periodontitis.

[0042] The term "periodontal disease" as used herein is meant to encompass a spectrum of clinical conditions. The clinical diagnosis of periodontal disease is based on visual and radiographic assessment of the periodontal tissues and on measurements of the space between the tooth and the gum. In humans, these spaces are normally 1-3 mm in depth, and deepen as supporting connective tissue and bone are lost. During a comprehensive clinical examination, pocket depths and tissue support are measured at various locations (e.g., 4-6 locations) around every tooth and the amount of plaque, dental calculus, gingival bleeding

and exudates are recorded. Dental radiographs are routinely used to assess the amount of bone support for the teeth.

[0043] The severity of the periodontal disease is usually based on the clinical attachment loss (CALs) measured from the cement-enamel junction or crown margin and may be considered mild (1-2 mm), moderate (3-4 mm), or severe (≥5 mm). The term "clinical attachment loss" (CAL) refers to the distance, measured in millimeters, from the cement-enamel junction (i.e. crown margin) to the apical gingival margin. Periodontal disease may also be characterized by pocket probing depths, with mild disease characterized by a periodontal pocket probing depth of about 4-5 mm, moderate disease characterized by pocket probing depths of about 6-7 mm and severe disease characterized by pocket probing depths of about ≥ 8 mm. The term periodontal "pocket probing depth" (PPD) refers to the distance, measured in millimeters, from the cement-enamel junction (i.e., crown margin) to the alveolar bone crest. Both PPD and CAL measurements are made with a periodontal probe at various sites around each tooth, for example the mesiobuccal or midbuccal sites. They provide a measure of the severity of periodontal disease. Alternatively, both PPD and CAL can be obtained from standard digital radiography with some anatomical landmarks.

[0044] Periodontal disease includes, but not limited to, plaque-induced and non-plaque-induced gingival diseases; chronic periodontitis (classified as slight (1-2 mm CAL), moderate (3-4 mm CAL), or severe (≥ 5 mm) of generalized or localized involvement; aggressive periodontitis (classified as (1-2 mm CAL), moderate (3-4 mm CAL), or severe (≥ 5 mm) of generalized or localized involvement); periodontitis as a manifestation of systemic diseases associated with hematologic disorders and genetic disorders; necrotizing periodontal diseases including necrotizing ulcerative gingivitis and necrotizing ulcerative periodontitis; abcesses of the periodontium including gingival, periodontal and pericoronal abscesses; periodontitis associated with endodontic lesions; and developmental or acquired deformities and conditions, for example, localized tooth-related factors that modify or predispose to plaque-induced gingival diseases or periodontitis, mucogingival deformities and conditions around teeth, and conditions on edentulous ridges and occlusal trauma. All of these conditions may be localized to one or a few specific teeth, or more generalized (i.e., >30% of sites are involved).

[0045] The term "advanced periodontal disease" as used herein refers to a subject presenting with a CAL of ≥ 5 mm or a periodontal PPD of ≥ 8 mm. Gingival recession, drifting of teeth, mobility and suppuration are signs that are often associated with advanced periodontal disease due to progressive destruction of the alveolar bone.

[0046] In some embodiments, the alveolar bone loss is produced by removal of sections of bone containing a benign tumor. Exemplary benign bone tumors include, but are not limited to, osteoma, osteoid osteoma, osteoblastoma, osteochondroma, enchondroma, chonrdomyxoid fibroma, aneurysmal bone cyst, unicameral bone cyst, fibrous dysplasia of bone and giant cell tumor of the bone.

[0047] Administration of the sclerostin inhibitor increases one or more parameters of alveolar bone (e.g., one or more of alveolar bone height, alveolar bone mass, alveolar bone density, alveolar bone volume, alveolar bone mineral content, and improved tooth stability). In this regard, "treating" alveolar bone loss includes, for example, any increase in alveolar bone height, alveolar bone mass, and alveolar bone density, as well as acceleration of alveolar bone repair. Similarly, "treating" alveolar bone loss includes mediating a level of alveolar bone repair beyond (i.e., greater than) the level of alveolar bone repair experienced in subjects (e.g., mammals, such as humans) not administered the sclerostin inhibitor (i.e., control subjects). Alveolar bone repair is evidenced by, for example, increased alveolar bone height, increased alveolar bone volume, increased alveolar bone mineral content and density, increased tooth stability or improved patient use of the affected area compared to such parameters prior to treatment. The increase in any one or more parameters of alveolar bone can be a return, in whole or in part, of the measured parameter to, e.g., (a) baseline level (e.g., the level prior to onset of disease), (b) values provided in normative databases or clinical standards used in the art, or (c) the contralateral functional level (e.g., return, in whole or in part, to the functional capabilities of, for example, non-diseased alveolar bone in the subject). In some cases, the increase can be an improvement beyond baseline level. If desired, the measured parameters in subjects administered one or more doses of the sclerostin inhibitor can be compared to the same parameters in other subjects presenting with alveolar bone loss (optionally age and gender matched) not administered the sclerostin inhibitor to further analyze the efficacy of the methods described herein.

[0048] Alveolar bone parameters (e.g., alveolar bone height, alveolar bone mass and/or alveolar bone density) may be measured using radiography (e.g., radiographic absorptometry), single- and/or dual-energy X-ray absorptometry, quantitative computed tomography (QCT), ultrasonography, radiography (e.g., radiographic absorptometry), and magnetic resonance imaging. In some embodiments, the amount of alveolar bone loss is identified and/or quantified by the periodontal pocket probing depth measurement.

[0049] In some embodiments, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered at a dose and for a time period effective to decrease the

distance between the cement-enamel junction and the alveolar bone crest by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment distance or a control subject (i.e., a subject with similar disease state that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some embodiments, the distance between the cement-enamel junction and the alveolar bone crest is restored to the pre-disease state by six weeks after initiation of treatment. In some embodiments, the distance between the cement-enamel junction and the alveolar bone crest is less than or equal to about 2 mm (e.g., about 2 mm, about 1.9 mm, about 1.8 mm, about 1.7 mm, about 1.6 mm, about 1.5 mm, about 1.4 mm, about 1.3 mm, about 1.2 mm, about 1.1 mm or about 1 mm) by six weeks after initiation of treatment. In some or any embodiments, the distance between the cement-enamel junction and the alveolar bone crest is comparable to the distance in a non-diseased area of the subject's mouth (e.g., an adjacent or contralateral tooth) by six weeks after initiation of treatment.

[0050] In some embodiments, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered at a dose and for a time period effective to increase the alveolar bone height by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment alveolar bone height or a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some embodiments, the alveolar bone height is restored to pre-disease state alveolar bone height by six weeks after initiation of treatment. In some embodiments, the alveolar bone height is increased by at least 0.1 mm (e.g., at least about 0.1 mm, about 0.2 mm, about 0.3 mm, about 0.4 mm, about 0.5 mm, about 0.6 mm, about 0.7 mm, about 0.8 mm, about 0.9 mm, about 1 mm, about 1.5 mm, about 2 mm, about 2.5 mm, about 3 mm, about 3.5 mm, about 4 mm, about 4.5 mm, about 5 mm, about 5.5 mm, about 6 mm, about 6.5 mm, about 7 mm, about 7.5 mm, about 8 mm, about 8.5 mm, about 9 mm, about 9.5 about 10 mm) or more compared to pre-treatment alveolar bone height by six weeks after initiation of treatment. In some or any embodiments, the alveolar bone height is comparable to the distance in a non-diseased area of the subject's mouth (e.g., an adjacent or contralateral tooth) by six weeks after initiation of treatment.

[0051] In some embodiments, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered at a dose and for a time period effective to increase the alveolar bone density by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least

40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment alveolar bone density or a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some embodiments, the alveolar bone density is restored to pre-disease state alveolar bone density (e.g., of comparable density to a non-diseased gingival area of the subject's mouth) by six weeks after initiation of treatment. In humans, bone mineral density often is determined clinically using dual x-ray absorptiometry (DXA). Other techniques include quantitative computed tomography (QCT), ultrasonography, single-energy x-ray absorptiometry (SXA), magnetic resonance imaging, radiography, and radiographic absorptiometry. Except for ultrasonography, the American Medical Association notes that BMD techniques typically involve the use of x-rays and are based on the principle that attenuation of the radiation depends on thickness and composition of the tissues in the radiation path. Often, techniques involve the comparison of results to a normative database.

[0052] Another parameter useful to assess successful treatment with a sclerostin inhibitor is alveolar bone volume fraction (BVF). The term "bone volume fraction" as used herein refers to the volume of mineralized bone per unit volume of the bone sample (BV/TV, %) and can be measured, for example, by micro-computed tomography (micro-CT). In some or any embodiments, the alveolar BVF is increased by at least 10% (e.g., at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90% or more) compared to the pre-treatment alveolar BVF or compared to a control subject (i.e., a subject with advanced periodontal disease that did not receive treatment with the sclerostin inhibitor) by six weeks after initiation of treatment. In some or any embodiments, the alveolar BVF is comparable to the alveolar BVF in a non-diseased area of the subject's mouth (e.g., an adjacent or contralateral tooth) by six weeks after initiation of treatment.

[0053] The increase in any one or more of alveolar bone height, alveolar bone mass, alveolar bone density, and alveolar bone volume fraction and/or the decrease in the distance between the cement-enamel junction and the bone crest (or improvement of any other alveolar bone parameter) can be determined at 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks, 7 weeks, 8 weeks, 9 weeks, 10 weeks or more following the initial administration of sclerostin inhibitor. Alternatively, the increase in any one or more of alveolar bone height, alveolar bone mass, alveolar bone volume fraction and alveolar bone density (and/or the decrease in the distance between the cement-enamel junction and the bone crest) can be determined after the treatment period ends (e.g., 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks, 7 weeks, 8 weeks, 9 weeks, 10 weeks, 11 weeks, 12 weeks, 13 weeks, 14 weeks, 15

weeks, 16 weeks, 5 months, 6 months, 7 months, 8, months, 9 months, 10 months, 11 months or 1 year after the treatment period ends). In one aspect, the method reduces the amount of time required to establish a desired level of alveolar bone height, alveolar bone mass, alveolar bone density and/or alveolar bone volume fraction and/or the decrease in the distance between the cement-enamel junction and the bone crest, e.g., any percent increase in alveolar bone height, alveolar bone mass or alveolar bone density and/or alveolar bone volume fraction, and/or distance between the cement-enamel junction and the bone crest described herein compared to age and gender-matched patients that do not receive the sclerostin inhibitor, thereby reducing recovery time for a subject. For example, in one embodiment, the sclerostin inhibitor reduces the amount of time required to increase alveolar bone height, alveolar bone mass, alveolar bone density and/or alveolar bone volume fraction and/or the decrease in the distance between the cement-enamel junction and the bone crest at least about 10% (e.g., at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, or at least about 50%) compared to subject not receiving the sclerostin inhibitor.

[0054] Functional, quality of life parameters indicative of enhanced alveolar bone include, but are not limited to, decreased risk of tooth loss; decreased bleeding of the gums, reduced depth of the periodontal pocket, increased level of gingival tissue attachment, improved pronunciation; improved sense of taste; increased ability to eat certain foods; decreased tension; improved diet and decreased irritability. Administration of one or more doses of a sclerostin inhibitor, as described herein, accelerates improvement of functional, quality of life parameters associated with alveolar bone loss in a statistically significant manner in the patient population tested.

[0055] In some embodiments, one or more doses of a sclerostin inhibitor, such as a sclerostin binding agent (e.g., an anti-sclerostin antibody or antibody fragment) is administered to a human over the course of a treatment period comprising 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31 weeks, 8 months, 9 months, 10 months, 11 months, 1 year, 18 months or longer. A "treatment period" begins upon administration of a first dose of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) and ends upon administration of a final dose of sclerostin inhibitor. Any number of administrations of sclerostin inhibitor during a treatment period is contemplated. For example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 doses or administrations of the sclerostin inhibitor is provided to the subject over the treatment period. In one embodiment, the treatment period comprises at least 6 weeks. In

some embodiments, the treatment period lasts at least 28 weeks. In other embodiments, the treatment period lasts at least 1 year. Alternatively or in addition, the treatment period lasts no more than 18 months. Indeed, one or more administrations of a pharmaceutical composition comprising the sclerostin inhibitor may be carried out over a treatment or therapeutic period lasting no more than 18 months, less than 1 year, no more than 8 months, no more than 28 weeks, or no more than 20 weeks. In one embodiment, the treatment period is about 28 weeks and yields significant improvement in alveolar bone parameters, such as (but not limited to) alveolar bone height, alveolar bone mass, alveolar bone volume fraction and alveolar bone density compared to untreated subjects with alveolar bone loss.

[0056] The sclerostin binding agent (e.g., anti-sclerostin antibody or antibody fragment) is administered in an amount that promotes, enhances, or accelerates repair of the alveolar bone. In any embodiment, the sclerostin inhibitor may be administered to a subject (e.g., a human subject) in an amount from about 5 milligrams to about 1,000 milligrams of sclerostin inhibitor per week. For example, the amount of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) can comprise at least about 5 mg, 15 mg, 25 mg, 50 mg, about 60 mg, about 70 mg, about 80 mg, about 90 mg, about 100 mg, about 120 mg, about 140 mg, about 150 mg, about 170 mg, about 180 mg, about 200 mg, about 210 mg, about 240 mg, about 250 mg, about 270 mg, about 280 mg, about 300 mg, about 350 mg, about 400 mg, about 420 mg, about 450 mg, about 500 mg, about 550 mg, about 600 mg, about 650 mg, about 700 mg, about 750 mg, about 800 mg, about 850 mg, about 900 mg, about 950 mg or up to about 1,000 mg of sclerostin inhibitor. Ranges between any and all of these endpoints are also contemplated, e.g. about 50 mg to about 80 mg, about 70 mg to about 140 mg, about 70 mg to about 210 mg, about 75 mg to about 100 mg, about 100 mg to about 150 mg, about 120 mg to about 270 mg, about 140 mg to about 210 mg, or about 150 mg to about 200 mg, or about 280 to about 410 mg. A dose is administered at any interval, such as multiple times a week (e.g., twice or three times per week), once a week, once every two weeks, once every three weeks, or once every four weeks. In some or any embodiments, a dose of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) ranging from about 120 mg to about 210 mg is administered twice a week. In some or any embodiments, a dose of about 140 mg of the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered twice a week. In some or any embodiments, the treatment period is 12 weeks and the sclerostin is administered on week 2, week 6 and week 12 of the treatment period, optionally at a dose of about 140 mg. Any of the doses described herein may be administered as divided doses. For example, a dose of 140 mg of sclerostin inhibitor may be administered

as two injections of 70 mg of sclerostin inhibitor or seven injections of 20 mg of sclerostin inhibitor during a dentist visit.

[0057] In some embodiments, the dose of sclerostin binding agent administered to a subject (e.g., a mammal, such as a human) may range from about 0.1 mg/kg to about 100 mg/kg, or about 10 mg/kg to about 50 mg/kg of body weight. For example, the dose of sclerostin inhibitor (e.g., sclerostin binding agent) may range from about 0.1 mg/kg, about 0.5 mg/kg, about 1 mg/kg, about 2 mg/kg , about 3 mg/kg, about 4 mg/kg about 5 mg/kg, about 6 mg/kg , about 7 mg/kg , about 8 mg/kg , about 9 mg/kg, about 10 mg/kg, about 20 mg/kg, about 25 mg/kg, about 26 mg/kg, about 27 mg/kg, about 28 mg/kg, about 29 mg/kg, about 30 mg/kg, about 31 mg/kg, about 32 mg/kg, about 33 mg/kg, about 34 mg/kg, about 35 mg/kg, about 36 mg/kg, about 37 mg/kg, about 38 mg/kg, about 39 mg/kg, about 40 mg/kg, about 41 mg/kg, about 42 mg/kg, about 43 mg/kg, about 44 mg/kg, about 45 mg/kg, about 46 mg/kg, about 47 mg/kg, about 48 mg/kg, about 49 mg/kg, or about 50 mg/kg, about 55 mg/kg, about 60 mg/kg, about 65 mg/kg, about 70 mg/kg, about 75 mg/kg, about 80 mg/kg, about 85 mg/kg, about 90 mg/kg, or about 95 mg/kg, up to about 100 mg/kg of body weight.

[0058] In addition, it may be advantageous to administer multiple doses of a sclerostin binding agent or space out the administration of doses, depending on the therapeutic regimen selected for a particular patient. For example, a dose of sclerostin inhibitor can be administered once every four weeks, once every three weeks, once every two weeks, once a week, or multiple times a week (e.g., twice a week, three times a week, four times a week, or more), depending on the severity of the disease state, the age and physical health of the patient, and the like.

[0059] In some embodiments, the subject optionally suffers from a bone-related disorder selected from the group consisting of advanced periodontal disease, achondroplasia, postmenopausal bone loss, oral bone loss, osteonecrosis of the jaw, and jaw bone loss associated with aging. Optionally, the subject is undergoing or has undergone oral or maxillofacial surgery.

[0060] In some embodiments, the subject optionally suffers from a secondary condition selected from the group consisting of juvenile Paget's disease, melorheostosis, metabolic bone diseases, mastocytosis, sickle cell anemia/disease, organ transplant related bone loss, kidney transplant related bone loss, systemic lupus erythematosus, ankylosing spondylitis, epilepsy, juvenile arthritides, thalassemia, mucopolysaccharidoses, Fabry Disease, Turner Syndrome, Down Syndrome, Klinefelter Syndrome, leprosy, Perthe's Disease, adolescent

idiopathic scoliosis, infantile onset multi-system inflammatory disease, Winchester Syndrome, Menkes Disease, Wilson's Disease, ischemic bone disease (such as Legg-Calve-Perthes disease and regional migratory osteoporosis), anemic states, conditions caused by steroids, glucocorticoid-induced bone loss, heparin-induced bone loss, bone marrow disorders, scurvy, malnutrition, calcium deficiency, osteoporosis, osteopenia, alcoholism, chronic liver disease, postmenopausal state, chronic inflammatory conditions, rheumatoid arthritis, inflammatory bowel disease, ulcerative colitis, inflammatory colitis, Crohn's disease, oligomenorrhea, amenorrhea, pregnancy, diabetes mellitus, hyperthyroidism, thyroid disorders, parathyroid disorders, Cushing's disease, acromegaly, hypogonadism, immobilization or disuse, reflex sympathetic dystrophy syndrome, regional osteoporosis, osteomalacia, bone loss associated with joint replacement, HIV associated bone loss, bone loss associated with loss of growth hormone, bone loss associated with cystic fibrosis, chemotherapy-associated bone loss, tumor-induced bone loss, cancer-related bone loss, hormone ablative bone loss, multiple myeloma, drug-induced bone loss, anorexia nervosa, disease-associated facial bone loss, disease-associated cranial bone loss, disease-associated bone loss of the jaw, disease-associated bone loss of the skull, bone loss associated with aging, facial bone loss associated with aging, cranial bone loss associated with aging, cleidocranial dysostosis, enchondromatosis, fibrous dysplasia, Gaucher's Disease, hypophosphatemic rickets, Marfan's syndrome, multiple hereditary exotoses, neurofibromatosis, osteogenesis imperfecta, osteopetrosis, osteopoikilosis, sclerotic lesions, pseudoarthrosis, pyogenic osteomyelitis, periodontal disease, anti-epileptic drug induced bone loss, primary and secondary hyperparathyroidism, familial hyperparathyroidism syndromes, weightlessness induced bone loss, osteoporosis in men, osteoarthritis, renal osteodystrophy, infiltrative disorders of bone, skull bone loss associated with aging and bone loss associated with space travel.

[0061] In some embodiments, the subject is optionally suffering from (or has suffered from) a cancer. The term "cancer" refers to a proliferative disorder associated with uncontrolled cell proliferation, unrestrained cell growth, and decreased cell death/apoptosis. Cancer includes, but is not limited to, breast cancer, prostate cancer, lung cancer, kidney cancer, thyroid cancer, melanoma, follicular lymphomas, carcinomas with p53 mutations, and hormone-dependent tumors, including, but not limited to, colon cancer, cardiac tumors, pancreatic cancer, retinoblastoma, glioblastoma, intestinal cancer, testicular cancer, stomach cancer, neuroblastoma, myxoma, myoma, lymphoma, endothelioma, osteoblastoma, osteoclastoma, osteosarcoma, chondrosarcoma, adenoma, Kaposi's sarcoma, ovarian cancer,

leukemia (including acute leukemias (for example, acute lymphocytic leukemia, acute myelocytic leukemia, including myeloblastic, promyelocytic, myelomonocytic, monocytic, and erythroleukemia)) and chronic leukemias (for example, chronic myelocytic (granulocytic) leukemia and chronic lymphocytic leukemia), myelodysplastic syndrome polycythemia vera, lymphomas (for example, Hodgkin's disease and non-Hodgkin's disease), multiple myeloma, Waldenstrom's macroglobulinemia, heavy chain diseases, and solid tumors including, but not limited to, sarcomas and carcinomas such as fibrosarcoma, myxosarcoma, liposarcoma, osteogenic sarcoma, chordoma, angiosarcoma, endotheliosarcoma, lymphangiosarcoma, lymphangioendotheliosarcoma, synovioma, mesothelioma, Ewing's tumor, leiomyosarcoma, rhabdomyosarcoma, squamous cell carcinoma, basal cell carcinoma, adenocarcinoma, sweat gland carcinoma, sebaceous gland carcinoma, papillary carcinoma, papillary adenocarcinomas, cystadenocarcinoma, medullary carcinoma, bronchogenic carcinoma, renal cell carcinoma, hepatoma, bile duct carcinoma, choriocarcinoma, seminoma, embryonal carcinoma, Wilm's tumor, cervical cancer, small cell lung carcinoma, bladder carcinoma, epithelial carcinoma, glioma, astrocytoma, medulloblastoma, craniopharyngioma, ependymoma, pinealoma, hemangioblastoma, acoustic neuroma, oligodendroglioma, and menangioma. The terms "metastasis" and "cancer metastasis" are used interchangeably herein to refer to the ability of a cancer cell to spread to other tissues. For example, "metastasis to bone" refers to the ability of certain types of cancer including, but not limited to, breast, prostate, lung, kidney, thyroid, and melanoma, to metastasize to bone.

[0062] The methods described herein are also applicable to other forms of periodontal disease including periodontal disease associated with systemic disorders such as cardiovascular disease, stroke, pulmonary disease, inflammatory diseases and systemic lupus erythematosus; periodontal disease associated with metabolic disorders such as diabetes mellitus, and periodontal disease associated with hormonal alterations associated with, for example, menopause. Use of certain drugs such as anticonvulsants, calcium channel blockers, and cyclosporine, may also elevate the risk of gingival hyperplasia or periodontal disease, as does certain hematologic disorders including immune system disorders caused by, for example, HIV. The treatment of subjects suffering from or at risk of suffering from the aforementioned disorders with a sclerostin inhibitor described herein is specifically contemplated.

[0063] In some embodiments, the subject optionally suffers from an osteolytic disorder. The term "osteolytic disorder" as used herein refers to any condition that is caused by an

increase in the activity of osteoclasts, which are cells responsible for bone resorption. The terms "osteolysis" and "osteolytic bone loss" are used interchangeably to refer to osteoclast-mediated bone resorption or bone loss associated with an osteolytic disorder. Osteolytic disorders occur in subjects with a predisposition to develop an osteolytic disorder, or they occur in subjects with a disease that leads to or contributes to an osteolytic disorder by stimulating osteoclast activity. In some embodiments, the osteolytic disorder is osteolytic bone loss. In other embodiments, the osteolytic disorder is cancer metastasis-induced osteolytic bone loss. In further embodiments, the osteolytic bone disorder is a metabolic bone disease, including but not limited to, endocrinopathies (e.g., hypercortisolism, hypogonadism, primary or secondary hyperparathyroidism, and hyperthyroidism); dietary deficiency, including but not limited to, rickets, osteomalacia, scurvy, and malnutrition; osteoporosis; drug use, including glucocorticoids (glucocorticoid-induced osteoperosis), heparin, and alcohol; chronic disease, including malabsorption syndromes; chronic renal failure, including renal osteodystrophy; chronic liver disease, including hepatic osteodystrophy; inherited disease, including osteogenesis imperfecta and homocystinuria; and bone inflammation associated with arthritis, rheumatoid arthritis, psoriatic arthritis, fibrous dysplasia, periodontal disease, and Paget's disease.

[0064] The terms "metastasis-induced osteolytic bone loss," and "cancer metastasis-induced osteolytic bone loss," are used interchangeably herein to refer to osteolysis or osteolytic bone loss resulting from cancer cell metastasis to bone. The term "cancer metastasis-induced osteoclast activation" is used herein to refer to the ability of cancer cells that have metastasized to bone to induce the activation of osteoclasts.

[0065] The methods described herein comprise administering an amount of a "sclerostin inhibitor." As used herein, the term "sclerostin inhibitor" means any molecule that inhibits the biological activity of sclerostin on bone, as measured by changes to bone mineralization, bone density, bone height, effect on osteoblasts and/or osteoclasts, markers of bone formation, markers of bone resorption, markers of osteoblast activity, and/or markers of osteoclast activity. Such inhibitors may act by binding to sclerostin or its receptor or binding partner. Inhibitors in this category include "sclerostin binding agents," such as, e.g., antibodies or peptide-based molecules. "Sclerostin inhibitors" also refers to small organic chemical compounds, optionally of less than about 1000 Daltons in molecular weight that bind sclerostin and inhibit its activity. Inhibitors may alternatively act by inhibiting expression of sclerostin. Inhibitors in this category include polynucleotides or oligonucleotides that bind to sclerostin DNA or mRNA and inhibit sclerostin expression,

including, but not limited to, an antisense oligonucleotide, inhibitory RNA, DNA enzyme (deoxyribozyme), ribozyme, an aptamer or pharmaceutically acceptable salts thereof that inhibit the expression of sclerostin.

[0066] A "sclerostin binding agent" binds to sclerostin or portions thereof to block or impair binding of human sclerostin to one or more ligands. Sclerostin, the product of the SOST gene, is absent in sclerosteosis, a skeletal disease characterized by bone overgrowth and strong dense bones (Brunkow et al., *Am. J. Hum. Genet.*, *68*:577-589 (2001); Balemans et al., *Hum. Mol. Genet.*, *10*:537-543 (2001)). The amino acid sequence of human sclerostin is reported by Brunkow et al. and is disclosed in U.S. Patent Publication No. 20070110747 as SEQ ID NO: 1 (which patent publication is incorporated in its entirety for its description of sclerostin binding agents and Sequence Listing). Recombinant human sclerostin/SOST is commercially available from R&D Systems (Minneapolis, Minn., USA; 2006 Catalog #1406-ST-025). Additionally, recombinant mouse sclerostin/SOST is commercially available from R&D Systems (Minneapolis, Minn., USA; 2006 Catalog #1589-ST-025). Research grade sclerostin-binding monoclonal antibodies are commercially available from R&D Systems (Minneapolis, Minn., USA; mouse monoclonal: 2006 Catalog # MAB1406; rat monoclonal: 2006 Catalog # MAB1589). U.S. Patent Nos. 6,395,511 and 6,803,453, and U.S. Patent Publication Nos. 20040009535 and 20050106683 refer to anti-sclerostin antibodies generally. Examples of sclerostin binding agents suitable for use in the context of the invention also are described in U.S. Patent Publication Nos. 20070110747 and 20070072797, which are hereby incorporated by reference. Additional information regarding materials and methods for generating sclerostin binding agents can be found in U.S. Patent Publication No. 20040158045 (hereby incorporated by reference).

[0067] The sclerostin binding agent of the invention preferably is an antibody. The term "antibody" refers to an intact antibody, or a binding fragment thereof. An antibody may comprise a complete antibody (immunoglobulin) molecule (including polyclonal, monoclonal, chimeric, humanized, and/or human versions having full length heavy and/or light chains), or comprise an antigen binding fragment thereof. Antibody fragments include $F(ab')_2$, Fab, Fab', Fv, Fc, and Fd fragments, and can be incorporated into single domain antibodies (e.g., nanobodies), single-chain antibodies, maxibodies, minibodies, intrabodies, diabodies, triabodies, tetrabodies, v-NAR and bis-scFv (see, e.g., Hollinger and Hudson, *Nature Biotechnology*, *23*(9):1126-1136 (2005)). Antibody polypeptides, including fibronectin polypeptide monobodies, also are disclosed in U.S. Patent No. 6,703,199. Other antibody polypeptides are disclosed in U.S. Patent Publication No. 20050238646. U.S.

Patent Nos. 6,395,511 and 6,803,453, and U.S. Patent Publication Nos. 20040009535 and 20050106683 (incorporated in their entirety by reference for their disclosure of anti-sclerostin antibodies) refer to anti-sclerostin antibodies generally. The amino acid sequence of human sclerostin is set forth in SEQ ID NO: 1 of the Sequence Listing and is provided as SEQ ID NO: 1 of U.S. Patent Publication No. 20070110747 (which patent publication is incorporated in its entirety for its description of sclerostin and sclerostin binding agents and Sequence Listing). Additional information regarding materials and methods for generating anti-sclerostin antibodies can be found in U.S. Patent Publication No. 20040158045 (hereby incorporated by reference in its entirety).

[0068] An antibody fragment may be a synthetic or genetically engineered protein. For example, antibody fragments include isolated fragments consisting of the light chain variable region, "Fv" fragments consisting of the variable regions of the heavy and light chains, and recombinant single chain polypeptide molecules in which light and heavy variable regions are connected by a peptide linker (scFv proteins).

[0069] Another form of an antibody fragment is a peptide comprising one or more complementarity determining regions (CDRs) of an antibody. CDRs (also termed "minimal recognition units" or "hypervariable region") are obtained by, e.g., constructing polynucleotides that encode the CDR of interest. Such polynucleotides are prepared, for example, by using the polymerase chain reaction to synthesize the variable region using mRNA of antibody-producing cells as a template (see, for example, Larrick et al., *Methods: A Companion to Methods in Enzymology,* 2:106 (1991); Courtenay-Luck, "Genetic Manipulation of Monoclonal Antibodies," in *Monoclonal Antibodies Production, Engineering and Clinical Application*, Ritter et al. (eds.), page 166, Cambridge University Press (1995); and Ward et al., "Genetic Manipulation and Expression of Antibodies," in *Monoclonal Antibodies: Principles and Applications*, Birch et al., (eds.), page 137, Wiley-Liss, Inc. (1995)).

[0070] Anti-sclerostin antibodies may bind to sclerostin of SEQ ID NO: 1, or a naturally occurring variant thereof, with an affinity (Kd) of less than or equal to 1×10^{-7} M, less than or equal to 1×10^{-8} M, less than or equal to 1×10^{-9} M, less than or equal to 1×10^{-10} M, less than or equal to 1×10^{-11} M, or less than or equal to 1×10^{-12} M. Affinity is determined using a variety of techniques, an example of which is an affinity ELISA assay. In various embodiments, affinity is determined by a BIAcore assay. In various embodiments, affinity is determined by a kinetic method. In various embodiments, affinity is determined by an equilibrium/solution method. U.S. Patent Publication No. 20070110747 contains additional

description of affinity assays suitable for determining the affinity (Kd) of an antibody for sclerostin.

[0071] In some or any embodiments, the anti-sclerostin antibody or antibody fragment binds to a sclerostin polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 1 and binds the sequence of SEQ ID NO: 6 (CGPARLLPNAIGRGKWWRPSGPDFRC; corresponding to amino acids 86-111 of SEQ ID NO: 1). Alternatively or in addition, the anti-sclerostin antibody binds to a sclerostin polypeptide comprising amino acids 57-146 of SEQ ID NO: 1. Alternatively or in addition, the anti-sclerostin antibody binds to a sclerostin polypeptide comprising amino acids 89-103 of SEQ ID NO: 1 and/or amino acids 137-151 of SEQ ID NO: 1. Alternatively or in addition, the anti-sclerostin antibody binds to a sclerostin polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 1 and binds the sequence of at least one of SEQ ID NO: 2 (DVSEYSCRELHFTR; corresponding to amino acids 51-64 of SEQ ID NO: 1), SEQ ID NO: 3 (SAKPVTELVCSGQCGPAR; corresponding to amino acids 73-90 of SEQ ID NO: 1), SEQ ID NO: 4 (WWRPSGPDFRCIPDRYR; corresponding to amino acids 101-117 of SEQ ID NO: 1), SEQ ID NO: 5 (LVASCKCKRLTR; corresponding to amino acids 138-149 of SEQ ID NO: 1), SEQ ID NO: 70 (SAKPVTELVCSGQC; corresponding to amino acids 73-86 of SEQ ID NO: 1), SEQ ID NO: 71 (LVASCKC; corresponding to amino acids 138-144 of SEQ ID NO: 1), SEQ ID NO: 72 (C1RELHFTR; corresponding to amino acids 57-64 of SEQ ID NO: 1), or SEQ ID NO: 73 (CIPDRYR; corresponding to amino acids 111-117 of SEQ ID NO: 1) within SEQ ID NO: 1. For example, in one aspect, the anti-sclerostin antibody binds a subregion of sclerostin of SEQ ID NO: 1 comprising SEQ ID NOs: 2-5 (and/or SEQ ID NOs: 70-73), optionally in its native three-dimensional conformation. Optionally, the anti-sclerostin antibody binds a peptide consisting of one or more of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 70, SEQ ID NO: 71, SEQ ID NO: 72, or SEQ ID NO: 73 (e.g., a peptide consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, and SEQ ID NO: 5 or a peptide consisting of SEQ ID NO: 70, SEQ ID NO: 71, SEQ ID NO: 72, and SEQ ID NO: 73).

[0072] In some or any embodiments, the anti-sclerostin antibody binds to a sclerostin polypeptide having the amino acid sequences of SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5, wherein SEQ ID NO:2 and 4 are joined by a disulfide bond at amino acid positions 57 and 111 with reference to SEQ ID NO:1, and SEQ ID NO:3 and 5 are joined by at least one of (a) a disulfide bond at amino acid positions 82 and 142 with reference to SEQ ID NO:1, and (b) a disulfide bond at amino acid positions 86 and 144 with reference to SEQ

ID NO:1; the polypeptide may retain the tertiary structure of the corresponding polypeptide region of human sclerostin of SEQ ID NO:1. Alternatively or in addition, the sclerostin binding agent (e.g., anti-sclerostin antibody) binds a polypeptide having the amino acid sequences of SEQ ID NO: 70, SEQ ID NO: 71, SEQ ID NO: 72 and SEQ ID NO: 73, wherein SEQ ID NO: 72 and 73 are joined by a disulfide bond at amino acid positions 57 and 111 with reference to SEQ ID NO: 1, and SEQ ID NO: 70 and 71 are joined by at least one of (a) a disulfide bond at amino acid positions 82 and 142 with reference to SEQ ID NO: 1, and (b) a disulfide bond at amino acid positions 86 and 144 with reference to SEQ ID NO: 1.

[0073] Optionally, the anti-sclerostin antibody binds a peptide consisting essentially of the amino acid sequences of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4 and SEQ ID NO: 5, wherein SEQ ID NO: 2 and 4 are joined by a disulfide bond at amino acid positions 57 and 111 with reference to SEQ ID NO: 1, and SEQ ID NO: 3 and 5 are joined by at least one of (a) a disulfide bond at amino acid positions 82 and 142 with reference to SEQ ID NO: 1, and (b) a disulfide bond at amino acid positions 86 and 144 with reference to SEQ ID NO: 1.

[0074] Optionally, the anti-sclerostin antibody binds to a polypeptide consisting essentially of a multiply truncated human sclerostin protein of SEQ ID NO: 1, wherein (a) amino acids 1-50, 65-72, 91-100, 118-137, and 150-190 of SEQ ID NO: 1 are absent from said polypeptide or (b) amino acids 1-56, 65-72, 87-110, 118-137, and 145-190 of SEQ ID NO: 1 are absent from said polypeptide.

[0075] In some or any embodiments, the anti-sclerostin antibody binds to a polypeptide having the amino acid sequences of SEQ ID NO: 70, SEQ ID NO: 71, SEQ ID NO: 72 and SEQ ID NO: 73, wherein SEQ ID NO: 72 and 73 are joined by a disulfide bond at amino acid positions 57 and 111 with reference to SEQ ID NO: 1, and SEQ ID NO: 70 and 71 are joined by at least one of (a) a disulfide bond at amino acid positions 82 and 142 with reference to SEQ ID NO: 1, and (b) a disulfide bond at amino acid positions 86 and 144 with reference to SEQ ID NO: 1.

[0076] In some or any embodiments, the polypeptide retains the tertiary structure of the corresponding polypeptide region of human sclerostin of SEQ ID NO: 1.

[0077] In some or any embodiments, the anti-sclerostin antibody that binds to

(i) a portion of human sclerostin comprising amino acids 51-64, 73-90, 101-117, and 138-149 of SEQ ID NO: 1, wherein said portion has at least one, at least two or all three of:

(a) a disulfide bond between amino acids 57 and 111;

(b) a disulfide bond between amino acids 82 and 142; and

(c) a disulfide bond between amino acids 86 and 144;

or

(ii) a portion of human sclerostin comprising amino acids 57-64, 73-86, 111-117, and 138-144 of SEQ ID NO: 1, wherein said portion has at least one, at least two, or all three of:

(a) a disulfide bond between amino acids 57 and 111;

(b) a disulfide bond between amino acids 82 and 142; and

(c) a disulfide bond between amino acids 86 and 144.

[0078] In some or any embodiments, the anti-sclerostin antibody also binds to an epitope of SEQ ID NO: 6.

[0079] Anti-sclerostin antibodies for use in the methods described herein preferably modulate sclerostin function in the cell-based assay described in U.S. Patent Publication No. 2007/0110747 and/or the *in vivo* assay described in U.S. Patent Publication No. 20070110747 and/or bind to one or more of the epitopes described in U.S. Patent Publication No. 2007/0110747 and/or cross-block the binding of one of the antibodies described in U.S. Patent Publication No. 2007/0110747 and/or are cross-blocked from binding sclerostin by one of the antibodies described in U.S. Patent Publication No. 2007/0110747 (incorporated by reference in its entirety and for its description of assays for characterizing an anti-sclerostin antibody).

[0080] In various aspects, the anti-sclerostin antibody is capable of neutralizing human sclerostin in a MC3T3 cell-based mineralization assay when there is less than a 6-fold excess of moles of sclerostin binding sites per well as compared to the number of moles of sclerostin per well. Mineralization by osteoblast-lineage cells in culture, either primary cells or cell lines, is used as an *in vitro* model of bone formation. An exemplary cell-based mineralization assay is described in U.S. Patent Publication No. 20070110747 at, e.g., Example 8 (hereby incorporated by reference). MC3T3-E1 cells (Sudo et al., *J. Cell Biol.*, *96*:191-198 (1983)) and subclones of the original cell line can form mineral in culture upon growth in the presence of differentiating agents. Such subclones include MC3T3-E1-BF (Smith et al., *J. Biol. Chem.*, *275*:19992-20001 (2000)). For both the MC3T3-E1-BF subclone as well as the original MC3T3-E1 cells, sclerostin can inhibit one or more of the sequence of events leading up to and including mineral deposition (i.e., sclerostin inhibits mineralization). Anti-sclerostin antibodies that are able to neutralize sclerostin's inhibitory activity allow for mineralization of the culture in the presence of sclerostin such that there is a statistically significant increase in, e.g., deposition of calcium phosphate (measured as calcium) as

compared to the amount of calcium measured in the sclerostin-only (i.e., no antibody) treatment group.

[0081] When running the assay with the goal of determining whether a particular anti-sclerostin antibody (or other sclerostin inhibitor) can neutralize sclerostin, the amount of sclerostin used in the assay desirably is the minimum amount of sclerostin that causes at least a 70%, statistically significant, reduction in deposition of calcium phosphate (measured as calcium) in the sclerostin-only group, as compared to the amount of calcium measured in the no sclerostin group. An anti-sclerostin neutralizing antibody is defined as one that causes a statistically significant increase in deposition of calcium phosphate (measured as calcium) as compared to the amount of calcium measured in the sclerostin-only (i.e., no antibody) treatment group. To determine whether an anti-sclerostin antibody is neutralizing or not, the amount of anti-sclerostin antibody used in the assay needs to be such that there is an excess of moles of sclerostin binding sites per well as compared to the number of moles of sclerostin per well. Depending on the potency of the antibody, the fold excess that may be required can be 24, 18, 12, 6, 3, or 1.5, and one of skill is familiar with the routine practice of testing more than one concentration of binding agent (antibody). For example, a very potent anti-sclerostin neutralizing antibody will neutralize sclerostin when there is less than a 6-fold excess of moles of sclerostin binding sites per well as compared to the number of moles of sclerostin per well. A less potent anti-sclerostin neutralizing antibody will neutralize sclerostin only at a 12, 18 or 24 fold excess.

[0082] The anti-sclerostin antibody optionally has an IC_{50} of 100 nM or less, or 75 nM or less, or 50 nM or less, or 25 nM or less for neutralizing human sclerostin in a cell-based assay, such as a bone specific alkaline phosphatase assay, e.g., the bone specific alkaline phosphatase assay described in International Patent Publication No. WO 2008/115732 and U.S. Patent No. 7,744,874 (incorporated herein by reference in its entirety for its description of cell-based assays and anti-sclerostin antibodies). The bone specific alkaline phosphatase assay is predicated on the ability of sclerostin to decrease BMP-4 and Wnt3a-stimulated alkaline phosphatase levels in the multipotential murine cell line, C2C12. According to WO 2008/115732, a neutralizing anti-sclerostin antibody mediates a dose-dependent increase of alkaline phosphatase activity in this assay. Exemplary protocols of the cell-based assays are provided in Example 1.

[0083] Alternatively or in addition, the anti-sclerostin antibody has an IC_{50} of 100 nM or less (e.g., 75 nM or less, or 50 nM or less) for neutralizing human sclerostin in a cell-based Wnt signaling assay in HEK293 cell lines, such as the Wnt assay involving Wnt1-mediated

induction of STF reporter gene described in e.g., International Patent Publication No. WO 2009/047356 (incorporated by reference for its discussion of anti-sclerostin antibodies and cell-based assays). Alternatively or in addition, the anti-sclerostin antibody has an IC_{50} of 500 nM or less (e.g., 250 nM or less, 150 nM or less, 100 nM or less, or 50 nM or less) for neutralizing human sclerostin in a BMP2-induced mineralization assay in MC3T3 cells, such as the mineralization assay described in e.g., International Patent Publication No. WO 2009/047356. An exemplary protocol is provided in Example 1.

[0084] Examples of anti-sclerostin antibodies suitable for use in the context of the invention are described in U.S. Patent Publication Nos. 2007/0110747 and 2007/0072797, which are hereby incorporated by reference. In one embodiment of the invention, the anti-sclerostin antibody cross-blocks the binding of at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24 (all of which are described in U.S. Patent Publication No. 20070110747) to sclerostin. Alternatively or in addition, the anti-sclerostin antibody is cross-blocked from binding to sclerostin by at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24 (all of which are described in U.S. Patent Publication No. 20070110747). The terms "cross-block," "cross-blocked," and "cross-blocking" are used interchangeably herein to mean the ability of an antibody to interfere with the binding of other antibodies to sclerostin. The extent to which an antibody is able to interfere with the binding of another to sclerostin, and therefore whether it can be said to cross-block, can be determined using competition binding assays. In some aspects of the invention, a cross-blocking antibody or fragment thereof reduces sclerostin binding of a reference antibody between about 40% and about 100%, such as about 60% and about 100%, specifically between 70% and 100%, and more specifically between 80% and 100%. A particularly suitable quantitative assay for detecting cross-blocking uses a Biacore machine which measures the extent of interactions using surface plasmon resonance technology. Another suitable quantitative cross-blocking assay uses an ELISA-based approach to measure competition between antibodies in terms of their binding to sclerostin.

[0085] In some or any embodiments, the anti-sclerostin antibody cross-blocks the binding of an immunoglobulin comprising full length heavy and light chains to sclerostin of SEQ ID NO: 1 and/or is cross-blocked from binding to sclerostin of SEQ ID NO: 1 by an immunoglobulin comprising full length heavy and light chains, wherein the immunoglobulin

comprising full length heavy and light chains comprise CDR sequences disclosed herein, such as one of the following three sets of CDR sequences: a) CDR-L1 of SEQ ID NO: 284, CDR-L2 of SEQ ID NO: 285, CDR-L3 of SEQ ID NO: 286, CDR-H1 of SEQ ID NO: 296, CDR-H2 of SEQ ID NO: 297, and CDR-H3 of SEQ ID NO: 298; b) CDR-L1 of SEQ ID NO: 48, CDR-L2 of SEQ ID NO: 49, CDR-L3 of SEQ ID NO: 50, CDR-H1 of SEQ ID NO: 45, CDR-H2 of SEQ ID NO: 46, and CDR-H3 of SEQ ID NO: 47; or c) CDR-L1 of SEQ ID NO: 42, CDR-L2 of SEQ ID NO: 43, CDR-L3 of SEQ ID NO: 44, CDR-H1 of SEQ ID NO: 39, CDR-H2 of SEQ ID NO: 40, and CDR-H3 of SEQ ID NO: 41. Alternatively, or in addition, the anti-sclerostin antibody cross-blocks the binding of immunoglobulin comprising full length heavy and light chains to sclerostin of SEQ ID NO: 1 and/or is cross-blocked from binding to sclerostin of SEQ ID NO: 1 by an immunoglobulin comprising full length heavy and light chains, wherein the immunoglobulin comprising full length heavy and light chains comprise the following CDRs: CDR-H1 of SEQ ID NO: 245, CDR-H2 of SEQ ID NO: 246, CDR-H3 of SEQ ID NO: 247, CDR-L1 of SEQ ID NO: 78, CDR-L2 of SEQ ID NO: 79 and CDR-L3 of SEQ ID NO: 80.

[0086] Alternatively, or in addition, the anti-sclerostin antibody cross-blocks the binding of immunoglobulin comprising full length heavy and light chains to sclerostin of SEQ ID NO: 1 and/or is cross-blocked from binding to sclerostin of SEQ ID NO: 1 by an immunoglobulin comprising full length heavy and light chains, wherein the immunoglobulin comprising full length heavy and light chains comprise the following CDRs: CDR-H1 of SEQ ID NO: 269, CDR-H2 of SEQ ID NO: 270, CDR-H3 of SEQ ID NO: 271, CDR-L1 of SEQ ID NO: 239, CDR-L2 of SEQ ID NO: 240 and CDR-L3 of SEQ ID NO: 241.

[0087] Examples of suitable anti-sclerostin antibodies and fragments thereof include antibodies and antibody fragments having one or more of CDR-H1, CDR-H2, CDR-H3, CDR-L1, CDR-L2 and CDR-L3 specifically disclosed herein and disclosed in U.S. Patent Publication No. 20070110747. At least one of the regions of CDR-H1, CDR-H2, CDR-H3, CDR-L1, CDR-L2, and CDR-L3 may have at least one amino acid substitution, provided that the antibody retains the binding specificity of the non-substituted CDR. Exemplary the anti-sclerostin antibodies include, but are not limited to, Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24 of U.S. Patent Publication No. 20070110747.

[0088] In addition, the anti-sclerostin antibody can comprise at least one CDR sequence having at least 75% identity (e.g., 100% identity) to a CDR selected from SEQ ID NOs: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 78, 79, 80, 81, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 351, 352, 353, 358, 359, and 360 provided in the Sequence Listing and disclosed in U.S. Patent Publication No. 20070110747. Preferably, the anti-sclerostin antibody comprises at least one CDR sequence having at least 75% identity to a CDR selected from SEQ ID NOs: 245, 246, 247, 78, 79, 80, 269, 270, 271, 239, 240, and 241, all of which is provided in the Sequence Listing and described in U.S. Patent Publication No. 20070110747. As described in U.S. Patent Publication No. 20070110747, the anti-sclerostin antibody can comprise: a) CDR sequences of SEQ ID NOs:54, 55, and 56 and CDR sequences of SEQ ID NOs:51, 52, and 53; b) CDR sequences of SEQ ID NOs:60, 61, and 62 and CDR sequences of SEQ ID NOs:57, 58, and 59; c) CDR sequences of SEQ ID NOs:48, 49, and 50 and CDR sequences of SEQ ID NOs:45, 46, and 47; d) CDR sequences of SEQ ID NOs:42, 43, and 44 and CDR sequences of SEQ ID NOs:39, 40, and 41; e) CDR sequences of SEQ ID NOs:275, 276, and 277 and CDR sequences of SEQ ID NOs:287, 288, and 289; f) CDR sequences of SEQ ID NOs:278, 279, and 280 and CDR sequences of SEQ ID NOs:290, 291, and 292; g) CDR sequences of SEQ ID NOs:78, 79, and 80 and CDR sequences of SEQ ID NOs: 245, 246, and 247; h) CDR sequences of SEQ ID NOs:81, 99, and 100 and CDR sequences of SEQ ID NOs:248, 249, and 250; i) CDR sequences of SEQ ID NOs:101, 102, and 103 and CDR sequences of SEQ ID NOs:251, 252, and 253; j) CDR sequences of SEQ ID NOs:104, 105, and 106 and CDR sequences of SEQ ID NOs:254, 255, and 256; k) CDR sequences of SEQ ID NOs:107, 108, and 109 and CDR sequences of SEQ ID NOs:257, 258, and 259; l) CDR sequences of SEQ ID NOs:110, 111, and 112 and CDR sequences of SEQ ID NOs:260, 261, and 262; m) CDR sequences of SEQ ID NOs:281, 282, and 283 and CDR sequences of SEQ ID NOs:293, 294, and 295; n) CDR sequences of SEQ ID NOs:113, 114, and 115 and CDR sequences of SEQ ID NOs:263, 264, and 265; o) CDR sequences of SEQ ID NOs:284, 285, and 286 and CDR sequences of SEQ ID NOs:296, 297, and 298; p) CDR sequences of SEQ ID NOs:116, 237, and 238 and CDR sequences of SEQ ID NOs:266, 267, and 268; q) CDR sequences of SEQ ID NOs:239, 240, and 241 and CDR sequences of SEQ ID NOs:269, 270, and 271) CDR sequences of SEQ ID NOs:242, 243, and

244 and CDR sequences of SEQ ID NOs:272, 273, and 274; or s) CDR sequences of SEQ ID NOs:351, 352, and 353 and CDR sequences of SEQ ID NOs:358, 359, and 360.

[0089] The anti-sclerostin antibody can comprise at least one CDR sequence having at least 75% identity (e.g., 100% identical) to a CDR selected from CDR-H1, CDR-H2, CDR-H3, CDR-L1, CDR-L2, and CDR-L3 wherein CDR-H1 has the sequence given in SEQ ID NO: 245, CDR-H2 has the sequence given in SEQ ID NO: 246, CDR-H3 has the sequence given in SEQ ID NO: 247, CDR-L1 has the sequence given in SEQ ID NO: 78, CDR-L2 has the sequence given in SEQ ID NO: 79 and CDR-L3 has the sequence given in SEQ ID NO: 80, all of which is provided in the Sequence Listing and described in U.S. Patent Publication No. 20070110747. The anti-sclerostin antibody, in various aspects, comprises two of the CDRs or six of the CDRs. Optionally, the anti-sclerostin antibody comprises all or part of a heavy chain (e.g., two heavy chains) comprising SEQ ID NO: 378 and all or part of a light chain (e.g., two light chains) comprising SEQ ID NO 376.

[0090] The anti-sclerostin antibody can comprise at least one CDR sequence having at least 75% identity (e.g., 100% identical) to a CDR selected from CDR-H1, CDR-H2, CDR-H3, CDR-L1, CDR-L2, and CDR-L3 wherein CDR-H1 has the sequence given in SEQ ID NO: 269, CDR-H2 has the sequence given in SEQ ID NO: 270, CDR-H3 has the sequence given in SEQ ID NO: 271, CDR-L1 has the sequence given in SEQ ID NO: 239, CDR-L2 has the sequence given in SEQ ID NO: 240 and CDR-L3 has the sequence given in SEQ ID NO 241, all of which is provided in the Sequence Listing and described in U.S. Patent Publication No. 20070110747. The anti-sclerostin antibody, in various aspects, comprises at least two of the CDRs or six of the CDRs. Optionally, the anti-sclerostin antibody comprises all or part of a heavy chain (e.g., two heavy chains) comprising SEQ ID NO: 366 and all or part of a light chain (e.g., two light chains) comprising SEQ ID NO 364.

[0091] Alternatively, the anti-sclerostin antibody can have a heavy chain comprising CDR's H1, H2, and H3 and comprising a polypeptide having the sequence provided in SEQ ID NO: 137, 145, or 392 or a variant thereof in which the CDRs are at least 75% identical (e.g., 100% identical) to SEQ ID NO: 245, 246, and 247, respectively, and a light chain comprising CDR's L1, L2 and L3 and comprising a polypeptide having the sequence provided in SEQ ID NO: 133 or 141 or a variant thereof in which the CDRs are at least 75% identical (e.g., 100% identical) to SEQ ID NO: 78, 79, and 80, respectively (as described in U.S. Patent Publication No. 20070110747).

[0092] The anti-sclerostin antibody may have a heavy chain comprising CDR's H1, H2, and H3 and comprising a polypeptide having the sequence provided in SEQ ID NO: 335, 331, 345, or 396 or a variant of any of the foregoing in which the CDRs are at least 75% (e.g., 100% identical) identical to SEQ ID NO: 269, 270, and 271, respectively, and a light chain comprising CDR's L1, L2, and L3 and comprising a polypeptide having the sequence provided in SEQ ID NO: 334 or 341 or a variant of any of the foregoing in which the CDRs are at least 75% identical (e.g., 100% identical) to SEQ ID NO: 239, 240, and 241, respectively (as described in U.S. Patent Publication No. 20070110747). All combinations of the heavy and light chain sequences are contemplated (e.g., heavy chains comprising SEQ ID NO: 335 and light chains comprising SEQ ID NO: 334; heavy chains comprising SEQ ID NO: 331 and light chains comprising SEQ ID NO: 334 or 341; and heavy chains comprising SEQ ID NO: 345 or 396 and light chains comprising SEQ ID NO: 341).

[0093] Alternatively, the anti-sclerostin antibody has a heavy chain comprising a polypeptide having the sequence provided in SEQ ID NO:137, and a light chain comprising a polypeptide having the sequence provided in SEQ ID NO:133; a heavy chain comprising a polypeptide having the sequence provided in SEQ ID NO:145 or 392, and a light chain comprising a polypeptide having the sequence provided in SEQ ID NO: 141; a heavy chain comprising a polypeptide having the sequence provided in SEQ ID NO:335, and a light chain comprising a polypeptide having the sequence provided in SEQ ID NO:334; a heavy chain comprising a polypeptide having the sequence provided in SEQ ID NO:331, and a light chain comprising a polypeptide having the sequence provided in SEQ ID NO:341; or a heavy chain comprising a polypeptide having the sequence provided in SEQ ID NO:345 or 396, and a light chain comprising a polypeptide having the sequence provided in SEQ ID NO:341 (as described in U.S. Patent Publication No. 20070110747).

[0094] Examples of anti-sclerostin antibodies also include, but are not limited to, the anti-sclerostin antibodies disclosed in International Patent Publication Nos. WO 2008/092894, WO 2008/115732, WO 2009/056634, WO 2009/047356, WO 2010/100200, WO 2010/100179, WO 2010/115932, and WO 2010/130830 (each of which is incorporated by reference herein in its entirety), such as an anti-sclerostin antibody comprising CDRs of SEQ ID NOs: 20-25 of International Patent Publication No. WO 2008/115732 (SEQ ID NOs: 416-421 herein), an anti-sclerostin antibody comprising CDRs of SEQ ID NOs: 26-31 of International Patent Publication No. WO 2008/115732 (SEQ ID NOs: 422-427 herein), an anti-sclerostin antibody comprising CDRs of SEQ ID NOs: 32-37 of International Patent Publication No. WO 2008/115732 (SEQ ID NOs: 428-433 herein), an anti-sclerostin

antibody comprising CDRs of SEQ ID NOs: 4, 15, 26, 37, 48, and 59 of International Patent Publication No. WO 2009/047356 (SEQ ID NOs: 443, 454, 465, 476, 487 and 498, respectively, herein), or an anti-sclerostin antibody comprising the amino acid sequence of at least one of SEQ ID NOs: 135-143, 153-161, or 171-179 of International Patent Publication No. WO 2010/130830 (SEQ ID NOs: 745-753, 763-771, 781-789, respectively, herein).

[0095] Alternatively, the methods described herein comprise administering a sclerostin inhibitor other than an anti-sclerostin antibody. Such agents can act directly or indirectly on SOST or sclerostin. Sclerostin inhibitors contemplated for use in the methods described herein include those described in U.S. Patent Publication No. 2003/0229041 (the entire disclosure of which is hereby incorporated by reference, with particular emphasis upon the description of sclerostin inhibitors). For example, agents useful for modulating SOST expression and sclerostin activity include, but are not limited to, steroids (such as those corresponding to Formula 1 of U.S. Patent Publication No. 2003/0229041), alkaloids, terpenoids, peptoids, and synthetic chemicals. In some embodiments, the SOST antagonist or agonist can bind to a glucocorticoid receptor. For example, dexamethasone tends to abolish the stimulatory effect of BMP-4 and BMP-6 on SOST expression. Other chemical entities including glucocorticoid analogs, bile salts (such as those corresponding to Formula 3 of U.S. Patent Publication No. 2003/0229041), and prostaglandins (such as those corresponding to Formula 2 of U.S. Patent Publication No. 2003/0229041) also modulate the effects of bone morphogenetic proteins on SOST expression, and are contemplated for use in the methods described herein.

[0096] Sclerostin expression inhibitors that may be used according to the methods described herein include, but are not limited to, inhibitory nucleic acids, including pharmaceutically acceptable salts thereof, e.g., sodium salts. In some embodiments, the inhibitory nucleic acid as described elsewhere herein is selected from the group consisting of antisense oligonucleotides, ribozymes, external guide sequence (EGS) oligonucleotides, siRNA compounds, single- or double-stranded RNA interference (RNAi) compounds such as siRNA compounds, modified bases/locked nucleic acids (LNAs), antagomirs, peptide nucleic acids (PNAs), and other oligomeric compounds or oligonucleotide mimetics which hybridize to at least a portion of the target nucleic acid and modulate its function. In some embodiments, the inhibitor nucleic acid is single stranded or double stranded. In some embodiments, the inhibitory nucleic acid is an antisense oligonucleotide, modified bases/locked nucleic acids (LNA), peptide nucleic acids (PNA), arabinonucleic acids (ANA) (as described, for example, in PCT Publication No. WO 99/67378); 2'-fluoro-D-

Arabinonucleic acids (FANA) (as described in, for example, Lon et al., *Biochem., 41*:3457-3467, 2002 and Min et al., *Bioorg. Med. Chem. Lett., 12*:2651-2654, 2002; the disclosures of which are incorporated herein by reference in their entireties); phosphorodiamidate morpholino oligomers (PMO) (e.g., as described in Iverson, *Curr. Opin. Mol. Ther., 3*:235-238, 2001; and Wang et al., *J. Gene Med., 12*:354-364, 2010; the disclosures of which are incorporated herein by reference in their entireties); ethylene bridged nucleic acids (as described in, for example, International Patent Publication No. WO 2005/042777, Morita et al., *Nucleic Acid Res., Suppl 1*:241-242, 2001; Surono et al., *Hum. Gene Ther., 15*:749-757, 2004; Koizumi, *Curr. Opin. Mol. Ther., 8*:144-149, 2006 and Horie et al., *Nucleic Acids Symp. Ser (Oxf), 49*:171-172, 2005; the disclosures of which are incorporated herein by reference in their entireties); 2'-O,4'-C-ethylene-bridged nucleic acid, ribozyme, external guide sequence (EGS) oligonucleotides, microRNAs (miRNAs), small, temporal RNAs (stRNAs), and single- or double-stranded RNA interference (RNAi) compounds or siRNA. In some embodiments, the inhibitory nucleic acid comprises at least one nucleotide and/or nucleoside modification (e.g., oligonucleotides with modified backbones or modified sugar moieties).

[0097] Activity of a particular sclerostin inhibitor, e.g., anti-sclerostin antibody or antibody fragment, for use in the methods described herein may be measured in a variety of ways, including the methods described above for detecting increases in bone mineral content or bone density. The ability of a sclerostin inhibitor to modulate bone mass may be calculated from body weights or by using other methods (see Guinness-Hey, *Metab. Bone Dis. Relat. Res.*, *5*:177-181 (1984)). Animals and particular animal models are used in the art for testing the effect of the pharmaceutical compositions and methods on, for example, parameters of bone loss, bone resorption, bone formation, bone strength, or bone mineralization. Examples of such models include the ovariectomized rat model (Kalu, *Bone and Mineral, 15*:175-192 (1991); Frost and Jee, *Bone and Mineral, 18*:227-236 (1992); and Jee and Yao, *J. Musculoskel. Neuron. Interact., 1*:193-207 (2001)). The methods for measuring sclerostin binding agent activity described herein also may be used to determine the efficacy of other sclerostin inhibitors.

[0098] Alternatively, a sclerostin inhibitor can be selected based on its ability to modulate bone marker levels. Bone markers are products created during the bone remodeling process and are released by bone, osteoblasts, and/or osteoclasts. Fluctuations in bone resorption and/or bone formation "marker" levels imply changes in bone remodeling/modeling. The International Osteoporosis Foundation (IOF) recommends using bone markers to monitor

bone density therapies (see, e.g., Delmas et al., *Osteoporos Int.*, Suppl. 6:S2-17 (2000), incorporated herein by reference). Markers indicative of bone resorption (or osteoclast activity) include, for example, C-telopeptide (e.g., C-terminal telopeptide of type 1 collagen (CTX) or serum cross-linked C-telopeptide), N-telopeptide (N-terminal telopeptide of type 1 collagen (NTX)), deoxypyridinoline (DPD), pyridinoline, urinary hydroxyproline, galactosyl hydroxylysine, and tartrate-resistant acid phosphatase (e.g., serum tartrate-resistant acid phosphatase isoform 5b). Bone formation/mineralization markers include, but are not limited to, bone-specific alkaline phosphatase (BSAP), peptides released from N- and C-terminal extension of type I procollagen (P1NP, PICP), and osteocalcin (OstCa). Several kits are commercially-available to detect and quantify markers in clinical samples, such as urine and blood.

[0099] Routes of Administration

[00100] The sclerostin inhibitor is preferably administered to a subject in a physiologically-acceptable (e.g., pharmaceutical) composition, which can include carriers, excipients, or diluents. It will be appreciated that the sclerostin inhibitors (e.g., an anti-sclerostin antibody or antibody fragment) described herein may be used in the preparation of a medicament for administration using any of the dosage and timing regimens disclosed herein. Pharmaceutical compositions and methods of treatment are disclosed in U.S. Patent Publication No. 20050106683 and 2007/110747, which are incorporated by reference herein. "Physiologically-acceptable" refers to molecular entities and compositions that do not produce an allergic or similar untoward reaction when administered to a human. In addition, the composition administered to a subject may contain more than one sclerostin inhibitor (e.g., two anti-sclerostin antibodies, or a sclerostin binding agent and a synthetic chemical sclerostin inhibitor) or a sclerostin inhibitor in combination with one or more therapeutics having different mechanisms of action.

[00101] The development of compositions suitable for use in a variety of routes of administration, including e.g., subcutaneous, oral, parenteral, intravenous, intranasal, and intramuscular administration and formulation, is well known in the art and discussed in U.S. Patent Publication No. 2007/0110747. For example, in certain circumstances, it will be desirable to deliver a pharmaceutical composition comprising a sclerostin binding agent subcutaneously, parenterally, intravenously, intramuscularly, or even intraperitoneally. Such approaches are well known to the skilled artisan, some of which are further described, for example, in U.S. Patent Nos. 5,543,158; 5,641,515; and 5,399,363. Illustrative pharmaceutical forms suitable for injectable use include sterile aqueous solutions or

dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersions (for example, see U.S. Patent No. 5,466,468). In all cases the form must be sterile and must be fluid to the extent that easy syringability exists (i.e., is not excessively viscous so as to prevent passage through a syringe).

[00102] In one aspect, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered systemically. In one embodiment, for parenteral administration in an aqueous solution, the solution should be suitably buffered if necessary and the liquid diluent first rendered isotonic with sufficient saline or glucose. These particular aqueous solutions are especially suitable for intravenous, intramuscular, subcutaneous, and intraperitoneal administration. For example, one dosage may be dissolved in 1 ml of isotonic NaCl solution and either added to 1000 ml of hypodermoclysis fluid or injected at the proposed site of infusion (see, for example, Remington's Pharmaceutical Sciences, 15th ed., Mack Pub. Co., Easton, PA, pp. 1035-1038 and 1570-1580). Some variation in dosage and frequency of administration may occur depending on the condition of the subject being treated; age, height, weight, and overall health of the patient; and the existence of any side effects. In addition, a pharmaceutical composition comprising a sclerostin binding agent may be placed within containers (e.g. vials or pre-filled syringes), along with packaging material that provides instructions regarding the use of such pharmaceutical compositions. Generally, such instructions will include a tangible expression describing the reagent concentration, as well as within certain embodiments, relative amounts of excipient ingredients or diluents (e.g., water, saline or PBS) that may be necessary to reconstitute the pharmaceutical composition.

[00103] In another aspect, the sclerostin inhibitor is administered locally to the subject. In some or any embodiments, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered by disease to the diseased gingival, bone or tooth area. In this regard, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is optionally injected directly into the gingival tissue and/or applied to the periodontal pocket by, for example, a syringe containing the sclerostin inhibitor and an appropriate carrier.

[00104] For local administration aspects (such as subcutaneous injection of the sclerostin inhibitor directly into the diseased gingival area or diseased periodontal pocket of the subject), the sclerostin inhibitor is optionally administered to a subject in an amount of about 0.1 mg to about 20 mg. In some embodiments, the sclerostin inhibitor is administered directly to the affected area in an amount of about 0.1 mg, 0.5 mg, 1 mg, 2 mg, 3 mg, 4 mg, 5 mg, 6 mg, 7 mg, 8 mg, 9 mg, 10 mg, 11 mg, 12 mg, 13 mg, 14 mg, 15 mg, 16 mg, 17 mg, 18

mg, 19, or about 20 mg. The dose is administered at any interval, such as multiple times a week (e.g., twice or three times per week), once a week, once every two weeks, once every three weeks, or once every four weeks. In some or any embodiments, a dose of sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) ranging from about 0.1 mg to about 20 mg is administered twice a week. The amount of inhibitor is optionally administered as a divided dose, e.g., using multiple injections along a segment of the affected area.

[00105] In some or any embodiments, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is incorporated into a gel, mesh, matrix or collagen sponge, embedded in a dental implant or bone graft, or coated on an implant. The implant may be a re-implantation of a subject's own tooth (e.g., lost through trauma) or a prosthetic implant (made of, for example, plastic, ceramic, metal or from stem cells as described in WO 2004/074464).

[00106] The term "mesh" means any material in any form including, for example, knotted, braided, extruded, stamped, knitted, woven, non-woven or other form, and may include a material with a substantially regular and/or irregular patterns. Examples of non-woven meshes, including electrospun materials, may be used (for a review on the preparation electrospun nanofiber material see Zheng-Ming Huang et al, Composites Science and Technology, 2003, 63:2223-2253). A mesh can be, without limitation, a cross-linked fiber mesh, a nanofiber mesh, a mesh fabric, biodegradable polymer mesh, or a combination of any of the foregoing. A mesh can be non-degradable, degradable or biodegradable. A degradable mesh can be a mesh that can be degraded via non-biological means (e.g., hydrolysis or photolysis). A biodegradable mesh is, in various embodiments, a type of mesh that can be broken down by a biological system through the action of cells or digestive enzymes or via oxidation by biomolecules.

[00107] Exemplary gel formulations for oral delivery of antibodies is described in WO 2010/1004179, the disclosure of which is incorporated herein by reference. In some embodiments, the gel is a hydrogel made of high molecular weight biocompatible elastomeric polymers of synthetic or natural origin. A desirable property for hydrogels is the ability to respond rapidly to mechanical stresses, particularly shears and loads, in the human body. Hydrogels obtained from natural sources are contemplated because they are more likely to be biodegradable and biocompatible for *in vivo* applications. Suitable hydrogels include natural hydrogels, such as, for example, gelatin; collagen; silk; elastin; fibrin and polysaccharide-derived polymers; glucomannan gel; hyaluronic acid; polysaccharides, such as cross-linked

carboxyl-containing polysaccharides, or a combination thereof. Synthetic hydrogels include, but are not limited to, those formed from polyvinyl alcohol; acrylamides such as polyacrylic acid and poly(acrylonitrile-acrylic acid); polyurethanes; polyethylene glycol (e.g., PEG 3350, PEG 4500, PEG 8000); silicone; polyolefins such as polyisobutylene and polyisoprene; copolymers of silicone and polyurethane; neoprene; nitrile; vulcanized rubber; poly(N-vinyl-2-pyrrolidone); acrylates such as poly(2-hydroxy ethyl methacrylate) and copolymers of acrylates with N-vinyl pyrolidone; N-vinyl lactams; polyacrylonitrile or combinations thereof. The hydrogel materials may further be cross-linked to provide further strength as needed. Examples of different types of polyurethanes include thermoplastic or thermoset polyurethanes, aliphatic or aromatic polyurethanes, polyetherurethane, polycarbonate-urethane or silicone polyether-urethane, or a combination thereof.

[00108] In various embodiments, rather than directly admixing the sclerostin inhibitor into the gel, microspheres being loaded with the sclerostin inhibitor may be dispersed within the gel. In one embodiment, the microspheres provide for a sustained release of the sclerostin inhibitor. In yet another embodiment, the gel, which is biodegradable, prevents the microspheres from releasing the sclerostin inhibitor; the microspheres thus do not release the sclerostin inhibitor until they have been released from the gel. For example, a gel may be deployed around a target tissue site (e.g., alveolar ridge).

[00109] The invention also contemplates the use of adherent gels to constrain dispersal of the sclerostin inhibitor. The gels may be deployed, for example, in the periodontal pocket, tooth, alveolar bone or in surrounding gingival tissue.

[00110] In some or any embodiments, the sclerostin inhibitor is formulated into pastes, balms, waxes, lotions, rinsing solutions, dried powers with/without bulking agent and various other formats for topical administration known in the art. The sclerostin inhibitor may also be delivered locally in the form of a powder or solution sprayed, or gargling solutions. Alternatively, the sclerostin inhibitor is incorporated into wound dressings, pads, gauze, or other means applied to the diseased area of interest (e.g., diseased gingival area or periodontal pocket) from which they are transferred to the area of interest.

[00111] Combination Therapy

[00112] Treatment of a pathology by combining two or more agents that target the same pathogen or biochemical pathway sometimes results in greater efficacy and diminished side effects relative to the use of the therapeutically relevant dose of each agent alone. In some cases, the efficacy of the drug combination is additive (the efficacy of the combination is

approximately equal to the sum of the effects of each drug alone), but in other cases the effect can be synergistic (the efficacy of the combination is greater than the sum of the effects of each drug given alone). As used herein, the term "combination therapy" means the two compounds can be delivered in a simultaneous manner, e.g., concurrently, or wherein one of the compounds is administered first, followed by the second agent, e.g., sequentially. The desired result can be either a subjective relief of one or more symptoms or an objectively identifiable improvement in the recipient of the dosage.

[00113] In some embodiments, the sclerostin inhibitor (e.g. anti-sclerostin antibody or antibody fragment) is administered in combination with the use of materials that support the regrowth of bone such as bone graft, bone dust, bone chips, demineralized bone matrix, bone scaffolds, prosthesis, metal stabilizers, or bone scaffold substances comprising one or more of polymers, ceramics, cement and calcium phosphates-based bone-graft substitutes. Many variations of such materials are known in the art.

[00114] In some or any embodiments, a method or use described herein comprises administering a standard of care therapy for the treatment of the periodontal disease to the subject prior to administering the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment). For example, in some embodiments, the standard of care therapy for the treatment of periodontal disease is a therapeutic selected from the group consisting of Periostat® and chemically modified tetracycline-3 (CMT-3). In some embodiments, the standard of care therapy comprises oral irrigation and/or scaling and supra- and/or sub-gingival debridement (e.g., removal of microbial plaque and calculus) of the affected area of the subject. In some embodiments, the standard of care comprises performing oral irrigation and/or scaling and debridement of the affected area in combination with Periostat and/or CMT-3 prior to administration of the sclerostin inhibitor. In some embodiments, the method comprises administering the standard of care therapy concurrently with the administration of the sclerostin inhibitor. In other embodiments, the standard of care therapy is administered sequentially. For example, the standard of care therapy can be administered 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 1 week, 2 weeks, 3 weeks, 4 weeks, 6 weeks, 8 weeks, 10 weeks, 12 weeks or more prior to administering the sclerostin inhibitor to the subject. In preferred embodiments, the periodontal disease progression in the subject is slowed, halted or reversed prior to administration of the sclerostin inhibitor.

[00115] In some or any embodiments, a method or use described herein further comprises administering an antibiotic, such as an antibiotic selected from the group consisting of amoxicillin, tetracycline hydrochloride, doxycycline, minocycline, azithromycin,

roxithromycin, moxifloxacin, ciprofloxacin and metronidazole. In some embodiments, the method or use comprises administering the antibiotic to the subject prior to administering the sclerostin inhibitor to the subject. In other embodiments, the method or use comprises administering the antibiotic to the subject concurrently with the administration of the sclerostin inhibitor.

[00116] In some embodiments, the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) is administered along with a second bone-enhancing therapeutic useful for the treatment of decreased bone mineral density or bone defect. In some embodiments, the bone-enhancing therapeutic is selected from the group consisting of an anti-resorptive drug, a bone-forming agent, an estrogen receptor modulator (including, but not limited to, raloxifene, bazedoxifene and lasofoxifene) and a drug that has an inhibitory effect on osteoclasts. In some embodiments, the second bone-enhancing agent is selected from the group consisting of a bisphosphonate (including, but not limited to, alendronate sodium (FOSAMAX®), risedronate, ibandronate sodium (BONIVA®) and zoledronic acid (RECLAST®)); an estrogen or estrogen analogue; an anti-RANK ligand (RANKL) antibody (e.g., PROLIA®) or RANKL inhibitor; vitamin D, or a vitamin D derivative or mimic thereof; a calcium source, Tibolone, calcitonin, a calcitriol; and hormone replacement therapy. In some embodiments, the second bone-enhancing agent includes, but is not limited to parathyroid hormone (PTH) or a peptide fragment thereof, PTH-related protein (PTHrp), bone morphogenetic protein, osteogenin, NaF, a PGE_2 agonist, a statin, strontium ranelate, an anti-DKK1 antibody or inhibitor. In some embodiments, the second bone-enhancing agent is Forteo® (Teriparatide), Preotact®, or Protelos®.

[00117] In various embodiments, the periodontal disease treatment plan includes regular supportive follow-up therapy after active treatment with the sclerostin inhibitor is completed. In some embodiments, the method or uses described herein optionally comprise performing a supportive follow-up therapy selected from the group consisting of mechanical debridement, reinforcement of oral hygiene (e.g., regular profession cleanings (i.e., every 6 months), daily brushing and flossing) and administration of antibiotics.

[00118] In some embodiments, the combination therapy employing a sclerostin inhibitor described herein may precede or follow administration of additional therapeutic(s) (e.g., an antibiotic or second bone-enhancing agent) by intervals ranging from minutes to weeks. For example, separate modalities are administered within about 24 hours of each other, e.g., within about 6-12 hours of each other, or within about 1-2 hours of each other, or within about 10-30 minutes of each other. In some situations, it may be desirable to extend the time

period for treatment significantly, where several days (2, 3, 4, 5, 6 or 7 days) to several weeks (1, 2, 3, 4, 5, 6, 7 or 8 weeks) lapse between the respective administrations of different modalities. Repeated treatments with one or both agents/therapies of the combination therapy is specifically contemplated.

[00119] Maintenance Therapeutic Regimen

[00120] Also contemplated is the use of a second bone-enhancing agent and/or sclerostin inhibitor in a maintenance regimen to, e.g., prevent or slow the loss of one or more of the following parameters of alveolar bone: bone mineral density, alveolar bone height, alveolar bone mass, alveolar bone volume and alveolar bone mineral content. In this regard, a method or use described herein optionally comprises administering one or more amounts of a second bone-enhancing agent effective to maintain bone mineral density, alveolar bone height, alveolar bone mass, alveolar bone volume and alveolar bone mineral content for a maintenance period of about 1 week to about 5 years after the treatment period with the sclerostin antibody has ended. For example, in some embodiments, a method or use described herein comprises the administration of a second bone-enhancing agent to the subject for a maintenance period of about at least about 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks, 7 weeks, 8 weeks, 9 weeks, 10 weeks, 11 weeks, 12 weeks, 3 months, 13 weeks, 14 weeks, 15 weeks, 16 weeks, 4 months, 17 weeks, 18 weeks, 19 weeks, 20 weeks, 5 months, 21 weeks, 22 weeks, 23 weeks, 24 weeks, 6 months, 25 weeks, 26 weeks, 27 weeks 28 weeks, 7 months, 29 weeks, 30 weeks, 31 weeks or longer (e.g., 8 months, 9 months, 10 months, 11 months, 1 year, 15 months, 18 months, 2 years, 3 years, 4 years, 5 years or longer (e.g., over the lifetime of the subject). In some embodiments, the maintenance period is about 6-12 weeks. In some embodiments, the maintenance period is about 4-12 weeks, or about 1-3 months. In some embodiments, the maintenance period is about 12-20 weeks, or about 3-5 months. In some embodiments, the maintenance period is about 20-32 weeks, or about 5-8 months. In some embodiments, the maintenance period is about 24-36 weeks, or about 6-9 months. In some embodiments, the maintenance period is about 1 year, about 2 years, about 3 years, about 4 years, about 5 years or longer. "Maintaining" alveolar bone includes maintaining similar levels of alveolar bone parameters experienced in the subject that received the sclerostin inhibitor treatment.

[00121] Similarly, a method or use described herein optionally comprises subsequently administering one or more amounts of a sclerostin inhibitor effective to bone mineral density, alveolar bone height, alveolar bone mass, alveolar bone volume and alveolar bone mineral content for a maintenance period of at least about least about 1 week, 2 weeks, 3 weeks, 4

weeks, 5 weeks, 6 weeks, 7 weeks, 8 weeks, 9 weeks, 10 weeks, 11 weeks, 12 weeks, 3 months, 13 weeks, 14 weeks, 15 weeks, 16 weeks, 4 months, 17 weeks, 18 weeks, 19 weeks, 20 weeks, 5 months, 21 weeks, 22 weeks, 23 weeks, 24 weeks, 6 months, 1 year, 2 years, 3 years, 4 years, 5 years or longer (e.g., over the lifetime of the subject) after the treatment period has ended. In some embodiments, the maintenance period is about 6-12 weeks. In some embodiments, the maintenance period is about 4-12 weeks, or about 1-3 months. In some embodiments, the maintenance period is about 12-20 weeks, or about 3-5 months. In some embodiments, the maintenance period is about 20-32 weeks, or about 5-8 months. In some embodiments, the maintenance period is about 24-36 weeks, or about 6-9 months. In some embodiments, the maintenance period is about 1 year, about 2 year, about 3 years, about 4 years, about 5 years or longer.

[00122] Kits

[00123] A pharmaceutical composition comprising the sclerostin inhibitor (e.g., anti-sclerostin antibody or antibody fragment) may be placed within containers (e.g., vials or syringes), along with packaging material that provides instructions regarding the use of such pharmaceutical compositions. Generally, such instructions will include a tangible expression describing the sclerostin inhibitor concentration, as well as within certain embodiments, relative amounts of excipient ingredients or diluents (e.g., water, saline or PBS) that may be necessary to reconstitute the pharmaceutical composition.

[00124] The invention is further described in the following examples. The following examples serve only to illustrate the invention and are not intended to limit the scope of the invention in any way.

EXAMPLES

Example 1

[00125] This Example describes various cell-based neutralization assays useful for characterizing the neutralization activity of an anti-sclerostin antibody.

[00126] *MC3T3 cell-based mineralization assay* - Ascorbic acid and B-glycerophosphate are used to induce MC3T3-E1-BF cell differentiation leading to mineral deposition. An exemplary screening protocol, in 96-well format, involves plating cells on day 1, followed by seven media changes over a 12-day period with most of the mineral deposition taking place in the final eighteen hours. The specific timing, and extent, of mineral deposition may vary depending, in part, on the particular serum lot number being used. Control experiments will allow such variables to be accounted for, as is well known in the art of cell culture

experimentation generally. For statistical analysis (using MS Excel and JMP) a 1-way-ANOVA followed by Dunnett's comparison may be used to determine differences between groups. Group means for each data set are considered significantly different when the P value is less than 0.05 ($P < 0.05$).

[00127] Cell culture for expansion of MC3T3-E1-BF cells is performed as follows. Cell culture is performed at 37°C and 5% CO_2. A cell bank can be generated for the purposes of screening for sclerostin neutralizing antibodies. One vial of frozen MC3T3-E1-BF cells are thawed by agitation in a 37°C water bath. The thawed cells are put into 10 mls of Expansion Medium (Alpha-MEM/10%FBS/PenStrepGlu) in a 50 ml tube and gently spun down for 5 minutes. The cells are then resuspended in 4 mls of Alpha-MEM/10%FBS/PenStrepGlu. After determining the number of cells using trypan blue and hemacytometer, 1×10^6 cells are plated in 50 mls Alpha-MEM/10%FBS/PenStrepGlu media in one T175 flask.

[00128] When this passage is confluent (at approximately 7 days), the cells are trypsinized with trypsin/EDTA (0.05% Trypsin; 0.53 mM EDTA), gently spun down for 5 minutes and then resuspended in 5 mls Alpha-MEM/10%FBS/PenStrepGlu. After determining the number of cells using trypan blue and hemacytometer, cells are plated at 1×10^6 cells in 50 mls Alpha-MEM/10%FBS/PenStrepGlu media per one T175 flask. The number of T175 flasks used for plating at this point depends upon the total cell number available and the desired number of flasks that are to be taken forward to the next passage.

[00129] When this passage is confluent (about 3-4 days), the cells are trypsinized with trypsin/EDTA (0.05% Trypsin; 0.53 mM EDTA), gently spun down for 5 minutes and then resuspended in 5 mls Alpha-MEM/10%FBS/PenStrepGlu. After determining the number of cells using trypan blue and hemacytometer, cells are plated at 1×10^6 cells in 50 mls Alpha-MEM/10%FBS/PenStrepGlu media per one T175 flask. The number of T175 flasks used for plating at this point depends upon the total cell number available and the desired number of flasks that were to be taken forward to the next passage.

[00130] When this passage is confluent (about 3-4 days), the cells are trypsinized with trypsin/EDTA (0.05% Trypsin; 0.53 mM EDTA), gently spun down for 5 minutes and then resuspended in 5 mls Alpha-MEM/10%FBS/PenStrepGlu. After determining the number of cells using trypan blue and hemacytometer, cells are plated at 1×10^6 cells in 50 mls Alpha-MEM/10%FBS/PenStrepGlu media per one T175 flask. The number of T175 flasks used for plating at this point depends upon the total cell number available and the desired number of

flasks that were to be taken forward to the next passage. Extra cells are frozen down at 1-2 x 10^6 live cells/ml in 90%FBS/10%DMSO.

[00131] When this passage is confluent (about 3-4 days), the cells were trypsinized with trypsin/EDTA (0.05% Trypsin; 0.53 mM EDTA), gently spun down for 5 minutes and then resuspended in 5 mls Alpha-MEM/10%FBS/PenStrepGlu. After determining the number of cells using trypan blue and hemacytometer, the cells are frozen down at 1-2 x 10^6 live cells/ml in 90%FBS/10%DMSO. This "final passage" of frozen cells is the passage used for the screening assay.

[00132] Cell culture for mineralizing MC3T3-E1-BF cells is performed as follows. Cell culture is performed at 37°C and 5% CO_2. It is desirable to minimize temperature and % CO_2 fluctuations during the mineralization cell culture procedure. An appropriate number of "final passage" vials prepared as described above are thawed by agitation in a 37°C water bath. The thawed cells are put into 10 mls of Expansion Medium (Alpha-MEM/10%FBS/PenStrepGlu) in a 50 ml tube and gently spun down for 5 minutes. The cells are then resuspended in 4 mls of Alpha-MEM/10%FBS/PenStrepGlu. After determining the number of cells by trypan blue and hemacytometer, 2500 cells are plated in 200 microliters of Expansion media per well on collagen I coated 96-well plates (Becton Dickinson Labware, cat # 354407).

[00133] An exemplary cell culture procedure is as follows. The starting day for plating the cells is indicated to be a Wednesday. If a different day of the week is used as the starting day for plating the cells, that day will trigger the daily schedule for removing and adding media during the entire process as indicated below. For example, if the cells are plated on a Tuesday, media should not be removed and added on the first Friday and Saturday, nor on the second Friday and Saturday. With a Tuesday start, the plates would be prepared for the calcium assay on the final Sunday. Cells are plated on a Wednesday at 2500 cells in 200 µl of Expansion media. On Thursday all of the Expansion media is removed and 200 µl of Differentiation Media is added. On Friday 100 µl of media is removed and 100 µl of fresh Differentiation Media is added. On Monday 100 µl of media is removed and 100 µl of fresh Differentiation Media is added. On Tuesday 100 µl of media is removed and 100 µl of fresh Differentiation Media is added. On Wednesday 100 µl of media is removed and 100 µl of fresh Differentiation Media is added. On Thursday 100 µl of media is removed and 100 µl of fresh Differentiation Media is added. On Friday 100 µl of media is removed and 100 µl of fresh Differentiation Media is added. On the following Monday plates are prepared for the calcium assay as follows: Plates are washed once with 10 mM Tris, HCl pH 7-8. Working

under a fume hood, 200 µl of 0.5 N HCl is added per well. Plates are then frozen at -80°C. Just prior to measuring calcium, the plates are freeze-thawed twice, and then trituration with a multichannel pipette is used to disperse the contents of the plate. The contents of the plate is then allowed to settle at 4°C for 30 minutes at which point an appropriate amount of supernatant is removed for measuring calcium using a commercially available calcium kit. An exemplary and not-limiting kit is Calcium (CPC) Liquicolor, Cat. No. 0150-250, Stanbio Laboratory, Boerne, TX.

[00134] In this cell based assay, sclerostin inhibits one or more of the sequence of events leading up to and including mineral deposition (i.e. sclerostin inhibits mineralization). Thus, in experiments where sclerostin is included in the particular cell culture experiment, the recombinant sclerostin is added to the media starting on the first Thursday and every feeding day thereafter. In cases where an anti-sclerostin antibody is being tested for the ability to neutralize sclerostin, i.e., allow for mineralization by neutralizing sclerostin's ability to inhibit mineralization, the antibody is added to the media starting on the first Thursday and every feeding day thereafter. The antibody is preincubated with the recombinant sclerostin in Differentiation media for 45-60 minutes at 37°C and then this media is used for feeding the cells.

[00135] Described above is a 12-day mineralization protocol for MC3T3-E1-BF cells. Mineralization of the original MC3T3-E1 cells is inhibited by recombinant sclerostin and this inhibition is blocked using an anti-sclerostin neutralizing antibody, e.g., an anti-sclerostin antibody comprising CDRs of SEQ ID NO: 245-247 and 78-80. The cell-based neutralization assay is further described in U.S. Patent Publication No. 7,592,429 at, e.g., Example 8 (hereby incorporated by reference for its description of cell-based neutralization assays).

[00136] *Bone specific alkaline phosphatase assay* – An exemplary bone specific alkaline phosphatase assay is described in International Patent Publication No. WO 2008/115732 and U.S. Patent No. 7,744,874 (hereby incorporated by reference for its description of cell-based neutralization assays). An exemplary protocol is as follows. C2C12 cells (ATCC, CRL 1772) are plated at 3000-5000 cells/well in a 96-well tissue culture plate in MEM medium supplemented with 5% fetal calf serum. The plate is incubated at 37°C in 5% CO_2 overnight. The antibody is diluted in 0.5X Wnt3a-conditioned medium (prepared as described in WO 2008/115732) to various final concentrations. The medium is removed from the plated cells and a pre-mixed antibody- BMP4-sclerostin solution (human or cynomologous monkey) is added (150 µl), providing an antibody final concentration of 30 µg/ml to 0.5 µg/ml, a final

BMP-4 concentration of 25 ng/ml, a final sclerostin protein concentration of 1.0 μg/ml, and the conditioned medium is at 0.5X concentration. The plate is then incubated at 37°C in 5% CO_2 for 72 hours. The medium is removed from the cells, which are washed once with PBS, and frozen and thawed three times alternating between -80°C and 37°C. Alkaline phosphatase activity is measured by adding alkaline phosphatase substrate (1-step PNPP, Pierce #37621) (150 μl/well). The plate of cells is incubated for 60 minutes at room temperature, at which time optical density (OD) is measured at 405 nm to determine alkaline phosphatase activity. IC_{50} calculations may be performed using, e.g., SigmaPlot Regression Wizard with a Sigmoid 4-parameter fit equation.

[00137] *BMP2-induced MC3T3 cell mineralization assay* – An exemplary BMP2-induced mineralization assay in MC3T3 cells is described in International Patent Publication No. WO 2009/047356 (hereby incorporated by reference for its description of cell-based neutralization assays). Briefly, MC3T31b cells are seeded in 96-well plates (e.g., 6 x 10^3 cells/well or 2 x 10^3 cells/well) in 100 μl assay culture medium (maintenance culture medium without G418) and incubated for three days to reach confluence. The assay culture medium is changed and compounds to be tested are added with 10 mM b-glycerophosphate and 50 μM ascorbic acid. Prior to addition to the cells, sclerostin and a candidate antibody are pre-incubated on a separate plate for two hours at room temperature. To the assay 96 well-plates, 2.1 or 2.8 nM BMP-2 (R&D Systems, Cat#355-BM-010) is applied before applying the sclerostin-antibody mixture. Cells are incubated for 14 days. At the end of the incubation, cells are washed twice with 200 μl PBS/well, 50 μl of 0.5 M HCl is added to each well, and plates are frozen at -20°C for a minimum of 24 hours. Plates are thawed at room temperature for 2 hours for testing. Ten 10μl of each well is transferred to a new plate and exposed to Calcium Working Solution (1:5) (200μl). Optical density is measured after a 5-30 minute incubation period at 595 nm on a microplate reader. Absorbance is translated into microgram of calcium according to a standard curve, allowing determination of the extent of BMP-2-induced mineralization.

[00138] *Cell-based wnt signaling assay* – An exemplary cell-based signaling assay employing super top flash (STF) reporter protein is described in International Patent Publication No. WO 2009/047356. HEK293 cells are transfected with pcDNA3+ (480 ng); SuperTopFlash (STF) (20 ng); and phRL-CMV (0.5 ng) for control wells and pcDNA-wnt1 (20 ng); pcDNA3+ (460 ng); SuperTopFlash (STF) (20 ng); and phRL-CMV (0.5 ng) for Wnt1 treatment wells. The plasmids are mixed with 1.6 μl of Lipofectamine 2000 diluted into 50 μl of OptiMEM® and incubated for 30 minutes at room temperature prior to

application to the cells. Once applied, the cells are incubated at 37°C in 5% CO_2 for five hours.

[00139] Antibodies are premixed with SOST to generate a series of dilutions. One ml of medium for each dilution is prepared, and 450 µl is added to each well after removing transfection mix. The cells are incubated with the antibody-SOST mixtures for 18-20 hours. At the end of the incubation, medium is removed, and 300 µl of 1X Passive Lysis Buffer (Promega, Cat#E194A) is added to lyse cells. Luciferase activity is then measured using Dual-Glo Luciferase System (Promega, Cat#E2940) with 30 µl of lysates in duplicates. Typically, 30µl of Dual-Glo luciferase (firefly luciferase; for STF) and 30µl of Dual-Glo Stop and Glo (Renilla luciferase; for transfection efficiency control) substrates is used. Luminescent signals are measured with Mithras LB940 instrument (Berthold Technologies). The ratio of firefly to *Renilla* luciferases is calculated. The final results are expressed by setting the value of Wnt1 without SOST as 1. Additional details of the assay are provided in International Patent Publication No. WO 2009/047356.

Example 2 –

[00140] The following Example illustrates the ability of a sclerostin inhibitor, namely an anti-sclerostin monoclonal antibody (Scl-Ab), to enhance alveolar bone repair in a rat periodontal disease model.

[00141] *Rat periodontitis model*: Experimental periodontal disease was induced in rats by ligature placement as described previously (Jin Q, et al., 2007. J Periodontol 78:1300-1308; Graves, DT, et al., 2008. J Clin Periodontol 35:89-105; the disclosures of which are incorporated herein by reference in their entireties). Briefly, male Sprague Dawley rats (body weight, approx. 300-350 g, Harlan Laboratory, IN) were anesthetized with ketamine and xylazine (83/17 ratio). Cotton suture (3.0) was then secured around the cervical part (just above the gingivae) of the molars on one side of the maxilla, to allow for normal mastication. The ligatures were evaluated three times per week, gently displaced apically into the gingival sulci to ensure a subgingival position, and replaced when necessary.

[00142] *Microcomputed Tomography (µCT) Scanning and Analysis*: Rats were sacrificed at designated time points. Maxillae were dissected and placed into 10% neutral buffered formalin for 48-72 hrs. Fixed, non-demineralized rat maxillae were scanned in 70% ethanol by a cone beam microCT system (GE Healthcare BioSciences). Linear and volumetric analyses were based on a previously developed methodology (Park CH, et al., 2007. J Periodontol 78:273-281). In brief, each maxillar specimen was scanned and reconstructed at

18 × 18 × 18-μm voxels using a μCT system. A three-dimensional (3-D) volume viewer and analyzer software (Microview Analysis, GE Healthcare) were used as the tool for both 3-D and 2-D visualization and quantification. The vertical, linear bone loss was identified by measuring the distance from the cemento-enamel junction (CEJ) to the alveolar bone crest (ABC) of the maxillary second molar. In terms of volumetric analysis, the most mesial root of the first molar (m-M1), the most distal root of the third molar (d-M3), the roof of the furcation, and root apex of M1-M3 were used as reproducible landmarks for assessment of maxillary alveolar bone. Two dimensional regions of interest (ROIs) were drawn at regular intervals (average, eight data slices) on a coronal view and reconstructed as a 3-D structure to quantify volumetric parameters, bone volume fraction (BVF), and bone mineral density (BMD; mg/cc).

[00143] *Statistical analysis*: GraphPad Prism (V.5.01) was used to perform the statistic analysis. The differences among groups for linear and volumetric bone measurements were statistically assessed by one-way analysis of variation (ANOVA) with Tukey multiple comparison post hoc test. Data were reported as Mean+ SE, and the level of significance was set as $P \leq 0.05$.

[00144] *Study Design*: Ten to twelve week old male Sprague-Dawley (SD) rats underwent experimental periodontitis induced by ligature placement as described above. In one mode of study, three days before the ligature placement, animals (n=10/group) were subcutaneously injected once with either saline vehicle or Scl-Ab (dose level of 25 mg/kg). Immediately after the ligature placement, ligated animals or their normal intact controls were treated with either saline vehicle or Scl-Ab. Both Scl-Ab (dose level of 25 mg/kg) and its vehicle control were given by subcutaneous injection twice per week. Necropsy were performed two-week and four-week post-disease induction respectively.

[00145] In another mode of study, following four weeks of ligature-induced experimental periodontitis, treatment was commenced immediately following removal of the ligature. Animals (n=10/group) with experimental periodontitis or their normal intact controls were subcutaneously injected twice weekly with either saline vehicle or Scl-Ab (dose level of 25 mg/kg). The treatment lasted for three weeks or six weeks following cessation of disease induction for a total study duration of seven or ten weeks. Body weight measurements were taken weekly prior to Scl-Ab administration until the termination of the study. Necropsies were performed seven-weeks and ten-weeks post-disease induction, respectively. Whole blood (for serum analysis), maxillae and femorae were collected. The study was approved by the Institution Animal Care and Use Committee at University of Michigan.

[00146] Results:

[00147] *Maxillary alveolar bone*: microCT measurements of supporting alveolar bone volume and density are set forth in Figures 2 and 3. In the mode of the study where the ligature was placed throughout the study (two-week and four-week), systemic Scl-Ab administration in the normal intact animal group resulted in a statistically significant increase in both bone volume fraction (BVF) and bone mineral density (BMD) when compared to normal intact animals receiving vehicle injections at two and four weeks following initiation of treatment. Furthermore, ligature-induced periodontal disease groups receiving systemic Scl-Ab injections showed increased BVF and BMD (although not statistically significant) values than the disease group receiving vehicle injections at the two- and four-week time points (Figures 2A and 2B).

[00148] In the mode of the study where the ligature was removed four-week after placement and immediately before treatment commencement both BVF and BMD showed a statistically significant decrease during the disease induction phase in the experimental periodontitis groups compared to the normal intact animal groups. Within three weeks following cessation of disease induction, BVF and BMD in the vehicle treatment group rebounded and then stabilized until the end of the study. Ligated animals receiving Scl-Ab treatment following induction of experimental periodontitis exhibited improved bone repair (i.e., greater bone volume and density values) throughout the six-week treatment phase compared to animal groups receiving vehicle injections. Most important, after six-weeks of treatment, BVF and BMD were statistically higher in animals treated with Scl-Ab than in vehicle-treated animal group. Furthermore, no statistical difference was found in the bone volume fraction and bone density between the Scl-Ab treated disease animals and vehicle treated normal intact animals at the end of 10- week study, indicating that Scl-Ab may aid in the regeneration of alveolar bone to healthy normal levels following periodontal disease.

[00149] *Linear bone measurement*: Alveolar bone height was measured from the bone crest to the cement-enamel junction of second molar with microCT assessment (Figure 4). In the mode of the study where the ligature was removed four-week after placement and immediately before treatment commencement, scl-Ab administration showed some effects on the linear bone repair (i.e., increased alveolar bone height). After three-weeks of treatment, no statistical significance of the linear bone measurement was observed between the Scl-Ab treatment and vehicle groups at the ligated second molar site. However, at the six-week post-treatment time point, Scl-Ab treatment showed an augment in linear bone repair – with a

statistically significant difference evident between the vehicle and Scl-Ab treatment groups and vehicle groups at the ligated second molar site (Figures 4A-4C).

[00150] Systemic administration of Scl-Ab for six weeks following induction of experimental periodontitis resulted in statistically greater BVF and BMD values compared to vehicle treatment as well as statistically similar bone measures to the normal intact group. Thus, systemic Scl-Ab administration contributes to alveolar bone regeneration as measured by BVF and BMD. Scl-Ab may hold promise as a therapeutic to augment and/or accelerate oral bone regeneration.

[00151] While this invention has been described with an emphasis upon preferred embodiments, it will be obvious to those of ordinary skill in the art that variations of the preferred compounds and methods may be used and that it is intended that the invention may be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications encompassed within the spirit and scope of the invention as defined by the following claims.

WHAT IS CLAIMED IS:

1. A method for treating alveolar bone loss in a subject comprising administering to the subject an anti-sclerostin antibody in an amount effective to decrease the distance between the cement-enamel junction and the alveolar bone crest, at a dose from about 5 mg to about 1,000 mg per week.

2. The method of claim 1, wherein the distance between the cement-enamel junction and the alveolar bone crest is decreased by at least 10% compared to the pre-treatment distance by six weeks after initiation of treatment.

3. The method of claim 1, wherein the alveolar bone height is increased by at least 10% compared to the pre-treatment alveolar bone height by six weeks after initiation of treatment.

4. The method of claim 1, wherein the alveolar bone height of the subject is increased by at least 1 mm compared to pre-treatment alveolar bone height by six weeks after initiation of treatment.

5. The method of claim 1, wherein the alveolar bone density of the subject is increased by at least 10% compared to pre-treatment alveolar bone density by six weeks after initiation of treatment.

6. The method of claim 1, wherein the alveolar bone volume fraction is increased by at least 10% compared to pre-treatment bone volume fraction by six weeks after initiation of treatment.

7. The method of claim 1, wherein the antibody is administered in an amount from about 120-270 mg.

8. The method of claim 1, wherein the anti-sclerostin antibody is administered twice a week.

9. The method of claim 1, wherein the anti-sclerostin antibody is administered locally to diseased gingival area or diseased periodontal pocket of the subject.

10. The method of any one of claims 1-9, wherein the method comprises administering a standard of care therapeutic selected from the group consisting of Periostat® or chemically modified tetracycline-3 (CMT-3) prior to administering the anti-sclerostin antibody.

11. The method of any one of claims 1-10, further comprising administering a second bone-enhancing therapeutic selected from the group consisting of parathyroid hormone, teriparatide, a bisphosphonate, a RANKL antibody and a DKK-1 antibody.

12. The method of claim 10, wherein the second bone-enhancing therapeutic is administered after the treatment period with the anti-sclerostin antibody has ended.

13. The method of claim 1, optionally comprising administering the anti-sclerostin antibody for a second period of time in an amount sufficient to maintain alveolar bone.

14. The method of any one of claims 1-13, wherein the anti-sclerostin antibody is an immunoglobulin comprising a heavy chain and a light chain.

15. The method of any one of claims 1-13, wherein the anti-sclerostin antibody is an antibody or fragment thereof that demonstrates a binding affinity for sclerostin of SEQ ID NO: 1 of less than or equal to 1×10^{-9} M.

16. The method of any one of claims 1-15, wherein the anti-sclerostin antibody neutralizes human sclerostin in a MC3T3 cell-based mineralization assay when there is less than a six-fold excess of moles of sclerostin binding sites per well as compared to the number of moles of sclerostin per well.

17. The method of any one of claims 1-13, where the anti-sclerostin antibody cross-blocks the binding of at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24 to sclerostin and/or is cross-blocked from binding to sclerostin by at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24.

18. The method of any one of claims 1-13, wherein the anti-sclerostin antibody comprises a CDR-H1 of SEQ ID NO:245, a CDR-H2 of SEQ ID NO:246, a CDR-H3 of SEQ ID NO:247, a CDR-L1 of SEQ ID NO:78, a CDR-L2 of SEQ ID NO:79, and a CDR-L3 of SEQ ID NO:80.

19. The method of claim 18, wherein anti-sclerostin antibody comprises heavy chains comprising SEQ ID NO: 378 and light chains comprising SEQ ID NO 376.

20. A dental implant comprising an anti-sclerostin antibody that binds to a sclerostin polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 1,

wherein said anti-sclerostin antibody demonstrates a binding affinity for sclerostin of SEQ ID NO: 1 of less than or equal to 1 x 10^{-9} M.

21. A gel or matrix comprising an anti-sclerostin antibody that binds to a sclerostin polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 1, wherein said anti-sclerostin antibody demonstrates a binding affinity for sclerostin of SEQ ID NO: 1 of less than or equal to 1 x 10^{-9} M.

22. An anti-sclerostin antibody for use in a method of treating alveolar bone loss in a subject, the method comprising administering an anti-sclerostin antibody in an amount effective to decrease the distance between the cement-enamel junction and the alveolar bone crest, optionally at a dose from about 5 mg to about 1,000 mg per week.

23. The anti-sclerostin antibody according to claim 22, wherein the method of treating alveolar bone loss further comprises administering a second bone-enhancing therapeutic selected from the group consisting of parathyroid hormone, teriparatide, a bisphosphonate, a RANKL antibody and a DKK-1 antibody.

24. The anti-sclerostin antibody according to claim 23, wherein the second bone-enhancing therapeutic is administered after the treatment period with the anti-sclerostin antibody has ended.

25. The anti-sclerostin antibody according to claim 22, wherein the method of treating alveolar bone loss optionally further comprises administering the anti-sclerostin antibody for a second period of time in an amount sufficient to maintain alveolar bone.

26. The anti-sclerostin antibody of any one of claims 22-25, wherein the anti-sclerostin antibody is an immunoglobulin comprising a heavy chain and a light chain.

27. The anti-sclerostin antibody of any one of claims 22-26, wherein the anti-sclerostin antibody is an antibody or fragment thereof that demonstrates a binding affinity for sclerostin of SEQ ID NO: 1 of less than or equal to 1 x 10-9 M.

28. The anti-sclerostin antibody of any one of claims 22-27, wherein the anti-sclerostin antibody neutralizes human sclerostin in a MC3T3 cell-based mineralization assay when there is less than a six-fold excess of moles of sclerostin binding sites per well as compared to the number of moles of sclerostin per well.

29. The anti-sclerostin antibody of any one of claims 22-28, where the anti-sclerostin antibody cross-blocks the binding of at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-

13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24 to sclerostin and/or is cross-blocked from binding to sclerostin by at least one of antibodies Ab-A, Ab-B, Ab-C, Ab-D, Ab-1, Ab-2, Ab-3, Ab-4, Ab-5, Ab-6, Ab-7, Ab-8, Ab-9, Ab-10, Ab-11, Ab-12, Ab-13, Ab-14, Ab-15, Ab-16, Ab-17, Ab-18, Ab-19, Ab-20, Ab-21, Ab-22, Ab-23, and Ab-24.

30. The anti-sclerostin antibody of any one of claims 22-29, wherein the anti-sclerostin antibody comprises a CDR-H1 of SEQ ID NO:245, a CDR-H2 of SEQ ID NO:246, a CDR-H3 of SEQ ID NO:247, a CDR-L1 of SEQ ID NO:78, a CDR-L2 of SEQ ID NO:79, and a CDR-L3 of SEQ ID NO:80.

31. The anti-sclerostin antibody of claim 30, wherein anti-sclerostin antibody comprises heavy chains comprising SEQ ID NO: 378 and light chains comprising SEQ ID NO 376.

32. Use of an anti-sclerostin antibody in preparation of a medicament for treating alveolar bone loss in a subject in an amount effective to decrease the distance between the cement-enamel junction and the alveolar bone crest, wherein the anti-sclerostin antibody is optionally at a dose from about 5 mg to about 1,000 mg per week.

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gtcctgaaca gttggactga tcaggacagc aaagacagca cctacagcat gagcagcacc 600

ctcacgttga ccaaggacga gtatgaacga cataacagct atacctgtga ggccactcac 660

aagacatcaa cttcacccat tgtcaagagc ttcaacagga atgagtgtta g 711

<210> 11
<211> 443
<212> PRT
<213> Mus musculus

<400> 11

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Thr Pro Gly Ala
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp His
20 25 30

Tyr Met Ser Trp Val Lys Gln Ser His Gly Lys Ser Leu Glu Trp Ile
35 40 45

Gly Asp Ile Asn Pro Tyr Ser Gly Glu Thr Thr Tyr Asn Gln Lys Phe

50 55 60

Lys Gly Thr Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Ile Ala Tyr
65 70 75 80

Met Glu Ile Arg Gly Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Asp Tyr Asp Ala Ser Pro Phe Ala Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr
115 120 125

Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu
130 135 140

Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp
145 150 155 160

Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser
180 185 190

Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser
195 200 205

Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys
210 215 220

Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro
225 230 235 240

Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr
245 250 255

Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser
260 265 270

Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg
275 280 285

Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile
290 295 300

Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn
305 310 315 320

Ser Pro Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys

325 330 335

Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu
340 345 350

Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe
355 360 365

Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala
370 375 380

Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr
385 390 395 400

Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly
405 410 415

Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His
420 425 430

Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440

<210> 12
<211> 1332
<212> DNA
<213> Mus musculus

<400> 12
gaggtccagc tgcaacagtc tggacctgaa ctggtgacgc ctggggcttc agtgaagata 60

tcttgtaagg cttctggata cacattcact gaccactaca tgagctgggt gaagcagagt 120

catggaaaaa gccttgagtg gattggagat attaatccct attctggtga aactacctac 180

aaccagaagt tcaagggcac ggccacattg actgtagaca agtcttccag tatagcctac 240

atggagatcc gcggcctgac atctgaggac tctgcagtct attactgtgc aagagatgat 300

tacgacgcct ctccgtttgc ttactggggc caagggactc tggtcactgt ctctgcagcc 360

aaaacgacac ccccatctgt ctatccactg gcccctggat ctgctgccca aactaactcc 420

atggtgaccc tgggatgcct ggtcaagggc tatttccctg agccagtgac agtgacctgg 480

aactctggat ccctgtccag cggtgtgcac accttcccag ctgtcctgca gtctgacctc 540

tacactctga gcagctcagt gactgtcccc tccagcacct ggcccagcga gaccgtcacc 600

tgcaacgttg cccacccggc cagcagcacc aaggtggaca agaaaattgt gcccagggat 660

tgtggttgta agccttgcat atgtacagtc ccagaagtat catctgtctt catcttcccc 720

ccaaagccca aggatgtgct caccattact ctgactccta aggtcacgtg tgttgtggta 780

gacatcagca aggatgatcc cgaggtccag ttcagctggt ttgtagatga tgtggaggtg 840

cacacagctc agacgcaacc ccgggaggag cagttcaaca gcactttccg ctcagtcagt 900

gaacttccca tcatgcacca ggactggctc aatggcaagg agttcaaatg cagggtcaac 960

SeqListing

agtccagctt tccctgcccc catcgagaaa accatctcca aaaccaaagg cagaccgaag 1020

gctccacagg tgtacaccat tccacctccc aaggagcaga tggccaagga taaagtcagt 1080

ctgacctgca tgataacaga cttcttccct gaagacatta ctgtggagtg gcagtggaat 1140

gggcagccag cggagaacta caagaacact cagcccatca tggacacaga tggctcttac 1200

ttcatctaca gcaagctcaa tgtgcagaag agcaactggg aggcaggaaa tactttcacc 1260

tgctctgtgt tacatgaggg cctgcacaac caccatactg agaagagcct ctcccactct 1320

cctggtaaat ga 1332

<210> 13
<211> 462
<212> PRT
<213> Mus musculus

<400> 13

Met Arg Cys Arg Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Thr
20 25 30

Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp His Tyr Met Ser Trp Val Lys Gln Ser His Gly Lys Ser Leu
50 55 60

Glu Trp Ile Gly Asp Ile Asn Pro Tyr Ser Gly Glu Thr Thr Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Thr Ala Thr Leu Thr Val Asp Lys Ser Ser Ser
85 90 95

Ile Ala Tyr Met Glu Ile Arg Gly Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Asp Asp Tyr Asp Ala Ser Pro Phe Ala Tyr Trp
115 120 125

Gly Gln Gly Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr Pro Pro
130 135 140

Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met
145 150 155 160

Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr
165 170 175

Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro

180 185 190

Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val
195 200 205

Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His
210 215 220

Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys
225 230 235 240

Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe
245 250 255

Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro
260 265 270

Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val
275 280 285

Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr
290 295 300

Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu
305 310 315 320

Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys
325 330 335

Arg Val Asn Ser Pro Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser
340 345 350

Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro
355 360 365

Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile
370 375 380

Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly
385 390 395 400

Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp
405 410 415

Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp
420 425 430

Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His
435 440 445

Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys

450 455 460

<210> 14
<211> 1389
<212> DNA
<213> Mus musculus

<400> 14
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gtccagctgc aacagtctgg acctgaactg gtgacgcctg gggcttcagt gaagatatct 120

tgtaaggctt ctggatacac attcactgac cactacatga gctgggtgaa gcagagtcat 180

ggaaaaagcc ttgagtggat tggagatatt aatccctatt ctggtgaaac tacctacaac 240

cagaagttca agggcacggc cacattgact gtagacaagt cttccagtat agcctacatg 300

gagatccgcg gcctgacatc tgaggactct gcagtctatt actgtgcaag agatgattac 360

gacgcctctc cgtttgctta ctggggccaa gggactctgg tcactgtctc tgcagccaaa 420

acgacacccc catctgtcta tccactggcc cctggatctg ctgcccaaac taactccatg 480

gtgaccctgg gatgcctggt caagggctat ttccctgagc cagtgacagt gacctggaac 540

tctggatccc tgtccagcgg tgtgcacacc ttcccagctg tcctgcagtc tgacctctac 600

actctgagca gctcagtgac tgtcccctcc agcacctggc ccagcgagac cgtcacctgc 660

aacgttgccc acccggccag cagcaccaag gtggacaaga aaattgtgcc cagggattgt 720

ggttgtaagc cttgcatatg tacagtccca gaagtatcat ctgtcttcat cttccccca 780

aagcccaagg atgtgctcac cattactctg actcctaagg tcacgtgtgt tgtggtagac 840

atcagcaagg atgatcccga ggtccagttc agctggtttg tagatgatgt ggaggtgcac 900

acagctcaga cgcaaccccg ggaggagcag ttcaacagca ctttccgctc agtcagtgaa 960

cttcccatca tgcaccagga ctggctcaat ggcaaggagt tcaaatgcag ggtcaacagt 1020

ccagctttcc ctgcccccat cgagaaaacc atctccaaaa ccaaaggcag accgaaggct 1080

ccacaggtgt acaccattcc acctcccaag gagcagatgg ccaaggataa agtcagtctg 1140

acctgcatga taacagactt cttccctgaa gacattactg tggagtggca gtggaatggg 1200

cagccagcgg agaactacaa gaacactcag cccatcatgg acacagatgg ctcttacttc 1260

atctacagca agctcaatgt gcagaagagc aactgggagg caggaaatac tttcacctgc 1320

tctgtgttac atgagggcct gcacaaccac catactgaga agagcctctc ccactctcct 1380

ggtaaatga 1389

<210> 15
<211> 218
<212> PRT
<213> Mus musculus

<400> 15

Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Thr Val Ser Leu Gly
1 5 10 15

SeqListing

Leu Arg Ala Thr Ile Ser Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
20 25 30

Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser Gly Ile Pro Ala
50 55 60

Arg Phe Ser Gly Asn Gly Ser Gly Thr Asp Phe Thr Leu Asn Ile His
65 70 75 80

Pro Val Glu Glu Glu Asp Ala Val Thr Tyr Tyr Cys Gln Gln Ser Asn
85 90 95

Glu Asp Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
100 105 110

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
115 120 125

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
130 135 140

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
145 150 155 160

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
165 170 175

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
180 185 190

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
195 200 205

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
210 215

<210> 16
<211> 657
<212> DNA
<213> Mus musculus

<400> 16
gacattgtgc tgacccaatc tccagcttct ttgactgtgt ctctaggcct gagggccacc 60

atctcctgca aggccagcca aagtgttgat tatgatggtg atagttatat gaactggtac 120

cagcagaaac caggacagcc acccaaactc ctcatctatg ctgcatccaa tctagaatct 180

gggatcccag ccaggtttag tggcaatggg tctgggacag acttcaccct caacatccat 240

cctgtggagg aggaggatgc tgtaacctat tactgtcaac aaagtaatga ggatccgtgg 300

acgttcggtg gaggcaccaa gctggaaatc aaacgggctg atgctgcacc aactgtatcc 360

atcttcccac catccagtga gcagttaaca tctggaggtg cctcagtcgt gtgcttcttg 420

aacaacttct accccaaaga catcaatgtc aagtggaaga ttgatggcag tgaacgacaa 480

aatggcgtcc tgaacagttg gactgatcag gacagcaaag acagcaccta cagcatgagc 540

agcaccctca cgttgaccaa ggacgagtat gaacgacata acagctatac ctgtgaggcc 600

actcacaaga catcaacttc acccattgtc aagagcttca acaggaatga gtgttag 657

<210> 17
<211> 238
<212> PRT
<213> Mus musculus

<400> 17

Met Glu Thr Asp Thr Ile Leu Leu Trp Val Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Thr
20 25 30

Val Ser Leu Gly Leu Arg Ala Thr Ile Ser Cys Lys Ala Ser Gln Ser
35 40 45

Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro
50 55 60

Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser
65 70 75 80

Gly Ile Pro Ala Arg Phe Ser Gly Asn Gly Ser Gly Thr Asp Phe Thr
85 90 95

Leu Asn Ile His Pro Val Glu Glu Glu Asp Ala Val Thr Tyr Tyr Cys
100 105 110

Gln Gln Ser Asn Glu Asp Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu
115 120 125

Glu Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro
130 135 140

Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu
145 150 155 160

Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly
165 170 175

Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser
180 185 190

Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp
195 200 205

Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr
210 215 220

Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 18
<211> 717
<212> DNA
<213> Mus musculus

<400> 18
atggagacag acacaatcct gctatgggtg ctgctgctct gggttccagg ctccactggt 60

gacattgtgc tgacccaatc tccagcttct ttgactgtgt ctctaggcct gagggccacc 120

atctcctgca aggccagcca aagtgttgat tatgatggtg atagttatat gaactggtac 180

cagcagaaac caggacagcc acccaaactc ctcatctatg ctgcatccaa tctagaatct 240

gggatcccag ccaggtttag tggcaatggg tctgggacag acttcaccct caacatccat 300

cctgtggagg aggaggatgc tgtaacctat tactgtcaac aaagtaatga ggatccgtgg 360

acgttcggtg gaggcaccaa gctggaaatc aaacgggctg atgctgcacc aactgtatcc 420

atcttcccac catccagtga gcagttaaca tctggaggtg cctcagtcgt gtgcttcttg 480

aacaacttct accccaaaga catcaatgtc aagtggaaga ttgatggcag tgaacgacaa 540

aatggcgtcc tgaacagttg gactgatcag gacagcaaag acagcaccta cagcatgagc 600

agcaccctca cgttgaccaa ggacgagtat gaacgacata acagctatac ctgtgaggcc 660

actcacaaga catcaacttc acccattgtc aagagcttca acaggaatga gtgttag 717

<210> 19
<211> 449
<212> PRT
<213> Mus musculus

<400> 19

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Thr
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Cys
20 25 30

Tyr Met Asn Trp Val Lys Gln Ser His Gly Lys Ser Leu Glu Trp Ile
35 40 45

Gly Asp Ile Asn Pro Phe Asn Gly Gly Thr Thr Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr

65 70 75 80

Met Gln Leu Asn Ser Leu Thr Ser Asp Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser His Tyr Tyr Phe Asp Gly Arg Val Pro Trp Asp Ala Met
100 105 110

Asp Tyr Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Lys Thr
115 120 125

Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr
130 135 140

Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser
180 185 190

Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn
195 200 205

Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro
210 215 220

Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser
225 230 235 240

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
245 250 255

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
260 265 270

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
275 280 285

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
290 295 300

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
305 310 315 320

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
325 330 335

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr

340 345 350

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
355 360 365

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln
370 375 380

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
385 390 395 400

Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys
405 410 415

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
420 425 430

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
435 440 445

Lys

<210> 20
<211> 1350
<212> DNA
<213> Mus musculus

<400> 20
gaggtccagc tgcaacaatc tggacctgag ctggtgaagc ctgggacttc agtgaagatg 60

tcctgtaagg cttctggata cacattcact gactgctaca tgaactgggt gaagcagagc 120

catgggaaga gccttgaatg gattggagat attaatcctt tcaacggtgg tactacctac 180

aaccagaagt tcaagggcaa ggccacattg actgtagaca aatcctccag cacagcctac 240

atgcagctca acagcctgac atctgacgac tctgcagtct attactgtgc aagatcccat 300

tattacttcg atggtagagt cccttgggat gctatggact actggggtca aggaacctca 360

gtcaccgtct cctcagccaa aacgacaccc ccatctgtct atccactggc ccctggatct 420

gctgcccaaa ctaactccat ggtgaccctg ggatgcctgg tcaagggcta tttccctgag 480

ccagtgacag tgacctggaa ctctggatcc ctgtccagcg gtgtgcacac cttcccagct 540

gtcctgcagt ctgacctcta cactctgagc agctcagtga ctgtcccctc cagcacctgg 600

cccagcgaga ccgtcacctg caacgttgcc cacccggcca gcagcaccaa ggtggacaag 660

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tctgtcttca tcttcccccc aaagcccaag gatgtgctca ccattactct gactcctaag 780

gtcacgtgtg ttgtggtaga catcagcaag gatgatcccg aggtccagtt cagctggttt 840

gtagatgatg tggaggtgca cacagctcag acgcaacccc gggaggagca gttcaacagc 900

actttccgct cagtcagtga acttcccatc atgcaccagg actggctcaa tggcaaggag 960

ttcaaatgca gggtcaacag tgcagctttc cctgccccca tcgagaaaac catctccaaa 1020

accaaaggca gaccgaaggc tccacaggtg tacaccattc cacctcccaa ggagcagatg 1080

gccaaggata aagtcagtct gacctgcatg ataacagact tcttccctga agacattact 1140

gtggagtggc agtggaatgg gcagccagcg gagaactaca agaacactca gcccatcatg 1200

gacacagatg gctcttactt catctacagc aagctcaatg tgcagaagag caactgggag 1260

gcaggaaata ctttcacctg ctctgtgtta catgagggcc tgcacaacca ccatactgag 1320

aagagcctct cccactctcc tggtaaatga 1350

<210> 21
<211> 468
<212> PRT
<213> Mus musculus

<400> 21

Met Gly Trp Asn Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Tyr Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
20 25 30

Pro Gly Thr Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Cys Tyr Met Asn Trp Val Lys Gln Ser His Gly Lys Ser Leu
50 55 60

Glu Trp Ile Gly Asp Ile Asn Pro Phe Asn Gly Gly Thr Thr Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser
85 90 95

Thr Ala Tyr Met Gln Leu Asn Ser Leu Thr Ser Asp Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Ser His Tyr Tyr Phe Asp Gly Arg Val Pro Trp
115 120 125

Asp Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser
130 135 140

Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala
145 150 155 160

Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
165 170 175

Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser

180 185 190

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
195 200 205

Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val
210 215 220

Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
225 230 235 240

Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro
245 250 255

Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu
260 265 270

Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser
275 280 285

Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu
290 295 300

Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr
305 310 315 320

Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn
325 330 335

Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro
340 345 350

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln
355 360 365

Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val
370 375 380

Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val
385 390 395 400

Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln
405 410 415

Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn
420 425 430

Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val
435 440 445

Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His

450 455 460

Ser Pro Gly Lys
465

<210> 22
<211> 1407
<212> DNA
<213> Mus musculus

<400> 22
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gtccagctgc aacaatctgg acctgagctg gtgaagcctg ggacttcagt gaagatgtcc 120

tgtaaggctt ctggatacac attcactgac tgctacatga actgggtgaa gcagagccat 180

gggaagagcc ttgaatggat tggagatatt aatcctttca acggtggtac tacctacaac 240

cagaagttca agggcaaggc cacattgact gtagacaaat cctccagcac agcctacatg 300

cagctcaaca gcctgacatc tgacgactct gcagtctatt actgtgcaag atcccattat 360

tacttcgatg gtagagtccc ttgggatgct atggactact ggggtcaagg aacctcagtc 420

accgtctcct cagccaaaac gacaccccca tctgtctatc cactggcccc tggatctgct 480

gcccaaacta actccatggt gaccctggga tgcctggtca agggctattt ccctgagcca 540

gtgacagtga cctggaactc tggatccctg tccagcggtg tgcacacctt cccagctgtc 600

ctgcagtctg acctctacac tctgagcagc tcagtgactg tcccctccag cacctggccc 660

agcgagaccg tcacctgcaa cgttgcccac ccggccagca gcaccaaggt ggacaagaaa 720

attgtgccca gggattgtgg ttgtaagcct tgcatatgta cagtcccaga agtatcatct 780

gtcttcatct tccccccaaa gcccaaggat gtgctcacca ttactctgac tcctaaggtc 840

acgtgtgttg tggtagacat cagcaaggat gatcccgagg tccagttcag ctggtttgta 900

gatgatgtgg aggtgcacac agctcagacg caaccccggg aggagcagtt caacagcact 960

ttccgctcag tcagtgaact tcccatcatg caccaggact ggctcaatgg caaggagttc 1020

aaatgcaggg tcaacagtgc agctttccct gcccccatcg agaaaaccat ctccaaaacc 1080

aaaggcagac cgaaggctcc acaggtgtac accattccac ctcccaagga gcagatggcc 1140

aaggataaag tcagtctgac ctgcatgata acagacttct tccctgaaga cattactgtg 1200

gagtggcagt ggaatgggca gccagcggag aactacaaga acactcagcc catcatggac 1260

acagatggct cttacttcat ctacagcaag ctcaatgtgc agaagagcaa ctgggaggca 1320

ggaaatactt tcacctgctc tgtgttacat gagggcctgc acaaccacca tactgagaag 1380

agcctctccc actctcctgg taaatga 1407

<210> 23
<211> 217
<212> PRT
<213> Artificial Sequence

<220>

SeqListing

<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 23

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Ala Gln Val Leu Thr Gln Thr Pro Ala Ser Val Ser Ala Ala Val Gly
1               5                  10                  15

Gly Thr Val Thr Ile Asn Cys Gln Ser Ser Gln Ser Val Tyr Asp Asn
            20                  25                  30

Asn Trp Leu Ala Trp Phe Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Asp Ala Ser Asp Leu Ala Ser Gly Val Pro Ser Arg Phe
    50                  55                  60

Ser Gly Ser Gly Ser Gly Thr Gln Phe Thr Leu Thr Ile Ser Gly Val
65                  70                  75                  80

Gln Cys Ala Asp Ala Ala Thr Tyr Tyr Cys Gln Gly Ala Tyr Asn Asp
                85                  90                  95

Val Ile Tyr Ala Phe Gly Gly Gly Thr Glu Val Val Val Lys Arg Thr
            100                 105                 110

Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu
        115                 120                 125

Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro
    130                 135                 140

Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn
145                 150                 155                 160

Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr
                165                 170                 175

Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His
            180                 185                 190

Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile
        195                 200                 205

Val Lys Ser Phe Asn Arg Asn Glu Cys
    210                 215
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<210> 24
<211> 654
<212> DNA

<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Rabbit-mouse chimera

<400> 24
gcgcaagtgc tgacccagac tccagcctcc gtgtctgcag ctgtgggagg cacagtcacc 60

atcaattgcc agtccagtca gagtgtttat gataacaact ggttagcctg gtttcagcag 120

aaaccagggc agcctcccaa gctcctgatt tatgatgcat ccgatctggc atctggggtc 180

ccatcgcggt tcagtggcag tggatctggg acacagttca ctctcaccat cagcggcgtg 240

cagtgtgccg atgctgccac ttactactgt caaggcgctt ataatgatgt tatttatgct 300

ttcggcggag ggaccgaggt ggtggtcaaa cgtacggatg ctgcaccaac tgtatccatc 360

ttcccaccat ccagtgagca gttaacatct ggaggtgcct cagtcgtgtg cttcttgaac 420

aacttctacc ccaaagacat caatgtcaag tggaagattg atggcagtga acgacaaaat 480

ggcgtcctga acagttggac tgatcaggac agcaaagaca gcacctacag catgagcagc 540

accctcacgt tgaccaagga cgagtatgaa cgacataaca gctatacctg tgaggccact 600

cacaagacat caacttcacc cattgtcaag agcttcaaca ggaatgagtg ttag 654

<210> 25
<211> 239
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 25

Met Asp Thr Arg Ala Pro Thr Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Pro Gly Ala Thr Phe Ala Gln Val Leu Thr Gln Thr Pro Ala Ser
20 25 30

Val Ser Ala Ala Val Gly Gly Thr Val Thr Ile Asn Cys Gln Ser Ser
35 40 45

Gln Ser Val Tyr Asp Asn Asn Trp Leu Ala Trp Phe Gln Gln Lys Pro
50 55 60

Gly Gln Pro Pro Lys Leu Leu Ile Tyr Asp Ala Ser Asp Leu Ala Ser
65 70 75 80

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Gln Phe Thr
85 90 95

Leu Thr Ile Ser Gly Val Gln Cys Ala Asp Ala Ala Thr Tyr Tyr Cys
100 105 110

Gln Gly Ala Tyr Asn Asp Val Ile Tyr Ala Phe Gly Gly Gly Thr Glu
115 120 125

Val Val Val Lys Arg Thr Asp Ala Ala Pro Thr Val Ser Ile Phe Pro
130 135 140

Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe
145 150 155 160

Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp
165 170 175

Gly Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp
180 185 190

Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys
195 200 205

Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys
210 215 220

Thr Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 26
<211> 720
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<220>
<221> misc_feature
<223> Rabbit-mouse chimera

<400> 26
atggacacga gggcccccac tcagctgctg gggctcctgc tgctctggct cccaggtgcc 60

acatttgcgc aagtgctgac ccagactcca gcctccgtgt ctgcagctgt gggaggcaca 120

gtcaccatca attgccagtc cagtcagagt gtttatgata acaactggtt agcctggttt 180

cagcagaaac cagggcagcc tcccaagctc ctgatttatg atgcatccga tctggcatct 240

ggggtcccat cgcggttcag tggcagtgga tctgggacac agttcactct caccatcagc 300

ggcgtgcagt gtgccgatgc tgccacttac tactgtcaag gcgcttataa tgatgttatt 360

tatgctttcg gcggagggac cgaggtggtg gtcaaacgta cggatgctgc accaactgta 420

tccatcttcc caccatccag tgagcagtta acatctggag gtgcctcagt cgtgtgcttc 480

ttgaacaact tctaccccaa agacatcaat gtcaagtgga agattgatgg cagtgaacga 540

caaaatggcg tcctgaacag ttggactgat caggacagca aagacagcac ctacagcatg 600

agcagcaccc tcacgttgac caaggacgag tatgaacgac ataacagcta tacctgtgag 660

gccactcaca agacatcaac ttcacccatt gtcaagagct tcaacaggaa tgagtgttag 720

<210> 27
<211> 433
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody

<400> 27

Gln Ser Leu Glu Glu Ser Gly Gly Arg Leu Val Thr Pro Gly Thr Pro
1 5 10 15

Leu Thr Leu Thr Cys Thr Ala Ser Gly Phe Ser Leu Ser Ser Tyr Trp
20 25 30

Met Asn Trp Val Arg Gln Ala Pro Gly Glu Gly Leu Glu Trp Ile Gly
35 40 45

Thr Ile Asp Ser Gly Gly Arg Thr Asp Tyr Ala Ser Trp Ala Lys Gly
50 55 60

Arg Phe Thr Ile Ser Arg Thr Ser Thr Thr Met Asp Leu Lys Met Thr
65 70 75 80

Ser Leu Thr Thr Gly Asp Thr Ala Arg Tyr Phe Cys Ala Arg Asn Trp
85 90 95

Asn Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
100 105 110

Lys Gly Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr
115 120 125

Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu
130 135 140

Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His
145 150 155 160

Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser

165 170 175

Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn
180 185 190

Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro
195 200 205

Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser
210 215 220

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
225 230 235 240

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
245 250 255

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
260 265 270

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
275 280 285

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
290 295 300

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
305 310 315 320

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr
325 330 335

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
340 345 350

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln
355 360 365

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
370 375 380

Asn Thr Asn Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys
385 390 395 400

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
405 410 415

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
420 425 430

Lys

<210> 28
<211> 1302
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody

<400> 28
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgcacagcct ctggattctc cctcagtagt tattggatga actgggtccg ccaggctcca 120

ggggaggggc tggaatggat cggaaccatt gattctggtg gtaggacgga ctacgcgagc 180

tgggcaaaag gccgattcac catctccaga acctcgacta cgatggatct gaaaatgacc 240

agtctgacga ccggggacac ggcccgttat ttctgtgcca gaaattggaa cttgtggggc 300

caaggcaccc tcgtcaccgt ctcgagcgct tctacaaagg gcccatctgt ctatccactg 360

gcccctggat ctgctgccca aactaactcc atggtgaccc tgggatgcct ggtcaagggc 420

tatttccctg agccagtgac agtgacctgg aactctggat ccctgtccag cggtgtgcac 480

accttcccag ctgtcctgca gtctgacctc tacactctga gcagctcagt gactgtcccc 540

tccagcacct ggcccagcga gaccgtcacc tgcaacgttg cccacccggc cagcagcacc 600

aaggtggaca agaaaattgt gcccagggat tgtggttgta agccttgcat atgtacagtc 660

ccagaagtat catctgtctt catcttcccc ccaaagccca aggatgtgct caccattact 720

ctgactccta aggtcacgtg tgttgtggta gacatcagca aggatgatcc cgaggtccag 780

ttcagctggt ttgtagatga tgtggaggtg cacacagctc agacgcaacc ccgggaggag 840

cagttcaaca gcactttccg ctcagtcagt gaacttccca tcatgcacca ggactggctc 900

aatggcaagg agttcaaatg cagggtcaac agtgcagctt tccctgcccc catcgagaaa 960

accatctcca aaaccaaagg cagaccgaag gctccacagg tgtacaccat tccacctccc 1020

aaggagcaga tggccaagga taaagtcagt ctgacctgca tgataacaga cttcttccct 1080

gaagacatta ctgtggagtg gcagtggaat gggcagccag cggagaacta caagaacact 1140

cagcccatca tggacacaga tggctcttac ttcgtctaca gcaagctcaa tgtgcagaag 1200

agcaactggg aggcaggaaa tactttcacc tgctctgtgt tacatgaggg cctgcacaac 1260

caccatactg agaagagcct ctcccactct cctggtaaat ga 1302

<210> 29
<211> 452
<212> PRT
<213> Artificial Sequence

<220>

SeqListing

<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody

<400> 29

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Met Glu Thr Gly Leu Arg Trp Leu Leu Leu Val Ala Val Leu Lys Gly
1               5                  10                  15

Val His Cys Gln Ser Leu Glu Glu Ser Gly Gly Arg Leu Val Thr Pro
            20                  25                  30

Gly Thr Pro Leu Thr Leu Thr Cys Thr Ala Ser Gly Phe Ser Leu Ser
        35                  40                  45

Ser Tyr Trp Met Asn Trp Val Arg Gln Ala Pro Gly Glu Gly Leu Glu
    50                  55                  60

Trp Ile Gly Thr Ile Asp Ser Gly Gly Arg Thr Asp Tyr Ala Ser Trp
65                  70                  75                  80

Ala Lys Gly Arg Phe Thr Ile Ser Arg Thr Ser Thr Thr Met Asp Leu
                85                  90                  95

Lys Met Thr Ser Leu Thr Thr Gly Asp Thr Ala Arg Tyr Phe Cys Ala
            100                 105                 110

Arg Asn Trp Asn Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125

Ala Ser Thr Lys Gly Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala
    130                 135                 140

Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
145                 150                 155                 160

Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser
                165                 170                 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
            180                 185                 190

Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val
        195                 200                 205

Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
    210                 215                 220

Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro
225                 230                 235                 240
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Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu
245 250 255

Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser
260 265 270

Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu
275 280 285

Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr
290 295 300

Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn
305 310 315 320

Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro
325 330 335

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln
340 345 350

Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val
355 360 365

Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val
370 375 380

Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln
385 390 395 400

Pro Ile Met Asn Thr Asn Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn
405 410 415

Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val
420 425 430

Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His
435 440 445

Ser Pro Gly Lys
450

<210> 30
<211> 1359
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature

SeqListing

<223> Humanized Antibody

<400> 30

atggagactg ggctgcgctg gcttctcctg gtcgctgtgc tcaaaggtgt ccactgtcag 60

tcgctggagg agtccggggg tcgcctggtc acgcctggga cacccctgac actcacctgc 120

acagcctctg gattctccct cagtagttat tggatgaact gggtccgcca ggctccaggg 180

gaggggctgg aatggatcgg aaccattgat tctggtggta ggacggacta cgcgagctgg 240

gcaaaaggcc gattcaccat ctccagaacc tcgactacga tggatctgaa aatgaccagt 300

ctgacgaccg gggacacggc ccgttatttc tgtgccagaa attggaactt gtggggccaa 360

ggcaccctcg tcaccgtctc gagcgcttct acaaagggcc catctgtcta tccactggcc 420

cctggatctg ctgcccaaac taactccatg gtgaccctgg gatgcctggt caagggctat 480

ttccctgagc cagtgacagt gacctggaac tctggatccc tgtccagcgg tgtgcacacc 540

ttcccagctg tcctgcagtc tgacctctac actctgagca gctcagtgac tgtcccctcc 600

agcacctggc ccagcgagac cgtcacctgc aacgttgccc acccggccag cagcaccaag 660

gtggacaaga aaattgtgcc cagggattgt ggttgtaagc cttgcatatg tacagtccca 720

gaagtatcat ctgtcttcat cttccccccа aagcccaagg atgtgctcac cattactctg 780

actcctaagg tcacgtgtgt tgtggtagac atcagcaagg atgatcccga ggtccagttc 840

agctggtttg tagatgatgt ggaggtgcac acagctcaga cgcaaccccg ggaggagcag 900

ttcaacagca ctttccgctc agtcagtgaa cttcccatca tgcaccagga ctggctcaat 960

ggcaaggagt tcaaatgcag ggtcaacagt gcagctttcc ctgccccat cgagaaaacc 1020

atctccaaaa ccaaaggcag accgaaggct ccacaggtgt acaccattcc acctcccaag 1080

gagcagatgg ccaaggataa agtcagtctg acctgcatga taacagactt cttccctgaa 1140

gacattactg tggagtggca gtggaatggg cagccagcgg agaactacaa gaacactcag 1200

cccatcatgg acacagatgg ctcttacttc gtctacagca agctcaatgt gcagaagagc 1260

aactgggagg caggaaatac tttcacctgc tctgtgttac atgagggcct gcacaaccac 1320

catactgaga agagcctctc ccactctcct ggtaaatga 1359

<210> 31
<211> 213
<212> PRT
<213> Mus musculus

<400> 31

Gln Ile Val Leu Thr Gln Ser Pro Thr Ile Val Ser Ala Ser Pro Gly
1 5 10 15

Glu Lys Val Thr Leu Ile Cys Ser Ala Ser Ser Ser Val Ser Phe Val
20 25 30

Asp Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Arg Trp Ile Tyr
35 40 45

SeqListing

```
Arg Thr Ser Asn Leu Gly Phe Gly Val Pro Ala Arg Phe Ser Gly Gly
    50                  55                  60

Gly Ser Gly Thr Ser His Ser Leu Thr Ile Ser Arg Met Glu Ala Glu
65                  70                  75                  80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Arg Ser Thr Tyr Pro Pro Thr
                85                  90                  95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg Ala Asp Ala Ala Pro
            100                 105                 110

Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly
        115                 120                 125

Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn
    130                 135                 140

Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn
145                 150                 155                 160

Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser
                165                 170                 175

Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr
            180                 185                 190

Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe
        195                 200                 205

Asn Arg Asn Glu Cys
    210
```

<210> 32
<211> 642
<212> DNA
<213> Mus musculus

<400> 32

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caaattgttc tcacccagtc tccaacaatc gtgtctgcat ctccagggga gaaggtcacc      60

ctaatctgca gtgccagttc aagtgtaagt ttcgtggact ggttccagca gaagccaggc     120

acttctccca aacgctggat ttacagaaca tccaacctgg gttttggagt ccctgctcgc     180

ttcagtggcg gtggatctgg gacctctcac tctctcacaa tcagccgaat ggaggctgaa     240

gatgctgcca cttattactg ccagcaaagg agtacttacc cacccacgtt cggtgctggg     300

accaagctgg aactgaaacg ggctgatgct gcaccaactg tatccatctt cccaccatcc     360

agtgagcagt taacatctgg aggtgcctca gtcgtgtgct tcttgaacaa cttctacccc     420

aaagacatca atgtcaagtg gaagattgat ggcagtgaac gacaaaatgg cgtcctgaac     480

agttggactg atcaggacag caaagacagc acctacagca tgagcagcac cctcacgttg     540
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accaaggacg agtatgaacg acataacagc tatacctgtg aggccactca caagacatca 600

acttcaccca ttgtcaagag cttcaacagg aatgagtgtt ag 642

<210> 33
<211> 235
<212> PRT
<213> Mus musculus

<400> 33

Met His Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser
1 5 10 15

Val Ile Val Ser Arg Gly Gln Ile Val Leu Thr Gln Ser Pro Thr Ile
20 25 30

Val Ser Ala Ser Pro Gly Glu Lys Val Thr Leu Ile Cys Ser Ala Ser
35 40 45

Ser Ser Val Ser Phe Val Asp Trp Phe Gln Gln Lys Pro Gly Thr Ser
50 55 60

Pro Lys Arg Trp Ile Tyr Arg Thr Ser Asn Leu Gly Phe Gly Val Pro
65 70 75 80

Ala Arg Phe Ser Gly Gly Gly Ser Gly Thr Ser His Ser Leu Thr Ile
85 90 95

Ser Arg Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Arg
100 105 110

Ser Thr Tyr Pro Pro Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys
115 120 125

Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu
130 135 140

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe
145 150 155 160

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg
165 170 175

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser
180 185 190

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu
195 200 205

Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser
210 215 220

Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 34
<211> 708
<212> DNA
<213> Mus musculus

<400> 34
atgcattttc aagtgcagat tttcagcttc ctgctaatca gtgcctcagt catagtgtcc 60

agagggcaaa ttgttctcac ccagtctcca acaatcgtgt ctgcatctcc aggggagaag 120

gtcaccctaa tctgcagtgc cagttcaagt gtaagtttcg tggactggtt ccagcagaag 180

ccaggcactt ctcccaaacg ctggatttac agaacatcca acctgggttt tggagtccct 240

gctcgcttca gtggcggtgg atctgggacc tctcactctc tcacaatcag ccgaatggag 300

gctgaagatg ctgccactta ttactgccag caaaggagta cttacccacc cacgttcggt 360

gctgggacca agctggaact gaaacgggct gatgctgcac caactgtatc catcttccca 420

ccatccagtg agcagttaac atctggaggt gcctcagtcg tgtgcttctt gaacaacttc 480

taccccaaag acatcaatgt caagtggaag attgatggca gtgaacgaca aaatggcgtc 540

ctgaacagtt ggactgatca ggacagcaaa gacagcacct acagcatgag cagcaccctc 600

acgttgacca aggacgagta tgaacgacat aacagctata cctgtgaggc cactcacaag 660

acatcaactt cacccattgt caagagcttc aacaggaatg agtgttag 708

<210> 35
<211> 449
<212> PRT
<213> Mus musculus

<400> 35

Gln Val Thr Leu Lys Glu Ser Gly Pro Gly Ile Leu Gln Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Ser Phe Ser Gly Phe Ser Leu Ser Thr Ser
20 25 30

Gly Met Gly Val Gly Trp Ile Arg His Pro Ser Gly Lys Asn Leu Glu
35 40 45

Trp Leu Ala His Ile Trp Trp Asp Asp Val Lys Arg Tyr Asn Pro Val
50 55 60

Leu Lys Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Asn Ser Gln Val
65 70 75 80

Phe Leu Lys Ile Ala Asn Val Asp Thr Ala Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala Arg Ile Glu Asp Phe Asp Tyr Asp Glu Glu Tyr Tyr Ala Met

100 105 110

Asp Tyr Trp Gly Gln Gly Thr Ser Val Ile Val Ser Ser Ala Lys Thr
115 120 125

Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr
130 135 140

Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser
180 185 190

Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn
195 200 205

Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro
210 215 220

Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser
225 230 235 240

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
245 250 255

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
260 265 270

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
275 280 285

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
290 295 300

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
305 310 315 320

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
325 330 335

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr
340 345 350

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
355 360 365

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln

370 375 380

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
385 390 395 400

Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys
405 410 415

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
420 425 430

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
435 440 445

Lys

<210> 36
<211> 1350
<212> DNA
<213> Mus musculus

<400> 36
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cacccatcag ggaagaatct ggagtggctg gcacacattt ggtgggatga tgtcaagcgc 180
tataacccag tcctgaagag ccgactgact atctccaagg atacctccaa cagccaggta 240
ttcctcaaga tcgccaatgt ggacactgca gatactgcca catactactg tgctcgaata 300
gaggactttg attacgacga ggagtattat gctatggact actggggtca aggaacctca 360
gtcatcgtct cctcagccaa aacgacaccc ccatctgtct atccactggc ccctggatct 420
gctgcccaaa ctaactccat ggtgaccctg ggatgcctgg tcaagggcta tttccctgag 480
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gtcctgcagt ctgacctcta cactctgagc agctcagtga ctgtcccctc cagcacctgg 600
cccagcgaga ccgtcacctg caacgttgcc cacccggcca gcagcaccaa ggtggacaag 660
aaaattgtgc ccagggattg tggttgtaag ccttgcatat gtacagtccc agaagtatca 720
tctgtcttca tcttcccccc aaagcccaag gatgtgctca ccattactct gactcctaag 780
gtcacgtgtg ttgtggtaga catcagcaag gatgatcccg aggtccagtt cagctggttt 840
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actttccgct cagtcagtga acttcccatc atgcaccagg actggctcaa tggcaaggag 960
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accaaaggca gaccgaaggc tccacaggtg tacaccattc cacctcccaa ggagcagatg 1080
gccaaggata aagtcagtct gacctgcatg ataacagact tcttccctga agacattact 1140
gtggagtggc agtggaatgg gcagccagcg gagaactaca agaacactca gcccatcatg 1200

gacacagatg gctcttactt cgtctacagc aagctcaatg tgcagaagag caactgggag 1260

gcaggaaata ctttcacctg ctctgtgtta catgagggcc tgcacaacca ccatactgag 1320

aagagcctct cccactctcc tggtaaatga 1350

<210> 37
<211> 468
<212> PRT
<213> Mus musculus

<400> 37

Met Gly Arg Leu Thr Ser Ser Phe Leu Leu Leu Ile Val Pro Ala Tyr
1 5 10 15

Val Leu Ser Gln Val Thr Leu Lys Glu Ser Gly Pro Gly Ile Leu Gln
20 25 30

Pro Ser Gln Thr Leu Ser Leu Thr Cys Ser Phe Ser Gly Phe Ser Leu
35 40 45

Ser Thr Ser Gly Met Gly Val Gly Trp Ile Arg His Pro Ser Gly Lys
50 55 60

Asn Leu Glu Trp Leu Ala His Ile Trp Trp Asp Asp Val Lys Arg Tyr
65 70 75 80

Asn Pro Val Leu Lys Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Asn
85 90 95

Ser Gln Val Phe Leu Lys Ile Ala Asn Val Asp Thr Ala Asp Thr Ala
100 105 110

Thr Tyr Tyr Cys Ala Arg Ile Glu Asp Phe Asp Tyr Asp Glu Glu Tyr
115 120 125

Tyr Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser Val Ile Val Ser Ser
130 135 140

Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala
145 150 155 160

Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
165 170 175

Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser
180 185 190

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
195 200 205

Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val

210 215 220

Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
225 230 235 240

Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro
245 250 255

Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu
260 265 270

Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser
275 280 285

Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu
290 295 300

Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr
305 310 315 320

Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn
325 330 335

Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro
340 345 350

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln
355 360 365

Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val
370 375 380

Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val
385 390 395 400

Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln
405 410 415

Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn
420 425 430

Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val
435 440 445

Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His
450 455 460

Ser Pro Gly Lys
465

<210> 38

SeqListing

<211> 1407
<212> DNA
<213> Mus musculus

<400> 38
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gttactctga aagagtctgg ccctgggata ttgcagccct cccagaccct cagtctgact 120

tgttctttct ctgggttttc actgagcact tctggtatgg gtgtaggctg gattcgtcac 180

ccatcaggga agaatctgga gtggctggca cacatttggt gggatgatgt caagcgctat 240

aacccagtcc tgaagagccg actgactatc tccaaggata cctccaacag ccaggtattc 300

ctcaagatcg ccaatgtgga cactgcagat actgccacat actactgtgc tcgaatagag 360

gactttgatt acgacgagga gtattatgct atggactact ggggtcaagg aacctcagtc 420

atcgtctcct cagccaaaac gacaccccca tctgtctatc cactggcccc tggatctgct 480

gcccaaacta actccatggt gaccctggga tgcctggtca agggctattt ccctgagcca 540

gtgacagtga cctggaactc tggatccctg tccagcggtg tgcacacctt cccagctgtc 600

ctgcagtctg acctctacac tctgagcagc tcagtgactg tcccctccag cacctggccc 660

agcgagaccg tcacctgcaa cgttgcccac ccggccagca gcaccaaggt ggacaagaaa 720

attgtgccca gggattgtgg ttgtaagcct tgcatatgta cagtcccaga agtatcatct 780

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acgtgtgttg tggtagacat cagcaaggat gatcccgagg tccagttcag ctggtttgta 900

gatgatgtgg aggtgcacac agctcagacg caaccccggg aggagcagtt caacagcact 960

ttccgctcag tcagtgaact tcccatcatg caccaggact ggctcaatgg caaggagttc 1020

aaatgcaggg tcaacagtgc agctttccct gcccccatcg agaaaaccat ctccaaaacc 1080

aaaggcagac cgaaggctcc acaggtgtac accattccac ctcccaagga gcagatggcc 1140

aaggataaag tcagtctgac ctgcatgata acagacttct tccctgaaga cattactgtg 1200

gagtggcagt ggaatgggca gccagcggag aactacaaga acactcagcc catcatggac 1260

acagatggct cttacttcgt ctacagcaag ctcaatgtgc agaagagcaa ctgggaggca 1320

ggaaatactt tcacctgctc tgtgttacat gagggcctgc acaaccacca tactgagaag 1380

agcctctccc actctcctgg taaatga 1407

<210> 39
<211> 5
<212> PRT
<213> Mus musculus

<400> 39

Asp His Tyr Met Ser
1 5

<210> 40
<211> 17
<212> PRT

<213> Mus musculus

<400> 40

Asp Ile Asn Pro Tyr Ser Gly Glu Thr Thr Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 41
<211> 10
<212> PRT
<213> Mus musculus

<400> 41

Asp Asp Tyr Asp Ala Ser Pro Phe Ala Tyr
1 5 10

<210> 42
<211> 11
<212> PRT
<213> Mus musculus

<400> 42

Gln Ala Ser Gln Gly Thr Ser Ile Asn Leu Asn
1 5 10

<210> 43
<211> 7
<212> PRT
<213> Mus musculus

<400> 43

Gly Ser Ser Asn Leu Glu Asp
1 5

<210> 44
<211> 9
<212> PRT
<213> Mus musculus

<400> 44

Leu Gln His Ser Tyr Leu Pro Tyr Thr
1 5

<210> 45
<211> 5
<212> PRT
<213> Mus musculus

<400> 45

Asp Cys Tyr Met Asn
1 5

<210> 46

SeqListing

<211> 17
<212> PRT
<213> Mus musculus

<400> 46

Asp Ile Asn Pro Phe Asn Gly Gly Thr Thr Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 47
<211> 16
<212> PRT
<213> Mus musculus

<400> 47

Ser His Tyr Tyr Phe Asp Gly Arg Val Pro Trp Asp Ala Met Asp Tyr
1 5 10 15

<210> 48
<211> 15
<212> PRT
<213> Mus musculus

<400> 48

Lys Ala Ser Gln Ser Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn
1 5 10 15

<210> 49
<211> 7
<212> PRT
<213> Mus musculus

<400> 49

Ala Ala Ser Asn Leu Glu Ser
1 5

<210> 50
<211> 9
<212> PRT
<213> Mus musculus

<400> 50

Gln Gln Ser Asn Glu Asp Pro Trp Thr
1 5

<210> 51
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
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<220>

<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 51

Ser Tyr Trp Met Asn
1 5

<210> 52
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 52

Thr Ile Asp Ser Gly Gly Arg Thr Asp Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 53
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Rabbit-Mouse Chimera

<400> 53

Asn Trp Asn Leu
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<210> 54
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 54

Gln Ser Ser Gln Ser Val Tyr Asp Asn Asn Trp Leu Ala
1 5 10

<210> 55
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 55

Asp Ala Ser Asp Leu Ala Ser
1 5

<210> 56
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<221> MISC_FEATURE
<223> Rabbit-mouse chimera

<400> 56

Gln Gly Ala Tyr Asn Asp Val Ile Tyr Ala
1 5 10

<210> 57
<211> 7
<212> PRT
<213> Mus musculus

<400> 57

Thr Ser Gly Met Gly Val Gly
1 5

<210> 58
<211> 16
<212> PRT
<213> Mus musculus

<400> 58

His Ile Trp Trp Asp Asp Val Lys Arg Tyr Asn Pro Val Leu Lys Ser
1 5 10 15

<210> 59
<211> 14
<212> PRT
<213> Mus musculus

<400> 59

Glu Asp Phe Asp Tyr Asp Glu Glu Tyr Tyr Ala Met Asp Tyr
1 5 10

<210> 60
<211> 10
<212> PRT
<213> Mus musculus

<400> 60

Ser Ala Ser Ser Ser Val Ser Phe Val Asp
1 5 10

<210> 61
<211> 7
<212> PRT
<213> Mus musculus

<400> 61

Arg Thr Ser Asn Leu Gly Phe
1 5

<210> 62
<211> 9
<212> PRT
<213> Mus musculus

<400> 62

Gln Gln Arg Ser Thr Tyr Pro Pro Thr
1 5

<210> 63
<211> 20
<212> PRT
<213> Homo sapiens

<400> 63

Cys Gly Pro Ala Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp
1 5 10 15

Trp Arg Pro Ser
20

<210> 64
<211> 20
<212> PRT
<213> Homo sapiens

<400> 64

Gly Pro Ala Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp
1 5 10 15

Arg Pro Ser Gly
20

<210> 65
<211> 20
<212> PRT
<213> Homo sapiens

<400> 65

Pro Ala Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg
1 5 10 15

Pro Ser Gly Pro
20

<210> 66
<211> 20
<212> PRT
<213> Homo sapiens

<400> 66

Ala Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro
1 5 10 15

Ser Gly Pro Asp
20

<210> 67
<211> 20
<212> PRT
<213> Homo sapiens

<400> 67

Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser
1 5 10 15

Gly Pro Asp Phe
20

<210> 68
<211> 20
<212> PRT
<213> Homo sapiens

<400> 68

Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser Gly
1 5 10 15

Pro Asp Phe Arg
20

<210> 69
<211> 20
<212> PRT
<213> Homo sapiens

<400> 69

Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser Gly Pro
1 5 10 15

Asp Phe Arg Cys
20

<210> 70
<211> 14

<212> PRT
<213> Homo sapiens

<400> 70

Ser Ala Lys Pro Val Thr Glu Leu Val Cys Ser Gly Gln Cys
1 5 10

<210> 71
<211> 7
<212> PRT
<213> Homo sapiens

<400> 71

Leu Val Ala Ser Cys Lys Cys
1 5

<210> 72
<211> 8
<212> PRT
<213> Homo sapiens

<400> 72

Cys Arg Glu Leu His Phe Thr Arg
1 5

<210> 73
<211> 7
<212> PRT
<213> Homo sapiens

<400> 73

Cys Ile Pro Asp Arg Tyr Arg
1 5

<210> 74
<211> 399
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 74
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acatttgctc aagttctgac ccagagtcca agcagtctct ccgccagcgt aggcgatcgt 120

gtgactatta cctgtcaatc tagtcagagc gtgtatgata acaattggct ggcgtggtac 180

cagcaaaaac cgggcaaagc cccgaagctg ctcatctatg acgcgtccga tctggctagc 240

ggtgtgccaa gccgtttcag tggcagtggc agcggtactg actttaccct cacaatttcg 300

tctctccagc cggaagattt cgccacttac tattgtcaag gtgcttacaa cgatgtgatt 360

tatgccttcg gtcagggcac taaagtagaa atcaaacgt 399

<210> 75
<211> 133
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 75

Met Asp Thr Arg Ala Pro Thr Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Pro Gly Ala Thr Phe Ala Gln Val Leu Thr Gln Ser Pro Ser Ser
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Gln Ser Ser
35 40 45

Gln Ser Val Tyr Asp Asn Asn Trp Leu Ala Trp Tyr Gln Gln Lys Pro
50 55 60

Gly Lys Ala Pro Lys Leu Leu Ile Tyr Asp Ala Ser Asp Leu Ala Ser
65 70 75 80

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
85 90 95

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys
100 105 110

Gln Gly Ala Tyr Asn Asp Val Ile Tyr Ala Phe Gly Gln Gly Thr Lys
115 120 125

Val Glu Ile Lys Arg
130

<210> 76
<211> 393
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 76

SeqListing

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gtgcagctgt tggagtctgg aggcgggctt gtccagcctg gagggagcct gcgtctctct 120

tgtgcagcaa gcggcttcag cttatcctct tactggatga attgggtgcg gcaggcacct 180

gggaagggcc tggagtgggt gggcaccatt gattccggag gccgtacaga ctacgcgtct 240

tgggcaaagg gccgtttcac catttcccgc gacaactcca aaaataccat gtacctccag 300

atgaactctc tccgcgcaga ggacacagca cgttattact gtgcacgcaa ctggaatctg 360

tggggtcaag gtactcttgt aacagtctcg agc 393

<210> 77
<211> 131
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 77

Met Glu Thr Gly Leu Arg Trp Leu Leu Leu Val Ala Val Leu Lys Gly
1 5 10 15

Val His Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Leu
35 40 45

Ser Ser Tyr Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Gly Thr Ile Asp Ser Gly Gly Arg Thr Asp Tyr Ala Ser
65 70 75 80

Trp Ala Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
85 90 95

Met Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Arg Tyr
100 105 110

Tyr Cys Ala Arg Asn Trp Asn Leu Trp Gly Gln Gly Thr Leu Val Thr
115 120 125

Val Ser Ser
130

<210> 78
<211> 11

<212> PRT
<213> Mus musculus

<400> 78

Arg Ala Ser Gln Asp Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 79
<211> 7
<212> PRT
<213> Mus musculus

<400> 79

Tyr Thr Ser Arg Leu Leu Ser
1 5

<210> 80
<211> 9
<212> PRT
<213> Mus musculus

<400> 80

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 81
<211> 11
<212> PRT
<213> Mus musculus

<400> 81

Arg Ala Ser Gln Asp Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 82
<211> 24
<212> PRT
<213> Rattus norvegicus

<400> 82

Gln Gly Trp Gln Ala Phe Lys Asn Asp Ala Thr Glu Ile Ile Pro Gly
1 5 10 15

Leu Arg Glu Tyr Pro Glu Pro Pro
20

<210> 83
<211> 20
<212> PRT
<213> Rattus norvegicus

<400> 83

Thr Glu Ile Ile Pro Gly Leu Arg Glu Tyr Pro Glu Pro Pro Gln Glu
1 5 10 15

Leu Glu Asn Asn
20

<210> 84
<211> 20
<212> PRT
<213> Rattus norvegicus

<400> 84

Pro Glu Pro Pro Gln Glu Leu Glu Asn Asn Gln Thr Met Asn Arg Ala
1 5 10 15

Glu Asn Gly Gly
20

<210> 85
<211> 20
<212> PRT
<213> Rattus norvegicus

<400> 85

Glu Asn Gly Gly Arg Pro Pro His His Pro Tyr Asp Thr Lys Asp Val
1 5 10 15

Ser Glu Tyr Ser
20

<210> 86
<211> 14
<212> PRT
<213> Rattus norvegicus

<400> 86

Cys Arg Glu Leu His Tyr Thr Arg Phe Val Thr Asp Gly Pro
1 5 10

<210> 87
<211> 25
<212> PRT
<213> Rattus norvegicus

<400> 87

Cys Arg Glu Leu His Tyr Thr Arg Phe Val Thr Asp Gly Pro Ser Arg
1 5 10 15

Ser Ala Lys Pro Val Thr Glu Leu Val
20 25

<210> 88
<211> 23
<212> PRT
<213> Rattus norvegicus

<400> 88

Cys Arg Ser Ala Lys Pro Val Thr Glu Leu Val Ser Ser Gly Gln Ser

1 5 10 15

Gly Pro Arg Ala Arg Leu Leu
20

<210> 89
<211> 25
<212> PRT
<213> Rattus norvegicus

<400> 89

Cys Gly Pro Ala Arg Leu Leu Pro Asn Ala Ile Gly Arg Val Lys Trp
1 5 10 15

Trp Arg Pro Asn Gly Pro Asp Phe Arg
20 25

<210> 90
<211> 20
<212> PRT
<213> Rattus norvegicus

<400> 90

Arg Ala Gln Arg Val Gln Leu Leu Cys Pro Gly Gly Ala Ala Pro Arg
1 5 10 15

Ser Arg Lys Val
20

<210> 91
<211> 16
<212> PRT
<213> Rattus norvegicus

<400> 91

Pro Gly Gly Ala Ala Pro Arg Ser Arg Lys Val Arg Leu Val Ala Ser
1 5 10 15

<210> 92
<211> 23
<212> PRT
<213> Rattus norvegicus

<400> 92

Lys Arg Leu Thr Arg Phe His Asn Gln Ser Glu Leu Lys Asp Phe Gly
1 5 10 15

Pro Glu Thr Ala Arg Pro Gln
20

<210> 93
<211> 16
<212> PRT
<213> Rattus norvegicus

<400> 93

Ile Pro Asp Arg Tyr Ala Gln Arg Val Gln Leu Leu Ser Pro Gly Gly
1 5 10 15

<210> 94
<211> 24
<212> PRT
<213> Rattus norvegicus

<400> 94

Ser Glu Leu Lys Asp Phe Gly Pro Glu Thr Ala Arg Pro Gln Lys Gly
1 5 10 15

Arg Lys Pro Arg Pro Arg Ala Arg
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<210> 95
<211> 23
<212> PRT
<213> Rattus norvegicus

<400> 95

Lys Gly Arg Lys Pro Arg Pro Arg Ala Arg Gly Ala Lys Ala Asn Gln
1 5 10 15

Ala Glu Leu Glu Asn Ala Tyr
20

<210> 96
<211> 18
<212> PRT
<213> Rattus norvegicus

<400> 96

Pro Asn Ala Ile Gly Arg Val Lys Trp Trp Arg Pro Asn Gly Pro Asp
1 5 10 15

Phe Arg

<210> 97
<211> 22
<212> PRT
<213> Rattus norvegicus

<400> 97

Lys Trp Trp Arg Pro Asn Gly Pro Asp Phe Arg Cys Ile Pro Asp Arg
1 5 10 15

Tyr Arg Ala Gln Arg Val
20

<210> 98
<211> 213

<212> PRT
<213> Rattus norvegicus

<400> 98

Met Gln Leu Ser Leu Ala Pro Cys Leu Ala Cys Leu Leu Val His Ala
1 5 10 15

Ala Phe Val Ala Val Glu Ser Gln Gly Trp Gln Ala Phe Lys Asn Asp
20 25 30

Ala Thr Glu Ile Ile Pro Gly Leu Arg Glu Tyr Pro Glu Pro Pro Gln
35 40 45

Glu Leu Glu Asn Asn Gln Thr Met Asn Arg Ala Glu Asn Gly Gly Arg
50 55 60

Pro Pro His His Pro Tyr Asp Thr Lys Asp Val Ser Glu Tyr Ser Cys
65 70 75 80

Arg Glu Leu His Tyr Thr Arg Phe Val Thr Asp Gly Pro Cys Arg Ser
85 90 95

Ala Lys Pro Val Thr Glu Leu Val Cys Ser Gly Gln Cys Gly Pro Ala
100 105 110

Arg Leu Leu Pro Asn Ala Ile Gly Arg Val Lys Trp Trp Arg Pro Asn
115 120 125

Gly Pro Asp Phe Arg Cys Ile Pro Asp Arg Tyr Arg Ala Gln Arg Val
130 135 140

Gln Leu Leu Cys Pro Gly Gly Ala Ala Pro Arg Ser Arg Lys Val Arg
145 150 155 160

Leu Val Ala Ser Cys Lys Cys Lys Arg Leu Thr Arg Phe His Asn Gln
165 170 175

Ser Glu Leu Lys Asp Phe Gly Pro Glu Thr Ala Arg Pro Gln Lys Gly
180 185 190

Arg Lys Pro Arg Pro Arg Ala Arg Gly Ala Lys Ala Asn Gln Ala Glu
195 200 205

Leu Glu Asn Ala Tyr
210

<210> 99
<211> 7
<212> PRT
<213> Mus musculus

<400> 99

Tyr Thr Ser Arg Leu His Ser
1 5

<210> 100
<211> 9
<212> PRT
<213> Mus musculus

<400> 100

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 101
<211> 11
<212> PRT
<213> Mus musculus

<400> 101

Arg Ala Ser Gln Val Ile Thr Asn Tyr Leu Tyr
1 5 10

<210> 102
<211> 7
<212> PRT
<213> Mus musculus

<400> 102

Tyr Thr Ser Arg Leu His Ser
1 5

<210> 103
<211> 9
<212> PRT
<213> Mus musculus

<400> 103

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 104
<211> 11
<212> PRT
<213> Mus musculus

<400> 104

Arg Ala Ser Gln Asp Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 105
<211> 7
<212> PRT
<213> Mus musculus

<400> 105

Tyr Thr Ser Arg Leu Leu Ser
1 5

<210> 106
<211> 9
<212> PRT
<213> Mus musculus

<400> 106

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 107
<211> 11
<212> PRT
<213> Mus musculus

<400> 107

Arg Ala Ser Gln Asp Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 108
<211> 7
<212> PRT
<213> Mus musculus

<400> 108

Tyr Thr Ser Arg Leu Phe Ser
1 5

<210> 109
<211> 9
<212> PRT
<213> Mus musculus

<400> 109

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 110
<211> 11
<212> PRT
<213> Mus musculus

<400> 110

Arg Ala Ser Gln Asp Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 111
<211> 7
<212> PRT
<213> Mus musculus

<400> 111

Tyr Thr Ser Arg Leu Leu Ser
1 5

<210> 112
<211> 9
<212> PRT
<213> Mus musculus

<400> 112

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 113
<211> 11
<212> PRT
<213> Mus musculus

<400> 113

Arg Ala Ser Gln Asp Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 114
<211> 7
<212> PRT
<213> Mus musculus

<400> 114

Tyr Thr Ser Thr Leu Gln Ser
1 5

<210> 115
<211> 9
<212> PRT
<213> Mus musculus

<400> 115

Gln Gln Gly Asp Thr Leu Pro Tyr Thr
1 5

<210> 116
<211> 12
<212> PRT
<213> Mus musculus

<400> 116

Ser Val Ser Ser Ser Ile Ser Ser Ser Asn Leu His
1 5 10

<210> 117
<211> 213
<212> PRT
<213> Mus musculus

<400> 117

Gln Ile Val Leu Ser Gln Ser Pro Ala Ile Leu Ser Thr Ser Pro Gly
1 5 10 15

Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Tyr Tyr Met
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Lys Pro Trp Ile Tyr
35 40 45

Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Val Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Thr Arg Val Glu Ala Glu
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asp Pro Leu Thr
85 90 95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg Ala Asp Ala Ala Pro
100 105 110

Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly
115 120 125

Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn
130 135 140

Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn
145 150 155 160

Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser
165 170 175

Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr
180 185 190

Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe
195 200 205

Asn Arg Asn Glu Cys
210

<210> 118
<211> 642
<212> DNA
<213> Mus musculus

<400> 118
caaattgttc tctcccagtc tccagcaatc ctgtctacat ctccagggga gaaggtcaca 60

atgacttgca gggccagctc aagtgtatat tacatgcact ggtaccagca gaagccagga 120

tcctcccccа aaccctggat ttatgccaca tccaacctgg cttctggagt ccctgttcgc 180

ttcagtggca gtgggtctgg gacctcttac tctctcacaa tcaccagagt ggaggctgaa 240

gatgctgcca cttattactg ccagcagtgg agtagtgacc cactcacgtt cggtgctggg 300

accaagctgg agctgaaacg ggctgatgct gcaccaactg tatccatctt cccaccatcc 360

SeqListing

agtgagcagt taacatctgg aggtgcctca gtcgtgtgct tcttgaacaa cttctacccc 420

aaagacatca atgtcaagtg gaagattgat ggcagtgaac gacaaaatgg cgtcctgaac 480

agttggactg atcaggacag caaagacagc acctacagca tgagcagcac cctcacgttg 540

accaaggacg agtatgaacg acataacagc tatacctgtg aggccactca caagacatca 600

acttcaccca ttgtcaagag cttcaacagg aatgagtgtt ag 642

<210> 119
<211> 235
<212> PRT
<213> Mus musculus

<400> 119

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser
1 5 10 15

Val Ile Met Ser Arg Gly Gln Ile Val Leu Ser Gln Ser Pro Ala Ile
20 25 30

Leu Ser Thr Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala Ser
35 40 45

Ser Ser Val Tyr Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Ser Ser
50 55 60

Pro Lys Pro Trp Ile Tyr Ala Thr Ser Asn Leu Ala Ser Gly Val Pro
65 70 75 80

Val Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile
85 90 95

Thr Arg Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp
100 105 110

Ser Ser Asp Pro Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys
115 120 125

Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu
130 135 140

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe
145 150 155 160

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg
165 170 175

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser
180 185 190

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu
195 200 205

Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser
210 215 220

Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 120
<211> 708
<212> DNA
<213> Mus musculus

<400> 120
atggattttc aagtgcagat tttcagcttc ctgctaatca gtgcttcagt cattatgtcc 60

aggggacaaa ttgttctctc ccagtctcca gcaatcctgt ctacatctcc aggggagaag 120

gtcacaatga cttgcagggc cagctcaagt gtatattaca tgcactggta ccagcagaag 180

ccaggatcct cccccaaacc ctggatttat gccacatcca acctggcttc tggagtccct 240

gttcgcttca gtggcagtgg gtctgggacc tcttactctc tcacaatcac cagagtggag 300

gctgaagatg ctgccactta ttactgccag cagtggagta gtgacccact cacgttcggt 360

gctgggacca agctggagct gaaacgggct gatgctgcac caactgtatc catcttccca 420

ccatccagtg agcagttaac atctggaggt gcctcagtcg tgtgcttctt gaacaacttc 480

taccccaaag acatcaatgt caagtggaag attgatggca gtgaacgaca aaatggcgtc 540

ctgaacagtt ggactgatca ggacagcaaa gacagcacct acagcatgag cagcaccctc 600

acgttgacca aggacgagta tgaacgacat aacagctata cctgtgaggc cactcacaag 660

acatcaactt cacccattgt caagagcttc aacaggaatg agtgttag 708

<210> 121
<211> 445
<212> PRT
<213> Mus musculus

<400> 121

Glu Val Gln Val Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Leu Ser Cys Thr Ala Ser Gly Phe Asn Ile Lys Asp Tyr
20 25 30

Phe Ile His Trp Val Lys Gln Arg Pro Glu Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Leu Asp Pro Glu Asp Gly Glu Ser Asp Tyr Ala Pro Lys Phe
50 55 60

Gln Asp Lys Ala Ile Met Thr Ala Asp Thr Ser Ser Asn Thr Ala Tyr
65 70 75 80

SeqListing

Leu Gln Leu Arg Ser Leu Thr Ser Glu Asp Thr Ala Ile Tyr Tyr Cys
85 90 95

Glu Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Phe Phe Pro Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser
115 120 125

Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val
130 135 140

Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro
180 185 190

Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro
195 200 205

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly
210 215 220

Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile
225 230 235 240

Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys
245 250 255

Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln
260 265 270

Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln
275 280 285

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu
290 295 300

Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg
305 310 315 320

Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
325 330 335

Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro
340 345 350

Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr
355 360 365

Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln
370 375 380

Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly
385 390 395 400

Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu
405 410 415

Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn
420 425 430

His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 122
<211> 1338
<212> DNA
<213> Mus musculus

<400> 122
gaggttcagg tgcagcagtc tgggccagaa cttgtgaagc caggggcctc agtcaagttg 60

tcctgcacag cttctggctt caacattaaa gactacttta tacactgggt gaagcagagg 120

cctgaacagg gcctggagtg gattggaagg cttgatcctg aggatggtga aagtgattat 180

gccccgaagt tccaggacaa ggccattatg acagcagaca catcatccaa cacagcctat 240

cttcagctca gaagcctgac atctgaggac actgccatct attattgtga gagagaggac 300

tacgatggta cctacacctt ttttccttac tggggccaag ggactctggt cactgtctct 360

gcagccaaaa cgacaccccc atctgtctat ccactggccc ctggatctgc tgcccaaact 420

aactccatgg tgaccctggg atgcctggtc aagggctatt tccctgagcc agtgacagtg 480

acctggaact ctggatccct gtccagcggt gtgcacacct tcccagctgt cctgcagtct 540

gacctctaca ctctgagcag ctcagtgact gtcccctcca gcacctggcc cagcgagacc 600

gtcacctgca acgttgccca cccggccagc agcaccaagg tggacaagaa aattgtgccc 660

agggattgtg gttgtaagcc ttgcatatgt acagtcccag aagtatcatc tgtcttcatc 720

ttcccccaa agcccaagga tgtgctcacc attactctga ctcctaaggt cacgtgtgtt 780

gtggtagaca tcagcaagga tgatcccgag gtccagttca gctggtttgt agatgatgtg 840

gaggtgcaca cagctcagac gcaaccccgg gaggagcagt tcaacagcac tttccgctca 900

gtcagtgaac ttcccatcat gcaccaggac tggctcaatg gcaaggagtt caaatgcagg 960

gtcaacagtg cagctttccc tgcccccatc gagaaaacca tctccaaaac caaaggcaga 1020

ccgaaggctc cacaggtgta caccattcca cctcccaagg agcagatggc caaggataaa 1080

gtcagtctga cctgcatgat aacagacttc ttccctgaag acattactgt ggagtggcag 1140

SeqListing

tggaatgggc agccagcgga gaactacaag aacactcagc ccatcatgga cacagatggc 1200

tcttacttca tctacagcaa gctcaatgtg cagaagagca actgggaggc aggaaatact 1260

ttcacctgct ctgtgttaca tgagggcctg cacaaccacc atactgagaa gagcctctcc 1320

cactctcctg gtaaatga 1338

<210> 123
<211> 464
<212> PRT
<213> Mus musculus

<400> 123

Met Lys Cys Ser Trp Val Ile Phe Phe Leu Met Ala Val Val Thr Gly
1 5 10 15

Val Asn Ser Glu Val Gln Val Gln Gln Ser Gly Pro Glu Leu Val Lys
20 25 30

Pro Gly Ala Ser Val Lys Leu Ser Cys Thr Ala Ser Gly Phe Asn Ile
35 40 45

Lys Asp Tyr Phe Ile His Trp Val Lys Gln Arg Pro Glu Gln Gly Leu
50 55 60

Glu Trp Ile Gly Arg Leu Asp Pro Glu Asp Gly Glu Ser Asp Tyr Ala
65 70 75 80

Pro Lys Phe Gln Asp Lys Ala Ile Met Thr Ala Asp Thr Ser Ser Asn
85 90 95

Thr Ala Tyr Leu Gln Leu Arg Ser Leu Thr Ser Glu Asp Thr Ala Ile
100 105 110

Tyr Tyr Cys Glu Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Phe Phe Pro
115 120 125

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr
130 135 140

Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn
145 150 155 160

Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro
165 170 175

Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr
180 185 190

Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val
195 200 205

SeqListing

Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val
210 215 220

Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg
225 230 235 240

Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser
245 250 255

Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu
260 265 270

Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro
275 280 285

Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala
290 295 300

Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val
305 310 315 320

Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe
325 330 335

Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr
340 345 350

Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile
355 360 365

Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys
370 375 380

Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp
385 390 395 400

Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp
405 410 415

Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser
420 425 430

Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly
435 440 445

Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
450 455 460

<210> 124
<211> 1395
<212> DNA
<213> Mus musculus

<400> 124
atgaaatgca gctgggtcat cttcttcctg atggcagtgg ttacaggggt caattcagag 60

gttcaggtgc agcagtctgg gccagaactt gtgaagccag gggcctcagt caagttgtcc 120

tgcacagctt ctggcttcaa cattaaagac tactttatac actgggtgaa gcagaggcct 180

gaacagggcc tggagtggat tggaaggctt gatcctgagg atggtgaaag tgattatgcc 240

ccgaagttcc aggacaaggc cattatgaca gcagacacat catccaacac agcctatctt 300

cagctcagaa gcctgacatc tgaggacact gccatctatt attgtgagag agaggactac 360

gatggtacct acacctttt tccttactgg ggccaaggga ctctggtcac tgtctctgca 420

gccaaaacga caccccatc tgtctatcca ctggcccctg gatctgctgc ccaaactaac 480

tccatggtga ccctgggatg cctggtcaag ggctatttcc ctgagccagt gacagtgacc 540

tggaactctg gatccctgtc cagcggtgtg cacaccttcc cagctgtcct gcagtctgac 600

ctctacactc tgagcagctc agtgactgtc ccctccagca cctggcccag cgagaccgtc 660

acctgcaacg ttgcccaccc ggccagcagc accaaggtgg acaagaaaat tgtgcccagg 720

gattgtggtt gtaagccttg catatgtaca gtcccagaag tatcatctgt cttcatcttc 780

cccccaaagc ccaaggatgt gctcaccatt actctgactc ctaaggtcac gtgtgttgtg 840

gtagacatca gcaaggatga tcccgaggtc agttcagct ggtttgtaga tgatgtggag 900

gtgcacacag ctcagacgca accccgggag gagcagttca acagcacttt ccgctcagtc 960

agtgaacttc ccatcatgca ccaggactgg ctcaatggca aggagttcaa atgcagggtc 1020

aacagtgcag ctttccctgc ccccatcgag aaaaccatct ccaaaaccaa aggcagaccg 1080

aaggctccac aggtgtacac cattccacct cccaaggagc agatggccaa ggataaagtc 1140

agtctgacct gcatgataac agacttcttc cctgaagaca ttactgtgga gtggcagtgg 1200

aatgggcagc cagcggagaa ctacaagaac actcagccca tcatggacac agatggctct 1260

tacttcatct acagcaagct caatgtgcag aagagcaact gggaggcagg aaatactttc 1320

acctgctctg tgttacatga gggcctgcac aaccaccata ctgagaagag cctctcccac 1380

tctcctggta aatga 1395

<210> 125
<211> 215
<212> PRT
<213> Mus musculus

<400> 125

Glu Ile Val Leu Thr Gln Ser Pro Ala Leu Met Ala Ala Ser Pro Gly
1 5 10 15

Glu Lys Val Thr Ile Thr Cys Ser Val Ser Ser Thr Ile Ser Ser Asn
20 25 30

His Leu His Trp Phe Gln Gln Lys Ser Asp Thr Ser Pro Lys Pro Trp
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly Val Pro Val Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro
85 90 95

Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Arg Arg Ala Asp Ala
100 105 110

Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser
115 120 125

Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp
130 135 140

Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val
145 150 155 160

Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met
165 170 175

Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser
180 185 190

Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys
195 200 205

Ser Phe Asn Arg Asn Glu Cys
210 215

<210> 126
<211> 648
<212> DNA
<213> Mus musculus

<400> 126
gaaattgtgc tcacccagtc tccagcactc atggctgcat ctccggggga gaaggtcacc 60

atcacctgca gtgtcagttc aactataagt tccaaccact tgcactggtt ccagcagaag 120

tcagacacct cccccaaacc ctggatttat ggcacatcca acctggcttc tggagtccct 180

gttcgcttca gtggcagtgg atctgggacc tcttattctc tcacaatcag cagcatggag 240

gctgaggatg ctgccactta ttactgtcaa cagtggagta gttacccact cacgttcggc 300

gctgggacca agctggagct gagacgggct gatgctgcac caactgtatc catcttccca 360

ccatccagtg agcagttaac atctggaggt gcctcagtcg tgtgcttctt gaacaacttc 420

taccccaaag acatcaatgt caagtggaag attgatggca gtgaacgaca aaatggcgtc 480

ctgaacagtt ggactgatca ggacagcaaa gacagcacct acagcatgag cagcaccctc 540

acgttgacca aggacgagta tgaacgacat aacagctata cctgtgaggc cactcacaag 600

acatcaactt cacccattgt caagagcttc aacaggaatg agtgttag 648

<210> 127
<211> 237
<212> PRT
<213> Mus musculus

<400> 127

Met Asp Phe His Val Gln Ile Phe Ser Phe Met Leu Ile Ser Val Thr
1 5 10 15

Val Ile Leu Ser Ser Gly Glu Ile Val Leu Thr Gln Ser Pro Ala Leu
20 25 30

Met Ala Ala Ser Pro Gly Glu Lys Val Thr Ile Thr Cys Ser Val Ser
35 40 45

Ser Thr Ile Ser Ser Asn His Leu His Trp Phe Gln Gln Lys Ser Asp
50 55 60

Thr Ser Pro Lys Pro Trp Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly
65 70 75 80

Val Pro Val Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu
85 90 95

Thr Ile Ser Ser Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
100 105 110

Gln Trp Ser Ser Tyr Pro Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu
115 120 125

Leu Arg Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser
130 135 140

Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn
145 150 155 160

Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser
165 170 175

Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys
180 185 190

Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu
195 200 205

Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser
210 215 220

Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 128
<211> 714
<212> DNA
<213> Mus musculus

<400> 128
atggattttc atgtgcagat tttcagcttc atgctaatca gtgtcacagt cattttgtcc 60

agtggagaaa ttgtgctcac ccagtctcca gcactcatgg ctgcatctcc gggggagaag 120

gtcaccatca cctgcagtgt cagttcaact ataagttcca accacttgca ctggttccag 180

cagaagtcag acacctcccc caaaccctgg atttatggca catccaacct ggcttctgga 240

gtccctgttc gcttcagtgg cagtggatct gggacctctt attctctcac aatcagcagc 300

atggaggctg aggatgctgc cacttattac tgtcaacagt ggagtagtta cccactcacg 360

ttcggcgctg ggaccaagct ggagctgaga cgggctgatg ctgcaccaac tgtatccatc 420

ttcccaccat ccagtgagca gttaacatct ggaggtgcct cagtcgtgtg cttcttgaac 480

aacttctacc ccaaagacat caatgtcaag tggaagattg atggcagtga acgacaaaat 540

ggcgtcctga acagttggac tgatcaggac agcaaagaca gcacctacag catgagcagc 600

accctcacgt tgaccaagga cgagtatgaa cgacataaca gctatacctg tgaggccact 660

cacaagacat caacttcacc cattgtcaag agcttcaaca ggaatgagtg ttag 714

<210> 129
<211> 449
<212> PRT
<213> Mus musculus

<400> 129

Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ala
1 5 10 15

Leu Val Lys Leu Ser Cys Thr Ala Ser Asp Phe Asn Ile Lys Asp Phe
20 25 30

Tyr Leu His Trp Met Arg Gln Arg Pro Glu Gln Gly Leu Asp Trp Ile
35 40 45

Gly Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp Pro Lys Phe
50 55 60

Gln Asp Lys Ala Thr Leu Thr Thr Asp Thr Ser Ser Asn Thr Ala Tyr
65 70 75 80

Leu Gln Leu Ser Gly Leu Thr Ser Glu Thr Thr Ala Val Tyr Tyr Cys
85 90 95

SeqListing

Ser Arg Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr Trp Tyr Phe
100 105 110

Asp Val Trp Gly Ala Gly Thr Thr Ile Thr Val Ser Ser Ala Lys Thr
115 120 125

Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr
130 135 140

Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser
180 185 190

Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn
195 200 205

Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro
210 215 220

Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser
225 230 235 240

Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr
245 250 255

Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp
260 265 270

Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr
275 280 285

Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser
290 295 300

Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu
305 310 315 320

Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys
325 330 335

Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr
340 345 350

Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr
355 360 365

SeqListing

Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln
370 375 380

Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met
385 390 395 400

Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys
405 410 415

Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu
420 425 430

Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly
435 440 445

Lys

<210> 130
<211> 1350
<212> DNA
<213> Mus musculus

<400> 130
gaggttcagc tgcagcagtc tggggctgaa cttgtgaggc caggggcctt agtcaagttg 60

tcctgcacag cttctgactt caacattaaa gacttctatc tacactggat gaggcagcgg 120

cctgaacagg gcctggactg gattggaagg attgatcctg agaatggtga tactttatat 180

gacccgaagt tccaggacaa ggccactctt acaacagaca catcctccaa cacagcctac 240

ctgcagctca gcggcctgac atctgagacc actgccgtct attactgttc tagagaggcg 300

gattatttcc acgatggtac ctcctactgg tacttcgatg tctggggcgc agggaccaca 360

atcaccgtct cctcagccaa aacgacaccc ccatctgtct atccactggc ccctggatct 420

gctgcccaaa ctaactccat ggtgaccctg ggatgcctgg tcaagggcta tttccctgag 480

ccagtgacag tgacctggaa ctctggatcc ctgtccagcg gtgtgcacac cttcccagct 540

gtcctgcagt ctgacctcta cactctgagc agctcagtga ctgtcccctc cagcacctgg 600

cccagcgaga ccgtcacctg caacgttgcc cacccggcca gcagcaccaa ggtggacaag 660

aaaattgtgc ccagggattg tggttgtaag ccttgcatat gtacagtccc agaagtatca 720

tctgtcttca tcttcccccc aaagcccaag gatgtgctca ccattactct gactcctaag 780

gtcacgtgtg ttgtggtaga catcagcaag gatgatcccg aggtccagtt cagctggttt 840

gtagatgatg tggaggtgca cacagctcag acgcaacccc gggaggagca gttcaacagc 900

actttccgct cagtcagtga acttcccatc atgcaccagg actggctcaa tggcaaggag 960

ttcaaatgca gggtcaacag tgcagctttc cctgccccca tcgagaaaac catctccaaa 1020

accaaaggca gaccgaaggc tccacaggtg tacaccattc cacctcccaa ggagcagatg 1080

gccaaggata aagtcagtct gacctgcatg ataacagact tcttccctga agacattact 1140

SeqListing

gtggagtggc agtggaatgg gcagccagcg gagaactaca agaacactca gcccatcatg 1200

gacacagatg gctcttactt catctacagc aagctcaatg tgcagaagag caactgggag 1260

gcaggaaata ctttcacctg ctctgtgtta catgagggcc tgcacaacca ccatactgag 1320

aagagcctct cccactctcc tggtaaatga 1350

<210> 131
<211> 468
<212> PRT
<213> Mus musculus

<400> 131

Met Lys Cys Ser Trp Val Ile Phe Phe Leu Met Ala Val Val Thr Gly
1 5 10 15

Val Asn Ser Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Arg
20 25 30

Pro Gly Ala Leu Val Lys Leu Ser Cys Thr Ala Ser Asp Phe Asn Ile
35 40 45

Lys Asp Phe Tyr Leu His Trp Met Arg Gln Arg Pro Glu Gln Gly Leu
50 55 60

Asp Trp Ile Gly Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp
65 70 75 80

Pro Lys Phe Gln Asp Lys Ala Thr Leu Thr Thr Asp Thr Ser Ser Asn
85 90 95

Thr Ala Tyr Leu Gln Leu Ser Gly Leu Thr Ser Glu Thr Thr Ala Val
100 105 110

Tyr Tyr Cys Ser Arg Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr
115 120 125

Trp Tyr Phe Asp Val Trp Gly Ala Gly Thr Thr Ile Thr Val Ser Ser
130 135 140

Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala
145 150 155 160

Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
165 170 175

Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser
180 185 190

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
195 200 205

SeqListing

Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val
210 215 220

Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
225 230 235 240

Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro
245 250 255

Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu
260 265 270

Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser
275 280 285

Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu
290 295 300

Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr
305 310 315 320

Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn
325 330 335

Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro
340 345 350

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln
355 360 365

Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val
370 375 380

Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val
385 390 395 400

Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln
405 410 415

Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn
420 425 430

Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val
435 440 445

Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His
450 455 460

Ser Pro Gly Lys
465

SeqListing

<210> 132
<211> 1407
<212> DNA
<213> Mus musculus

<400> 132
atgaaatgca gctgggtcat cttcttcctg atggcagtgg ttacaggggt caattcagag 60

gttcagctgc agcagtctgg ggctgaactt gtgaggccag gggccttagt caagttgtcc 120

tgcacagctt ctgacttcaa cattaaagac ttctatctac actggatgag gcagcggcct 180

gaacagggcc tggactggat tggaaggatt gatcctgaga atggtgatac tttatatgac 240

ccgaagttcc aggacaaggc cactcttaca acagacacat cctccaacac agcctacctg 300

cagctcagcg gcctgacatc tgagaccact gccgtctatt actgttctag agaggcggat 360

tatttccacg atggtacctc ctactggtac ttcgatgtct ggggcgcagg gaccacaatc 420

accgtctcct cagccaaaac gacaccccca tctgtctatc cactggcccc tggatctgct 480

gcccaaacta actccatggt gaccctggga tgcctggtca agggctattt ccctgagcca 540

gtgacagtga cctggaactc tggatccctg tccagcggtg tgcacacctt cccagctgtc 600

ctgcagtctg acctctacac tctgagcagc tcagtgactg tcccctccag cacctggccc 660

agcgagaccg tcacctgcaa cgttgcccac ccggccagca gcaccaaggt ggacaagaaa 720

attgtgccca gggattgtgg ttgtaagcct tgcatatgta cagtcccaga agtatcatct 780

gtcttcatct tcccccaaa gcccaaggat gtgctcacca ttactctgac tcctaaggtc 840

acgtgtgttg tggtagacat cagcaaggat gatcccgagg tccagttcag ctggtttgta 900

gatgatgtgg aggtgcacac agctcagacg caaccccggg aggagcagtt caacagcact 960

ttccgctcag tcagtgaact tcccatcatg caccaggact ggctcaatgg caaggagttc 1020

aaatgcaggg tcaacagtgc agctttccct gcccccatcg agaaaaccat ctccaaaacc 1080

aaaggcagac cgaaggctcc acaggtgtac accattccac ctcccaagga gcagatggcc 1140

aaggataaag tcagtctgac ctgcatgata acagacttct tccctgaaga cattactgtg 1200

gagtggcagt ggaatgggca gccagcggag aactacaaga acactcagcc catcatggac 1260

acagatggct cttacttcat ctacagcaag ctcaatgtgc agaagagcaa ctgggaggca 1320

ggaaatactt tcacctgctc tgtgttacat gagggcctgc acaaccacca tactgagaag 1380

agcctctccc actctcctgg taaatga 1407

<210> 133
<211> 214
<212> PRT
<213> Mus musculus

<400> 133

Asp Ile Gln Met Thr Gln Ile Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr Asn Leu Glu Gln
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 134
<211> 645
<212> DNA
<213> Mus musculus

<400> 134
gatatccaga tgacacagat tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 60

atcagttgca gggcaagtca agacattagc aattatttaa actggtatca gcagaaacca 120

gatggaactt ttaaactcct tatcttctac acatcaagat tactctcagg agtcccatca 180

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 240

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 300

gggaccaagc tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 645

<210> 135
<211> 234
<212> PRT
<213> Mus musculus

<400> 135

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Ile Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe
50 55 60

Lys Leu Leu Ile Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr
85 90 95

Asn Leu Glu Gln Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 136
<211> 705
<212> DNA
<213> Mus musculus

<400> 136
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacacagat tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 120

atcagttgca gggcaagtca agacattagc aattatttaa actggtatca gcagaaacca 180

gatggaactt ttaaactcct tatcttctac acatcaagat tactctcagg agtcccatca 240

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 300

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 360

gggaccaagc tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 705

<210> 137
<211> 447
<212> PRT
<213> Mus musculus

<400> 137

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Thr Leu Glu Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr Thr Ala Tyr
65 70 75 80

SeqListing

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Pro
115 120 125

Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
130 135 140

Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr
180 185 190

Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
195 200 205

His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
210 215 220

Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
225 230 235 240

Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
245 250 255

Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu
260 265 270

Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
275 280 285

Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser
290 295 300

Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
305 310 315 320

Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
340 345 350

SeqListing

Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met
355 360 365

Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn
370 375 380

Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr
385 390 395 400

Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn
405 410 415

Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu
420 425 430

His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 138
<211> 1344
<212> DNA
<213> Mus musculus

<400> 138
gaggtccaac tgcaacagtc tggacctgaa ctaatgaagc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggata tacattcact gactacaaca tgcactgggt gaagcagaac 120

caaggaaaga ccctagagtg gataggagaa attaatccta acagtggtgg tgctggctac 180

aaccagaagt tcaagggcaa ggccacattg actgtagaca agtcctccac cacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aagattgggc 300

tacgatgata tctacgacga ctggtacttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctcag ccaaaacgac accccatct gtctatccac tggccctgg atctgctgcc 420

caaactaact ccatggtgac cctgggatgc ctggtcaagg gctatttccc tgagccagtg 480

acagtgacct ggaactctgg atccctgtcc agcggtgtgc acaccttccc agctgtcctg 540

cagtctgacc tctacactct gagcagctca gtgactgtcc cctccagcac ctggcccagc 600

gagaccgtca cctgcaacgt tgcccacccg gccagcagca ccaaggtgga caagaaaatt 660

gtgcccaggg attgtggttg taagccttgc atatgtacag tcccagaagt atcatctgtc 720

ttcatcttcc ccccaaagcc caaggatgtg ctcaccatta ctctgactcc taaggtcacg 780

tgtgttgtgg tagacatcag caaggatgat cccgaggtcc agttcagctg gtttgtagat 840

gatgtggagg tgcacacagc tcagacgcaa ccccgggagg agcagttcaa cagcactttc 900

cgctcagtca gtgaacttcc catcatgcac caggactggc tcaatggcaa ggagttcaaa 960

tgcagggtca acagtgcagc tttccctgcc cccatcgaga aaaccatctc caaaaccaaa 1020

ggcagaccga aggctccaca ggtgtacacc attccacctc ccaaggagca gatggccaag 1080

gataaagtca gtctgacctg catgataaca gacttcttcc ctgaagacat tactgtggag 1140

SeqListing

tggcagtgga atgggcagcc agcggagaac tacaagaaca ctcagcccat catggacaca 1200

gatggctctt acttcatcta cagcaagctc aatgtgcaga agagcaactg ggaggcagga 1260

aatactttca cctgctctgt gttacatgag ggcctgcaca accaccatac tgagaagagc 1320

ctctcccact ctcctggtaa atga 1344

<210> 139
<211> 466
<212> PRT
<213> Mus musculus

<400> 139

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Thr Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln
145 150 155 160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val
180 185 190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser
195 200 205

SeqListing

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys
210 215 220

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val
225 230 235 240

Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
245 250 255

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
260 265 270

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
275 280 285

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
290 295 300

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
355 360 365

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
370 375 380

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
385 390 395 400

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
405 410 415

Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln
420 425 430

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
435 440 445

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
450 455 460

Gly Lys
465

SeqListing

<210> 140
<211> 1401
<212> DNA
<213> Mus musculus

<400> 140
atgggatgga gctggacctt tctcttcctc ctgtcaggaa ctgcaggtgt cctctctgag 60

gtccaactgc aacagtctgg acctgaacta atgaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctggatatac attcactgac tacaacatgc actgggtgaa gcagaaccaa 180

ggaaagaccc tagagtggat aggagaaatt aatcctaaca gtggtggtgc tggctacaac 240

cagaagttca agggcaaggc cacattgact gtagacaagt cctccaccac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaag attgggctac 360

gatgatatct acgacgactg gtacttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctcagcca aaacgacacc cccatctgtc tatccactgg cccctggatc tgctgcccaa 480

actaactcca tggtgaccct gggatgcctg gtcaagggct atttccctga gccagtgaca 540

gtgacctgga actctggatc cctgtccagc ggtgtgcaca ccttcccagc tgtcctgcag 600

tctgacctct acactctgag cagctcagtg actgtccctc ccagcacctg gcccagcgag 660

accgtcacct gcaacgttgc ccacccggcc agcagcacca aggtggacaa gaaaattgtg 720

cccagggatt gtggttgtaa gccttgcata tgtacagtcc cagaagtatc atctgtcttc 780

atcttccccc caaagcccaa ggatgtgctc accattactc tgactcctaa ggtcacgtgt 840

gttgtggtag acatcagcaa ggatgatccc gaggtccagt tcagctggtt tgtagatgat 900

gtggaggtgc acacagctca gacgcaaccc cgggaggagc agttcaacag cactttccgc 960

tcagtcagtg aacttcccat catgcaccag gactggctca atggcaagga gttcaaatgc 1020

agggtcaaca gtgcagcttt ccctgccccc atcgagaaaa ccatctccaa aaccaaaggc 1080

agaccgaagg ctccacaggt gtacaccatt ccacctccca aggagcagat ggccaaggat 1140

aaagtcagtc tgacctgcat gataacagac ttcttccctg aagacattac tgtggagtgg 1200

cagtggaatg ggcagccagc ggagaactac aagaacactc agcccatcat ggacacagat 1260

ggctcttact tcatctacag caagctcaat gtgcagaaga gcaactggga ggcaggaaat 1320

actttcacct gctctgtgtt acatgagggc ctgcacaacc accatactga gaagagcctc 1380

tcccactctc ctggtaaatg a 1401

<210> 141
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

SeqListing

<400> 141

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 142
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>

SeqListing

<221> misc_feature
<223> Humanized Antibody Sequence

<400> 142
gacatccaga tgacccagtc tccatcctcc ctctccgcat ccgtaggcga ccgcgtaacc 60

ataacatgta gagcatctca agatatttcc aactatttga attggtacca acaaaaaccc 120

ggcaaagcac ctaaactcct catttactat acatcaagac tcctctccgg cgttccatca 180

cgattctcag gctccggctc cggcacagat ttcacactca ctatttcctc cctccaacca 240

gaagattttg caacctatta ctgtcaacaa ggcgatacac tcccatacac attcggcggc 300

ggcacaaaag ttgaaattaa acgtacggtg gctgcaccat ctgtcttcat cttcccgcca 360

tctgatgagc agttgaaatc tggaactgcc tctgttgtgt gcctgctgaa taacttctat 420

cccagagagg ccaaagtaca gtggaaggtg gataacgccc tccaatcggg taactcccag 480

gagagtgtca cagagcagga cagcaaggac agcacctaca gcctcagcag caccctgacg 540

ctgagcaaag cagactacga gaaacacaaa gtctacgcct gcgaagtcac ccatcagggc 600

ctgagctcgc ccgtcacaaa gagcttcaac aggggagagt gt 642

<210> 143
<211> 236
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 143

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Arg Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
35 40 45

Gln Asp Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys
50 55 60

Ala Pro Lys Leu Leu Ile Tyr Tyr Thr Ser Arg Leu Leu Ser Gly Val
65 70 75 80

Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
100 105 110

Gly Asp Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
115 120 125

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
130 135 140

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
145 150 155 160

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
165 170 175

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
180 185 190

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
195 200 205

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
210 215 220

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230 235

<210> 144
<211> 708
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 144
atggacatga gggtccccgc tcagctcctg gggctcctgc tactctggct ccgaggtgcc 60

agatgtgaca tccagatgac ccagtctcca tcctccctct ccgcatccgt aggcgaccgc 120

gtaaccataa catgtagagc atctcaagat atttccaact atttgaattg gtaccaacaa 180

aaacccggca aagcacctaa actcctcatt tactatacat caagactcct ctccggcgtt 240

ccatcacgat tctcaggctc cggctccggc acagatttca cactcactat ttcctccctc 300

caaccagaag attttgcaac ctattactgt caacaaggcg atacactccc atacacattc 360

ggcggcggca caaaagttga aattaaacgt acggtggctg caccatctgt cttcatcttc 420

ccgccatctg atgagcagtt gaaatctgga actgcctctg ttgtgtgcct gctgaataac 480

ttctatccca gagaggccaa agtacagtgg aaggtggata acgccctcca atcgggtaac 540

tcccaggaga gtgtcacaga gcaggacagc aaggacagca cctacagcct cagcagcacc 600

SeqListing

ctgacgctga gcaaagcaga ctacgagaaa cacaaagtct acgcctgcga agtcacccat 660

cagggcctga gctcgcccgt cacaaagagc ttcaacaggg gagagtgt 708

<210> 145
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 145

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

SeqListing

Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
195 200 205

Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys
210 215 220

Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro
225 230 235 240

Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
245 250 255

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
260 265 270

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
275 280 285

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val
290 295 300

Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu
305 310 315 320

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys
325 330 335

Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
340 345 350

Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
355 360 365

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
370 375 380

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu
385 390 395 400

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
405 410 415

Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
420 425 430

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
435 440 445

Lys

SeqListing

<210> 146
<211> 1347
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 146
gaggtgcagc tggtgcagag cggcgccgag gtaaaaaaac caggagcaag cgttaaagtt 60

tcttgtaaag caagcggata tacatttaca gattacaaca tgcattgggt aagacaagcg 120

ccaggacaag gattggaatg gatgggcgaa attaacccta atagtggagg agcaggctac 180

aatcaaaaat tcaaagggag agttacaatg acaacagaca caagcacttc aacagcatat 240

atggaactgc gatcacttag aagcgacgat acagctgtat actattgcgc acgacttggg 300

tatgatgata tatatgatga ctggtatttc gatgtttggg gccagggaac aacagttacc 360

gtctctagtg cctccaccaa gggcccatcg gtcttccccc tggcgccctg ctccaggagc 420

acctccgaga gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg 480

acggtgtcgt ggaactcagg cgctctgacc agcggcgtgc acaccttccc agctgtccta 540

cagtcctcag gactctactc cctcagcagc gtggtgaccg tgccctccag caacttcggc 600

acccagacct acacctgcaa cgtagatcac aagcccagca acaccaaggt ggacaagaca 660

gttgagcgca aatgttgtgt cgagtgccca ccgtgcccag caccacctgt ggcaggaccg 720

tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccg gaccctgag 780

gtcacgtgcg tggtggtgga cgtgagccac gaagaccccg aggtccagtt caactggtac 840

gtggacggcg tggaggtgca taatgccaag acaaagccac gggaggagca gttcaacagc 900

acgttccgtg tggtcagcgt cctcaccgtt gtgcaccagg actggctgaa cggcaaggag 960

tacaagtgca aggtctccaa caaaggcctc ccagccccca tcgagaaaac catctccaaa 1020

accaaagggc agccccgaga accacaggtg tacaccctgc ccccatcccg ggaggagatg 1080

accaagaacc aggtcagcct gacctgcctg gtcaaaggct tctaccccag cgacatcgcc 1140

gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacacc tcccatgctg 1200

gactccgacg gctccttctt cctctacagc aagctcaccg tggacaagag caggtggcag 1260

caggggaacg tcttctcatg ctccgtgatg catgaggctc tgcacaacca ctacacgcag 1320

aagagcctct ccctgtctcc gggtaaa 1347

<210> 147
<211> 468
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 147

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Met Asp Trp Thr Trp Arg Ile Leu Phe Leu Val Ala Ala Ala Thr Gly
1               5                  10                  15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
            20                  25                  30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
        35                  40                  45

Thr Asp Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
    50                  55                  60

Glu Trp Met Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn
65                  70                  75                  80

Gln Lys Phe Lys Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser
                85                  90                  95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr
        115                 120                 125

Phe Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
    130                 135                 140

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr
145                 150                 155                 160

Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
                165                 170                 175

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
            180                 185                 190

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
        195                 200                 205

Ser Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr
    210                 215                 220

Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
225                 230                 235                 240
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SeqListing

Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val
245 250 255

Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu
260 265 270

Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
275 280 285

His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu
290 295 300

Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr
305 310 315 320

Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn
325 330 335

Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro
340 345 350

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln
355 360 365

Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val
370 375 380

Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
385 390 395 400

Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
405 410 415

Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
420 425 430

Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
435 440 445

Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
450 455 460

Ser Pro Gly Lys
465

<210> 148
<211> 1404
<212> DNA
<213> Mus musculus

<400> 148
atggactgga cctggaggat cctcttcttg gtggcagcag ccacaggagc ccactccgag 60

SeqListing

gtgcagctgg tgcagagcgg cgccgaggta aaaaaaccag gagcaagcgt taaagtttct 120

tgtaaagcaa gcggatatac atttacagat tacaacatgc attgggtaag acaagcgcca 180

ggacaaggat tggaatggat gggcgaaatt aaccctaata gtggaggagc aggctacaat 240

caaaaattca aagggagagt tacaatgaca acagacacaa gcacttcaac agcatatatg 300

gaactgcgat cacttagaag cgacgataca gctgtatact attgcgcacg acttgggtat 360

gatgatatat atgatgactg gtatttcgat gtttggggcc agggaacaac agttaccgtc 420

tctagtgcct ccaccaaggg cccatcggtc ttcccctgg cgccctgctc caggagcacc 480

tccgagagca cagcggccct gggctgcctg gtcaaggact acttccccga accggtgacg 540

gtgtcgtgga actcaggcgc tctgaccagc ggcgtgcaca ccttcccagc tgtcctacag 600

tcctcaggac tctactccct cagcagcgtg gtgaccgtgc cctccagcaa cttcggcacc 660

cagacctaca cctgcaacgt agatcacaag cccagcaaca ccaaggtgga caagacagtt 720

gagcgcaaat gttgtgtcga gtgcccaccg tgcccagcac cacctgtggc aggaccgtca 780

gtcttcctct tccccccaaa acccaaggac accctcatga tctcccggac ccctgaggtc 840

acgtgcgtgg tggtggacgt gagccacgaa gaccccgagg tccagttcaa ctggtacgtg 900

gacggcgtgg aggtgcataa tgccaagaca aagccacggg aggagcagtt caacagcacg 960

ttccgtgtgg tcagcgtcct caccgttgtg caccaggact ggctgaacgg caaggagtac 1020

aagtgcaagg tctccaacaa aggcctccca gcccccatcg agaaaaccat ctccaaaacc 1080

aaagggcagc cccgagaacc acaggtgtac accctgcccc catcccggga ggagatgacc 1140

aagaaccagg tcagcctgac ctgcctggtc aaaggcttct accccagcga catcgccgtg 1200

gagtgggaga gcaatgggca gccggagaac aactacaaga ccacacctcc catgctggac 1260

tccgacggct ccttcttcct ctacagcaag ctcaccgtgg acaagagcag gtggcagcag 1320

gggaacgtct tctcatgctc cgtgatgcat gaggctctgc acaaccacta cacgcagaag 1380

agcctctccc tgtctccggg taaa 1404

<210> 149
<211> 214
<212> PRT
<213> Mus musculus

<400> 149

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Phe Gln Gln Lys Pro Asp Gly Thr Leu Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Arg Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu Gln
65 70 75 80

Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Arg Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 150
<211> 645
<212> DNA
<213> Mus musculus

<400> 150
gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagagtcacc 60

atcagttgca gggcaagtca ggacattagc aattatttaa actggtttca gcagaaacca 120

gatggaactc ttaaactcct gatcttctac acatcaagat tacactcagg agttccatca 180

aggttcagtg gcagtgggtc tggaacagat tattctctca ccattagcaa cctggagcaa 240

gaagatattg ccacttactt ttgccaacag ggtgatacgc ttccgtacac gttcgggggg 300

gggaccaagc tggaaataag acgggctgat gctgcaccaa ctgtatccat cttcccacca 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 645

<210> 151
<211> 234
<212> PRT
<213> Mus musculus

<400> 151

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Phe Gln Gln Lys Pro Asp Gly Thr Leu
50 55 60

Lys Leu Leu Ile Phe Tyr Thr Ser Arg Leu His Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser
85 90 95

Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Arg Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 152
<211> 705
<212> DNA
<213> Mus musculus

<400> 152
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gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagagtcacc 120

atcagttgca gggcaagtca ggacattagc aattatttaa actggtttca gcagaaacca 180

gatggaactc ttaaactcct gatcttctac acatcaagat tacactcagg agttccatca 240

aggttcagtg gcagtgggtc tggaacagat tattctctca ccattagcaa cctggagcaa 300

gaagatattg ccacttactt ttgccaacag ggtgatacgc ttccgtacac gttcgggggg 360

gggaccaagc tggaaataag acgggctgat gctgcaccaa ctgtatccat cttcccacca 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 705

<210> 153
<211> 447
<212> PRT
<213> Mus musculus

<400> 153

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Ser Leu Glu Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ser Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Val Tyr Asp Gly Ser Tyr Glu Asp Trp Tyr Phe Asp Val
100 105 110

SeqListing

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Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Pro
        115                 120                 125

Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
    130                 135                 140

Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr
            180                 185                 190

Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
        195                 200                 205

His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
    210                 215                 220

Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
225                 230                 235                 240

Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
                245                 250                 255

Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu
            260                 265                 270

Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
        275                 280                 285

Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser
    290                 295                 300

Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
305                 310                 315                 320

Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
                325                 330                 335

Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
            340                 345                 350

Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met
        355                 360                 365

Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn
    370                 375                 380
```

Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr
385 390 395 400

Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn
405 410 415

Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu
420 425 430

His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 154
<211> 1344
<212> DNA
<213> Mus musculus

<400> 154
gaggtccagc tgcaacagtc tggacctgaa ctaatgaagc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggata cacattcact gactacaaca tgcactgggt gaaacagaac 120

caaggaaaga gcctagagtg gataggagaa attaatccta acagtggtgg tagtggctac 180

aaccaaaagt tcaaaggcaa ggccacattg actgtagaca agtcttccag cacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aagattggtc 300

tacgatggca gctacgagga ctggtacttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctcag ccaaaacgac acccccatct gtctatccac tggccctgg atctgctgcc 420

caaactaact ccatggtgac cctgggatgc ctggtcaagg gctatttccc tgagccagtg 480

acagtgacct ggaactctgg atccctgtcc agcggtgtgc acaccttccc agctgtcctg 540

cagtctgacc tctacactct gagcagctca gtgactgtcc cctccagcac ctggcccagc 600

gagaccgtca cctgcaacgt tgcccacccg gccagcagca ccaaggtgga caagaaaatt 660

gtgcccaggg attgtggttg taagccttgc atatgtacag tcccagaagt atcatctgtc 720

ttcatcttcc ccccaaagcc caaggatgtg ctcaccatta ctctgactcc taaggtcacg 780

tgtgttgtgg tagacatcag caaggatgat cccgaggtcc agttcagctg gtttgtagat 840

gatgtggagg tgcacacagc tcagacgcaa ccccgggagg agcagttcaa cagcactttc 900

cgctcagtca gtgaacttcc catcatgcac caggactggc tcaatggcaa ggagttcaaa 960

tgcagggtca acagtgcagc tttccctgcc cccatcgaga aaaccatctc caaaaccaaa 1020

ggcagaccga aggctccaca ggtgtacacc attccacctc ccaaggagca gatggccaag 1080

gataaagtca gtctgacctg catgataaca gacttcttcc ctgaagacat tactgtggag 1140

tggcagtgga atgggcagcc agcggagaac tacaagaaca ctcagcccat catggacaca 1200

gatggctctt acttcatcta cagcaagctc aatgtgcaga agagcaactg ggaggcagga 1260

aatactttca cctgctctgt gttacatgag ggcctgcaca accaccatac tgagaagagc 1320

ctctcccact ctcctggtaa atga 1344

SeqListing

<210> 155
<211> 466
<212> PRT
<213> Mus musculus

<400> 155

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Ser Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ser Gly Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Leu Val Tyr Asp Gly Ser Tyr Glu Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln
145 150 155 160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val
180 185 190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser
195 200 205

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys
210 215 220

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val
225 230 235 240

SeqListing

Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
245 250 255

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
260 265 270

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
275 280 285

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
290 295 300

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
355 360 365

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
370 375 380

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
385 390 395 400

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
405 410 415

Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln
420 425 430

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
435 440 445

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
450 455 460

Gly Lys
465

<210> 156
<211> 1401
<212> DNA
<213> Mus musculus

<400> 156
atgggatgga gctggacctt tctcttcctc ctgtcaggaa ctgcaggtgt cctctctgag 60

gtccagctgc aacagtctgg acctgaacta atgaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctggatacac attcactgac tacaacatgc actgggtgaa acagaaccaa 180

ggaaagagcc tagagtggat aggagaaatt aatcctaaca gtggtggtag tggctacaac 240

caaaagttca aaggcaaggc cacattgact gtagacaagt cttccagcac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaag attggtctac 360

gatggcagct acgaggactg gtacttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctcagcca aaacgacacc cccatctgtc tatccactgg cccctggatc tgctgcccaa 480

actaactcca tggtgaccct gggatgcctg gtcaagggct atttccctga gccagtgaca 540

gtgacctgga actctggatc cctgtccagc ggtgtgcaca ccttcccagc tgtcctgcag 600

tctgacctct acactctgag cagctcagtg actgtccctc ccagcacctg gcccagcgag 660

accgtcacct gcaacgttgc ccacccggcc agcagcacca aggtggacaa gaaaattgtg 720

cccagggatt gtggttgtaa gccttgcata tgtacagtcc cagaagtatc atctgtcttc 780

atcttccccc caaagcccaa ggatgtgctc accattactc tgactcctaa ggtcacgtgt 840

gttgtggtag acatcagcaa ggatgatccc gaggtccagt tcagctggtt tgtagatgat 900

gtggaggtgc acacagctca gacgcaaccc cgggaggagc agttcaacag cactttccgc 960

tcagtcagtg aacttcccat catgcaccag gactggctca atggcaagga gttcaaatgc 1020

agggtcaaca gtgcagcttt ccctgccccc atcgagaaaa ccatctccaa aaccaaaggc 1080

agaccgaagg ctccacaggt gtacaccatt ccacctccca aggagcagat ggccaaggat 1140

aaagtcagtc tgacctgcat gataacagac ttcttccctg aagacattac tgtggagtgg 1200

cagtggaatg ggcagccagc ggagaactac aagaacactc agcccatcat ggacacagat 1260

ggctcttact tcatctacag caagctcaat gtgcagaaga gcaactggga ggcaggaaat 1320

actttcacct gctctgtgtt acatgagggc ctgcacaacc accatactga gaagagcctc 1380

tcccactctc ctggtaaatg a 1401

<210> 157
<211> 214
<212> PRT
<213> Mus musculus

<400> 157

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Thr Ile Cys Cys Arg Ala Ser Gln Val Ile Thr Asn Tyr
20 25 30

Leu Tyr Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe Lys Leu Leu Ile
35 40 45

Tyr Tyr Thr Ser Arg Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu Gln
65 70 75 80

Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 158
<211> 642
<212> DNA
<213> Mus musculus

<400> 158
gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagagtcacc 60

atctgttgca gggcaagtca ggtcattacc aattatttat actggtatca gcagaaacca 120

gatggaactt ttaaactcct gatctactac acatcaagat tacactcagg agtcccatca 180

aggttcagtg gcagtgggtc tggaacagat tattctctca ccattagcaa cctggaacag 240

gaagatattg ccacttactt ttgccaacag ggtgatacgc ttccgtacac gttcggaggg 300

gggaccaagc tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gt 642

<210> 159
<211> 234
<212> PRT
<213> Mus musculus

<400> 159

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Thr Ile Cys Cys Arg Ala Ser Gln Val
35 40 45

Ile Thr Asn Tyr Leu Tyr Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe
50 55 60

Lys Leu Leu Ile Tyr Tyr Thr Ser Arg Leu His Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser
85 90 95

Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 160
<211> 702
<212> DNA
<213> Mus musculus

<400> 160
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagagtcacc 120

atctgttgca gggcaagtca ggtcattacc aattatttat actggtatca gcagaaacca 180

gatggaactt ttaaactcct gatctactac acatcaagat tacactcagg agtcccatca 240

aggttcagtg gcagtgggtc tggaacagat tattctctca ccattagcaa cctggaacag 300

gaagatattg ccacttactt ttgccaacag ggtgatacgc ttccgtacac gttcggaggg 360

gggaccaagc tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gt 702

<210> 161
<211> 447
<212> PRT
<213> Mus musculus

<400> 161

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Met Lys Gln Asn Gln Gly Lys Ser Leu Glu Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Gln Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Arg Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Val Gly Asn Tyr Glu Asp Trp Tyr Phe Asp Val
100 105 110

SeqListing

Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Pro
115 120 125

Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
130 135 140

Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr
180 185 190

Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
195 200 205

His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
210 215 220

Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
225 230 235 240

Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
245 250 255

Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu
260 265 270

Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
275 280 285

Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser
290 295 300

Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
305 310 315 320

Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
340 345 350

Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met
355 360 365

Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn
370 375 380

Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr
385 390 395 400

Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn
405 410 415

Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu
420 425 430

His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 162
<211> 1341
<212> DNA
<213> Mus musculus

<400> 162
gaggtccagc tgcaacagtc tggacctgaa ctaatgaagc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggata cacattcact gactacaaca tgcactggat gaagcagaac 120

caaggaaaga gcctagaatg gataggagaa attaatccta acagtggtgg tgctggctac 180

aaccagcagt tcaaaggcaa ggccacattg actgtagaca agtcctccag gacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aagattgggc 300

tacgttggta attacgagga ctggtacttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctcag ccaaaacgac acccccatct gtctatccac tggccctgg atctgctgcc 420

caaactaact ccatggtgac cctgggatgc ctggtcaagg gctatttccc tgagccagtg 480

acagtgacct ggaactctgg atccctgtcc agcggtgtgc acaccttccc agctgtcctg 540

cagtctgacc tctacactct gagcagctca gtgactgtcc cctccagcac ctggcccagc 600

gagaccgtca cctgcaacgt tgcccacccg gccagcagca ccaaggtgga caagaaaatt 660

gtgcccaggg attgtggttg taagccttgc atatgtacag tcccagaagt atcatctgtc 720

ttcatcttcc ccccaaagcc caaggatgtg ctcaccatta ctctgactcc taaggtcacg 780

tgtgttgtgg tagacatcag caaggatgat cccgaggtcc agttcagctg gtttgtagat 840

gatgtggagg tgcacacagc tcagacgcaa ccccgggagg agcagttcaa cagcactttc 900

cgctcagtca gtgaacttcc catcatgcac caggactggc tcaatggcaa ggagttcaaa 960

tgcagggtca acagtgcagc tttccctgcc cccatcgaga aaaccatctc caaaaccaaa 1020

ggcagaccga aggctccaca ggtgtacacc attccacctc ccaaggagca gatggccaag 1080

gataaagtca gtctgacctg catgataaca gacttcttcc ctgaagacat tactgtggag 1140

tggcagtgga atgggcagcc agcggagaac tacaagaaca ctcagcccat catggacaca 1200

gatggctctt acttcatcta cagcaagctc aatgtgcaga agagcaactg ggaggcagga 1260

aatactttca cctgctctgt gttacatgag ggcctgcaca accaccatac tgagaagagc 1320

ctctcccact ctcctggtaa a 1341

<210> 163
<211> 466
<212> PRT
<213> Mus musculus

<400> 163

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Met Lys Gln Asn Gln Gly Lys Ser Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn
65 70 75 80

Gln Gln Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Arg
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Leu Gly Tyr Val Gly Asn Tyr Glu Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln
145 150 155 160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val
180 185 190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser
195 200 205

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys
210 215 220

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val
225 230 235 240

Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
245 250 255

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
260 265 270

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
275 280 285

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
290 295 300

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
355 360 365

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
370 375 380

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
385 390 395 400

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
405 410 415

Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln
420 425 430

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
435 440 445

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
450 455 460

Gly Lys
465

<210> 164
<211> 1398
<212> DNA
<213> Mus musculus

<400> 164
atgggatgga gctggacctt tctcttcctc ctgtcaggaa ctgcaggtgt cctctctgag 60

gtccagctgc aacagtctgg acctgaacta atgaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctggatacac attcactgac tacaacatgc actggatgaa gcagaaccaa 180

ggaaagagcc tagaatggat aggagaaatt aatcctaaca gtggtggtgc tggctacaac 240

cagcagttca aaggcaaggc cacattgact gtagacaagt cctccaggac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaag attgggctac 360

gttggtaatt acgaggactg gtacttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctcagcca aaacgacacc cccatctgtc tatccactgg cccctggatc tgctgcccaa 480

actaactcca tggtgaccct gggatgcctg gtcaagggct atttccctga gccagtgaca 540

gtgacctgga actctggatc cctgtccagc ggtgtgcaca ccttcccagc tgtcctgcag 600

tctgacctct acactctgag cagctcagtg actgtccct ccagcacctg gcccagcgag 660

accgtcacct gcaacgttgc ccacccggcc agcagcacca aggtggacaa gaaaattgtg 720

cccagggatt gtggttgtaa gccttgcata tgtacagtcc cagaagtatc atctgtcttc 780

atcttccccc caaagcccaa ggatgtgctc accattactc tgactcctaa ggtcacgtgt 840

gttgtggtag acatcagcaa ggatgatccc gaggtccagt tcagctggtt tgtagatgat 900

gtggaggtgc acacagctca gacgcaaccc cgggaggagc agttcaacag cactttccgc 960

tcagtcagtg aacttcccat catgcaccag gactggctca atggcaagga gttcaaatgc 1020

agggtcaaca gtgcagcttt ccctgccccc atcgagaaaa ccatctccaa aaccaaaggc 1080

agaccgaagg ctccacaggt gtacaccatt ccacctccca aggagcagat ggccaaggat 1140

aaagtcagtc tgacctgcat gataacagac ttcttccctg aagacattac tgtggagtgg 1200

cagtggaatg ggcagccagc ggagaactac aagaacactc agcccatcat ggacacagat 1260

ggctcttact tcatctacag caagctcaat gtgcagaaga gcaactggga ggcaggaaat 1320

actttcacct gctctgtgtt acatgagggc ctgcacaacc accatactga gaagagcctc 1380

tcccactctc ctggtaaa 1398

<210> 165
<211> 214
<212> PRT
<213> Mus musculus

<400> 165

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr Asn Leu Glu Gln
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 166
<211> 645
<212> DNA
<213> Mus musculus

<400> 166
gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 60

atcagttgca gggcaagtca agacattagc aattatttaa actggtatca gcagaaacca 120

gatggaactt ttaaactcct tatcttctac acatcaagat tactctcagg agtcccatca 180

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 240

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 300

gggaccaaac tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 645

<210> 167
<211> 234
<212> PRT
<213> Mus musculus

<400> 167

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe
50 55 60

Lys Leu Leu Ile Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr
85 90 95

Asn Leu Glu Gln Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 168
<211> 705
<212> DNA
<213> Mus musculus

<400> 168
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 120

atcagttgca gggcaagtca agacattagc aattatttaa actggtatca gcagaaacca 180

gatggaactt ttaaactcct tatcttctac acatcaagat tactctcagg agtcccatca 240

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 300

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 360

gggaccaaac tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 705

<210> 169
<211> 447
<212> PRT
<213> Mus musculus

<400> 169

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Thr Leu Asp Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

SeqListing

Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Pro
115 120 125

Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
130 135 140

Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr
180 185 190

Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
195 200 205

His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
210 215 220

Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
225 230 235 240

Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
245 250 255

Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu
260 265 270

Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
275 280 285

Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser
290 295 300

Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
305 310 315 320

Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
340 345 350

Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met
355 360 365

Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn
370 375 380

SeqListing

Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr
385 390 395 400

Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn
405 410 415

Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu
420 425 430

His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 170
<211> 1344
<212> DNA
<213> Mus musculus

<400> 170
gaggtccaac tgcaacagtc tggacctgaa ctaatgaagc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggata tacattcact gactacaaca tgcactgggt gaagcagaac 120

caaggaaaga ccctagactg gataggagaa attaatccta acagtggtgg tgctggctac 180

aaccagaagt tcaagggcaa ggccacattg actgtagaca agtcctccac cacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aagattgggc 300

tacgatgata tctacgacga ctggtacttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctcag ccaaaacgac accccatct gtctatccac tggccctgg atctgctgcc 420

caaactaact ccatggtgac cctgggatgc ctggtcaagg gctatttccc tgagccagtg 480

acagtgacct ggaactctgg atccctgtcc agcggtgtgc acaccttccc agctgtcctg 540

cagtctgacc tctacactct gagcagctca gtgactgtcc cctccagcac ctggcccagc 600

gagaccgtca cctgcaacgt tgcccacccg gccagcagca ccaaggtgga caagaaaatt 660

gtgcccaggg attgtggttg taagccttgc atatgtacag tcccagaagt atcatctgtc 720

ttcatcttcc ccccaaagcc caaggatgtg ctcaccatta ctctgactcc taaggtcacg 780

tgtgttgtgg tagacatcag caaggatgat cccgaggtcc agttcagctg gtttgtagat 840

gatgtggagg tgcacacagc tcagacgcaa ccccgggagg agcagttcaa cagcactttc 900

cgctcagtca gtgaacttcc catcatgcac caggactggc tcaatggcaa ggagttcaaa 960

tgcagggtca acagtgcagc tttccctgcc cccatcgaga aaaccatctc caaaaccaaa 1020

ggcagaccga aggctccaca ggtgtacacc attccacctc ccaaggagca gatggccaag 1080

gataaagtca gtctgacctg catgataaca gacttcttcc ctgaagacat tactgtggag 1140

tggcagtgga atgggcagcc agcggagaac tacaagaaca ctcagcccat catggacaca 1200

gatggctctt acttcatcta cagcaagctc aatgtgcaga agagcaactg ggaggcagga 1260

aatactttca cctgctctgt gttacatgag ggcctgcaca accaccatac tgagaagagc 1320

ctctcccact ctcctggtaa atga 1344

SeqListing

<210> 171
<211> 466
<212> PRT
<213> Mus musculus

<400> 171

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Thr Leu
50 55 60

Asp Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln
145 150 155 160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val
180 185 190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser
195 200 205

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys
210 215 220

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val
225 230 235 240

Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
245 250 255

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
260 265 270

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
275 280 285

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
290 295 300

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
355 360 365

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
370 375 380

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
385 390 395 400

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
405 410 415

Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln
420 425 430

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
435 440 445

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
450 455 460

Gly Lys
465

<210> 172
<211> 1401
<212> DNA
<213> Mus musculus

<400> 172
atgggatgga gctggacctt tctcttcctc ctgtcaggaa ctgcaggtgt cctctctgag 60

SeqListing

gtccaactgc aacagtctgg acctgaacta atgaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctggatatac attcactgac tacaacatgc actgggtgaa gcagaaccaa 180

ggaaagaccc tagactggat aggagaaatt aatcctaaca gtggtggtgc tggctacaac 240

cagaagttca agggcaaggc cacattgact gtagacaagt cctccaccac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaag attgggctac 360

gatgatatct acgacgactg gtacttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctcagcca aaacgacacc cccatctgtc tatccactgg cccctggatc tgctgcccaa 480

actaactcca tggtgaccct gggatgcctg gtcaagggct atttccctga gccagtgaca 540

gtgacctgga actctggatc cctgtccagc ggtgtgcaca ccttcccagc tgtcctgcag 600

tctgacctct acactctgag cagctcagtg actgtccct ccagcacctg gcccagcgag 660

accgtcacct gcaacgttgc ccacccggcc agcagcacca aggtggacaa gaaaattgtg 720

cccagggatt gtggttgtaa gccttgcata tgtacagtcc cagaagtatc atctgtcttc 780

atcttccccc caaagcccaa ggatgtgctc accattactc tgactcctaa ggtcacgtgt 840

gttgtggtag acatcagcaa ggatgatccc gaggtccagt tcagctggtt tgtagatgat 900

gtggaggtgc acacagctca gacgcaaccc cgggaggagc agttcaacag cactttccgc 960

tcagtcagtg aacttcccat catgcaccag gactggctca atggcaagga gttcaaatgc 1020

agggtcaaca gtgcagcttt ccctgccccc atcgagaaaa ccatctccaa aaccaaaggc 1080

agaccgaagg ctccacaggt gtacaccatt ccacctccca aggagcagat ggccaaggat 1140

aaagtcagtc tgacctgcat gataacagac ttcttccctg aagacattac tgtggagtgg 1200

cagtggaatg ggcagccagc ggagaactac aagaacactc agcccatcat ggacacagat 1260

ggctcttact tcatctacag caagctcaat gtgcagaaga gcaactggga ggcaggaaat 1320

actttcacct gctctgtgtt acatgagggc ctgcacaacc accatactga gaagagcctc 1380

tcccactctc ctggtaaatg a 1401

<210> 173
<211> 214
<212> PRT
<213> Mus musculus

<400> 173

Asp Ile Gln Met Thr Gln Ile Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Arg Leu Phe Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr Asn Leu Glu Gln
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 174
<211> 642
<212> DNA
<213> Mus musculus

<400> 174
gatatccaga tgacacagat tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 60

atcagttgca gggcaagtca agacattagc aattatttaa attggtatca gcagaaacca 120

gatggaactt ttaaactcct tatcttctac acatcaagat tattttcagg agtcccatca 180

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 240

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 300

gggaccaagg tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

SeqListing

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gt 642

<210> 175
<211> 234
<212> PRT
<213> Mus musculus

<400> 175

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Ile Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe
50 55 60

Lys Leu Leu Ile Phe Tyr Thr Ser Arg Leu Phe Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr
85 90 95

Asn Leu Glu Gln Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 176
<211> 702
<212> DNA
<213> Mus musculus

<400> 176
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacacagat tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 120

atcagttgca gggcaagtca agacattagc aattatttaa attggtatca gcagaaacca 180

gatggaactt ttaaactcct tatcttctac acatcaagat tattttcagg agtcccatca 240

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 300

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 360

gggaccaagg tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gt 702

<210> 177
<211> 450
<212> PRT
<213> Mus musculus

<400> 177

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Thr
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Lys Gln Thr Gln Gly Lys Thr Leu Glu Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

SeqListing

```
Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Ala
        115                 120                 125

Pro Ser Val Tyr Pro Leu Ala Pro Val Cys Gly Asp Thr Thr Gly Ser
    130                 135                 140

Ser Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Leu Thr Trp Asn Ser Gly Ser Leu Ser Ser Asp Val His Thr Phe
                165                 170                 175

Pro Ala Leu Leu Gln Ser Gly Leu Tyr Thr Leu Ser Ser Ser Val Thr
            180                 185                 190

Val Thr Thr Trp Pro Ser Gln Thr Ile Thr Cys Asn Val Ala His Pro
        195                 200                 205

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Ser Pro
    210                 215                 220

Thr His Lys Pro Cys Pro Pro Cys Pro Ala Pro Asn Leu Leu Gly Gly
225                 230                 235                 240

Pro Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met Ile
                245                 250                 255

Ser Leu Ser Pro Met Val Thr Cys Val Val Val Asp Val Ser Glu Asp
            260                 265                 270

Asp Pro Asp Val His Val Ser Trp Phe Val Asn Asn Val Glu Val His
        275                 280                 285

Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Ile Arg
    290                 295                 300

Val Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys
305                 310                 315                 320

Glu Phe Lys Cys Lys Val Asn Asn Lys Ala Leu Pro Ala Pro Ile Glu
                325                 330                 335

Arg Thr Ile Ser Lys Pro Lys Gly Pro Val Arg Ala Pro Gln Val Tyr
            340                 345                 350

Val Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr Leu
        355                 360                 365

Thr Cys Met Ile Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu Trp
    370                 375                 380
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SeqListing

Thr Asn Asn Gly Gln Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val
385 390 395 400

Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu
405 410 415

Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val His
420 425 430

Glu Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr Pro
435 440 445

Gly Lys
450

<210> 178
<211> 1350
<212> DNA
<213> Mus musculus

<400> 178
gaggtccaac tgcaacagtc tggacctgaa ctaatgaagc ctgggacttc agtgaagatg 60

tcctgcaagg cttctggata tacattcact gactacaaca tgcactgggt gaagcagacc 120

caaggaaaga ccctagagtg gataggagaa attaatccta acagtggtgg tgctggctac 180

aaccagaagt tcaagggcaa ggccacattg actgtagaca agtcctccac cacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aaaattgggc 300

tacgatgata tctacgacga ctggtatttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctcag ccaaaacaac agccccatcg gtctatccac tggccctgt gtgtggagat 420

acaactggct cctcggtgac tctaggatgc ctggtcaagg gttatttccc tgagccagtg 480

accttgacct ggaactctgg atccctgtcc agtgatgtgc acaccttccc agctctcctg 540

cagtctggcc tctacaccct cagcagctca gtgactgtaa ccacctggcc cagccagacc 600

atcacctgca atgtggccca cccggcaagc agcaccaaag tggacaagaa aattgagccc 660

agagggtccc caacacataa accctgtcct ccatgcccag ctcctaacct cttgggtgga 720

ccatccgtct tcatcttccc tccaaagatc aaggatgtac tcatgatctc cctgagcccc 780

atggtcacgt gtgtggtggt ggatgtgagc gaggatgacc cagatgtcca tgtcagctgg 840

ttcgtgaaca acgtggaagt acacacagct cagacacaaa cccatagaga ggattacaac 900

agtactatcc gggtggtcag tgccctcccc atccagcacc aggactggat gagtggcaag 960

gagttcaaat gcaaggtcaa caacaaagcc ctcccagcgc ccatcgagag aaccatctca 1020

aaacccaaag ggccagtaag agctccacag gtatatgtct tgcctccacc agaagaagag 1080

atgactaaga aacaggtcac tctgacctgc atgatcacag acttcatgcc tgaagacatt 1140

tacgtggagt ggaccaacaa cgggcaaaca gagctaaact acaagaacac tgaaccagtc 1200

ctggactctg atggttctta cttcatgtac agcaagctga gagtggaaaa gaagaactgg 1260

gtggaaagaa atagctactc ctgttcagtg gtccacgagg gtctgcacaa tcaccacacg 1320

actaagagct tctcccggac tccgggtaaa 1350

<210> 179
<211> 469
<212> PRT
<213> Mus musculus

<400> 179

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Thr Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Val Lys Gln Thr Gln Gly Lys Thr Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Lys Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Ala Pro Ser Val Tyr Pro Leu Ala Pro Val Cys Gly Asp Thr
145 150 155 160

Thr Gly Ser Ser Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Leu Thr Trp Asn Ser Gly Ser Leu Ser Ser Asp Val
180 185 190

His Thr Phe Pro Ala Leu Leu Gln Ser Gly Leu Tyr Thr Leu Ser Ser
195 200 205

Ser Val Thr Val Thr Thr Trp Pro Ser Gln Thr Ile Thr Cys Asn Val
210 215 220

SeqListing

Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg
225 230 235 240

Gly Ser Pro Thr His Lys Pro Cys Pro Pro Cys Pro Ala Pro Asn Leu
245 250 255

Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val
260 265 270

Leu Met Ile Ser Leu Ser Pro Met Val Thr Cys Val Val Val Asp Val
275 280 285

Ser Glu Asp Asp Pro Asp Val His Val Ser Trp Phe Val Asn Asn Val
290 295 300

Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser
305 310 315 320

Thr Ile Arg Val Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met
325 330 335

Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Ala Leu Pro Ala
340 345 350

Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Pro Val Arg Ala Pro
355 360 365

Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln
370 375 380

Val Thr Leu Thr Cys Met Ile Thr Asp Phe Met Pro Glu Asp Ile Tyr
385 390 395 400

Val Glu Trp Thr Asn Asn Gly Gln Thr Glu Leu Asn Tyr Lys Asn Thr
405 410 415

Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu
420 425 430

Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser
435 440 445

Val Val His Glu Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser
450 455 460

Arg Thr Pro Gly Lys
465

<210> 180
<211> 1407
<212> DNA
<213> Mus musculus

<400> 180
atgggatgga gctggacctt tctcttcctc ctgtcaggaa ctgcaggtgt cctctctgag 60

gtccaactgc aacagtctgg acctgaacta atgaagcctg ggacttcagt gaagatgtcc 120

tgcaaggctt ctggatatac attcactgac tacaacatgc actgggtgaa gcagacccaa 180

ggaaagaccc tagagtggat aggagaaatt aatcctaaca gtggtggtgc tggctacaac 240

cagaagttca agggcaaggc cacattgact gtagacaagt cctccaccac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaaa attgggctac 360

gatgatatct acgacgactg gtatttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctcagcca aaacaacagc cccatcggtc tatccactgg cccctgtgtg tggagataca 480

actggctcct cggtgactct aggatgcctg gtcaagggtt atttccctga gccagtgacc 540

ttgacctgga actctggatc cctgtccagt gatgtgcaca ccttcccagc tctcctgcag 600

tctggcctct acaccctcag cagctcagtg actgtaacca cctggcccag ccagaccatc 660

acctgcaatg tggcccaccc ggcaagcagc accaaagtgg acaagaaaat tgagcccaga 720

gggtccccaa cacataaacc ctgtcctcca tgcccagctc ctaacctctt gggtggacca 780

tccgtcttca tcttccctcc aaagatcaag gatgtactca tgatctccct gagccccatg 840

gtcacgtgtg tggtggtgga tgtgagcgag gatgacccag atgtccatgt cagctggttc 900

gtgaacaacg tggaagtaca cacagctcag acacaaaccc atagagagga ttacaacagt 960

actatccggg tggtcagtgc cctccccatc cagcaccagg actggatgag tggcaaggag 1020

ttcaaatgca aggtcaacaa caaagccctc ccagcgccca tcgagagaac catctcaaaa 1080

cccaaagggc cagtaagagc tccacaggta tatgtcttgc ctccaccaga agaagagatg 1140

actaagaaac aggtcactct gacctgcatg atcacagact tcatgcctga agacatttac 1200

gtggagtgga ccaacaacgg gcaaacagag ctaaactaca agaacactga accagtcctg 1260

gactctgatg gttcttactt catgtacagc aagctgagag tggaaaagaa gaactgggtg 1320

gaaagaaata gctactcctg ttcagtggtc cacgagggtc tgcacaatca ccacacgact 1380

aagagcttct cccggactcc gggtaaa 1407

<210> 181
<211> 214
<212> PRT
<213> Mus musculus

<400> 181

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr Asn Leu Glu Gln
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Leu Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 182
<211> 645
<212> DNA
<213> Mus musculus

<400> 182
gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 60

atcagttgca gggcaagtca agacattagc aattatttaa actggtatca gcagaaacca 120

gatggaactt ttaaactcct tatcttctac acatcaagat tactctcagg agtcccatca 180

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 240

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 300

gggaccaaac tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacta 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

SeqListing

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag cacctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 645

<210> 183
<211> 234
<212> PRT
<213> Mus musculus

<400> 183

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe
50 55 60

Lys Leu Leu Ile Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr
85 90 95

Asn Leu Glu Gln Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Leu Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 184
<211> 705
<212> DNA
<213> Mus musculus

<400> 184
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagggtctcc 120

atcagttgca gggcaagtca agacattagc aattatttaa actggtatca gcagaaacca 180

gatggaactt ttaaactcct tatcttctac acatcaagat tactctcagg agtcccatca 240

aggttcagtg gcagtgggtc tggaacagat tattctctca ccatttacaa cctggagcaa 300

gaagattttg ccacttactt ttgccaacag ggagatacgc ttccgtacac tttcggaggg 360

gggaccaaac tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacta 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 705

<210> 185
<211> 447
<212> PRT
<213> Mus musculus

<400> 185

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Thr Leu Glu Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

SeqListing

Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Pro
115 120 125

Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
130 135 140

Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr
180 185 190

Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
195 200 205

His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
210 215 220

Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
225 230 235 240

Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
245 250 255

Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu
260 265 270

Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
275 280 285

Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser
290 295 300

Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
305 310 315 320

Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
340 345 350

Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met
355 360 365

SeqListing

Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn
370 375 380

Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr
385 390 395 400

Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn
405 410 415

Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu
420 425 430

His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 186
<211> 1344
<212> DNA
<213> Mus musculus

<400> 186
gaggtccaac tgcaacagtc tggacctgaa ctaatgaagc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggata tacattcact gactacaaca tgcactgggt gaagcagaac 120

caaggaaaga ccctagaatg gataggagaa attaatccta acagtggtgg tgctggctac 180

aaccagaagt tcaagggcaa ggccacattg actgtagaca agtcctccac cacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aagattgggc 300

tacgatgata tctacgacga ctggtacttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctcag ccaaaacgac accccatct gtctatccac tggccctgg atctgctgcc 420

caaactaact ccatggtgac cctgggatgc ctggtcaagg gctatttccc tgagccagtg 480

acagtgacct ggaactctgg atccctgtcc agcggtgtgc acaccttccc agctgtcctg 540

cagtctgacc tctacactct gagcagctca gtgactgtcc cctccagcac ctggcccagc 600

gagaccgtca cctgcaacgt tgcccacccg gccagcagca ccaaggtgga caagaaaatt 660

gtgcccaggg attgtggttg taagccttgc atatgtacag tcccagaagt atcatctgtc 720

ttcatcttcc ccccaaagcc caaggatgtg ctcaccatta ctctgactcc taaggtcacg 780

tgtgttgtgg tagacatcag caaggatgat cccgaggtcc agttcagctg gtttgtagat 840

gatgtggagg tgcacacagc tcagacgcaa ccccgggagg agcagttcaa cagcactttc 900

cgctcagtca gtgaacttcc catcatgcac caggactggc tcaatggcaa ggagttcaaa 960

tgcagggtca acagtgcagc tttccctgcc cccatcgaga aaaccatctc caaaaccaaa 1020

ggcagaccga aggctccaca ggtgtacacc attccacctc ccaaggagca gatggccaag 1080

gataaagtca gtctgacctg catgataaca gacttcttcc ctgaagacat tactgtggag 1140

tggcagtgga atgggcagcc agcggagaac tacaagaaca ctcagcccat catggacaca 1200

gatggctctt acttcatcta cagcaagctc aatgtgcaga agagcaactg ggaggcagga 1260

SeqListing

aatactttca cctgctctgt gttacatgag ggcctgcaca accaccatac tgagaagagc 1320

ctctcccact ctcctggtaa atga 1344

<210> 187
<211> 466
<212> PRT
<213> Mus musculus

<400> 187

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Val Lys Gln Asn Gln Gly Lys Thr Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Thr
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln
145 150 155 160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val
180 185 190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser
195 200 205

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys
210 215 220

SeqListing

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val
225 230 235 240

Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
245 250 255

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
260 265 270

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
275 280 285

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
290 295 300

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
355 360 365

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
370 375 380

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
385 390 395 400

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
405 410 415

Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln
420 425 430

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
435 440 445

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
450 455 460

Gly Lys
465

<210> 188
<211> 1401
<212> DNA
<213> Mus musculus

<400> 188
atgggatgga gctggacctt tctcttcctc ctgtcaggaa ctgcaggtgt cctctctgag 60

gtccaactgc aacagtctgg acctgaacta atgaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctggatatac attcactgac tacaacatgc actgggtgaa gcagaaccaa 180

ggaaagaccc tagaatggat aggagaaatt aatcctaaca gtggtggtgc tggctacaac 240

cagaagttca agggcaaggc cacattgact gtagacaagt cctccaccac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaag attgggctac 360

gatgatatct acgacgactg gtacttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctcagcca aaacgacacc cccatctgtc tatccactgg cccctggatc tgctgcccaa 480

actaactcca tggtgaccct gggatgcctg gtcaagggct atttccctga gccagtgaca 540

gtgacctgga actctggatc cctgtccagc ggtgtgcaca ccttcccagc tgtcctgcag 600

tctgacctct acactctgag cagctcagtg actgtccct ccagcacctg gcccagcgag 660

accgtcacct gcaacgttgc ccacccggcc agcagcacca aggtggacaa gaaaattgtg 720

cccagggatt gtggttgtaa gccttgcata tgtacagtcc cagaagtatc atctgtcttc 780

atcttccccc caaagcccaa ggatgtgctc accattactc tgactcctaa ggtcacgtgt 840

gttgtggtag acatcagcaa ggatgatccc gaggtccagt tcagctggtt tgtagatgat 900

gtggaggtgc acacagctca gacgcaaccc cgggaggagc agttcaacag cactttccgc 960

tcagtcagtg aacttcccat catgcaccag gactggctca atggcaagga gttcaaatgc 1020

agggtcaaca gtgcagcttt ccctgccccc atcgagaaaa ccatctccaa aaccaaaggc 1080

agaccgaagg ctccacaggt gtacaccatt ccacctccca aggagcagat ggccaaggat 1140

aaagtcagtc tgacctgcat gataacagac ttcttccctg aagacattac tgtggagtgg 1200

cagtggaatg ggcagccagc ggagaactac aagaacactc agcccatcat ggacacagat 1260

ggctcttact tcatctacag caagctcaat gtgcagaaga gcaactggga ggcaggaaat 1320

actttcacct gctctgtgtt acatgagggc ctgcacaacc accatactga gaagagcctc 1380

tcccactctc ctggtaaatg a 1401

<210> 189
<211> 213
<212> PRT
<213> Mus musculus

<400> 189

Gln Ile Val Leu Ser Gln Ser Pro Ala Phe Leu Ser Val Ser Pro Gly
1 5 10 15

Asp Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Ile Ser Tyr Ile
20 25 30

His Trp Phe Gln Gln Lys Pro Gly Ser Ser Pro Arg Ser Trp Ile Tyr
35 40 45

Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Gly Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Val Glu Ala Glu
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asp Pro Leu Thr
85 90 95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg Ala Asp Ala Ala Pro
100 105 110

Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly
115 120 125

Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn
130 135 140

Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn
145 150 155 160

Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser
165 170 175

Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr
180 185 190

Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe
195 200 205

Asn Arg Asn Glu Cys
210

<210> 190
<211> 642
<212> DNA
<213> Mus musculus

<400> 190
caaattgttc tctcccagtc tccagcattc ctgtctgtat ctccagggga taaggtcaca 60

atgacttgca gggccagctc aagtataagt tacatacact ggtttcagca gaagccagga 120

tcctccccca gatcctggat ttatgccaca tccaacctgg cttctggagt ccctggtcgc 180

ttcagtggca gtgggtctgg gacctcttac tctctcacaa tcagcagagt ggaggctgag 240

gatgctgcca cttattactg ccagcagtgg agtagtgacc cactcacgtt cggtgctggg 300

accaagctgg agctgaaacg ggctgatgct gcaccaactg tatccatctt cccaccatcc 360

agtgagcagt taacatctgg aggtgcctca gtcgtgtgct tcttgaacaa cttctacccc 420

aaagacatca atgtcaagtg gaagattgat ggcagtgaac gacaaaatgg cgtcctgaac 480

SeqListing

agttggactg atcaggacag caaagacagc acctacagca tgagcagcac cctcacgttg 540

accaaggacg agtatgaacg acataacagc tatacctgtg aggccactca caagacatca 600

acttcaccca ttgtcaagag cttcaacagg aatgagtgtt ag 642

<210> 191
<211> 235
<212> PRT
<213> Mus musculus

<400> 191

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser
1 5 10 15

Val Ile Met Ser Arg Gly Gln Ile Val Leu Ser Gln Ser Pro Ala Phe
20 25 30

Leu Ser Val Ser Pro Gly Asp Lys Val Thr Met Thr Cys Arg Ala Ser
35 40 45

Ser Ser Ile Ser Tyr Ile His Trp Phe Gln Gln Lys Pro Gly Ser Ser
50 55 60

Pro Arg Ser Trp Ile Tyr Ala Thr Ser Asn Leu Ala Ser Gly Val Pro
65 70 75 80

Gly Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile
85 90 95

Ser Arg Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp
100 105 110

Ser Ser Asp Pro Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys
115 120 125

Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu
130 135 140

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe
145 150 155 160

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg
165 170 175

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser
180 185 190

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu
195 200 205

Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser
210 215 220

Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 192
<211> 708
<212> DNA
<213> Mus musculus

<400> 192
atggattttc aagtgcagat tttcagcttc ctgctaatca gtgcttcagt cataatgtcc 60

agaggacaaa ttgttctctc ccagtctcca gcattcctgt ctgtatctcc aggggataag 120

gtcacaatga cttgcagggc cagctcaagt ataagttaca tacactggtt tcagcagaag 180

ccaggatcct cccccagatc ctggatttat gccacatcca acctggcttc tggagtccct 240

ggtcgcttca gtggcagtgg gtctgggacc tcttactctc tcacaatcag cagagtggag 300

gctgaggatg ctgccactta ttactgccag cagtggagta gtgacccact cacgttcggt 360

gctgggacca agctggagct gaaacgggct gatgctgcac caactgtatc catcttccca 420

ccatccagtg agcagttaac atctggaggt gcctcagtcg tgtgcttctt gaacaacttc 480

taccccaaag acatcaatgt caagtggaag attgatggca gtgaacgaca aaatggcgtc 540

ctgaacagtt ggactgatca ggacagcaaa gacagcacct acagcatgag cagcaccctc 600

acgttgacca aggacgagta tgaacgacat aacagctata cctgtgaggc cactcacaag 660

acatcaactt cacccattgt caagagcttc aacaggaatg agtgttag 708

<210> 193
<211> 445
<212> PRT
<213> Mus musculus

<400> 193

Glu Val Gln Leu Gln Gln Ser Gly Ala Asp Leu Val Gln Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Thr Ala Ser Gly Phe Asp Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Met Lys Gln Arg Pro Asp Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala Pro Lys Phe
50 55 60

Pro Gly Lys Ala Thr Phe Thr Thr Asp Thr Ser Ser Asn Thr Ala Tyr
65 70 75 80

Leu Gln Leu Arg Gly Leu Thr Ser Glu Asp Thr Ala Ile Tyr Tyr Cys
85 90 95

SeqListing

Gly Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser
115 120 125

Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val
130 135 140

Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro
180 185 190

Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro
195 200 205

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly
210 215 220

Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile
225 230 235 240

Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys
245 250 255

Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln
260 265 270

Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln
275 280 285

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu
290 295 300

Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg
305 310 315 320

Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
325 330 335

Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro
340 345 350

Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr
355 360 365

SeqListing

Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln
370 375 380

Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly
385 390 395 400

Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu
405 410 415

Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn
420 425 430

His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 194
<211> 1338
<212> DNA
<213> Mus musculus

<400> 194
gaagttcagc tgcaacagtc tggggcagac cttgtgcagc caggggcctc agtcaaggtg 60

tcctgcacag cttctggctt cgacattaag gactactata tacactggat gaaacagagg 120

cctgaccagg gcctggagtg gattggaagg gttgatcctg acaatggtga gactgaattt 180

gccccgaagt tcccgggcaa ggccactttt acaacagaca catcctccaa cacagcctac 240

ctacaactca gaggcctgac atctgaggac actgccatct attactgtgg gagagaagac 300

tacgatggta cctacacctg gtttccttat tggggccaag ggactctggt cactgtctct 360

gcagccaaaa cgacaccccc atctgtctat ccactggccc ctggatctgc tgcccaaact 420

aactccatgg tgaccctggg atgcctggtc aagggctatt tccctgagcc agtgacagtg 480

acctggaact ctggatccct gtccagcggt gtgcacacct tcccagctgt cctgcagtct 540

gacctctaca ctctgagcag ctcagtgact gtccctcca gcacctggcc cagcgagacc 600

gtcacctgca acgttgccca cccggccagc agcaccaagg tggacaagaa aattgtgccc 660

agggattgtg gttgtaagcc ttgcatatgt acagtcccag aagtatcatc tgtcttcatc 720

ttcccccaa agcccaagga tgtgctcacc attactctga ctcctaaggt cacgtgtgtt 780

gtggtagaca tcagcaagga tgatcccgag gtccagttca gctggtttgt agatgatgtg 840

gaggtgcaca cagctcagac gcaaccccgg gaggagcagt tcaacagcac tttccgctca 900

gtcagtgaac ttcccatcat gcaccaggac tggctcaatg gcaaggagtt caaatgcagg 960

gtcaacagtg cagctttccc tgcccccatc gagaaaacca tctccaaaac caaaggcaga 1020

ccgaaggctc cacaggtgta caccattcca cctcccaagg agcagatggc caaggataaa 1080

gtcagtctga cctgcatgat aacagacttc ttccctgaag acattactgt ggagtggcag 1140

tggaatgggc agccagcgga gaactacaag aacactcagc ccatcatgga cacagatggc 1200

tcttacttca tctacagcaa gctcaatgtg cagaagagca actgggaggc aggaaatact 1260

ttcacctgct ctgtgttaca tgagggcctg cacaaccacc atactgagaa gagcctctcc 1320

cactctcctg gtaaatga 1338

<210> 195
<211> 464
<212> PRT
<213> Mus musculus

<400> 195

Met Lys Cys Ser Trp Val Ile Phe Phe Leu Met Ala Val Val Thr Gly
1 5 10 15

Val Asn Ser Glu Val Gln Leu Gln Gln Ser Gly Ala Asp Leu Val Gln
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Thr Ala Ser Gly Phe Asp Ile
35 40 45

Lys Asp Tyr Tyr Ile His Trp Met Lys Gln Arg Pro Asp Gln Gly Leu
50 55 60

Glu Trp Ile Gly Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala
65 70 75 80

Pro Lys Phe Pro Gly Lys Ala Thr Phe Thr Thr Asp Thr Ser Ser Asn
85 90 95

Thr Ala Tyr Leu Gln Leu Arg Gly Leu Thr Ser Glu Asp Thr Ala Ile
100 105 110

Tyr Tyr Cys Gly Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro
115 120 125

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr
130 135 140

Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn
145 150 155 160

Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro
165 170 175

Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr
180 185 190

Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val
195 200 205

Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val
210 215 220

SeqListing

Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg
225 230 235 240

Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser
245 250 255

Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu
260 265 270

Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro
275 280 285

Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala
290 295 300

Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val
305 310 315 320

Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe
325 330 335

Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr
340 345 350

Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile
355 360 365

Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys
370 375 380

Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp
385 390 395 400

Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp
405 410 415

Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser
420 425 430

Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly
435 440 445

Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
450 455 460

<210> 196
<211> 1395
<212> DNA
<213> Mus musculus

<400> 196
atgaaatgca gctgggtcat cttcttcctg atggcagtgg ttacaggggt caattcagaa 60

SeqListing

gttcagctgc aacagtctgg ggcagacctt gtgcagccag gggcctcagt caaggtgtcc 120

tgcacagctt ctggcttcga cattaaggac tactatatac actggatgaa acagaggcct 180

gaccagggcc tggagtggat tggaagggtt gatcctgaca atggtgagac tgaatttgcc 240

ccgaagttcc cgggcaaggc acttttaca acagacacat cctccaacac agcctaccta 300

caactcagag gcctgacatc tgaggacact gccatctatt actgtgggag agaagactac 360

gatggtacct acacctggtt tccttattgg ggccaaggga ctctggtcac tgtctctgca 420

gccaaaacga cacccccatc tgtctatcca ctggcccctg gatctgctgc ccaaactaac 480

tccatggtga ccctgggatg cctggtcaag ggctatttcc ctgagccagt gacagtgacc 540

tggaactctg gatccctgtc cagcggtgtg cacaccttcc cagctgtcct gcagtctgac 600

ctctacactc tgagcagctc agtgactgtc ccctccagca cctggcccag cgagaccgtc 660

acctgcaacg ttgcccaccc ggccagcagc accaaggtgg acaagaaaat tgtgcccagg 720

gattgtggtt gtaagccttg catatgtaca gtcccagaag tatcatctgt cttcatcttc 780

cccccaaagc ccaaggatgt gctcaccatt actctgactc ctaaggtcac gtgtgttgtg 840

gtagacatca gcaaggatga tcccgaggtc agttcagct ggtttgtaga tgatgtggag 900

gtgcacacag ctcagacgca accccgggag gagcagttca acagcacttt ccgctcagtc 960

agtgaacttc ccatcatgca ccaggactgg ctcaatggca aggagttcaa atgcagggtc 1020

aacagtgcag ctttccctgc ccccatcgag aaaaccatct ccaaaaccaa aggcagaccg 1080

aaggctccac aggtgtacac cattccacct cccaaggagc agatggccaa ggataaagtc 1140

agtctgacct gcatgataac agacttcttc cctgaagaca ttactgtgga gtggcagtgg 1200

aatgggcagc cagcggagaa ctacaagaac actcagccca tcatggacac agatggctct 1260

tacttcatct acagcaagct caatgtgcag aagagcaact gggaggcagg aaatactttc 1320

acctgctctg tgttacatga gggcctgcac aaccaccata ctgagaagag cctctcccac 1380

tctcctggta aatga 1395

<210> 197
<211> 214
<212> PRT
<213> Mus musculus

<400> 197

Asp Leu Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asn Tyr Ser Leu Thr Ile Thr Asn Leu Glu Gln
65 70 75 80

Asp Asp Ala Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala
100 105 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly
115 120 125

Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile
130 135 140

Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu
145 150 155 160

Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
165 170 175

Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr
180 185 190

Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser
195 200 205

Phe Asn Arg Asn Glu Cys
210

<210> 198
<211> 645
<212> DNA
<213> Mus musculus

<400> 198
gatctccaga tgacacagac tacttcctcc ctgtctgcct ctctgggaga cagagtcacc 60

atcagttgca gggcaagtca ggacattagc aattatttaa actggtatca gcagaaacca 120

gatggaactg ttaagctcct gatcttctac acatcaacat tacagtcagg agtcccatcg 180

aggttcagtg gcagtgggtc tggaacaaat tattctctca ccattaccaa cctggagcaa 240

gatgatgctg ccacttactt ttgccaacag ggtgatacgc ttccgtacac gttcggaggg 300

gggaccaagc tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 360

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 420

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 480

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 540

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 600

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 645

<210> 199
<211> 234
<212> PRT
<213> Mus musculus

<400> 199

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Ser Arg Cys Asp Leu Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val
50 55 60

Lys Leu Leu Ile Phe Tyr Thr Ser Thr Leu Gln Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asn Tyr Ser Leu Thr Ile Thr
85 90 95

Asn Leu Glu Gln Asp Asp Ala Ala Thr Tyr Phe Cys Gln Gln Gly Asp
100 105 110

Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
115 120 125

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
130 135 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145 150 155 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
165 170 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
180 185 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
195 200 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
210 215 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230

<210> 200
<211> 705
<212> DNA
<213> Mus musculus

<400> 200
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg ttccagatgt 60

gatctccaga tgacacagac tacttcctcc ctgtctgcct ctctgggaga cagagtcacc 120

atcagttgca gggcaagtca ggacattagc aattatttaa actggtatca gcagaaacca 180

gatggaactg ttaagctcct gatcttctac acatcaacat tacagtcagg agtcccatcg 240

aggttcagtg gcagtgggtc tggaacaaat tattctctca ccattaccaa cctggagcaa 300

gatgatgctg ccacttactt ttgccaacag ggtgatacgc ttccgtacac gttcggaggg 360

gggaccaagc tggaaataaa acgggctgat gctgcaccaa ctgtatccat cttcccacca 420

tccagtgagc agttaacatc tggaggtgcc tcagtcgtgt gcttcttgaa caacttctac 480

cccaaagaca tcaatgtcaa gtggaagatt gatggcagtg aacgacaaaa tggcgtcctg 540

aacagttgga ctgatcagga cagcaaagac agcacctaca gcatgagcag caccctcacg 600

ttgaccaagg acgagtatga acgacataac agctatacct gtgaggccac tcacaagaca 660

tcaacttcac ccattgtcaa gagcttcaac aggaatgagt gttag 705

<210> 201
<211> 447
<212> PRT
<213> Mus musculus

<400> 201

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Met Lys Gln Asn Gln Gly Lys Ser Leu Glu Trp Ile
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ser Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Tyr Gly Asn Tyr Glu Asp Trp Tyr Phe Asp Val
100 105 110

SeqListing

```
Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr Pro
        115                 120                 125

Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
    130                 135                 140

Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr
            180                 185                 190

Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
        195                 200                 205

His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
    210                 215                 220

Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
225                 230                 235                 240

Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
                245                 250                 255

Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu
            260                 265                 270

Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
        275                 280                 285

Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser
    290                 295                 300

Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
305                 310                 315                 320

Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
                325                 330                 335

Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
            340                 345                 350

Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met
        355                 360                 365

Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn
    370                 375                 380
```

Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr
385 390 395 400

Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn
405 410 415

Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu
420 425 430

His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 202
<211> 1344
<212> DNA
<213> Mus musculus

<400> 202
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tcctgcaagg cttctggata cacattcact gactacaaca tgcactggat gaagcagaac 120

caaggaaaga gcctagagtg gataggagag attaatccta acagtggtgg ttctggttac 180

aaccagaagt tcaaaggcaa ggccacattg actgtagaca agtcctccag cacagcctac 240

atggagctcc gcagcctgac atctgaggac tctgcagtct attactgtgc aagattgggc 300

tactatggta actacgagga ctggtatttc gatgtctggg gcgcagggac cacggtcacc 360

gtctcctctg ccaaaacgac acccccatct gtctatccac tggcccctgg atctgctgcc 420

caaactaact ccatggtgac cctgggatgc ctggtcaagg gctatttccc tgagccagtg 480

acagtgacct ggaactctgg atccctgtcc agcggtgtgc acaccttccc agctgtcctg 540

cagtctgacc tctacactct gagcagctca gtgactgtcc cctccagcac ctggcccagc 600

gagaccgtca cctgcaacgt tgcccacccg gccagcagca ccaaggtgga caagaaaatt 660

gtgcccaggg attgtggttg taagccttgc atatgtacag tcccagaagt atcatctgtc 720

ttcatcttcc ccccaaagcc caaggatgtg ctcaccatta ctctgactcc taaggtcacg 780

tgtgttgtgg tagacatcag caaggatgat cccgaggtcc agttcagctg gtttgtagat 840

gatgtggagg tgcacacagc tcagacgcaa ccccgggagg agcagttcaa cagcactttc 900

cgctcagtca gtgaacttcc catcatgcac caggactggc tcaatggcaa ggagttcaaa 960

tgcagggtca acagtgcagc tttccctgcc cccatcgaga aaaccatctc caaaaccaaa 1020

ggcagaccga aggctccaca ggtgtacacc attccacctc ccaaggagca gatggccaag 1080

gataaagtca gtctgacctg catgataaca gacttcttcc ctgaagacat tactgtggag 1140

tggcagtgga atgggcagcc agcggagaac tacaagaaca ctcagcccat catggacaca 1200

gatggctctt acttcatcta cagcaagctc aatgtgcaga agagcaactg ggaggcagga 1260

aatactttca cctgctctgt gttacatgag ggcctgcaca accaccatac tgagaagagc 1320

ctctcccact ctcctggtaa atga 1344

SeqListing

<210> 203
<211> 466
<212> PRT
<213> Mus musculus

<400> 203

Met Gly Trp Ser Trp Thr Phe Leu Phe Leu Leu Ser Gly Thr Ser Gly
1 5 10 15

Val Leu Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met His Trp Met Lys Gln Asn Gln Gly Lys Ser Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn Pro Asn Ser Gly Gly Ser Gly Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Leu Gly Tyr Tyr Gly Asn Tyr Glu Asp Trp Tyr
115 120 125

Phe Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Ala Lys
130 135 140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln
145 150 155 160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro
165 170 175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val
180 185 190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser
195 200 205

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys
210 215 220

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val
225 230 235 240

```
Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val
                245                 250                 255

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
            260                 265                 270

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp
        275                 280                 285

Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His
    290                 295                 300

Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305                 310                 315                 320

Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys
                325                 330                 335

Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu
            340                 345                 350

Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr
        355                 360                 365

Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu
    370                 375                 380

Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp
385                 390                 395                 400

Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile
                405                 410                 415

Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln
            420                 425                 430

Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His
        435                 440                 445

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
    450                 455                 460

Gly Lys
465


<210>  204
<211>  1401
<212>  DNA
<213>  Mus musculus

<400>  204
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SeqListing

gtccagttgc aacagtctgg acctgaacta atgaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctggatacac attcactgac tacaacatgc actggatgaa gcagaaccaa 180

ggaaagagcc tagagtggat aggagagatt aatcctaaca gtggtggttc tggttacaac 240

cagaagttca aaggcaaggc cacattgact gtagacaagt cctccagcac agcctacatg 300

gagctccgca gcctgacatc tgaggactct gcagtctatt actgtgcaag attgggctac 360

tatggtaact acgaggactg gtatttcgat gtctggggcg cagggaccac ggtcaccgtc 420

tcctctgcca aaacgacacc cccatctgtc tatccactgg cccctggatc tgctgcccaa 480

actaactcca tggtgaccct gggatgcctg gtcaagggct atttccctga gccagtgaca 540

gtgacctgga actctggatc cctgtccagc ggtgtgcaca ccttcccagc tgtcctgcag 600

tctgacctct acactctgag cagctcagtg actgtccct ccagcacctg gcccagcgag 660

accgtcacct gcaacgttgc ccacccggcc agcagcacca aggtggacaa gaaaattgtg 720

cccagggatt gtggttgtaa gccttgcata tgtacagtcc cagaagtatc atctgtcttc 780

atcttccccc caaagcccaa ggatgtgctc accattactc tgactcctaa ggtcacgtgt 840

gttgtggtag acatcagcaa ggatgatccc gaggtccagt tcagctggtt tgtagatgat 900

gtggaggtgc acacagctca gacgcaaccc cgggaggagc agttcaacag cactttccgc 960

tcagtcagtg aacttcccat catgcaccag gactggctca atggcaagga gttcaaatgc 1020

agggtcaaca gtgcagcttt ccctgccccc atcgagaaaa ccatctccaa aaccaaaggc 1080

agaccgaagg ctccacaggt gtacaccatt ccacctccca aggagcagat ggccaaggat 1140

aaagtcagtc tgacctgcat gataacagac ttcttccctg aagacattac tgtggagtgg 1200

cagtggaatg ggcagccagc ggagaactac aagaacactc agcccatcat ggacacagat 1260

ggctcttact tcatctacag caagctcaat gtgcagaaga gcaactggga ggcaggaaat 1320

actttcacct gctctgtgtt acatgagggc ctgcacaacc accatactga gaagagcctc 1380

tcccactctc ctggtaaatg a 1401

<210> 205
<211> 215
<212> PRT
<213> Mus musculus

<400> 205

Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly
1 5 10 15

Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Thr Ser Ser
20 25 30

Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Lys Leu Trp
35 40 45

Ile Tyr Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Val Glu
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Phe Phe Pro
85 90 95

Ser Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala
100 105 110

Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser
115 120 125

Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp
130 135 140

Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val
145 150 155 160

Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met
165 170 175

Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser
180 185 190

Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys
195 200 205

Ser Phe Asn Arg Asn Glu Cys
210 215

<210> 206
<211> 645
<212> DNA
<213> Mus musculus

<400> 206
cagattgttc tcacccagtc tccagcaatc atgtctgcat ctccagggga gaaggtcacc 60

atgacctgca gggccagctc aagtgtaact tccagttact tgaactggta ccagcagaag 120

ccaggatctt cccccaaact ctggatttat agcacatcca acctggcttc aggagtccca 180

gctcgcttca gtggcagtgg gtctgggacc tcttactctc tcacaatcag cagtgtggag 240

gctgaggatg ctgccactta ttactgccag cagtatgatt ttttcccatc gacgttcggt 300

ggaggcacca agctggaaat caagcgggct gatgctgcac caactgtatc catcttccca 360

ccatccagtg agcagttaac atctggaggt gcctcagtcg tgtgcttctt gaacaacttc 420

taccccaaag acatcaatgt caagtggaag attgatggca gtgaacgaca aaatggcgtc 480

ctgaacagtt ggactgatca ggacagcaaa gacagcacct acagcatgag cagcaccctc 540

acgttgacca aggacgagta tgaacgacat aacagctata cctgtgaggc cactcacaag 600

SeqListing

acatcaactt cacccatcgt caagagcttc aacaggaatg agtgt 645

<210> 207
<211> 237
<212> PRT
<213> Mus musculus

<400> 207

Met Asp Ser Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Leu
1 5 10 15

Val Lys Met Ser Arg Gly Gln Ile Val Leu Thr Gln Ser Pro Ala Ile
20 25 30

Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala Ser
35 40 45

Ser Ser Val Thr Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly
50 55 60

Ser Ser Pro Lys Leu Trp Ile Tyr Ser Thr Ser Asn Leu Ala Ser Gly
65 70 75 80

Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu
85 90 95

Thr Ile Ser Ser Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
100 105 110

Gln Tyr Asp Phe Phe Pro Ser Thr Phe Gly Gly Gly Thr Lys Leu Glu
115 120 125

Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser
130 135 140

Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn
145 150 155 160

Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser
165 170 175

Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys
180 185 190

Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu
195 200 205

Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser
210 215 220

Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 208
<211> 711
<212> DNA
<213> Mus musculus

<400> 208
atggattctc aagtgcagat tttcagcttc cttctaatca gtgccttagt caaaatgtcc 60

agaggacaga ttgttctcac ccagtctcca gcaatcatgt ctgcatctcc aggggagaag 120

gtcaccatga cctgcagggc cagctcaagt gtaacttcca gttacttgaa ctggtaccag 180

cagaagccag gatcttcccc caaactctgg atttatagca catccaacct ggcttcagga 240

gtcccagctc gcttcagtgg cagtgggtct gggacctctt actctctcac aatcagcagt 300

gtggaggctg aggatgctgc cacttattac tgccagcagt atgatttttt cccatcgacg 360

ttcggtggag gcaccaagct ggaaatcaag cgggctgatg ctgcaccaac tgtatccatc 420

ttcccaccat ccagtgagca gttaacatct ggaggtgcct cagtcgtgtg cttcttgaac 480

aacttctacc ccaaagacat caatgtcaag tggaagattg atggcagtga acgacaaaat 540

ggcgtcctga acagttggac tgatcaggac agcaaagaca gcacctacag catgagcagc 600

accctcacgt tgaccaagga cgagtatgaa cgacataaca gctatacctg tgaggccact 660

cacaagacat caacttcacc catcgtcaag agcttcaaca ggaatgagtg t 711

<210> 209
<211> 445
<212> PRT
<213> Mus musculus

<400> 209

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Tyr Met Asn Trp Val Lys Gln Ser His Gly Glu Ser Leu Glu Trp Ile
35 40 45

Gly Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn His Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Asn Thr Ala Tyr
65 70 75 80

Met Gln Leu Asn Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp Tyr Trp Gly
100 105 110

SeqListing

Gln Gly Thr Ser Val Thr Val Ser Ser Ala Lys Thr Thr Pro Pro Ser
115 120 125

Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val
130 135 140

Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro
180 185 190

Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro
195 200 205

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly
210 215 220

Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile
225 230 235 240

Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys
245 250 255

Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln
260 265 270

Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln
275 280 285

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu
290 295 300

Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg
305 310 315 320

Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
325 330 335

Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro
340 345 350

Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr
355 360 365

Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln
370 375 380

SeqListing

Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly
385 390 395 400

Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu
405 410 415

Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn
420 425 430

His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440 445

<210> 210
<211> 1335
<212> DNA
<213> Mus musculus

<400> 210
gaggtccagc tgcaacaatc tggacctgag ctggtgaagc ctggggcttc agtgaagatg 60

tcctgtaagg cttctggata cacattcact gactactaca tgaactgggt gaagcagagc 120

catggagaga gccttgagtg gattggagat attaatcctt acaacgatga tactacctac 180

aaccacaagt tcaagggcaa ggccacattg actgtagaca aatcctccaa cacagcctac 240

atgcagctca acagcctgac atctgaggac tctgcagtct attactgtgc aagagagacg 300

gccgttatta ctacgaatgc tatggactac tggggtcaag gaacctcagt caccgtctcc 360

tcagccaaaa cgacaccccc atctgtctat ccactggccc ctggatctgc tgcccaaact 420

aactccatgg tgaccctggg atgcctggtc aagggctatt tccctgagcc agtgacagtg 480

acctggaact ctggatccct gtccagcggt gtgcacacct tcccagctgt cctgcagtct 540

gacctctaca ctctgagcag ctcagtgact gtcccctcca gcacctggcc cagcgagacc 600

gtcacctgca acgttgccca cccggccagc agcaccaagg tggacaagaa aattgtgccc 660

agggattgtg gttgtaagcc ttgcatatgt acagtcccag aagtatcatc tgtcttcatc 720

ttcccccaa agcccaagga tgtgctcacc attactctga ctcctaaggt cacgtgtgtt 780

gtggtagaca tcagcaagga tgatcccgag gtccagttca gctggtttgt agatgatgtg 840

gaggtgcaca cagctcagac gcaaccccgg gaggagcagt tcaacagcac tttccgctca 900

gtcagtgaac ttcccatcat gcaccaggac tggctcaatg gcaaggagtt caaatgcagg 960

gtcaacagtg cagctttccc tgcccccatc gagaaaacca tctccaaaac caaaggcaga 1020

ccgaaggctc cacaggtgta caccattcca cctcccaagg agcagatggc caaggataaa 1080

gtcagtctga cctgcatgat aacagacttc ttccctgaag acattactgt ggagtggcag 1140

tggaatgggc agccagcgga gaactacaag aacactcagc ccatcatgga cacagatggc 1200

tcttacttca tctacagcaa gctcaatgtg cagaagagca actgggaggc aggaaatact 1260

ttcacctgct ctgtgttaca tgagggcctg cacaaccacc atactgagaa gagcctctcc 1320

cactctcctg gtaaa 1335

SeqListing

<210> 211
<211> 464
<212> PRT
<213> Mus musculus

<400> 211

Met Gly Trp Asn Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Tyr Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Tyr Met Asn Trp Val Lys Gln Ser His Gly Glu Ser Leu
50 55 60

Glu Trp Ile Gly Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn
65 70 75 80

His Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Asn
85 90 95

Thr Ala Tyr Met Gln Leu Asn Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp
115 120 125

Tyr Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Lys Thr Thr
130 135 140

Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn
145 150 155 160

Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro
165 170 175

Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr
180 185 190

Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val
195 200 205

Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val
210 215 220

Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg
225 230 235 240

Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser
245 250 255

Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu
260 265 270

Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro
275 280 285

Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala
290 295 300

Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val
305 310 315 320

Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe
325 330 335

Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr
340 345 350

Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile
355 360 365

Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys
370 375 380

Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp
385 390 395 400

Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp
405 410 415

Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser
420 425 430

Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly
435 440 445

Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
450 455 460

<210> 212
<211> 1392
<212> DNA
<213> Mus musculus

<400> 212
atgggatgga actggatctt tctcttcctc ttgtcaggaa ctgcaggtgt ctactctgag 60

gtccagctgc aacaatctgg acctgagctg gtgaagcctg gggcttcagt gaagatgtcc 120

tgtaaggctt ctggatacac attcactgac tactacatga actgggtgaa gcagagccat 180

ggagagagcc ttgagtggat tggagatatt aatccttaca acgatgatac tacctacaac 240

cacaagttca agggcaaggc cacattgact gtagacaaat cctccaacac agcctacatg 300

cagctcaaca gcctgacatc tgaggactct gcagtctatt actgtgcaag agagacggcc 360

gttattacta cgaatgctat ggactactgg ggtcaaggaa cctcagtcac cgtctcctca 420

gccaaaacga cacccccatc tgtctatcca ctggcccctg gatctgctgc ccaaactaac 480

tccatggtga ccctgggatg cctggtcaag ggctatttcc ctgagccagt gacagtgacc 540

tggaactctg gatccctgtc cagcggtgtg cacaccttcc cagctgtcct gcagtctgac 600

ctctacactc tgagcagctc agtgactgtc ccctccagca cctggcccag cgagaccgtc 660

acctgcaacg ttgcccaccc ggccagcagc accaaggtgg acaagaaaat tgtgcccagg 720

gattgtggtt gtaagccttg catatgtaca gtcccagaag tatcatctgt cttcatcttc 780

cccccaaagc ccaaggatgt gctcaccatt actctgactc ctaaggtcac gtgtgttgtg 840

gtagacatca gcaaggatga tcccgaggtc agttcagct ggtttgtaga tgatgtggag 900

gtgcacacag ctcagacgca accccgggag gagcagttca acagcacttt ccgctcagtc 960

agtgaacttc ccatcatgca ccaggactgg ctcaatggca aggagttcaa atgcagggtc 1020

aacagtgcag ctttccctgc ccccatcgag aaaaccatct ccaaaaccaa aggcagaccg 1080

aaggctccac aggtgtacac cattccacct cccaaggagc agatggccaa ggataaagtc 1140

agtctgacct gcatgataac agacttcttc cctgaagaca ttactgtgga gtggcagtgg 1200

aatgggcagc cagcggagaa ctacaagaac actcagccca tcatggacac agatggctct 1260

tacttcatct acagcaagct caatgtgcag aagagcaact gggaggcagg aaatactttc 1320

acctgctctg tgttacatga gggcctgcac aaccaccata ctgagaagag cctctcccac 1380

tctcctggta aa 1392

<210> 213
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 213

Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Thr Ser Ser
20 25 30

Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Phe Phe Pro
85 90 95

Ser Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 214
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 214
gacatccagc tgacccagag ccccagcttc ctttccgcat ccgttggtga ccgagtaaca 60

atcacatgcc gcgcctcatc ttcagttaca tcttcttatc ttaattggta tcaacaaaaa 120

ccaggaaaag cacctaaact tcttatatac tctacatcta atctcgcatc aggagttccc 180

tctcgatttt caggatctgg atcaggcaca gaatttacac ttactatatc atcactccaa 240

ccagaagact tcgccactta ttactgccaa caatacgatt tttttccaag cacattcgga 300

ggaggtacaa aagtagaaat caagcgtacg gtggctgcac catctgtctt catcttcccg 360

ccatctgatg agcagttgaa atctggaact gcctctgttg tgtgcctgct gaataacttc 420

tatcccagag aggccaaagt acagtggaag gtggataacg ccctccaatc gggtaactcc 480

caggagagtg tcacagagca ggacagcaag gacagcacct acagcctcag cagcaccctg 540

acgctgagca aagcagacta cgagaaacac aaagtctacg cctgcgaagt cacccatcag 600

ggcctgagct cgcccgtcac aaagagcttc aacaggggag agtgt 645

<210> 215
<211> 237
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 215

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Pro Gly Ala Arg Cys Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
35 40 45

Ser Ser Val Thr Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly
50 55 60

Lys Ala Pro Lys Leu Leu Ile Tyr Ser Thr Ser Asn Leu Ala Ser Gly
65 70 75 80

Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu
85 90 95

Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln
100 105 110

Gln Tyr Asp Phe Phe Pro Ser Thr Phe Gly Gly Gly Thr Lys Val Glu
115 120 125

Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
130 135 140

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
145 150 155 160

Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
165 170 175

Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
180 185 190

Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
195 200 205

Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
210 215 220

Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230 235

<210> 216
<211> 711
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> *Humanized Antibody Sequence*

<400> 216
atggacatga gggtccccgc tcagctcctg gggctcctgc tactctggct cccaggtgcc 60

agatgtgaca tccagctgac ccagagcccc agcttccttt ccgcatccgt tggtgaccga 120

gtaacaatca catgccgcgc ctcatcttca gttacatctt cttatcttaa ttggtatcaa 180

caaaaaccag gaaaagcacc taaacttctt atatactcta catctaatct cgcatcagga 240

gttccctctc gattttcagg atctggatca ggcacagaat ttacacttac tatatcatca 300

ctccaaccag aagacttcgc cacttattac tgccaacaat acgatttttt tccaagcaca 360

ttcggaggag gtacaaaagt agaaatcaag cgtacggtgg ctgcaccatc tgtcttcatc 420

ttcccgccat ctgatgagca gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat 480

aacttctatc ccagagaggc caaagtacag tggaaggtgg ataacgccct ccaatcgggt 540

aactcccagg agagtgtcac agagcaggac agcaaggaca gcacctacag cctcagcagc 600

accctgacgc tgagcaaagc agactacgag aaacacaaag tctacgcctg cgaagtcacc 660

catcagggcc tgagctcgcc cgtcacaaag agcttcaaca ggggagagtg t 711

<210> 217
<211> 447
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 217

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Tyr Met Asn Trp Val Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Met
35 40 45

Gly Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn His Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys
210 215 220

Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val
225 230 235 240

SeqListing

Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
245 250 255

Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
260 265 270

Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys
275 280 285

Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser
290 295 300

Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305 310 315 320

Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
340 345 350

Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
355 360 365

Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
370 375 380

Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser
385 390 395 400

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg
405 410 415

Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440 445

<210> 218
<211> 1341
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 218
gaggtgcagc tggtgcagag cggcgccgag gtcaagaaac ctggagcaag cgtaaaggtt 60

SeqListing

agttgcaaag catctggata cacatttacc gactactaca tgaattgggt acgacaagcc 120

cctggacaaa gacttgaatg gatgggagac attaaccctt ataacgacga cactacatac 180

aatcataaat ttaaaggaag agttacaatt acaagagata catccgcatc aaccgcctat 240

atggaacttt cctcattgag atctgaagac actgctgttt attactgtgc aagagaaact 300

gccgttatta ctactaacgc tatggattac tggggtcaag gaaccactgt taccgtctct 360

agtgcctcca ccaagggccc atcggtcttc cccctggcgc cctgctccag gagcacctcc 420

gagagcacag cggccctggg ctgcctggtc aaggactact tccccgaacc ggtgacggtg 480

tcgtggaact caggcgctct gaccagcggc gtgcacacct tcccagctgt cctacagtcc 540

tcaggactct actccctcag cagcgtggtg accgtgccct ccagcaactt cggcacccag 600

acctacacct gcaacgtaga tcacaagccc agcaacacca aggtggacaa gacagttgag 660

cgcaaatgtt gtgtcgagtg cccaccgtgc ccagcaccac ctgtggcagg accgtcagtc 720

ttcctcttcc ccccaaaacc caaggacacc ctcatgatct cccggacccc tgaggtcacg 780

tgcgtggtgg tggacgtgag ccacgaagac cccgaggtcc agttcaactg gtacgtggac 840

ggcgtggagg tgcataatgc caagacaaag ccacgggagg agcagttcaa cagcacgttc 900

cgtgtggtca gcgtcctcac cgttgtgcac caggactggc tgaacggcaa ggagtacaag 960

tgcaaggtct ccaacaaagg cctcccagcc cccatcgaga aaaccatctc caaaaccaaa 1020

gggcagcccc gagaaccaca ggtgtacacc ctgcccccat cccgggagga gatgaccaag 1080

aaccaggtca gcctgacctg cctggtcaaa ggcttctacc ccagcgacat cgccgtggag 1140

tgggagagca atgggcagcc ggagaacaac tacaagacca cacctcccat gctggactcc 1200

gacggctcct tcttcctcta cagcaagctc accgtggaca agagcaggtg gcagcagggg 1260

aacgtcttct catgctccgt gatgcatgag gctctgcaca accactacac gcagaagagc 1320

ctctccctgt ctccgggtaa a 1341

<210> 219
<211> 466
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 219

Met Asp Trp Thr Trp Arg Ile Leu Phe Leu Val Ala Ala Ala Thr Gly
1 5 10 15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

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Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
        35                  40                  45

Thr Asp Tyr Tyr Met Asn Trp Val Arg Gln Ala Pro Gly Gln Arg Leu
    50                  55                  60

Glu Trp Met Gly Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn
65                  70                  75                  80

His Lys Phe Lys Gly Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Ser
                85                  90                  95

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Arg Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp
        115                 120                 125

Tyr Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
    130                 135                 140

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
145                 150                 155                 160

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
                165                 170                 175

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
            180                 185                 190

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
        195                 200                 205

Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
    210                 215                 220

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg
225                 230                 235                 240

Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly
                245                 250                 255

Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile
            260                 265                 270

Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu
        275                 280                 285

Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His
    290                 295                 300
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Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu
340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr
355 360 365

Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu
370 375 380

Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp
385 390 395 400

Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met
405 410 415

Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp
420 425 430

Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His
435 440 445

Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
450 455 460

Gly Lys
465

<210> 220
<211> 1398
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 220
atggactgga cctggaggat cctcttcttg gtggcagcag ccacaggagc ccactccgag 60

gtgcagctgg tgcagagcgg cgccgaggtc aagaaacctg gagcaagcgt aaaggttagt 120

tgcaaagcat ctggatacac atttaccgac tactacatga attgggtacg acaagcccct 180

ggacaaagac ttgaatggat gggagacatt aacccttata acgacgacac tacatacaat 240

cataaattta aaggaagagt tacaattaca agagatacat ccgcatcaac cgcctatatg 300

gaactttcct cattgagatc tgaagacact gctgtttatt actgtgcaag agaaactgcc 360

gttattacta ctaacgctat ggattactgg ggtcaaggaa ccactgttac cgtctctagt 420

gcctccacca agggcccatc ggtcttcccc ctggcgccct gctccaggag cacctccgag 480

agcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 540

tggaactcag gcgctctgac cagcggcgtg cacaccttcc cagctgtcct acagtcctca 600

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcaacttcgg cacccagacc 660

tacacctgca acgtagatca caagcccagc aacaccaagg tggacaagac agttgagcgc 720

aaatgttgtg tcgagtgccc accgtgccca gcaccacctg tggcaggacc gtcagtcttc 780

ctcttccccc caaaacccaa ggacaccctc atgatctccc ggacccctga ggtcacgtgc 840

gtggtggtgg acgtgagcca cgaagacccc gaggtccagt tcaactggta cgtggacggc 900

gtggaggtgc ataatgccaa gacaaagcca cgggaggagc agttcaacag cacgttccgt 960

gtggtcagcg tcctcaccgt tgtgcaccag gactggctga acggcaagga gtacaagtgc 1020

aaggtctcca acaaaggcct cccagccccc atcgagaaaa ccatctccaa aaccaaaggg 1080

cagccccgag aaccacaggt gtacaccctg cccccatccc gggaggagat gaccaagaac 1140

caggtcagcc tgacctgcct ggtcaaaggc ttctacccca gcgacatcgc cgtggagtgg 1200

gagagcaatg ggcagccgga gaacaactac aagaccacac ctcccatgct ggactccgac 1260

ggctccttct tcctctacag caagctcacc gtggacaaga gcaggtggca gcaggggaac 1320

gtcttctcat gctccgtgat gcatgaggct ctgcacaacc actacacgca gaagagcctc 1380

tccctgtctc cgggtaaa 1398

<210> 221
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 221

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Val Ser Ser Thr Ile Ser Ser Asn
20 25 30

His Leu His Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Ser Leu
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 222
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 222
gacatccaga tgacccagtc tccatcctcc ctctcagcat ccgtaggcga tagagttaca 60

ataacatgca gcgtatcatc aactatatca tcaaatcatc ttcattggtt ccaacagaaa 120

cccggcaaag cacctaaatc acttatatac ggcacatcaa atctcgcatc aggcgttcct 180

tcaagatttt caggctctgg ctcaggcacc gactttactc ttacaatatc ctccctccaa 240

cccgaagact tcgcaaccta ttactgtcaa caatggtcct catatccact cacatttggc 300

ggcggcacaa aagtagaaat taaacgtacg gtggctgcac catctgtctt catcttcccg 360

SeqListing

ccatctgatg agcagttgaa atctggaact gcctctgttg tgtgcctgct gaataacttc 420

tatcccagag aggccaaagt acagtggaag gtggataacg ccctccaatc gggtaactcc 480

caggagagtg tcacagagca ggacagcaag gacagcacct acagcctcag cagcaccctg 540

acgctgagca aagcagacta cgagaaacac aaagtctacg cctgcgaagt cacccatcag 600

ggcctgagct cgcccgtcac aaagagcttc aacaggggag agtgt 645

<210> 223
<211> 237
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 223

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Arg Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Ser Val Ser
35 40 45

Ser Thr Ile Ser Ser Asn His Leu His Trp Phe Gln Gln Lys Pro Gly
50 55 60

Lys Ala Pro Lys Ser Leu Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly
65 70 75 80

Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
85 90 95

Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln
100 105 110

Gln Trp Ser Ser Tyr Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu
115 120 125

Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
130 135 140

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
145 150 155 160

Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
165 170 175

Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
180 185 190

Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
195 200 205

Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
210 215 220

Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230 235

<210> 224
<211> 711
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 224
atggacatga gggtccccgc tcagctcctg gggctcctgc tactctggct ccgaggtgcc 60

agatgtgaca tccagatgac ccagtctcca tcctccctct cagcatccgt aggcgataga 120

gttacaataa catgcagcgt atcatcaact atatcatcaa atcatcttca ttggttccaa 180

cagaaacccg gcaaagcacc taaatcactt atatacggca catcaaatct cgcatcaggc 240

gttccttcaa gattttcagg ctctggctca ggcaccgact ttactcttac aatatcctcc 300

ctccaacccg aagacttcgc aacctattac tgtcaacaat ggtcctcata tccactcaca 360

tttggcggcg gcacaaaagt agaaattaaa cgtacggtgg ctgcaccatc tgtcttcatc 420

ttcccgccat ctgatgagca gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat 480

aacttctatc ccagagaggc caaagtacag tggaaggtgg ataacgccct ccaatcgggt 540

aactcccagg agagtgtcac agagcaggac agcaaggaca gcacctacag cctcagcagc 600

accctgacgc tgagcaaagc agactacgag aaacacaaag tctacgcctg cgaagtcacc 660

catcagggcc tgagctcgcc cgtcacaaag agcttcaaca ggggagagtg t 711

<210> 225
<211> 451
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE

SeqListing

<223> Humanized Antibody Sequence

<400> 225

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Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                  10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Asp Phe Asn Ile Lys Asp Phe
            20                  25                  30

Tyr Leu His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp Pro Lys Phe
    50                  55                  60

Gln Asp Lys Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr Trp Tyr Phe
            100                 105                 110

Asp Val Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser
    130                 135                 140

Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys
        195                 200                 205

Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu
    210                 215                 220

Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala
225                 230                 235                 240

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                245                 250                 255
```

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
260 265 270

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
275 280 285

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe
290 295 300

Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly
305 310 315 320

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile
325 330 335

Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val
340 345 350

Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser
355 360 365

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
370 375 380

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385 390 395 400

Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
405 410 415

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
420 425 430

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
435 440 445

Pro Gly Lys
450

<210> 226
<211> 1353
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 226
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctgactt caacattaaa gacttctatc tacactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gattggaagg attgatcctg agaatggtga tactttatat 180

gacccgaagt tccaggacaa ggtcaccatg accacagaca cgtccaccag cacagcctac 240

atggagctga ggagcctgag atctgacgac acggccgtgt attactgtgc gagagaggcg 300

gattatttcc acgatggtac ctcctactgg tacttcgatg tctggggccg tggcaccctg 360

gtcaccgtct ctagtgcctc caccaagggc ccatcggtct tcccccctggc gccctgctcc 420

aggagcacct ccgagagcac agcggccctg ggctgcctgg tcaaggacta cttccccgaa 480

ccggtgacgg tgtcgtggaa ctcaggcgct ctgaccagcg gcgtgcacac cttcccagct 540

gtcctacagt cctcaggact ctactccctc agcagcgtgg tgaccgtgcc ctccagcaac 600

ttcggcaccc agacctacac ctgcaacgta gatcacaagc ccagcaacac caaggtggac 660

aagacagttg agcgcaaatg ttgtgtcgag tgcccaccgt gcccagcacc acctgtggca 720

ggaccgtcag tcttcctctt ccccccaaaa cccaaggaca ccctcatgat ctcccggacc 780

cctgaggtca cgtgcgtggt ggtggacgtg agccacgaag accccgaggt ccagttcaac 840

tggtacgtgg acggcgtgga ggtgcataat gccaagacaa agccacggga ggagcagttc 900

aacagcacgt tccgtgtggt cagcgtcctc accgttgtgc accaggactg gctgaacggc 960

aaggagtaca agtgcaaggt ctccaacaaa ggcctcccag ccccatcga gaaaaccatc 1020

tccaaaacca aagggcagcc ccgagaacca caggtgtaca ccctgccccc atcccgggag 1080

gagatgacca agaaccaggt cagcctgacc tgcctggtca aaggcttcta ccccagcgac 1140

atcgccgtgg agtgggagag caatgggcag ccggagaaca actacaagac cacacctccc 1200

atgctggact ccgacggctc cttcttcctc tacagcaagc tcaccgtgga caagagcagg 1260

tggcagcagg ggaacgtctt ctcatgctcc gtgatgcatg aggctctgca caaccactac 1320

acgcagaaga gcctctccct gtctccgggt aaa 1353

<210> 227
<211> 470
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 227

Met Asp Trp Thr Trp Arg Ile Leu Phe Leu Val Ala Ala Ala Thr Gly
1 5 10 15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Asp Phe Asn Ile
35 40 45

Lys Asp Phe Tyr Leu His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu

50 55 60

Glu Trp Ile Gly Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp
65 70 75 80

Pro Lys Phe Gln Asp Lys Val Thr Met Thr Thr Asp Thr Ser Thr Ser
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr
115 120 125

Trp Tyr Phe Asp Val Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser
130 135 140

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
145 150 155 160

Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
165 170 175

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
180 185 190

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
195 200 205

Leu Ser Ser Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr
210 215 220

Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys
225 230 235 240

Thr Val Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro
245 250 255

Pro Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
260 265 270

Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
275 280 285

Val Ser His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly
290 295 300

Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn
305 310 315 320

Ser Thr Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp

325 330 335

Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro
340 345 350

Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu
355 360 365

Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn
370 375 380

Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
385 390 395 400

Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
405 410 415

Thr Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
420 425 430

Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
435 440 445

Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
450 455 460

Ser Leu Ser Pro Gly Lys
465 470

<210> 228
<211> 1410
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 228
atggactgga cctggaggat cctcttcttg gtggcagcag ccacaggagc ccactccgag 60

gtgcagctgg tgcagtctgg ggctgaggtg aagaagcctg gggcctcagt gaaggtctcc 120

tgcaaggctt ctgacttcaa cattaaagac ttctatctac actgggtgcg acaggcccct 180

ggacaagggc ttgagtggat tggaaggatt gatcctgaga atggtgatac tttatatgac 240

ccgaagttcc aggacaaggt caccatgacc acagacacgt ccaccagcac agcctacatg 300

gagctgagga gcctgagatc tgacgacacg gccgtgtatt actgtgcgag agaggcggat 360

tatttccacg atggtacctc ctactggtac ttcgatgtct ggggccgtgg caccctggtc 420

accgtctcta gtgcctccac caagggccca tcggtcttcc ccctggcgcc ctgctccagg 480

agcacctccg agagcacagc ggccctgggc tgcctggtca aggactactt ccccgaaccg 540

gtgacggtgt cgtggaactc aggcgctctg accagcggcg tgcacacctt cccagctgtc 600

ctacagtcct caggactcta ctccctcagc agcgtggtga ccgtgccctc cagcaacttc 660

ggcacccaga cctacacctg caacgtagat cacaagccca gcaacaccaa ggtggacaag 720

acagttgagc gcaaatgttg tgtcgagtgc ccaccgtgcc cagcaccacc tgtggcagga 780

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 840

gaggtcacgt gcgtggtggt ggacgtgagc cacgaagacc ccgaggtcca gttcaactgg 900

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cacgggagga gcagttcaac 960

agcacgttcc gtgtggtcag cgtcctcacc gttgtgcacc aggactggct gaacggcaag 1020

gagtacaagt gcaaggtctc caacaaaggc ctcccagccc ccatcgagaa aaccatctcc 1080

aaaaccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 1140

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctaccc cagcgacatc 1200

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac acctcccatg 1260

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 1320

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 1380

cagaagagcc tctccctgtc tccgggtaaa 1410

<210> 229
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 229

Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Ile Ser Tyr Ile
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
35 40 45

Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asp Pro Leu Thr
85 90 95

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
100 105 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
115 120 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Cys
210

<210> 230
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 230
gacatccagt tgacccagtc tccatccttc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgca gggccagctc aagtataagt tacatacact ggtatcagca aaaaccaggg 120

aaagccccta agctcctgat ctatgccaca tccaacctgg cttctggggt cccatcaagg 180

ttcagcggca gtggatctgg gacagaattc actctcacaa tcagcagcct gcagcctgaa 240

gattttgcaa cttattactg tcagcagtgg agtagtgacc cactcacgtt cggcggaggg 300

accaaggtgg agatcaaacg tacggtggct gcaccatctg tcttcatctt cccgccatct 360

gatgagcagt tgaaatctgg aactgcctct gttgtgtgcc tgctgaataa cttctatccc 420

agagaggcca aagtacagtg gaaggtggat aacgccctcc aatcgggtaa ctcccaggag 480

agtgtcacag agcaggacag caaggacagc acctacagcc tcagcagcac cctgacgctg 540

agcaaagcag actacgagaa acacaaagtc tacgcctgcg aagtcaccca tcagggcctg 600

agctcgcccg tcacaaagag cttcaacagg ggagagtgt 639

<210> 231
<211> 235
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 231

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Pro Gly Ala Arg Cys Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
35 40 45

Ser Ser Ile Ser Tyr Ile His Trp Tyr Gln Gln Lys Pro Gly Lys Ala
50 55 60

Pro Lys Leu Leu Ile Tyr Ala Thr Ser Asn Leu Ala Ser Gly Val Pro
65 70 75 80

Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile
85 90 95

Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
100 105 110

Ser Ser Asp Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
115 120 125

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
130 135 140

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
145 150 155 160

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
165 170 175

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
180 185 190

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
195 200 205

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
210 215 220

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230 235

<210> 232
<211> 705
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 232
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agatgtgaca tccagttgac ccagtctcca tccttcctgt ctgcatctgt aggagacaga 120

gtcaccatca cttgcagggc cagctcaagt ataagttaca tacactggta tcagcaaaaa 180

ccagggaaag cccctaagct cctgatctat gccacatcca acctggcttc tggggtccca 240

tcaaggttca gcggcagtgg atctgggaca gaattcactc tcacaatcag cagcctgcag 300

cctgaagatt ttgcaactta ttactgtcag cagtggagta gtgacccact cacgttcggc 360

ggagggacca aggtggagat caaacgtacg gtggctgcac catctgtctt catcttcccg 420

ccatctgatg agcagttgaa atctggaact gcctctgttg tgtgcctgct gaataacttc 480

tatcccagag aggccaaagt acagtggaag gtggataacg ccctccaatc gggtaactcc 540

caggagagtg tcacagagca ggacagcaag gacagcacct acagcctcag cagcaccctg 600

acgctgagca aagcagacta cgagaaacac aaagtctacg cctgcgaagt cacccatcag 660

ggcctgagct cgcccgtcac aaagagcttc aacaggggag agtgt 705

<210> 233
<211> 447
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 233

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala

SeqListing

1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asp Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala Pro Lys Phe
50 55 60

Pro Gly Lys Val Thr Met Thr Thr Asp Thr Ser Ile Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Arg Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys
210 215 220

Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val
225 230 235 240

Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
245 250 255

Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
260 265 270

Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys

275 280 285

Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser
290 295 300

Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305 310 315 320

Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
340 345 350

Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
355 360 365

Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
370 375 380

Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser
385 390 395 400

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg
405 410 415

Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440 445

<210> 234
<211> 1341
<212> DNA
<213> Artificial Sequence

<220>
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<220>
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<223> Humanized Antibody Sequence

<400> 234
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tcctgcaagg cttctggatt cgacattaag gactactata tacactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatcggaagg gttgatcctg acaatggtga gactgaattt 180

gccccgaagt tcccgggcaa ggtcaccatg accacagaca cgtccatcag cacagcctac 240

atggagctga gcaggctgag atctgacgac acggccgtgt attactgtgc gagagaagac 300

tacgatggta cctacacctg gtttccttat tggggccaag ggactctggt caccgtctct 360

agtgcctcca ccaagggccc atcggtcttc cccctggcgc cctgctccag gagcacctcc 420

gagagcacag cggccctggg ctgcctggtc aaggactact tccccgaacc ggtgacggtg 480

tcgtggaact caggcgctct gaccagcggc gtgcacacct tcccagctgt cctacagtcc 540

tcaggactct actccctcag cagcgtggtg accgtgccct ccagcaactt cggcacccag 600

acctacacct gcaacgtaga tcacaagccc agcaacacca aggtggacaa gacagttgag 660

cgcaaatgtt gtgtcgagtg cccaccgtgc ccagcaccac ctgtggcagg accgtcagtc 720

ttcctcttcc ccccaaaacc caaggacacc ctcatgatct cccggacccc tgaggtcacg 780

tgcgtggtgg tggacgtgag ccacgaagac cccgaggtcc agttcaactg gtacgtggac 840

ggcgtggagg tgcataatgc caagacaaag ccacgggagg agcagttcaa cagcacgttc 900

cgtgtggtca gcgtcctcac cgttgtgcac caggactggc tgaacggcaa ggagtacaag 960

tgcaaggtct ccaacaaagg cctcccagcc cccatcgaga aaaccatctc caaaaccaaa 1020

gggcagcccc gagaaccaca ggtgtacacc ctgcccccat cccgggagga gatgaccaag 1080

aaccaggtca gcctgacctg cctggtcaaa ggcttctacc ccagcgacat cgccgtggag 1140

tgggagagca atgggcagcc ggagaacaac tacaagacca cacctcccat gctggactcc 1200

gacggctcct tcttcctcta cagcaagctc accgtggaca agagcaggtg gcagcagggg 1260

aacgtcttct catgctccgt gatgcatgag gctctgcaca accactacac gcagaagagc 1320

ctctccctgt ctccgggtaa a 1341

<210> 235
<211> 466
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 235

Met Asp Trp Thr Trp Arg Ile Leu Phe Leu Val Ala Ala Ala Thr Gly
1 5 10 15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asp Ile
35 40 45

Lys Asp Tyr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

Glu Trp Ile Gly Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala

65 70 75 80

Pro Lys Phe Pro Gly Lys Val Thr Met Thr Thr Asp Thr Ser Ile Ser
85 90 95

Thr Ala Tyr Met Glu Leu Ser Arg Leu Arg Ser Asp Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro
115 120 125

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
130 135 140

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
145 150 155 160

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
165 170 175

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
180 185 190

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
195 200 205

Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
210 215 220

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg
225 230 235 240

Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly
245 250 255

Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile
260 265 270

Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu
275 280 285

Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His
290 295 300

Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg
305 310 315 320

Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys
325 330 335

Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu

340 345 350

Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr
355 360 365

Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu
370 375 380

Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp
385 390 395 400

Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met
405 410 415

Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp
420 425 430

Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His
435 440 445

Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
450 455 460

Gly Lys
465

<210> 236
<211> 1398
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 236
atggactgga cctggaggat cctcttcttg gtggcagcag ccacaggagc ccactccgag 60

gtgcagctgg tgcagtctgg ggctgaggtg aagaagcctg gggcctcagt gaaggtctcc 120

tgcaaggctt ctggattcga cattaaggac tactatatac actgggtgcg acaggcccct 180

ggacaagggc ttgagtggat cggaagggtt gatcctgaca atggtgagac tgaatttgcc 240

ccgaagttcc cgggcaaggt caccatgacc acagacacgt ccatcagcac agcctacatg 300

gagctgagca ggctgagatc tgacgacacg gccgtgtatt actgtgcgag agaagactac 360

gatggtacct acacctggtt tccttattgg ggccaaggga ctctggtcac cgtctctagt 420

gcctccacca agggcccatc ggtcttcccc ctggcgccct gctccaggag cacctccgag 480

agcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 540

tggaactcag gcgctctgac cagcggcgtg cacaccttcc cagctgtcct acagtcctca 600

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcaacttcgg cacccagacc 660

tacacctgca acgtagatca caagcccagc aacaccaagg tggacaagac agttgagcgc 720

aaatgttgtg tcgagtgccc accgtgccca gcaccacctg tggcaggacc gtcagtcttc 780

ctcttccccc caaaacccaa ggacaccctc atgatctccc ggacccctga ggtcacgtgc 840

gtggtggtgg acgtgagcca cgaagacccc gaggtccagt tcaactggta cgtggacggc 900

gtggaggtgc ataatgccaa gacaaagcca cgggaggagc agttcaacag cacgttccgt 960

gtggtcagcg tcctcaccgt tgtgcaccag gactggctga acggcaagga gtacaagtgc 1020

aaggtctcca acaaaggcct cccagccccc atcgagaaaa ccatctccaa aaccaaaggg 1080

cagccccgag aaccacaggt gtacaccctg cccccatccc gggaggagat gaccaagaac 1140

caggtcagcc tgacctgcct ggtcaaaggc ttctacccca gcgacatcgc cgtggagtgg 1200

gagagcaatg ggcagccgga gaacaactac aagaccacac ctcccatgct ggactccgac 1260

ggctccttct tcctctacag caagctcacc gtggacaaga gcaggtggca gcaggggaac 1320

gtcttctcat gctccgtgat gcatgaggct ctgcacaacc actacacgca gaagagcctc 1380

tccctgtctc cgggtaaa 1398

<210> 237
<211> 7
<212> PRT
<213> Mus musculus

<400> 237

Gly Thr Ser Asn Leu Ala Ser
1 5

<210> 238
<211> 8
<212> PRT
<213> Mus musculus

<400> 238

Gln Gln Trp Thr Thr Thr Tyr Thr
1 5

<210> 239
<211> 11
<212> PRT
<213> Mus musculus

<400> 239

Arg Ala Ser Gln Asp Ile Ser Ser Tyr Leu Asn
1 5 10

<210> 240
<211> 7
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<213> Mus musculus

<400> 240

Ser Thr Ser Arg Leu Asn Ser
1 5

<210> 241
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<212> PRT
<213> Mus musculus

<400> 241

Gln Gln Asp Ile Lys His Pro Thr
1 5

<210> 242
<211> 11
<212> PRT
<213> Mus musculus

<400> 242

Lys Ala Ser Gln Asp Val Phe Thr Ala Val Ala
1 5 10

<210> 243
<211> 7
<212> PRT
<213> Mus musculus

<400> 243

Trp Ala Ser Thr Arg His Thr
1 5

<210> 244
<211> 9
<212> PRT
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<400> 244

Gln Gln Tyr Ser Ser Tyr Pro Leu Thr
1 5

<210> 245
<211> 5
<212> PRT
<213> Mus musculus

<400> 245

Asp Tyr Asn Met His
1 5

<210> 246
<211> 17
<212> PRT
<213> Mus musculus

<400> 246

Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 247
<211> 14
<212> PRT
<213> Mus musculus

<400> 247

Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
1 5 10

<210> 248
<211> 5
<212> PRT
<213> Mus musculus

<400> 248

Asp Tyr Asn Met His
1 5

<210> 249
<211> 17
<212> PRT
<213> Mus musculus

<400> 249

Glu Ile Asn Pro Asn Ser Gly Gly Ser Gly Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 250
<211> 14
<212> PRT
<213> Mus musculus

<400> 250

Leu Val Tyr Asp Gly Ser Tyr Glu Asp Trp Tyr Phe Asp Val
1 5 10

<210> 251
<211> 5
<212> PRT
<213> Mus musculus

<400> 251

Asp Tyr Asn Met His
1 5

<210> 252

<211> 17
<212> PRT
<213> Mus musculus

<400> 252

Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Gln Phe Lys
1 5 10 15

Gly

<210> 253
<211> 14
<212> PRT
<213> Mus musculus

<400> 253

Leu Gly Tyr Val Gly Asn Tyr Glu Asp Trp Tyr Phe Asp Val
1 5 10

<210> 254
<211> 5
<212> PRT
<213> Mus musculus

<400> 254

Asp Tyr Asn Met His
1 5

<210> 255
<211> 17
<212> PRT
<213> Mus musculus

<400> 255

Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 256
<211> 14
<212> PRT
<213> Mus musculus

<400> 256

Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
1 5 10

<210> 257
<211> 5
<212> PRT
<213> Mus musculus

<400> 257

Asp Tyr Asn Met His
1 5

<210> 258
<211> 17
<212> PRT
<213> Mus musculus

<400> 258

Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 259
<211> 14
<212> PRT
<213> Mus musculus

<400> 259

Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
1 5 10

<210> 260
<211> 5
<212> PRT
<213> Mus musculus

<400> 260

Asp Tyr Asn Met His
1 5

<210> 261
<211> 17
<212> PRT
<213> Mus musculus

<400> 261

Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 262
<211> 14
<212> PRT
<213> Mus musculus

<400> 262

Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
1 5 10

<210> 263
<211> 5
<212> PRT
<213> Mus musculus

<400> 263

Asp Tyr Asn Met His
1 5

<210> 264
<211> 17
<212> PRT
<213> Mus musculus

<400> 264

Glu Ile Asn Pro Asn Ser Gly Gly Ser Gly Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 265
<211> 14
<212> PRT
<213> Mus musculus

<400> 265

Leu Gly Tyr Tyr Gly Asn Tyr Glu Asp Trp Tyr Phe Asp Val
1 5 10

<210> 266
<211> 5
<212> PRT
<213> Mus musculus

<400> 266

Asp Tyr Tyr Ile His
1 5

<210> 267
<211> 17
<212> PRT
<213> Mus musculus

<400> 267

Arg Ile Asp Pro Asp Asn Gly Glu Ser Thr Tyr Val Pro Lys Phe Gln
1 5 10 15

Gly

<210> 268
<211> 13
<212> PRT
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<400> 268

Glu Gly Leu Asp Tyr Gly Asp Tyr Tyr Ala Val Asp Tyr
1 5 10

<210> 269
<211> 5
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<400> 269

Asp Tyr Ile Met His
1 5

<210> 270
<211> 17
<212> PRT
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<400> 270

Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe Lys
1 5 10 15

Gly

<210> 271
<211> 11
<212> PRT
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<400> 271

Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr
1 5 10

<210> 272
<211> 5
<212> PRT
<213> Mus musculus

<400> 272

Asp Tyr Tyr Met His
1 5

<210> 273
<211> 17
<212> PRT
<213> Mus musculus

<400> 273

Arg Ile Asp Pro Glu Asn Gly Asp Ile Ile Tyr Asp Pro Lys Phe Gln
1 5 10 15

Gly

<210> 274
<211> 10
<212> PRT
<213> Mus musculus

<400> 274

Asp Ala Gly Asp Pro Ala Trp Phe Thr Tyr
1 5 10

<210> 275
<211> 10
<212> PRT
<213> Mus musculus

<400> 275

Arg Ala Ser Ser Ser Val Tyr Tyr Met His
1 5 10

<210> 276
<211> 7
<212> PRT
<213> Mus musculus

<400> 276

Ala Thr Ser Asn Leu Ala Ser
1 5

<210> 277
<211> 9
<212> PRT
<213> Mus musculus

<400> 277

Gln Gln Trp Ser Ser Asp Pro Leu Thr
1 5

<210> 278
<211> 12
<212> PRT
<213> Mus musculus

<400> 278

Ser Val Ser Ser Thr Ile Ser Ser Asn His Leu His
1 5 10

<210> 279
<211> 7
<212> PRT
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<400> 279

Gly Thr Ser Asn Leu Ala Ser
1 5

<210> 280

<211> 9
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<400> 280

Gln Gln Trp Ser Ser Tyr Pro Leu Thr
1 5

<210> 281
<211> 10
<212> PRT
<213> Mus musculus

<400> 281

Arg Ala Ser Ser Ser Ile Ser Tyr Ile His
1 5 10

<210> 282
<211> 7
<212> PRT
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<400> 282

Ala Thr Ser Asn Leu Ala Ser
1 5

<210> 283
<211> 9
<212> PRT
<213> Mus musculus

<400> 283

Gln Gln Trp Ser Ser Asp Pro Leu Thr
1 5

<210> 284
<211> 12
<212> PRT
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<400> 284

Arg Ala Ser Ser Ser Val Thr Ser Ser Tyr Leu Asn
1 5 10

<210> 285
<211> 7
<212> PRT
<213> Mus musculus

<400> 285

Ser Thr Ser Asn Leu Ala Ser
1 5

<210> 286
<211> 9
<212> PRT

<213> Mus musculus

<400> 286

Gln Gln Tyr Asp Phe Phe Pro Ser Thr
1 5

<210> 287
<211> 5
<212> PRT
<213> Mus musculus

<400> 287

Asp Tyr Phe Ile His
1 5

<210> 288
<211> 17
<212> PRT
<213> Mus musculus

<400> 288

Arg Leu Asp Pro Glu Asp Gly Glu Ser Asp Tyr Ala Pro Lys Phe Gln
1 5 10 15

Asp

<210> 289
<211> 12
<212> PRT
<213> Mus musculus

<400> 289

Glu Asp Tyr Asp Gly Thr Tyr Thr Phe Phe Pro Tyr
1 5 10

<210> 290
<211> 5
<212> PRT
<213> Mus musculus

<400> 290

Asp Phe Tyr Leu His
1 5

<210> 291
<211> 17
<212> PRT
<213> Mus musculus

<400> 291

Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp Pro Lys Phe Gln
1 5 10 15

Asp

<210> 292
<211> 16
<212> PRT
<213> Mus musculus

<400> 292

Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr Trp Tyr Phe Asp Val
1 5 10 15

<210> 293
<211> 5
<212> PRT
<213> Mus musculus

<400> 293

Asp Tyr Tyr Ile His
1 5

<210> 294
<211> 17
<212> PRT
<213> Mus musculus

<400> 294

Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala Pro Lys Phe Pro
1 5 10 15

Gly

<210> 295
<211> 12
<212> PRT
<213> Mus musculus

<400> 295

Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro Tyr
1 5 10

<210> 296
<211> 5
<212> PRT
<213> Mus musculus

<400> 296

Asp Tyr Tyr Met Asn
1 5

<210> 297
<211> 17
<212> PRT
<213> Mus musculus

<400> 297

Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn His Lys Phe Lys
1 5 10 15

Gly

<210> 298
<211> 11
<212> PRT
<213> Mus musculus

<400> 298

Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp
1 5 10

<210> 299
<211> 130
<212> PRT
<213> Mus musculus

<400> 299

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Met Leu Ile Ser Val Thr
1 5 10 15

Val Ile Leu Ser Ser Gly Glu Ile Val Leu Thr Gln Ser Pro Ala Leu
20 25 30

Met Ala Ala Ser Pro Gly Glu Lys Val Thr Ile Thr Cys Ser Val Ser
35 40 45

Ser Ser Ile Ser Ser Ser Asn Leu His Trp Ser Gln Gln Lys Ser Gly
50 55 60

Thr Ser Pro Lys Leu Trp Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly
65 70 75 80

Val Pro Val Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu
85 90 95

Thr Ile Ser Ser Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
100 105 110

Gln Trp Thr Thr Thr Tyr Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu
115 120 125

Lys Arg
130

<210> 300
<211> 390
<212> DNA
<213> Mus musculus

SeqListing

<400> 300
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agtggagaaa ttgtgctcac ccagtctcca gcactcatgg ctgcatctcc aggggagaag 120

gtcaccatca cctgcagtgt cagctcgagt ataagttcca gcaacttaca ctggtcccag 180

cagaagtcag gaacctcccc caaactctgg atttatggca catccaacct tgcttctgga 240

gtccctgttc gcttcagtgg cagtggatct gggacctctt attctctcac aatcagcagc 300

atggaggctg aagatgctgc cacttattac tgtcaacagt ggactactac gtatacgttc 360

ggatcgggga ccaagctgga gctgaaacgt 390

<210> 301
<211> 141
<212> PRT
<213> Mus musculus

<400> 301

Met Gly Trp Asn Trp Ile Ile Phe Phe Leu Met Ala Val Val Thr Gly
1 5 10 15

Val Asn Ser Glu Val Gln Leu Arg Gln Ser Gly Ala Asp Leu Val Lys
20 25 30

Pro Gly Ala Ser Val Lys Leu Ser Cys Thr Ala Ser Gly Phe Asn Ile
35 40 45

Lys Asp Tyr Tyr Ile His Trp Val Lys Gln Arg Pro Glu Gln Gly Leu
50 55 60

Glu Trp Ile Gly Arg Ile Asp Pro Asp Asn Gly Glu Ser Thr Tyr Val
65 70 75 80

Pro Lys Phe Gln Gly Lys Ala Thr Ile Thr Ala Asp Thr Ser Ser Asn
85 90 95

Thr Ala Tyr Leu Gln Leu Arg Ser Leu Thr Ser Glu Asp Thr Ala Ile
100 105 110

Tyr Tyr Cys Gly Arg Glu Gly Leu Asp Tyr Gly Asp Tyr Tyr Ala Val
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser
130 135 140

<210> 302
<211> 423
<212> DNA
<213> Mus musculus

<400> 302
atgggatgga actggatcat cttcttcctg atggcagtgg ttacaggggt caattcagag 60

gtgcagttgc ggcagtctgg ggcagacctt gtgaagccag gggcctcagt caagttgtcc 120

tgcacagctt ctggcttcaa cattaaagac tactatatac actgggtgaa gcagaggcct 180

gaacagggcc tggagtggat tggaaggatt gatcctgata atggtgaaag tacatatgtc 240

ccgaagttcc agggcaaggc cactataaca gcagacacat catccaacac agcctaccta 300

caactcagaa gcctgacatc tgaggacact gccatctatt attgtgggag agaggggctc 360

gactatggtg actactatgc tgtggactac tggggtcaag gaacctcggt cacagtctcg 420

agc 423

<210> 303
<211> 130
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 303

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Pro Gly Ala Arg Cys Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Ser Val Ser
35 40 45

Ser Ser Ile Ser Ser Ser Asn Leu His Trp Tyr Gln Gln Lys Pro Gly
50 55 60

Lys Ala Pro Lys Leu Leu Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly
65 70 75 80

Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu
85 90 95

Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln
100 105 110

Gln Trp Thr Thr Thr Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
115 120 125

Lys Arg
130

<210> 304
<211> 390
<212> DNA

<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 304
atggatatgc gcgtgccggc gcagctgctg ggcctgctgc tgctgtggct gccgggcgcg 60

cgctgcgata ttcagctgac ccagagcccg agctttctga gcgcgagcgt gggcgatcgc 120

gtgaccatta cctgcagcgt gagcagcagc attagcagca gcaacctgca ttggtatcag 180

cagaaaccgg gcaaagcgcc gaaactgctg atttatggca ccagcaacct ggcgagcggc 240

gtgccgagcc gctttagcgg cagcggcagc ggcaccgaat ttaccctgac cattagcagc 300

ctgcagccgg aagattttgc gacctattat tgccagcagt ggaccaccac ctataccttt 360

ggccagggca ccaaactgga aattaaacgt 390

<210> 305
<211> 141
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 305

Met Asp Trp Thr Trp Ser Ile Leu Phe Leu Val Ala Ala Pro Thr Gly
1 5 10 15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asn Ile
35 40 45

Lys Asp Tyr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

Glu Trp Met Gly Arg Ile Asp Pro Asp Asn Gly Glu Ser Thr Tyr Val
65 70 75 80

Pro Lys Phe Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Glu Gly Leu Asp Tyr Gly Asp Tyr Tyr Ala Val
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
130 135 140

<210> 306
<211> 423
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 306
atggattgga cctggagcat tctgtttctg gtggcggcgc cgaccggcgc gcatagcgaa 60

gtgcagctgg tgcagagcgg cgcggaagtg aaaaaaccgg gcgcgagcgt gaaagtgagc 120

tgcaaagcga gcggctttaa cattaaagat tattatattc attgggtgcg ccaggcgccg 180

ggccagggcc tggaatggat gggccgcatt gatccggata acggcgaaag cacctatgtg 240

ccgaaatttc agggccgcgt gaccatgacc accgatacca gcaccagcac cgcgtatatg 300

gaactgcgca gcctgcgcag cgatgatacc gcggtgtatt attgcgcgcg cgaaggcctg 360

gattatggcg attattatgc ggtggattat tggggccagg gcaccctggt gaccgtctcg 420

agc 423

<210> 307
<211> 127
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 307

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
20 25 30

Ala Ser Leu Gly Asp Arg Val Asn Ile Ser Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val

50 55 60

Lys Leu Leu Ile Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser
85 90 95

Asn Leu Ala Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Asp Ile
100 105 110

Lys His Pro Thr Phe Gly Gly Gly Thr Lys Leu Glu Leu Lys Arg
115 120 125

<210> 308
<211> 381
<212> DNA
<213> Mus musculus

<400> 308
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacacagac tacatcctcc ctgtctgcct ctctgggaga cagagtcaac 120

atcagctgca gggcaagtca ggacattagc agttatttaa actggtatca gcagaaacca 180

gatggaactg ttaaactcct gatctactcc acatcaagat taaactcagg agtcccatca 240

aggttcagtg gcagtgggtc tgggacagat tattctctca ctattagcaa cctggcacaa 300

gaagatattg ccacttactt ttgccaacag gatattaagc atccgacgtt cggtggaggc 360

accaagttgg agctgaaacg t 381

<210> 309
<211> 139
<212> PRT
<213> Mus musculus

<400> 309

Met Glu Trp Ile Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
20 25 30

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Phe Thr Phe
35 40 45

Thr Asp Tyr Ile Met His Trp Val Lys Gln Lys Pro Gly Gln Gly Leu
50 55 60

Glu Trp Ile Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn
65 70 75 80

Glu Lys Phe Lys Gly Lys Ala Thr Leu Thr Ser Asp Lys Ser Ser Ser

85 90 95

Thr Ala Tyr Met Asp Leu Ser Ser Leu Thr Ser Glu Gly Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr
115 120 125

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
130 135

<210> 310
<211> 417
<212> DNA
<213> Mus musculus

<400> 310
atggaatgga tctggatatt tctcttcctc ctgtcaggaa ctgcaggtgt ccactctgag 60

gtccagctgc agcagtctgg acctgagctg gtaaagcctg gggcttcagt gaagatgtcc 120

tgcaaggctt ctgggttcac attcactgac tacattatgc actgggtgaa gcagaagcct 180

gggcagggcc ttgagtggat tggatatatt aatccttaca atgatgatac tgaatacaat 240

gagaagttca aaggcaaggc cacactgact tcagacaaat cctccagcac agcctacatg 300

gatctcagca gtctgacctc tgagggctct gcggtctatt actgtgcaag atcgatttat 360

tactacgatg ccccgtttgc ttactggggc caagggactc tggtcacagt ctcgagc 417

<210> 311
<211> 127
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 311

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1 5 10 15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser
20 25 30

Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp
35 40 45

Ile Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
50 55 60

Lys Leu Leu Ile Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val Pro Ser

65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
85 90 95

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Asp Ile
100 105 110

Lys His Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
115 120 125

<210> 312
<211> 381
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 312
atgatgtcct ctgctcagtt ccttggtctc ctgttgctct gttttcaagg taccagatgt 60

gatatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggtga ccgtgtcacc 120

atcacttgcc gcgcaagtca ggatattagc agctatttaa attggtatca gcagaaacca 180

gggaaagccc ctaagctcct gatctattct acttcccgtt tgaatagtgg ggtcccatca 240

cgcttcagtg gcagtggctc tgggacagat ttcactctca ccatcagcag tctgcaacct 300

gaagattttg caacttacta ctgtcaacag gatattaaac accctacgtt cggtcaaggc 360

accaaggtgg agatcaaacg t 381

<210> 313
<211> 139
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 313

Met Glu Trp Ile Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe

35 40 45

Thr Asp Tyr Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

Glu Trp Met Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn
65 70 75 80

Glu Lys Phe Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser
85 90 95

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr
115 120 125

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
130 135

<210> 314
<211> 107
<212> PRT
<213> Mus musculus

<400> 314

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Asn Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Ser Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys Leu Leu Ile
35 40 45

Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Ala Gln
65 70 75 80

Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Asp Ile Lys His Pro Thr
85 90 95

Phe Gly Gly Gly Thr Lys Leu Glu Leu Lys Arg
100 105

<210> 315
<211> 128
<212> PRT
<213> Mus musculus

<400> 315

```
Met Lys Ser Gln Thr Gln Val Phe Val Tyr Met Leu Leu Trp Leu Ser
1               5                  10                  15

Gly Val Glu Gly Asp Ile Val Met Thr Gln Ser His Lys Phe Met Ser
            20                  25                  30

Thr Ser Val Gly Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asp
        35                  40                  45

Val Phe Thr Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro
    50                  55                  60

Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp
65                  70                  75                  80

Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                85                  90                  95

Asn Val Gln Ser Glu Asp Leu Ala Asp Tyr Phe Cys Gln Gln Tyr Ser
            100                 105                 110

Ser Tyr Pro Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg
        115                 120                 125
```

<210> 316
<211> 381
<212> DNA
<213> Mus musculus

<400> 316

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atgaagtcac agacccaggt ctttgtatac atgttgctgt ggttgtctgg tgttgaagga      60

gacattgtga tgacccagtc tcacaaattc atgtccacgt cagtaggaga cagggtcacc     120

atcacctgca aggccagtca ggatgtcttt actgctgtag cctggtatca acagaaacca     180

ggacaatctc ctaaactact gatttactgg gcatccaccc ggcacactgg agtccctgat     240

cgcttcacag gcagtggatc tgggacagat ttcactctca ccattagcaa tgtgcagtct     300

gaagacttgg cagattattt ctgtcaacaa tatagcagct atcctctcac gttcggtgct     360

gggaccaagt tggagctgaa a                                               381
```

<210> 317
<211> 138
<212> PRT
<213> Mus musculus

<400> 317

```
Met Gly Trp Asn Trp Ile Ile Phe Phe Leu Met Ala Val Val Thr Gly
1               5                  10                  15

Val Asn Ser Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Arg
            20                  25                  30
```

```
Pro Gly Ala Leu Val Lys Leu Ser Cys Lys Ala Ser Gly Phe Asn Ile
        35                  40                  45

Lys Asp Tyr Tyr Met His Trp Val Lys Gln Arg Pro Glu Gln Gly Leu
    50                  55                  60

Glu Trp Ile Gly Arg Ile Asp Pro Glu Asn Gly Asp Ile Ile Tyr Asp
65                  70                  75                  80

Pro Lys Phe Gln Gly Lys Ala Ser Ile Thr Thr Asp Thr Ser Ser Asn
                85                  90                  95

Thr Ala Tyr Leu Gln Leu Ser Ser Leu Thr Ser Glu Asp Thr Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Tyr Asp Ala Gly Asp Pro Ala Trp Phe Thr Tyr Trp
        115                 120                 125

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
    130                 135
```

<210> 318
<211> 411
<212> DNA
<213> Mus musculus

<400> 318

```
atgggatgga actggatcat cttcttcctg atggcagtgg ttacaggggt caattcagag       60

gttcagctgc agcagtctgg ggctgagctt gtgaggccag gggccttagt caagttgtcc      120

tgcaaagctt ctggcttcaa tattaaagac tactatatgc actgggtgaa gcagaggcct      180

gaacagggcc tggagtggat tggaaggatt gatcctgaga atggtgatat tatatatgac      240

ccgaagttcc agggcaaggc cagtataaca acagacacat cctccaacac agcctacctg      300

cagctcagca gcctgacgtc tgaggacact gccgtctatt actgtgctta cgatgctggt      360

gaccccgcct ggtttactta ctggggccaa gggactctgg tcaccgtctc g               411
```

<210> 319
<211> 130
<212> PRT
<213> Mus musculus

<400> 319

```
Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1               5                   10                  15

Leu Arg Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
            20                  25                  30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Lys Ala Ser
        35                  40                  45
```

Gln Asp Val Phe Thr Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys
50 55 60

Ala Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg His Thr Gly Val
65 70 75 80

Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
100 105 110

Tyr Ser Ser Tyr Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
115 120 125

Lys Arg
130

<210> 320
<211> 390
<212> DNA
<213> Mus musculus

<400> 320
atggatatgc gcgtgccggc gcagctgctg ggcctgctgc tgctgtggct gcgcggcgcg 60

cgctgcgata tccagatgac ccagagcccg agcagcctga gcgcgagcgt gggcgatcgc 120

gtgaccatta cctgcaaagc gagccaggat gtgtttaccg cggtggcgtg gtatcagcag 180

aaaccgggca aagcgccgaa actgctgatt tattgggcga gcacccgcca taccggcgtg 240

ccgagtcgct ttagcggcag cggcagcggc accgatttta ccctgaccat tagcagcctg 300

cagccggaag attttgcgac ctattattgc cagcagtata gcagctatcc gctgaccttt 360

ggcggcggca ccaaagtgga aattaaacgt 390

<210> 321
<211> 138
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 321

Met Asp Trp Thr Trp Ser Ile Leu Phe Leu Val Ala Ala Pro Thr Gly
1 5 10 15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asn Ile
35 40 45

Lys Asp Tyr Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

Glu Trp Ile Gly Arg Ile Asp Pro Glu Asn Gly Asp Ile Ile Tyr Asp
65 70 75 80

Pro Lys Phe Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser
85 90 95

Thr Ala Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Tyr Asp Ala Gly Asp Pro Ala Trp Phe Thr Tyr Trp
115 120 125

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
130 135

<210> 322
<211> 414
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<220>
<221> misc_feature
<223> Humanized Antibody Sequence

<400> 322
atggattgga cctggagcat tctgtttctg gtggcggcgc cgaccggcgc gcatagcgaa 60

gtgcagctgg tgcagagcgg cgcggaagtg aaaaaaccgg gcgcgagcgt gaaagtgagc 120

tgcaaagcga gcggctttaa cattaaagat tattatatgc attgggtgcg ccaggcgccg 180

ggccagggcc tggaatggat cggccgcatt gatccggaaa acggcgatat tatttatgat 240

ccgaaatttc agggccgcgt gaccatgacc accgatacca gcaccagcac cgcgtatatg 300

gaactgcgca gcctgcgcag cgatgatacc gcggtgtatt attgcgcgta tgatgcgggc 360

gatccggcgt ggtttaccta ttggggccag ggcaccctgg tgaccgtctc gagc 414

<210> 323
<211> 106
<212> PRT
<213> Mus musculus

<400> 323

Thr Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
1 5 10 15

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
20 25 30

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
35 40 45

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
50 55 60

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
65 70 75 80

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
85 90 95

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
100 105

<210> 324
<211> 320
<212> PRT
<213> Mus musculus

<400> 324

Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala
1 5 10 15

Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
20 25 30

Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser
35 40 45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
50 55 60

Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val
65 70 75 80

Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
85 90 95

Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro
100 105 110

Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu
115 120 125

Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser
130 135 140

Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu
145 150 155 160

Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr
165 170 175

Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn
180 185 190

Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro
195 200 205

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln
210 215 220

Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val
225 230 235 240

Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val
245 250 255

Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln
260 265 270

Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr Ser Lys Leu Asn
275 280 285

Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val
290 295 300

Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His
305 310 315 320

<210> 325
<211> 106
<212> PRT
<213> Homo sapiens

<400> 325

Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
1 5 10 15

Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
20 25 30

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys

65 70 75 80

His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
85 90 95

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 326
<211> 327
<212> PRT
<213> Homo sapiens

<400> 326

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
1 5 10 15

Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
20 25 30

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
50 55 60

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr
65 70 75 80

Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro
100 105 110

Glu Phe Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
115 120 125

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
130 135 140

Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp
145 150 155 160

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe
165 170 175

Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
180 185 190

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu
195 200 205

Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
210 215 220

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys
225 230 235 240

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
245 250 255

Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys
260 265 270

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
275 280 285

Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser
290 295 300

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
305 310 315 320

Leu Ser Leu Ser Leu Gly Lys
325

<210> 327
<211> 120
<212> PRT
<213> Mus musculus

<400> 327

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Lys Gln Lys Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Ser Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Ser Leu Thr Ser Glu Gly Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 328
<211> 120
<212> PRT
<213> Mus musculus

<400> 328

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Lys Gln Lys Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Ser Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Ser Leu Thr Ser Glu Gly Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 329
<211> 120
<212> PRT
<213> Mus musculus

<400> 329

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr

65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 330
<211> 226
<212> PRT
<213> Mus musculus

<400> 330

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Lys Gln Lys Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Ser Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Ser Leu Thr Ser Glu Gly Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Thr Val Ala Ala Pro Ser Val Phe
115 120 125

Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val
130 135 140

Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp
145 150 155 160

Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr
165 170 175

Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr
180 185 190

Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val
195 200 205

Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly
210 215 220

Glu Cys
225

<210> 331
<211> 447
<212> PRT
<213> Mus musculus

<400> 331

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr Gly Pro
210 215 220

Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro Ser Val
225 230 235 240

Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
245 250 255

Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp Pro Glu
260 265 270

Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys
275 280 285

Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val Val Ser
290 295 300

Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305 310 315 320

Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys Thr Ile
325 330 335

Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
340 345 350

Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
355 360 365

Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
370 375 380

Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
385 390 395 400

Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg
405 410 415

Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys
435 440 445

<210> 332
<211> 107
<212> PRT

SeqListing

<213> Mus musculus

<400> 332

Asp Ile Gln Met Thr Gln Ile Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Ser Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Phe Lys Leu Leu Ile
35 40 45

Phe Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Tyr Asn Leu Glu Gln
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 333
<211> 324
<212> PRT
<213> Mus musculus

<400> 333

Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala
1 5 10 15

Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
20 25 30

Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser
35 40 45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
50 55 60

Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val
65 70 75 80

Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
85 90 95

Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro
100 105 110

Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu

115 120 125

Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser
130 135 140

Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu
145 150 155 160

Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr
165 170 175

Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn
180 185 190

Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro
195 200 205

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln
210 215 220

Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala Lys Asp Lys Val
225 230 235 240

Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu Asp Ile Thr Val
245 250 255

Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr Lys Asn Thr Gln
260 265 270

Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn
275 280 285

Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe Thr Cys Ser Val
290 295 300

Leu His Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His
305 310 315 320

Ser Pro Gly Lys

<210> 334
<211> 213
<212> PRT
<213> Mus musculus

<400> 334

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

Asp Arg Val Asn Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Ser Tyr
20 25 30

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Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys Leu Leu Ile
        35                  40                  45

Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Ala Gln
65                  70                  75                  80

Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Asp Ile Lys His Pro Thr
                85                  90                  95

Phe Gly Gly Gly Thr Lys Leu Glu Leu Lys Arg Thr Asp Ala Ala Pro
            100                 105                 110

Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly
        115                 120                 125

Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn
    130                 135                 140

Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn
145                 150                 155                 160

Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser
                165                 170                 175

Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr
            180                 185                 190

Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe
        195                 200                 205

Asn Arg Asn Glu Cys
    210


<210>  335
<211>  444
<212>  PRT
<213>  Mus musculus

<400>  335

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
            20                  25                  30

Ile Met His Trp Val Lys Gln Lys Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45
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SeqListing

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Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
     50                  55                  60

Lys Gly Lys Ala Thr Leu Thr Ser Asp Lys Ser Ser Ser Thr Ala Tyr
65                  70                  75                  80

Met Asp Leu Ser Ser Leu Thr Ser Glu Gly Ser Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Lys Thr Thr Pro Pro Ser Val
        115                 120                 125

Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr
    130                 135                 140

Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr
145                 150                 155                 160

Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser
            180                 185                 190

Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala
        195                 200                 205

Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys
    210                 215                 220

Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe
225                 230                 235                 240

Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val
                245                 250                 255

Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe
            260                 265                 270

Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro
        275                 280                 285

Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro
    290                 295                 300

Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val
305                 310                 315                 320
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Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr
325 330 335

Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys
340 345 350

Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp
355 360 365

Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro
370 375 380

Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser
385 390 395 400

Tyr Phe Val Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala
405 410 415

Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His
420 425 430

His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440

<210> 336
<211> 108
<212> PRT
<213> Mus musculus

<400> 336

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asp Val Phe Thr Ala
20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Ser Tyr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 337
<211> 324
<212> DNA
<213> Mus musculus

<400> 337
gatatccaga tgacccagag cccgagcagc ctgagcgcga gcgtgggcga tcgcgtgacc 60

attacctgca aagcgagcca ggatgtgttt accgcggtgg cgtggtatca gcagaaaccg 120

ggcaaagcgc cgaaactgct gatttattgg gcgagcaccc gccataccgg cgtgccgagt 180

cgctttagcg gcagcggcag cggcaccgat tttaccctga ccattagcag cctgcagccg 240

gaagattttg cgacctatta ttgccagcag tatagcagct atccgctgac ctttggcggc 300

ggcaccaaag tggaaattaa acgt 324

<210> 338
<211> 119
<212> PRT
<213> Mus musculus

<400> 338

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asn Ile Lys Asp Tyr
20 25 30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Ile Asp Pro Glu Asn Gly Asp Ile Ile Tyr Asp Pro Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Tyr Asp Ala Gly Asp Pro Ala Trp Phe Thr Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 339
<211> 357
<212> DNA
<213> Mus musculus

<400> 339
gaagtgcagc tggtgcagag cggcgcggaa gtgaaaaaac cgggcgcgag cgtgaaagtg 60

agctgcaaag cgagcggctt taacattaaa gattattata tgcattgggt gcgccaggcg 120

ccgggccagg gcctggaatg gatcggccgc attgatccgg aaaacggcga tattatttat 180

gatccgaaat ttcagggccg cgtgaccatg accaccgata ccagcaccag caccgcgtat 240

atggaactgc gcagcctgcg cagcgatgat accgcggtgt attattgcgc gtatgatgcg 300

ggcgatccgg cgtggtttac ctattggggc cagggcaccc tggtgaccgt ctcgagc 357

<210> 340
<211> 1395
<212> DNA
<213> Mus musculus

<400> 340
atggactgga cctggaggat cctcttcttg gtggcagcag ccacaggagc ccactccgag 60

gtgcagctgg tgcagtctgg ggctgaggtg aagaagcctg ggtcctcggt gaaggtctcc 120

tgcaaggctt ctggttttac cttcaccgac tatattatgc actgggtgcg tcaggccccc 180

ggtcaagggc ttgagtggat gggctatatc aacccttata atgatgacac cgaatacaac 240

gagaagttca agggccgtgt cacgattacc gcggacaaat ccacgagcac agcctacatg 300

gagctgagca gcctgcgctc tgaggacacg gccgtgtatt actgtgcgcg ttcgatttat 360

tactacgatg ccccgtttgc ttactggggc caagggactc tggtcaccgt ctctagtgcc 420

tccaccaagg gcccatcggt cttccccctg gcgccctgct ccaggagcac ctccgagagc 480

acagcggccc tgggctgcct ggtcaaggac tacttccccg aaccggtgac ggtgtcgtgg 540

aactcaggcg ctctgaccag cggcgtgcac accttcccag ctgtcctaca gtcctcagga 600

ctctactccc tcagcagcgt ggtgaccgtg ccctccagca acttcggcac ccagacctac 660

acctgcaacg tagatcacaa gcccagcaac accaaggtgg acaagacagt tgagcgcaaa 720

tgttgtgtcg agtgcccacc gtgcccagca ccacctgtgg caggaccgtc agtcttcctc 780

ttccccccaa aacccaagga caccctcatg atctcccgga ccctgaggt cacgtgcgtg 840

gtggtggacg tgagccacga agaccccgag gtccagttca actggtacgt ggacggcgtg 900

gaggtgcata atgccaagac aaagccacgg gaggagcagt tcaacagcac gttccgtgtg 960

gtcagcgtcc tcaccgttgt gcaccaggac tggctgaacg gcaaggagta caagtgcaag 1020

gtctccaaca aaggcctccc agcccccatc gagaaaacca tctccaaaac caaagggcag 1080

ccccgagaac cacaggtgta caccctgccc ccatcccggg aggagatgac caagaaccag 1140

gtcagcctga cctgcctggt caaaggcttc taccccagcg acatcgccgt ggagtgggag 1200

agcaatgggc agccggagaa caactacaag accacacctc ccatgctgga ctccgacggc 1260

tccttcttcc tctacagcaa gctcaccgtg gacaagagca ggtggcagca ggggaacgtc 1320

ttctcatgct ccgtgatgca tgaggctctg cacaaccact acacgcagaa gagcctctcc 1380

ctgtctccgg gtaaa 1395

<210> 341
<211> 213
<212> PRT
<213> Mus musculus

SeqListing

<400> 341

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Ser Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Asp Ile Lys His Pro Thr
85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
100 105 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
115 120 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Cys
210

<210> 342
<211> 639
<212> DNA
<213> Mus musculus

<400> 342
gacatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggtga ccgtgtcacc 60

atcacttgcc gcgcaagtca ggatattagc agctatttaa attggtatca gcagaaacca 120

gggaaagccc ctaagctcct gatctattct acttcccgtt tgaatagtgg ggtcccatca 180

cgcttcagtg gcagtggctc tgggacagat ttcactctca ccatcagcag tctgcaacct 240

gaagattttg caacttacta ctgtcaacag gatattaaac accctacgtt cggtcaaggc 300

accaaggtgg agatcaaacg tacggtggct gcaccatctg tcttcatctt cccgccatct 360

gatgagcagt tgaaatctgg aactgcctct gttgtgtgcc tgctgaataa cttctatccc 420

agagaggcca aagtacagtg gaaggtggat aacgccctcc aatcgggtaa ctcccaggag 480

agtgtcacag agcaggacag caaggacagc acctacagcc tcagcagcac cctgacgctg 540

agcaaagcag actacgagaa acacaaagtc tacgcctgcg aagtcaccca tcagggcctg 600

agctcgcccg tcacaaagag cttcaacagg ggagagtgt 639

<210> 343
<211> 235
<212> PRT
<213> Mus musculus

<400> 343

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
1 5 10 15

Leu Arg Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
20 25 30

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
35 40 45

Gln Asp Ile Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys
50 55 60

Ala Pro Lys Leu Leu Ile Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val
65 70 75 80

Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
100 105 110

Asp Ile Lys His Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
115 120 125

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
130 135 140

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
145 150 155 160

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln

165 170 175

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
180 185 190

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
195 200 205

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
210 215 220

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230 235

<210> 344
<211> 705
<212> DNA
<213> Mus musculus

<400> 344
atggacatga gggtgcccgc tcagctcctg gggctcctgc tgctgtggct gagaggtgcc 60

agatgtgaca tccagatgac ccagtctcca tcctccctgt ctgcatctgt aggtgaccgt 120

gtcaccatca cttgccgcgc aagtcaggat attagcagct atttaaattg gtatcagcag 180

aaaccaggga aagcccctaa gctcctgatc tattctactt cccgtttgaa tagtggggtc 240

ccatcacgct tcagtggcag tggctctggg acagatttca ctctcaccat cagcagtctg 300

caacctgaag attttgcaac ttactactgt caacaggata ttaaacaccc tacgttcggt 360

caaggcacca aggtggagat caaacgtacg gtggctgcac catctgtctt catcttcccg 420

ccatctgatg agcagttgaa atctggaact gcctctgttg tgtgcctgct gaataacttc 480

tatcccagag aggccaaagt acagtggaag gtggataacg ccctccaatc gggtaactcc 540

caggagagtg tcacagagca ggacagcaag gacagcacct acagcctcag cagcaccctg 600

acgctgagca aagcagacta cgagaaacac aaagtctacg cctgcgaagt cacccatcag 660

ggcctgagct cgcccgtcac aaagagcttc aacaggggag agtgt 705

<210> 345
<211> 446
<212> PRT
<213> Mus musculus

<400> 345

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

```
Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
    50                  55                  60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val
    210                 215                 220

Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
        275                 280                 285

Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val
    290                 295                 300

Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320
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Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
325 330 335

Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
340 345 350

Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
355 360 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
370 375 380

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp
385 390 395 400

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
405 410 415

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
420 425 430

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440 445

<210> 346
<211> 1338
<212> DNA
<213> Mus musculus

<400> 346
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggttt taccttcacc gactatatta tgcactgggt gcgtcaggcc 120

cctggtcaag ggcttgagtg gatgggctat atcaaccctt ataatgatga caccgaatac 180

aacgagaagt tcaagggccg tgtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgcg ctctgaggac acggccgtgt attactgtgc gcgttcgatt 300

tattactacg atgccccgtt tgcttactgg ggccaaggga ctctggtcac cgtctctagt 360

gcctccacca agggcccatc ggtcttcccc ctggcgccct gctccaggag cacctccgag 420

agcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 480

tggaactcag gcgctctgac cagcggcgtg cacaccttcc cagctgtcct acagtcctca 540

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcaacttcgg cacccagacc 600

tacacctgca acgtagatca caagcccagc aacaccaagg tggacaagac agttgagcgc 660

aaatgttgtg tcgagtgccc accgtgccca gcaccacctg tggcaggacc gtcagtcttc 720

ctcttccccc caaaacccaa ggacaccctc atgatctccc ggacccctga ggtcacgtgc 780

gtggtggtgg acgtgagcca cgaagacccc gaggtccagt tcaactggta cgtggacggc 840

gtggaggtgc ataatgccaa gacaaagcca cgggaggagc agttcaacag cacgttccgt 900

gtggtcagcg tcctcaccgt tgtgcaccag gactggctga acggcaagga gtacaagtgc 960

aaggtctcca acaaaggcct cccagccccc atcgagaaaa ccatctccaa aaccaaaggg 1020

cagccccgag aaccacaggt gtacaccctg cccccatccc gggaggagat gaccaagaac 1080

caggtcagcc tgacctgcct ggtcaaaggc ttctacccca gcgacatcgc cgtggagtgg 1140

gagagcaatg ggcagccgga gaacaactac aagaccacac ctcccatgct ggactccgac 1200

ggctccttct tcctctacag caagctcacc gtggacaaga gcaggtggca gcaggggaac 1260

gtcttctcat gctccgtgat gcatgaggct ctgcacaacc actacacgca gaagagcctc 1320

tccctgtctc cgggtaaa 1338

<210> 347
<211> 465
<212> PRT
<213> Mus musculus

<400> 347

Met Asp Trp Thr Trp Arg Ile Leu Phe Leu Val Ala Ala Ala Thr Gly
1 5 10 15

Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe
35 40 45

Thr Asp Tyr Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

Glu Trp Met Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn
65 70 75 80

Glu Lys Phe Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser
85 90 95

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr
115 120 125

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
130 135 140

Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
145 150 155 160

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
165 170 175

SeqListing

```
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
            180                 185                 190

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
        195                 200                 205

Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
    210                 215                 220

Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys
225                 230                 235                 240

Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro
                245                 250                 255

Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
            260                 265                 270

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
        275                 280                 285

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
    290                 295                 300

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val
305                 310                 315                 320

Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu
                325                 330                 335

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys
            340                 345                 350

Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
        355                 360                 365

Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
    370                 375                 380

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
385                 390                 395                 400

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu
                405                 410                 415

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
            420                 425                 430

Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
        435                 440                 445
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Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
450 455 460

Lys
465

<210> 348
<211> 1395
<212> DNA
<213> Mus musculus

<400> 348
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gtgcagctgg tgcagtctgg ggctgaggtg aagaagcctg ggtcctcggt gaaggtctcc 120

tgcaaggctt ctggttttac cttcaccgac tatattatgc actgggtgcg tcaggccccc 180

ggtcaagggc ttgagtggat gggctatatc aacccttata atgatgacac cgaatacaac 240

gagaagttca agggccgtgt cacgattacc gcggacaaat ccacgagcac agcctacatg 300

gagctgagca gcctgcgctc tgaggacacg gccgtgtatt actgtgcgcg ttcgatttat 360

tactacgatg ccccgtttgc ttactggggc caagggactc tggtcaccgt ctctagtgcc 420

tccaccaagg gcccatcggt cttccccctg gcgccctgct ccaggagcac ctccgagagc 480

acagcggccc tgggctgcct ggtcaaggac tacttccccg aaccggtgac ggtgtcgtgg 540

aactcaggcg ctctgaccag cggcgtgcac accttcccag ctgtcctaca gtcctcagga 600

ctctactccc tcagcagcgt ggtgaccgtg ccctccagca acttcggcac ccagacctac 660

acctgcaacg tagatcacaa gcccagcaac accaaggtgg acaagacagt tgagcgcaaa 720

tgttgtgtcg agtgcccacc gtgcccagca ccacctgtgg caggaccgtc agtcttcctc 780

ttccccccaa aacccaagga caccctcatg atctcccgga cccctgaggt cacgtgcgtg 840

gtggtggacg tgagccacga agaccccgag gtccagttca actggtacgt ggacggcgtg 900

gaggtgcata atgccaagac aaagccacgg gaggagcagt tcaacagcac gttccgtgtg 960

gtcagcgtcc tcaccgttgt gcaccaggac tggctgaacg gcaaggagta caagtgcaag 1020

gtctccaaca aaggcctccc agcccccatc gagaaaacca tctccaaaac caaagggcag 1080

ccccgagaac cacaggtgta caccctgccc ccatcccggg aggagatgac caagaaccag 1140

gtcagcctga cctgcctggt caaaggcttc taccccagcg acatcgccgt ggagtgggag 1200

agcaatgggc agccggagaa caactacaag accacacctc ccatgctgga ctccgacggc 1260

tccttcttcc tctacagcaa gctcaccgtg gacaagagca ggtggcagca ggggaacgtc 1320

ttctcatgct ccgtgatgca tgaggctctg cacaaccact acacgcagaa gagcctctcc 1380

ctgtctccgg gtaaa 1395

<210> 349
<211> 417
<212> DNA
<213> Mus musculus

SeqListing

<400> 349
atggaatgga tctggatatt tctcttcctc ctgtcaggaa ctgcaggtgt ccactctgag 60

gtgcagctgg tgcagtctgg ggctgaggtg aagaagcctg ggtcctcggt gaaggtctcc 120

tgcaaggctt ctggttttac cttcaccgac tatattatgc actgggtgcg tcaggcccct 180

ggtcaagggc ttgagtggat gggctatatc aacccttata atgatgacac cgaatacaac 240

gagaagttca agggccgtgt cacgattacc gcggacaaat ccacgagcac agcctacatg 300

gagctgagca gcctgcgctc tgaggacacg gccgtgtatt actgtgcgcg ttcgatttat 360

tactacgatg ccccgtttgc ttactggggc caagggactc tggtcacagt ctcgagc 417

<210> 350
<211> 218
<212> PRT
<213> Mus musculus

<400> 350

Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Gln Arg Ala Thr Ile Ala Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
20 25 30

Gly Thr Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser Glu Ile Pro Ala
50 55 60

Arg Phe Ser Gly Thr Gly Ser Gly Thr Asp Phe Thr Leu Asn Ile His
65 70 75 80

Pro Val Glu Glu Glu Asp Ile Thr Thr Tyr Tyr Cys Gln Gln Ser Asn
85 90 95

Glu Asp Pro Phe Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
100 105 110

Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
115 120 125

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
130 135 140

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
145 150 155 160

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
165 170 175

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
180 185 190

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
195 200 205

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
210 215

<210> 351
<211> 15
<212> PRT
<213> Mus musculus

<400> 351

Lys Ala Ser Gln Ser Val Asp Tyr Asp Gly Thr Ser Tyr Met Asn
1 5 10 15

<210> 352
<211> 7
<212> PRT
<213> Mus musculus

<400> 352

Ala Ala Ser Asn Leu Glu Ser
1 5

<210> 353
<211> 9
<212> PRT
<213> Mus musculus

<400> 353

Gln Gln Ser Asn Glu Asp Pro Phe Thr
1 5

<210> 354
<211> 657
<212> DNA
<213> Mus musculus

<400> 354
gacattgtgt tgacccagtc tccagcttct ttggctgtgt ctctagggca gagggccacc 60

atcgcctgca aggccagcca aagtgttgat tatgatggta ctagttatat gaattggtac 120

caacagaaac caggacagcc acccaaactc ctcatctatg ctgcatccaa tctagaatct 180

gagatcccag ccaggtttag tggcactggg tctgggacag acttcaccct caacatccat 240

cctgtggagg aggaggatat cacaacctat tactgtcagc aaagtaatga ggatccgttc 300

acgttcggag gggggaccaa gttggaaata aaacgggctg atgctgcacc aactgtatcc 360

atcttcccac catccagtga gcagttaaca tctggaggtg cctcagtcgt gtgcttcttg 420

aacaacttct accccaaaga catcaatgtc aagtggaaga ttgatggcag tgaacgacaa 480

aatggcgtcc tgaacagttg gactgatcag gacagcaaag acagcaccta cagcatgagc 540

agcaccctca cgttgaccaa ggacgagtat gaacgacata acagctatac ctgtgaggcc 600

actcacaaga catcaacttc acccattgtc aagagcttca acaggaatga gtgttag 657

<210> 355
<211> 238
<212> PRT
<213> Mus musculus

<400> 355

Met Glu Thr Asp Thr Ile Leu Leu Trp Val Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala
20 25 30

Val Ser Leu Gly Gln Arg Ala Thr Ile Ala Cys Lys Ala Ser Gln Ser
35 40 45

Val Asp Tyr Asp Gly Thr Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro
50 55 60

Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser
65 70 75 80

Glu Ile Pro Ala Arg Phe Ser Gly Thr Gly Ser Gly Thr Asp Phe Thr
85 90 95

Leu Asn Ile His Pro Val Glu Glu Glu Asp Ile Thr Thr Tyr Tyr Cys
100 105 110

Gln Gln Ser Asn Glu Asp Pro Phe Thr Phe Gly Gly Gly Thr Lys Leu
115 120 125

Glu Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro
130 135 140

Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu
145 150 155 160

Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly
165 170 175

Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser
180 185 190

Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp
195 200 205

Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr
210 215 220

Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225 230 235

<210> 356
<211> 717
<212> DNA
<213> Mus musculus

<400> 356
atggagacag acacaatcct gctatgggtg ctgctgctct gggttccagg ctccactggt 60

gacattgtgt tgacccagtc tccagcttct ttggctgtgt ctctagggca gagggccacc 120

atcgcctgca aggccagcca aagtgttgat tatgatggta ctagttatat gaattggtac 180

caacagaaac caggacagcc acccaaactc ctcatctatg ctgcatccaa tctagaatct 240

gagatcccag ccaggtttag tggcactggg tctgggacag acttcaccct caacatccat 300

cctgtggagg aggaggatat cacaacctat tactgtcagc aaagtaatga ggatccgttc 360

acgttcggag gggggaccaa gttggaaata aaacgggctg atgctgcacc aactgtatcc 420

atcttcccac catccagtga gcagttaaca tctggaggtg cctcagtcgt gtgcttcttg 480

aacaacttct accccaaaga catcaatgtc aagtggaaga ttgatggcag tgaacgacaa 540

aatggcgtcc tgaacagttg gactgatcag gacagcaaag acagcaccta cagcatgagc 600

agcaccctca cgttgaccaa ggacgagtat gaacgacata acagctatac ctgtgaggcc 660

actcacaaga catcaacttc acccattgtc aagagcttca acaggaatga gtgttag 717

<210> 357
<211> 442
<212> PRT
<213> Mus musculus

<400> 357

Gln Val Gln Leu Gln Gln Pro Gly Thr Glu Leu Val Arg Pro Gly Thr
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr Thr Tyr
20 25 30

Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Met Ile His Pro Ser Ala Ser Glu Ile Arg Leu Asp Gln Lys Phe
50 55 60

Lys Asp Lys Ala Thr Leu Thr Leu Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met His Leu Ser Gly Pro Thr Ser Val Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Gly Glu Trp Gly Ser Met Asp Tyr Trp Gly Gln Gly Thr

100 105 110

Ser Val Thr Val Ser Ser Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro
115 120 125

Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly
130 135 140

Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn
145 150 155 160

Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr
180 185 190

Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser
195 200 205

Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro
210 215 220

Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro
225 230 235 240

Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys
245 250 255

Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp
260 265 270

Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu
275 280 285

Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met
290 295 300

His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser
305 310 315 320

Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly
325 330 335

Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln
340 345 350

Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe
355 360 365

Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu

370 375 380

Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe
385 390 395 400

Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn
405 410 415

Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr
420 425 430

Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440

<210> 358
<211> 5
<212> PRT
<213> Mus musculus

<400> 358

Thr Tyr Trp Met Asn
1 5

<210> 359
<211> 17
<212> PRT
<213> Mus musculus

<400> 359

Met Ile His Pro Ser Ala Ser Glu Ile Arg Leu Asp Gln Lys Phe Lys
1 5 10 15

Asp

<210> 360
<211> 9
<212> PRT
<213> Mus musculus

<400> 360

Ser Gly Glu Trp Gly Ser Met Asp Tyr
1 5

<210> 361
<211> 1329
<212> DNA
<213> Mus musculus

<400> 361
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tcctgtaagg cttctggcta catcttcacc acctactgga tgaactgggt gaaacagagg 120

cctggacaag gccttgagtg gattggcatg attcatcctt ccgcaagtga aattaggttg 180

gatcagaaat tcaaggacaa ggccacattg actcttgaca aatcctccag cacagcctat 240

atgcacctca gcggcccgac atctgtggat tctgcggtct attactgtgc aagatcaggg 300

gaatgggggt ctatggacta ctggggtcaa ggaacctcag tcaccgtctc ctcagccaaa 360

acgacacccc catctgtcta tccactggcc cctggatctg ctgcccaaac taactccatg 420

gtgaccctgg gatgcctggt caagggctat ttccctgagc cagtgacagt gacctggaac 480

tctggatccc tgtccagcgg tgtgcacacc ttcccagctg tcctgcagtc tgacctctac 540

actctgagca gctcagtgac tgtcccctcc agcacctggc ccagcgagac cgtcacctgc 600

aacgttgccc acccggccag cagcaccaag gtggacaaga aaattgtgcc cagggattgt 660

ggttgtaagc cttgcatatg tacagtccca gaagtatcat ctgtcttcat cttccccca 720

aagcccaagg atgtgctcac cattactctg actcctaagg tcacgtgtgt tgtggtagac 780

atcagcaagg atgatcccga ggtccagttc agctggtttg tagatgatgt ggaggtgcac 840

acagctcaga cgcaaccccg ggaggagcag ttcaacagca ctttccgctc agtcagtgaa 900

cttcccatca tgcaccagga ctggctcaat ggcaaggagt tcaaatgcag ggtcaacagt 960

gcagctttcc ctgccccat cgagaaaacc atctccaaaa ccaaaggcag accgaaggct 1020

ccacaggtgt acaccattcc acctcccaag gagcagatgg ccaaggataa agtcagtctg 1080

acctgcatga taacagactt cttccctgaa gacattactg tggagtggca gtggaatggg 1140

cagccagcgg agaactacaa gaacactcag cccatcatgg acacagatgg ctcttacttc 1200

atctacagca agctcaatgt gcagaagagc aactgggagg caggaaatac tttcacctgc 1260

tctgtgttac atgagggcct gcacaaccac catactgaga agagcctctc ccactctcct 1320

ggtaaatga 1329

<210> 362
<211> 461
<212> PRT
<213> Mus musculus

<400> 362

Met Gly Trp Ser Ser Ile Ile Leu Phe Leu Val Ala Thr Ala Thr Gly
1 5 10 15

Val His Ser Gln Val Gln Leu Gln Gln Pro Gly Thr Glu Leu Val Arg
20 25 30

Pro Gly Thr Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Ile Phe
35 40 45

Thr Thr Tyr Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu
50 55 60

Glu Trp Ile Gly Met Ile His Pro Ser Ala Ser Glu Ile Arg Leu Asp
65 70 75 80

SeqListing

Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Leu Asp Lys Ser Ser Ser
85 90 95

Thr Ala Tyr Met His Leu Ser Gly Pro Thr Ser Val Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Ser Gly Glu Trp Gly Ser Met Asp Tyr Trp Gly
115 120 125

Gln Gly Thr Ser Val Thr Val Ser Ser Ala Lys Thr Thr Pro Pro Ser
130 135 140

Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val
145 150 155 160

Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val
165 170 175

Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala
180 185 190

Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro
195 200 205

Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala His Pro
210 215 220

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly
225 230 235 240

Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile
245 250 255

Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys
260 265 270

Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln
275 280 285

Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Gln
290 295 300

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu
305 310 315 320

Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg
325 330 335

Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
340 345 350

Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro
355 360 365

Lys Glu Gln Met Ala Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr
370 375 380

Asp Phe Phe Pro Glu Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln
385 390 395 400

Pro Ala Glu Asn Tyr Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly
405 410 415

Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu
420 425 430

Ala Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn
435 440 445

His His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
450 455 460

<210> 363
<211> 1386
<212> DNA
<213> Mus musculus

<400> 363
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gtccaactac agcagcctgg gactgagctg gtgaggcctg gaacttcagt gaagttgtcc 120

tgtaaggctt ctggctacat cttcaccacc tactggatga actgggtgaa acagaggcct 180

ggacaaggcc ttgagtggat tggcatgatt catccttccg caagtgaaat taggttggat 240

cagaaattca aggacaaggc cacattgact cttgacaaat cctccagcac agcctatatg 300

cacctcagcg gcccgacatc tgtggattct gcggtctatt actgtgcaag atcaggggaa 360

tgggggtcta tggactactg gggtcaagga acctcagtca ccgtctcctc agccaaaacg 420

acacccccat ctgtctatcc actggccccc ggatctgctg cccaaactaa ctccatggtg 480

accctgggat gcctggtcaa gggctatttc cctgagccag tgacagtgac ctggaactct 540

ggatccctgt ccagcggtgt gcacaccttc ccagctgtcc tgcagtctga cctctacact 600

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gttgcccacc cggccagcag caccaaggtg gacaagaaaa ttgtgcccag ggattgtggt 720

tgtaagcctt gcatatgtac agtcccagaa gtatcatctg tcttcatctt ccccccaaag 780

cccaaggatg tgctcaccat tactctgact cctaaggtca cgtgtgttgt ggtagacatc 840

agcaaggatg atcccgaggt ccagttcagc tggtttgtag atgatgtgga ggtgcacaca 900

gctcagacgc aaccccggga ggagcagttc aacagcactt tccgctcagt cagtgaactt 960

cccatcatgc accaggactg gctcaatggc aaggagttca aatgcagggt caacagtgca 1020

gctttccctg cccccatcga gaaaaccatc tccaaaacca aaggcagacc gaaggctcca 1080

caggtgtaca ccattccacc tcccaaggag cagatggcca aggataaagt cagtctgacc 1140

tgcatgataa cagacttctt ccctgaagac attactgtgg agtggcagtg gaatgggcag 1200

ccagcggaga actacaagaa cactcagccc atcatggaca cagatggctc ttacttcatc 1260

tacagcaagc tcaatgtgca gaagagcaac tgggaggcag gaaatacttt cacctgctct 1320

gtgttacatg agggcctgca caaccaccat actgagaaga gcctctccca ctctcctggt 1380

aaatga 1386

<210> 364
<211> 106
<212> PRT
<213> Mus musculus

<400> 364

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Ser Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ser Thr Ser Arg Leu Asn Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Asp Ile Lys His Pro Thr
85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 365
<211> 318
<212> DNA
<213> Mus musculus

<400> 365
gacatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggtga ccgtgtcacc 60

atcacttgcc gcgcaagtca ggatattagc agctatttaa attggtatca gcagaaacca 120

gggaaagccc ctaagctcct gatctattct acttcccgtt tgaatagtgg ggtcccatca 180

cgcttcagtg gcagtggctc tgggacagat ttcactctca ccatcagcag tctgcaacct 240

gaagattttg caacttacta ctgtcaacag gatattaaac accctacgtt cggtcaaggc 300

accaaggtgg agatcaaa 318

SeqListing

<210> 366
<211> 120
<212> PRT
<213> Mus musculus

<400> 366

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 367
<211> 360
<212> DNA
<213> Mus musculus

<400> 367
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggttt taccttcacc gactatatta tgcactgggt gcgtcaggcc 120

cctggtcaag ggcttgagtg gatgggctat atcaaccctt ataatgatga caccgaatac 180

aacgagaagt tcaagggccg tgtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgcg ctctgaggac acggccgtgt attactgtgc gcgttcgatt 300

tattactacg atgccccgtt tgcttactgg ggccaaggga ctctggtcac cgtctctagt 360

<210> 368
<211> 108
<212> PRT
<213> Mus musculus

<400> 368

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asp Val Phe Thr Ala
20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Ser Tyr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 369
<211> 324
<212> DNA
<213> Mus musculus

<400> 369
gatatccaga tgacccagag cccgagcagc ctgagcgcga gcgtgggcga tcgcgtgacc 60

attacctgca aagcgagcca ggatgtgttt accgcggtgg cgtggtatca gcagaaaccg 120

ggcaaagcgc cgaaactgct gatttattgg gcgagcaccc gccataccgg cgtgccgagt 180

cgctttagcg gcagcggcag cggcaccgat tttaccctga ccattagcag cctgcagccg 240

gaagattttg cgacctatta ttgccagcag tatagcagct atccgctgac ctttggcggc 300

ggcaccaaag tggaaattaa acgt 324

<210> 370
<211> 119
<212> PRT
<213> Mus musculus

<400> 370

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asn Ile Lys Asp Tyr
20 25 30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Ile Asp Pro Glu Asn Gly Asp Ile Ile Tyr Asp Pro Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Tyr Asp Ala Gly Asp Pro Ala Trp Phe Thr Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 371
<211> 357
<212> DNA
<213> Mus musculus

<400> 371
gaagtgcagc tggtgcagag cggcgcggaa gtgaaaaaac cgggcgcgag cgtgaaagtg 60

agctgcaaag cgagcggctt taacattaaa gattattata tgcattgggt gcgccaggcg 120

ccgggccagg gcctggaatg gatcggccgc attgatccgg aaaacggcga tattatttat 180

gatccgaaat ttcagggccg cgtgaccatg accaccgata ccagcaccag caccgcgtat 240

atggaactgc gcagcctgcg cagcgatgat accgcggtgt attattgcgc gtatgatgcg 300

ggcgatccgg cgtggtttac ctattggggc cagggcaccc tggtgaccgt ctcgagc 357

<210> 372
<211> 108
<212> PRT
<213> Mus musculus

<400> 372

Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Val Ser Ser Ser Ile Ser Ser Ser
20 25 30

Asn Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Thr Thr Thr Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
100 105

<210> 373
<211> 324
<212> DNA
<213> Mus musculus

<400> 373
gatattcagc tgacccagag cccgagcttt ctgagcgcga gcgtgggcga tcgcgtgacc 60

attacctgca gcgtgagcag cagcattagc agcagcaacc tgcattggta tcagcagaaa 120

ccgggcaaag cgccgaaact gctgatttat ggcaccagca acctggcgag cggcgtgccg 180

agccgcttta gcggcagcgg cagcggcacc gaatttaccc tgaccattag cagcctgcag 240

ccggaagatt ttgcgaccta ttattgccag cagtggacca ccacctatac ctttggccag 300

ggcaccaaac tggaaattaa acgt 324

<210> 374
<211> 122
<212> PRT
<213> Mus musculus

<400> 374

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asn Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Asp Pro Asp Asn Gly Glu Ser Thr Tyr Val Pro Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Leu Asp Tyr Gly Asp Tyr Tyr Ala Val Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 375
<211> 366
<212> DNA
<213> Mus musculus

<400> 375
gaagtgcagc tggtgcagag cggcgcggaa gtgaaaaaac cgggcgcgag cgtgaaagtg 60

SeqListing

agctgcaaag cgagcggctt taacattaaa gattattata ttcattgggt gcgccaggcg 120

ccgggccagg gcctggaatg gatgggccgc attgatccgg ataacggcga aagcacctat 180

gtgccgaaat ttcagggccg cgtgaccatg accaccgata ccagcaccag caccgcgtat 240

atggaactgc gcagcctgcg cagcgatgat accgcggtgt attattgcgc gcgcgaaggc 300

ctggattatg gcgattatta tgcggtggat tattggggcc agggcaccct ggtgaccgtc 360

tcgagc 366

<210> 376
<211> 107
<212> PRT
<213> Mus musculus

<400> 376

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Thr Ser Arg Leu Leu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Asp Thr Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 377
<211> 321
<212> DNA
<213> Mus musculus

<400> 377
gacatccaga tgacccagtc tccatcctcc ctctccgcat ccgtaggcga ccgcgtaacc 60

ataacatgta gagcatctca agatatttcc aactatttga attggtacca acaaaaaccc 120

ggcaaagcac ctaaactcct catttactat acatcaagac tcctctccgg cgttccatca 180

cgattctcag gctccggctc cggcacagat ttcacactca ctatttcctc cctccaacca 240

gaagattttg caacctatta ctgtcaacaa ggcgatacac tcccatacac attcggcggc 300

ggcacaaaag ttgaaattaa a 321

<210> 378

SeqListing

<211> 123
<212> PRT
<213> Mus musculus

<400> 378

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 379
<211> 369
<212> DNA
<213> Mus musculus

<400> 379
gaggtgcagc tggtgcagag cggcgccgag gtaaaaaaac caggagcaag cgttaaagtt 60

tcttgtaaag caagcggata tacatttaca gattacaaca tgcattgggt aagacaagcg 120

ccaggacaag gattggaatg gatgggcgaa attaacccta atagtggagg agcaggctac 180

aatcaaaaat tcaaagggag agttacaatg acaacagaca caagcacttc aacagcatat 240

atggaactgc gatcacttag aagcgacgat acagctgtat actattgcgc acgacttggg 300

tatgatgata tatatgatga ctggtatttc gatgtttggg gccagggaac aacagttacc 360

gtctctagt 369

<210> 380
<211> 108
<212> PRT
<213> Mus musculus

<400> 380

Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Thr Ser Ser
20 25 30

Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Phe Phe Pro
85 90 95

Ser Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 381
<211> 324
<212> DNA
<213> Mus musculus

<400> 381
gacatccagc tgacccagag ccccagcttc ctttccgcat ccgttggtga ccgagtaaca 60

atcacatgcc gcgcctcatc ttcagttaca tcttcttatc ttaattggta tcaacaaaaa 120

ccaggaaaag cacctaaact tcttatatac tctacatcta atctcgcatc aggagttccc 180

tctcgatttt caggatctgg atcaggcaca gaatttacac ttactatatc atcactccaa 240

ccagaagact tcgccactta ttactgccaa caatacgatt tttttccaag cacattcgga 300

ggaggtacaa aagtagaaat caag 324

<210> 382
<211> 121
<212> PRT
<213> Mus musculus

<400> 382

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Tyr Met Asn Trp Val Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Met
35 40 45

Gly Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn His Lys Phe
50 55 60

SeqListing

Lys Gly Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 383
<211> 363
<212> DNA
<213> Mus musculus

<400> 383
gaggtgcagc tggtgcagag cggcgccgag gtcaagaaac ctggagcaag cgtaaaggtt 60

agttgcaaag catctggata cacatttacc gactactaca tgaattgggt acgacaagcc 120

cctggacaaa gacttgaatg gatgggagac attaaccctt ataacgacga cactacatac 180

aatcataaat ttaaaggaag agttacaatt acaagagata catccgcatc aaccgcctat 240

atggaacttt cctcattgag atctgaagac actgctgttt attactgtgc aagagaaact 300

gccgttatta ctactaacgc tatggattac tggggtcaag gaaccactgt taccgtctct 360

agt 363

<210> 384
<211> 108
<212> PRT
<213> Mus musculus

<400> 384

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Val Ser Ser Thr Ile Ser Ser Asn
20 25 30

His Leu His Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Ser Leu
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 385
<211> 324
<212> DNA
<213> Mus musculus

<400> 385
gacatccaga tgacccagtc tccatcctcc ctctcagcat ccgtaggcga tagagttaca 60

ataacatgca gcgtatcatc aactatatca tcaaatcatc ttcattggtt ccaacagaaa 120

cccggcaaag cacctaaatc acttatatac ggcacatcaa atctcgcatc aggcgttcct 180

tcaagatttt caggctctgg ctcaggcacc gactttactc ttacaatatc ctccctccaa 240

cccgaagact tcgcaaccta ttactgtcaa caatggtcct catatccact cacatttggc 300

ggcggcacaa aagtagaaat taaa 324

<210> 386
<211> 125
<212> PRT
<213> Mus musculus

<400> 386

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Asp Phe Asn Ile Lys Asp Phe
20 25 30

Tyr Leu His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp Pro Lys Phe
50 55 60

Gln Asp Lys Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr Trp Tyr Phe
100 105 110

Asp Val Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 387
<211> 375
<212> DNA
<213> Mus musculus

<400> 387

SeqListing

gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctgactt caacattaaa gacttctatc tacactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gattggaagg attgatcctg agaatggtga tactttatat 180

gacccgaagt tccaggacaa ggtcaccatg accacagaca cgtccaccag cacagcctac 240

atggagctga ggagcctgag atctgacgac acggccgtgt attactgtgc gagagaggcg 300

gattatttcc acgatggtac ctcctactgg tacttcgatg tctggggccg tggcaccctg 360

gtcaccgtct ctagt 375

<210> 388
<211> 106
<212> PRT
<213> Mus musculus

<400> 388

Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Ile Ser Tyr Ile
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
35 40 45

Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asp Pro Leu Thr
85 90 95

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 389
<211> 318
<212> DNA
<213> Mus musculus

<400> 389
gacatccagt tgacccagtc tccatccttc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgca gggccagctc aagtataagt tacatacact ggtatcagca aaaaccaggg 120

aaagccccta agctcctgat ctatgccaca tccaacctgg cttctggggt cccatcaagg 180

ttcagcggca gtggatctgg gacagaattc actctcacaa tcagcagcct gcagcctgaa 240

gattttgcaa cttattactg tcagcagtgg agtagtgacc cactcacgtt cggcggaggg 300

accaaggtgg agatcaaa 318

SeqListing

<210> 390
<211> 121
<212> PRT
<213> Mus musculus

<400> 390

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asp Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala Pro Lys Phe
50 55 60

Pro Gly Lys Val Thr Met Thr Thr Asp Thr Ser Ile Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Arg Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 391
<211> 363
<212> DNA
<213> Mus musculus

<400> 391
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggatt cgacattaag gactactata tacactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatcggaagg gttgatcctg acaatggtga gactgaattt 180

gccccgaagt tcccgggcaa ggtcaccatg accacagaca cgtccatcag cacagcctac 240

atggagctga gcaggctgag atctgacgac acggccgtgt attactgtgc gagagaagac 300

tacgatggta cctacacctg gtttccttat tggggccaag ggactctggt caccgtctct 360

agt 363

<210> 392
<211> 448
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 392

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Glu Ile Asn Pro Asn Ser Gly Gly Ala Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Leu Gly Tyr Asp Asp Ile Tyr Asp Asp Trp Tyr Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
195 200 205

Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys
210 215 220

Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro
225 230 235 240

Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
245 250 255

Arg Thr Pro Glu Val Thr Cys Val Val Asp Val Ser His Glu Asp
260 265 270

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
275 280 285

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val
290 295 300

Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu
305 310 315 320

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys
325 330 335

Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
340 345 350

Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
355 360 365

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
370 375 380

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu
385 390 395 400

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
405 410 415

Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
420 425 430

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
435 440 445

<210> 393
<211> 446
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 393

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala

SeqListing

1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Tyr Met Asn Trp Val Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Met
35 40 45

Gly Asp Ile Asn Pro Tyr Asn Asp Asp Thr Thr Tyr Asn His Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ala Val Ile Thr Thr Asn Ala Met Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys
210 215 220

Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val
225 230 235 240

Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
245 250 255

Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
260 265 270

Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys

275 280 285

Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser
290 295 300

Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305 310 315 320

Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335

Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
340 345 350

Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
355 360 365

Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
370 375 380

Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser
385 390 395 400

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg
405 410 415

Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
435 440 445

<210> 394
<211> 450
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 394

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Asp Phe Asn Ile Lys Asp Phe
20 25 30

Tyr Leu His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

```
Gly Arg Ile Asp Pro Glu Asn Gly Asp Thr Leu Tyr Asp Pro Lys Phe
     50                  55                  60

Gln Asp Lys Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Ala Asp Tyr Phe His Asp Gly Thr Ser Tyr Trp Tyr Phe
            100                 105                 110

Asp Val Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser
    130                 135                 140

Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys
        195                 200                 205

Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu
    210                 215                 220

Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala
225                 230                 235                 240

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                245                 250                 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
            260                 265                 270

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
        275                 280                 285

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe
    290                 295                 300

Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly
305                 310                 315                 320
```

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile
325 330 335

Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val
340 345 350

Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser
355 360 365

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
370 375 380

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385 390 395 400

Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
405 410 415

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
420 425 430

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
435 440 445

Pro Gly
450

<210> 395
<211> 446
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 395

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asp Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Val Asp Pro Asp Asn Gly Glu Thr Glu Phe Ala Pro Lys Phe
50 55 60

```
Pro Gly Lys Val Thr Met Thr Thr Asp Thr Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Arg Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Asp Tyr Asp Gly Thr Tyr Thr Trp Phe Pro Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys
    210                 215                 220

Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val
225                 230                 235                 240

Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
                245                 250                 255

Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
            260                 265                 270

Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys
        275                 280                 285

Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser
    290                 295                 300

Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305                 310                 315                 320

Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile
                325                 330                 335
```

Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
340 345 350

Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
355 360 365

Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
370 375 380

Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser
385 390 395 400

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg
405 410 415

Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
435 440 445

<210> 396
<211> 445
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> MISC_FEATURE
<223> Humanized Antibody Sequence

<400> 396

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Thr Phe Thr Asp Tyr
20 25 30

Ile Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Tyr Ile Asn Pro Tyr Asn Asp Asp Thr Glu Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

SeqListing

Ala Arg Ser Ile Tyr Tyr Tyr Asp Ala Pro Phe Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val
210 215 220

Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe
225 230 235 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
245 250 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
260 265 270

Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
275 280 285

Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val
290 295 300

Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305 310 315 320

Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
325 330 335

Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
340 345 350

Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
355 360 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
370 375 380

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp
385 390 395 400

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
405 410 415

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
420 425 430

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
435 440 445

<210> 397
<211> 213
<212> PRT
<213> Homo sapiens

<400> 397

Met Gln Leu Pro Leu Ala Leu Cys Leu Val Cys Leu Leu Val His Thr
1 5 10 15

Ala Phe Arg Val Val Glu Gly Gln Gly Trp Gln Ala Phe Lys Asn Asp
20 25 30

Ala Thr Glu Ile Ile Pro Glu Leu Gly Glu Tyr Pro Glu Pro Pro Pro
35 40 45

Glu Leu Glu Asn Asn Lys Thr Met Asn Arg Ala Glu Asn Gly Gly Arg
50 55 60

Pro Pro His His Pro Phe Glu Thr Lys Asp Val Ser Glu Tyr Ser Cys
65 70 75 80

Arg Glu Leu His Phe Thr Arg Tyr Val Thr Asp Gly Pro Cys Arg Ser
85 90 95

Ala Lys Pro Val Thr Glu Leu Val Cys Ser Gly Gln Cys Gly Pro Ala
100 105 110

Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser
115 120 125

Gly Pro Asp Phe Arg Cys Ile Pro Asp Arg Tyr Arg Ala Gln Arg Val
130 135 140

Gln Leu Leu Cys Pro Gly Gly Glu Ala Pro Arg Ala Arg Lys Val Arg
145 150 155 160

Leu Val Ala Ser Cys Lys Cys Lys Arg Leu Thr Arg Phe His Asn Gln

165 170 175

Ser Glu Leu Lys Asp Phe Gly Thr Glu Ala Ala Arg Pro Gln Lys Gly
180 185 190

Arg Lys Pro Arg Pro Arg Ala Arg Ser Ala Lys Ala Asn Gln Ala Glu
195 200 205

Leu Glu Asn Ala Tyr
210

<210> 398
<211> 444
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 398

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Phe Leu Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Thr Ile Tyr Pro Tyr His Asp Gly Thr Thr Tyr Ser Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Glu Glu Asp Gly Gln Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
115 120 125

Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly
130 135 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145 150 155 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

SeqListing

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Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys
    210                 215                 220

Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro Ser Val Phe Leu
225                 230                 235                 240

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
                245                 250                 255

Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp Pro Glu Val Gln
            260                 265                 270

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
        275                 280                 285

Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu
    290                 295                 300

Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
305                 310                 315                 320

Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys
                325                 330                 335

Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
            340                 345                 350

Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
        355                 360                 365

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
    370                 375                 380

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
385                 390                 395                 400

Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln
                405                 410                 415

Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
            420                 425                 430

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
        435                 440
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SeqListing

<210> 399
<211> 444
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 399

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Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                  10                  15

Ser Val Lys Val Ser Cys Lys Val Ser Gly Phe Pro Ile Lys Asp Thr
            20                  25                  30

Phe Gln His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ser Asp Pro Glu Ile Gly Asp Thr Glu Tyr Ala Ser Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Glu Asp Thr Ser Thr Asp Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Gly Asp Thr Thr Tyr Lys Phe Asp Phe Trp Gly Gln Gly Thr
            100                 105                 110

Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys
    210                 215                 220

Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro Ser Val Phe Leu
```

225 230 235 240

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
245 250 255

Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp Pro Glu Val Gln
260 265 270

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
275 280 285

Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu
290 295 300

Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
305 310 315 320

Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys
325 330 335

Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
340 345 350

Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
355 360 365

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
370 375 380

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
385 390 395 400

Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln
405 410 415

Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
420 425 430

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
435 440

<210> 400
<211> 450
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 400

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

SeqListing

Ser Leu Lys Ile Ser Cys Lys Gly Ser Asp Phe Glu Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Gln Ile Asp Ala Glu Asp Gly Glu Thr Glu Tyr Ala Pro Arg Phe
50 55 60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65 70 75 80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Tyr Tyr Tyr Asp Gly Arg Asp Tyr Trp Tyr Phe Asp
100 105 110

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
115 120 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
130 135 140

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145 150 155 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
195 200 205

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser
210 215 220

Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly
225 230 235 240

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
245 250 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
260 265 270

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
275 280 285

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr
290 295 300

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
305 310 315 320

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile
325 330 335

Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
340 345 350

Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser
355 360 365

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
370 375 380

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385 390 395 400

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val
405 410 415

Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met
420 425 430

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
435 440 445

Leu Gly
450

<210> 401
<211> 214
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 401

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Gln Gly Ile Gln Trp Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Thr Ser Ser Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly

50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln His Ser Lys Leu Pro Arg
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 402
<211> 214
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 402

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asp Val His Thr Ala
20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Trp Ala Ser Thr Arg Trp Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Asp Tyr Pro Trp
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 403
<211> 213
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 403

Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Ser Ala Ser Ser Ser Val Ser Tyr Ile
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
35 40 45

Ser Thr Ser Glu Leu Ala Ser Gly Ile Pro Ala Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro Glu

65 70 75 80

Asp Phe Ala Val Tyr Tyr Cys Gln Gln Leu Ser His Leu Pro Leu Thr
85 90 95

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
100 105 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
115 120 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Cys
210

<210> 404
<211> 1332
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 404
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc agtgaaggtt 60

tcctgcaagg catctggata cacattcact gactactttc tgaactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaact atttatcctt accatgatgg tactacctac 180

tctcagaagt tcaagggcag agtcaccatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gagagaggaa 300

gaggatggtc agttcgacta ctggggccaa ggaaccacgg tcaccgtctc ctcagcctcc 360

accaagggcc catcggtctt cccgctagcg ccctgctcca ggagcacctc cgagagcaca 420

gccgccctgg gctgcctggt caaggactac ttccccgaac cggtgacggt gtcgtggaac 480

tcaggcgccc tgaccagcgg cgtgcacacc ttcccggctg tcctacagtc ctcaggactc 540

tactccctca gcagcgtggt gaccgtgccc tccagcagct tgggcacgaa gacctacacc 600

tgcaacgtag atcacaagcc cagcaacacc aaggtggaca agagagttga gtccaaatat 660

ggtcccccat gcccaccctg cccagcacct gagttcctgg ggggaccatc agtcttcctg 720

ttcccccaa aacccaagga cactctcatg atctcccgga cccctgaggt cacgtgcgtg 780

gtggtggacg tgagccagga agaccccgag gtccagttca actggtacgt ggatggcgtg 840

gaggtgcata atgccaagac aaagccgcgg gaggagcagt tcaacagcac gtaccgtgtg 900

gtcagcgtcc tcaccgtcct gcaccaggac tggctgaacg gcaaggagta caagtgcaag 960

gtctccaaca aaggcctccc gtcctccatc gagaaaacca tctccaaagc caaagggcag 1020

ccccgagagc cacaggtgta caccctgccc ccatcccagg aggagatgac caagaaccag 1080

gtcagcctga cctgcctggt caaaggcttc taccccagcg acatcgccgt ggagtgggaa 1140

agcaatgggc agccggagaa caactacaag accacgcctc ccgtgctgga ctccgacggc 1200

tccttcttcc tctacagcag gctaaccgtg gacaagagca ggtggcagga ggggaatgtc 1260

ttctcatgct ccgtgatgca tgaggctctg cacaaccact acacacagaa gagcctctcc 1320

ctgtctctgg gt 1332

<210> 405
<211> 1332
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 405
caggttcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg tttccggctt ccccattaag gacacctttc agcactgggt gcgacaggct 120

cctggaaaag ggcttgagtg gatgggatgg agcgatcctg agatcggtga tactgaatat 180

gcctcgaagt tccagggcag agtcaccatg accgaggaca catctacaga cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc aacaggcgac 300

accacataca agtttgactt ctgggggcaa gggaccacgg tcaccgtctc ctcagcctcc 360

accaagggcc catcggtctt cccgctagcg ccctgctcca ggagcacctc cgagagcaca 420

gccgccctgg gctgcctggt caaggactac ttccccgaac cggtgacggt gtcgtggaac 480

tcaggcgccc tgaccagcgg cgtgcacacc ttcccggctg tcctacagtc ctcaggactc 540

tactccctca gcagcgtggt gaccgtgccc tccagcagct tgggcacgaa gacctacacc 600

tgcaacgtag atcacaagcc cagcaacacc aaggtggaca agagagttga gtccaaatat 660

ggtcccccat gcccaccctg cccagcacct gagttcctgg ggggaccatc agtcttcctg 720

ttcccccaa aacccaagga cactctcatg atctcccgga cccctgaggt cacgtgcgtg 780

gtggtggacg tgagccagga agaccccgag gtccagttca actggtacgt ggatggcgtg 840

gaggtgcata atgccaagac aaagccgcgg gaggagcagt tcaacagcac gtaccgtgtg 900

gtcagcgtcc tcaccgtcct gcaccaggac tggctgaacg gcaaggagta caagtgcaag 960

gtctccaaca aaggcctccc gtcctccatc gagaaaacca tctccaaagc caaagggcag 1020

ccccgagagc cacaggtgta caccctgccc ccatcccagg aggagatgac caagaaccag 1080

gtcagcctga cctgcctggt caaaggcttc taccccagcg acatcgccgt ggagtgggaa 1140

agcaatgggc agccggagaa caactacaag accacgcctc ccgtgctgga ctccgacggc 1200

tccttcttcc tctacagcag gctaaccgtg gacaagagca ggtggcagga ggggaatgtc 1260

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ctgtctctgg gt 1332

<210> 406
<211> 1350
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 406
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tcctgtaagg gttctgactt cgagattaaa gactactata tacattgggt gcgccagatg 120

cccgggaaag gcctggagtg gatggggcag attgatgctg aggatggtga aactgaatat 180

gccccgaggt tccagggcca ggtcaccatc tcagccgaca agtccatcag caccgcctac 240

ctgcagtgga gcagcctgaa ggcctcggac accgccatgt attactgtgc gagagagggt 300

tattactacg atgggcgcga ctactggtac ttcgatgtct ggggccaagg gaccacggtc 360

accgtctcct cagcctccac caagggccca tcggtcttcc cgctagcgcc ctgctccagg 420

agcacctccg agagcacagc cgccctgggc tgcctggtca aggactactt ccccgaaccg 480

gtgacggtgt cgtggaactc aggcgccctg accagcggcg tgcacacctt cccggctgtc 540

ctacagtcct caggactcta ctccctcagc agcgtggtga ccgtgccctc cagcagcttg 600

ggcacgaaga cctacacctg caacgtagat cacaagccca gcaacaccaa ggtggacaag 660

agagttgagt ccaaatatgg tcccccatgc ccaccctgcc cagcacctga gttcctgggg 720

ggaccatcag tcttcctgtt cccccaaaa cccaaggaca ctctcatgat ctcccggacc 780

cctgaggtca cgtgcgtggt ggtggacgtg agccaggaag accccgaggt ccagttcaac 840

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aacagcacgt accgtgtggt cagcgtcctc accgtcctgc accaggactg gctgaacggc 960

aaggagtaca agtgcaaggt ctccaacaaa ggcctcccgt cctccatcga gaaaaccatc 1020

tccaaagcca aagggcagcc ccgagagcca caggtgtaca ccctgccccc atcccaggag 1080

gagatgacca agaaccaggt cagcctgacc tgcctggtca aaggcttcta ccccagcgac 1140

atcgccgtgg agtgggaaag caatgggcag ccggagaaca actacaagac cacgcctccc 1200

gtgctggact ccgacggctc cttcttcctc tacagcaggc taaccgtgga caagagcagg 1260

tggcaggagg ggaatgtctt ctcatgctcc gtgatgcatg aggctctgca caaccactac 1320

acacagaaga gcctctccct gtctctgggt 1350

<210> 407
<211> 642
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 407
gacatccaga tgacccagtc tccatcctct ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgca gtgcaagtca gggcattcag tggtatttaa actggtatca gcagaaacca 120

gggaaagccc ctaagctcct gatctattac acatcaagtt tacactcagg ggtcccatca 180

aggttcagtg gcagtggatc tgggacagat ttcactctca ccatcagcag tctgcaacct 240

gaagattttg caacttacta ctgtcagcag catagtaaac ttcctcggac gttcggcgga 300

gggaccaagg tggagatcaa acggactgtg gctgcaccat ctgtcttcat cttcccgcca 360

tctgatgagc agttgaaatc tggaactgcc tctgttgtgt gcctgctgaa taacttctat 420

cccagagagg ccaaagtaca gtggaaggtg gataacgccc tccaatcggg taactcccag 480

gagagtgtca cagagcagga cagcaaggac agcacctaca gcctcagcag caccctgacg 540

ctgagcaaag cagactacga gaaacacaaa gtctacgcct gcgaagtcac ccatcagggc 600

ctgagctcgc ccgtcacaaa gagcttcaac aggggagagt gc 642

<210> 408
<211> 642
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 408
gacatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgca aggccagtca ggatgtgcac actgctgtag cctggtatca gcagaaacca 120

gggaaagccc ctaagctcct gatctattgg gcatccaccc ggtggactgg agtcccatca 180

aggttcagtg gcagtggatc tgggacagat ttcactctca ccatcagcag tctgcaacct 240

gaagattttg caacttacta ctgtcagcaa tatagcgatt atccgtggac gttcggcgga 300

gggaccaagg tggagatcaa acggactgtg gctgcaccat ctgtcttcat cttcccgcca 360

tctgatgagc agttgaaatc tggaactgcc tctgttgtgt gcctgctgaa taacttctat 420

cccagagagg ccaaagtaca gtggaaggtg gataacgccc tccaatcggg taactcccag 480

gagagtgtca cagagcagga cagcaaggac agcacctaca gcctcagcag caccctgacg 540

ctgagcaaag cagactacga gaaacacaaa gtctacgcct gcgaagtcac ccatcagggc 600

ctgagctcgc ccgtcacaaa gagcttcaac aggggagagt gc 642

<210> 409

SeqListing

<211> 639
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 409
gaaattgtgt tgacacagtc tccagccacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgca gtgccagctc aagtgtaagt tacatccact ggtaccaaca gaaacctggc 120

caggctccca ggctcctcat ctatagcaca tccgagctgg cttctggcat cccagccagg 180

ttcagtggca gtgggtctgg gacagacttc actctcacca tcagcagcct agagcctgaa 240

gattttgcag tttattactg tcagcagctt agtcatctcc cgctcacgtt cggcggaggg 300

accaaggtgg agatcaaacg aactgtggct gcaccatctg tcttcatctt cccgccatct 360

gatgagcagt tgaaatctgg aactgcctct gttgtgtgcc tgctgaataa cttctatccc 420

agagaggcca aagtacagtg gaaggtggat aacgccctcc aatcgggtaa ctcccaggag 480

agtgtcacag agcaggacag caaggacagc acctacagcc tcagcagcac cctgacgctg 540

agcaaagcag actacgagaa acacaaagtc tacgcctgcg aagtcaccca tcagggcctg 600

agctcgcccg tcacaaagag cttcaacagg ggagagtgc 639

<210> 410
<211> 118
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 410

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Phe Leu Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Thr Ile Tyr Pro Tyr His Asp Gly Thr Thr Tyr Ser Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Glu Glu Asp Gly Gln Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Thr Val Thr Val Ser Ser
115

<210> 411
<211> 118
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 411

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Val Ser Gly Phe Pro Ile Lys Asp Thr
20 25 30

Phe Gln His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Trp Ser Asp Pro Glu Ile Gly Asp Thr Glu Tyr Ala Ser Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Glu Asp Thr Ser Thr Asp Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Thr Gly Asp Thr Thr Tyr Lys Phe Asp Phe Trp Gly Gln Gly Thr
100 105 110

Thr Val Thr Val Ser Ser
115

<210> 412
<211> 124
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 412

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Asp Phe Glu Ile Lys Asp Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Gln Ile Asp Ala Glu Asp Gly Glu Thr Glu Tyr Ala Pro Arg Phe
50 55 60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65 70 75 80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Tyr Tyr Tyr Asp Gly Arg Asp Tyr Trp Tyr Phe Asp
100 105 110

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 413
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 413

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Gln Gly Ile Gln Trp Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Thr Ser Ser Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln His Ser Lys Leu Pro Arg
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 414
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 414

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Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                  10                  15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asp Val His Thr Ala
            20                  25                  30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Trp Ala Ser Thr Arg Trp Thr Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Asp Tyr Pro Trp
                85                  90                  95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105
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<210> 415
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 415

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Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                  10                  15

Glu Arg Ala Thr Leu Ser Cys Ser Ala Ser Ser Ser Val Ser Tyr Ile
            20                  25                  30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
        35                  40                  45

Ser Thr Ser Glu Leu Ala Ser Gly Ile Pro Ala Arg Phe Ser Gly Ser
    50                  55                  60

Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro Glu
65                  70                  75                  80

Asp Phe Ala Val Tyr Tyr Cys Gln Gln Leu Ser His Leu Pro Leu Thr
                85                  90                  95

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105
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<210> 416

<211> 10
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 416

Gly Tyr Thr Phe Thr Asp Tyr Phe Leu Asn
1 5 10

<210> 417
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 417

Thr Ile Tyr Pro Tyr His Asp Gly Thr Thr Tyr Ser Gln Lys Phe Lys
1 5 10 15

Gly

<210> 418
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 418

Glu Glu Glu Asp Gly Gln Phe Asp Tyr
1 5

<210> 419
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 419

Ser Ala Ser Gln Gly Ile Gln Trp Tyr Leu Asn
1 5 10

<210> 420
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 420

Tyr Thr Ser Ser Leu His Ser
1 5

<210> 421
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 421

Gln Gln His Ser Lys Leu Pro Arg Thr
1 5

<210> 422
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 422

Gly Phe Pro Ile Lys Asp Thr Phe Gln His
1 5 10

<210> 423
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 423

Trp Ser Asp Pro Glu Ile Gly Asp Thr Glu Tyr Ala Ser Lys Phe Gln
1 5 10 15

Gly

<210> 424
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 424

Gly Asp Thr Thr Tyr Lys Phe Asp Phe
1 5

<210> 425
<211> 11
<212> PRT

<213> Artificial

<220>
<223> Miscellaneous construct

<400> 425

Lys Ala Ser Gln Asp Val His Thr Ala Val Ala
1 5 10

<210> 426
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 426

Trp Ala Ser Thr Arg Trp Thr
1 5

<210> 427
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 427

Gln Gln Tyr Ser Asp Tyr Pro Trp Thr
1 5

<210> 428
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 428

Asp Phe Glu Ile Lys Asp Tyr Tyr Ile His
1 5 10

<210> 429
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 429

Gln Ile Asp Ala Glu Asp Gly Glu Thr Glu Tyr Ala Pro Arg Phe Gln
1 5 10 15

Gly

<210> 430
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 430

Gln Ile Asp Ala Glu Asp Gly Glu Thr Glu Tyr Ala Pro Arg Phe Gln
1 5 10 15

Gly

<210> 431
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 431

Gln Ile Asp Ala Glu Asp Gly Glu Thr Glu Tyr Ala Pro Arg Phe Gln
1 5 10 15

Gly

<210> 432
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 432

Ser Thr Ser Glu Leu Ala Ser
1 5

<210> 433
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 433

Gln Gln Leu Ser His Leu Pro Leu Thr
1 5

<210> 434

SeqListing

<211> 322
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 434

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
1 5 10 15

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
20 25 30

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
35 40 45

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
50 55 60

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
65 70 75 80

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser
85 90 95

Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly
100 105 110

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
115 120 125

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
130 135 140

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
145 150 155 160

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr
165 170 175

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
180 185 190

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile
195 200 205

Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
210 215 220

Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser
225 230 235 240

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
245 250 255

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
260 265 270

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val
275 280 285

Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met
290 295 300

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
305 310 315 320

Leu Gly

<210> 435
<211> 970
<212> DNA
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 435
ggcccatcgg tcttcccgct agcgccctgc tccaggagca cctccgagag cacagccgcc 60

ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc 120

gccctgacca gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc 180

gctcagcagc gtggtgaccg tgccctccag cagcttgggc acgaagacct acacctgcaa 240

cgtagatcac aagcccagca acaccaaggt ggacaagaga gttgagtcca aatatggtcc 300

cccatgccca ccctgcccag cacctgagtt cctgggggga ccatcagtct tcctgttccc 360

cccaaaaccc aaggacactc tcatgatctc ccggacccct gaggtcacgt gcgtggtggt 420

ggacgtgagc caggaagacc ccgaggtcca gttcaactgg tacgtggatg gcgtggaggt 480

gcataatgcc aagacaaagc cgcgggagga gcagttcaac agcacgtacc gtgtggtcag 540

cgtcctcacc gtcctgcacc aggactggct gaacggcaag gagtacaagt gcaaggtctc 600

caacaaaggc ctcccgtcct ccatcgagaa aaccatctcc aaagccaaag ggcagccccg 660

agagccacag gtgtacaccc tgccccatc ccaggaggag atgaccaaga accaggtcag 720

cctgacctgc ctggtcaaag gcttctaccc agcgacatc gccgtggagt gggaaagcaa 780

tgggcagccg gagaacaact acaagaccac gcctcccgtg ctggactccg acggctcctt 840

cttcctctac agcaggctaa ccgtggacaa gagcaggtgg caggagggga atgtcttctc 900

atgctccgtg atgcatgagg ctctgcacaa ccactacaca cagaagagcc tctccctgtc 960

tctgggttga 970

SeqListing

<210> 436
<211> 444
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 436

Glu Val Gln Leu Gln Gln Ser Val Ala Glu Leu Val Arg Pro Gly Ala
1 5 10 15

Ser Val Lys Leu Ser Cys Thr Ala Ser Gly Phe Asn Ile Lys Ser Thr
20 25 30

Phe Met His Trp Val Lys Gln Arg Pro Asp Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asp Pro Glu Asn Gly Asp Thr Glu Tyr Ala Ser Lys Phe
50 55 60

Gln Gly Lys Ala Thr Met Thr Ala Asp Thr Ser Ser Asn Thr Ala Tyr
65 70 75 80

Leu Gln Leu Ser Ser Leu Thr Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Thr Gly Glu Ser Asn Tyr Asp Phe Asp Phe Trp Gly Leu Gly Thr
100 105 110

Thr Leu Thr Val Ser Ser Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro
115 120 125

Leu Ala Pro Gly Thr Ala Leu Lys Ser Asn Ser Met Val Thr Leu Gly
130 135 140

Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn
145 150 155 160

Ser Gly Ala Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Gly Leu Tyr Thr Leu Thr Ser Ser Val Thr Val Pro Ser Ser Thr
180 185 190

Trp Pro Ser Gln Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser
195 200 205

Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asn Cys Gly Gly Asp Cys
210 215 220

Lys Pro Cys Ile Cys Thr Gly Ser Glu Val Ser Ser Val Phe Ile Phe

225 230 235 240

Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val
245 250 255

Thr Cys Val Val Val Asp Ile Ser Gln Asp Asp Pro Glu Val His Phe
260 265 270

Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln Thr Arg Pro
275 280 285

Pro Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro
290 295 300

Ile Leu His Gln Asp Trp Leu Asn Gly Arg Thr Phe Arg Cys Lys Val
305 310 315 320

Thr Ser Ala Ala Phe Pro Ser Pro Ile Glu Lys Thr Ile Ser Lys Pro
325 330 335

Glu Gly Arg Thr Gln Val Pro His Val Tyr Thr Met Ser Pro Thr Lys
340 345 350

Glu Glu Met Thr Gln Asn Glu Val Ser Ile Thr Cys Met Val Lys Gly
355 360 365

Phe Tyr Pro Pro Asp Ile Tyr Val Glu Trp Gln Met Asn Gly Gln Pro
370 375 380

Gln Glu Asn Tyr Lys Asn Thr Pro Pro Thr Met Asp Thr Asp Gly Ser
385 390 395 400

Tyr Phe Leu Tyr Ser Lys Leu Asn Val Lys Lys Glu Lys Trp Gln Gln
405 410 415

Gly Asn Thr Phe Thr Cys Ser Val Leu His Glu Gly Leu His Asn His
420 425 430

His Thr Glu Lys Ser Leu Ser His Ser Pro Gly Lys
435 440

<210> 437
<211> 214
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 437

Asp Ile Val Met Thr Gln Ser His Lys Phe Met Ser Thr Ser Val Gly
1 5 10 15

```
Asp Arg Val Ser Ile Thr Cys Lys Ala Ser Gln Asp Val Ser Thr Ala
            20                  25                  30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg Phe Thr Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Asp Val Gln Ser
65                  70                  75                  80

Glu Asp Leu Ala Asp Tyr Phe Cys Gln Gln Tyr Ser Asn Tyr Pro Trp
                85                  90                  95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala
            100                 105                 110

Pro Thr Val Ser Ile Phe Pro Pro Ser Thr Glu Gln Leu Ala Thr Gly
        115                 120                 125

Gly Ala Ser Val Val Cys Leu Met Asn Asn Phe Tyr Pro Arg Asp Ile
    130                 135                 140

Ser Val Lys Trp Lys Ile Asp Gly Thr Glu Arg Arg Asp Gly Val Leu
145                 150                 155                 160

Asp Ser Val Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser
                165                 170                 175

Ser Thr Leu Ser Leu Ser Lys Ala Asp Tyr Glu Ser His Asn Leu Tyr
            180                 185                 190

Thr Cys Glu Val Val His Lys Thr Ser Ser Ser Pro Val Val Lys Ser
        195                 200                 205

Phe Asn Arg Asn Glu Cys
    210
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<210> 438
<211> 450
<212> PRT
<213> Artificial

<220>
<223> Miscellaneous construct

<400> 438

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Glu Val Gln Leu Gln Gln Ser Gly Ala Glu His Val Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Leu Ser Cys Thr Ala Ser Asp Phe Asn Ile Lys Asp Tyr
```

20 25 30

Tyr Ile His Trp Val Lys Gln Arg Thr Ala Gln Gly Leu Glu Trp Ile
35 40 45

Gly Arg Ile Asp Pro Glu Asp Gly Glu Thr Glu Tyr Ala Pro Arg Phe
50 55 60

Gln Gly Lys Ala Thr Ile Ile Ala Asp Thr Ser Ser Asn Thr Ala Tyr
65 70 75 80

Leu Gln Leu Ser Ser Leu Thr Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Tyr Tyr Tyr Asp Ser Arg Asp Tyr Trp Tyr Phe Asp
100 105 110

Val Trp Gly Thr Gly Thr Thr Val Thr Val Ser Ser Ala Lys Thr Thr
115 120 125

Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Thr Ala Leu Lys Ser Asn
130 135 140

Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro
145 150 155 160

Val Thr Val Thr Trp Asn Ser Gly Ala Leu Ser Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Gly Leu Tyr Thr Leu Thr Ser Ser Val
180 185 190

Thr Val Pro Ser Ser Thr Trp Pro Ser Gln Thr Val Thr Cys Asn Val
195 200 205

Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg
210 215 220

Asn Cys Gly Gly Asp Cys Lys Pro Cys Ile Cys Thr Gly Ser Glu Val
225 230 235 240

Ser Ser Val Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile
245 250 255

Thr Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Gln Asp
260 265 270

Asp Pro Glu Val His Phe Ser Trp Phe Val Asp Asp Val Glu Val His
275 280 285

Thr Ala Gln Thr Arg Pro Pro Glu Glu Gln Phe Asn Ser Thr Phe Arg

290 295 300

Ser Val Ser Glu Leu Pro Ile Leu His Gln Asp Trp Leu Asn Gly Arg
305 310 315 320

Thr Phe Arg Cys Lys Val Thr Ser Ala Ala Phe Pro Ser Pro Ile Glu
325 330 335

Lys Thr Ile Ser Lys Pro Glu Gly Arg Thr Gln Val Pro His Val Tyr
340 345 350

Thr Met Ser Pro Thr Lys Glu Glu Met Thr Gln Asn Glu Val Ser Ile
355 360 365

Thr Cys Met Val Lys Gly Phe Tyr Pro Pro Asp Ile Tyr Val Glu Trp
370 375 380

Gln Met Asn Gly Gln Pro Gln Glu Asn Tyr Lys Asn Thr Pro Pro Thr
385 390 395 400

Met Asp Thr Asp Gly Ser Tyr Phe Leu Tyr Ser Lys Leu Asn Val Lys
405 410 415

Lys Glu Lys Trp Gln Gln Gly Asn Thr Phe Thr Cys Ser Val Leu His
420 425 430

Glu Gly Leu His Asn His His Thr Glu Lys Ser Leu Ser His Ser Pro
435 440 445

Gly Lys
450

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<400> 439

Glu Ile Val Leu Thr Gln Ser Pro Ala Leu Met Ser Ala Ser Pro Gly
1 5 10 15

Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met
20 25 30

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Ile Tyr
35 40 45

Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser
50 55 60

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Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu Ala Glu
65                  70                  75                  80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Leu Thr
                85                  90                  95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg Ala Asp Ala Ala Pro
            100                 105                 110

Thr Val Ser Ile Phe Pro Pro Ser Thr Glu Gln Leu Ala Thr Gly Gly
        115                 120                 125

Ala Ser Val Val Cys Leu Met Asn Asn Phe Tyr Pro Arg Asp Ile Ser
    130                 135                 140

Val Lys Trp Lys Ile Asp Gly Thr Glu Arg Arg Asp Gly Val Leu Asp
145                 150                 155                 160

Ser Val Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser
                165                 170                 175

Thr Leu Ser Leu Ser Lys Ala Asp Tyr Glu Ser His Asn Leu Tyr Thr
            180                 185                 190

Cys Glu Val Val His Lys Thr Ser Ser Ser Pro Val Val Lys Ser Phe
        195                 200                 205

Asn Arg Asn Glu Cys
    210
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<400> 440

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Gly Phe Thr Phe Ser Ser Tyr Val Met Asn
1               5                   10
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<210> 441
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<400> 441

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Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1               5                   10
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<210> 442
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<400> 442

Gly Phe Thr Phe Ser Ser Tyr Val Met Asn
1 5 10

<210> 443
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<400> 443

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 444
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<400> 444

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 445
<211> 10
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<400> 445

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 446
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<400> 446

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 447
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Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 448
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<400> 448

SeqListing

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 449
<211> 10
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<400> 449

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

<210> 450
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<400> 450

Gly Phe Thr Phe Arg Ser His Trp Leu Ser
1 5 10

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<400> 451

Trp Val Ser Phe Ile Ser Gly Asp Ser Ser Asn Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly
20

<210> 452
<211> 20
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<400> 452

Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly
20

<210> 453
<211> 20
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<400> 453

Trp Val Ser Phe Ile Ser Gly Asp Ser Ser Asn Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly

20

<210> 454
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<400> 454

Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly
20

<210> 455
<211> 19
<212> PRT
<213> Homo sapiens

<400> 455

Trp Val Ser Val Thr Gly Val His Gly Asp Thr Tyr Tyr Ala Asp Ser
1 5 10 15

Val Lys Gly

<210> 456
<211> 19
<212> PRT
<213> Homo sapiens

<400> 456

Trp Val Ser Val Ile Gly Asn Trp Gly Asp Thr Tyr Tyr Ala Asp Ser
1 5 10 15

Val Lys Gly

<210> 457
<211> 19
<212> PRT
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<400> 457

Trp Val Ser Val Thr Thr His Gln Gly Tyr Thr Tyr Tyr Ala Asp Ser
1 5 10 15

Val Lys Gly

<210> 458
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<212> PRT
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Trp Val Ser Ala Thr Asn Arg Tyr Gly Tyr Thr Tyr Tyr Ala Asp Ser
1 5 10 15

Val Lys Gly

<210> 459
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Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly
20

<210> 460
<211> 19
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<400> 460

Trp Val Ser Val Ile Thr Pro Tyr Gly Asp Thr Tyr Tyr Ala Asp Ser
1 5 10 15

Val Lys Gly

<210> 461
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<212> PRT
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Trp Val Ser Val Ile Thr Pro Tyr Gly Asp Thr Tyr Tyr Ala Asp Ser
1 5 10 15

Val Lys Gly

<210> 462
<211> 15
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<400> 462

Thr Phe Met His Gly His Leu Gly Gly Gly Leu Ser Met Asp Phe
1 5 10 15

<210> 463
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<212> PRT
<213> Homo sapiens

<400> 463

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 464
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<212> PRT
<213> Homo sapiens

<400> 464

Thr Phe Met His Gly His Leu Gly Gly Gly Leu Ser Met Asp Phe
1 5 10 15

<210> 465
<211> 8
<212> PRT
<213> Homo sapiens

<400> 465

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 466
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<213> Homo sapiens

<400> 466

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 467
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<400> 467

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 468
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<212> PRT
<213> Homo sapiens

<400> 468

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 469
<211> 8
<212> PRT
<213> Homo sapiens

<400> 469

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 470
<211> 8
<212> PRT
<213> Homo sapiens

<400> 470

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 471
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<213> Homo sapiens

<400> 471

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 472
<211> 8
<212> PRT
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<400> 472

Asp Thr Tyr Leu His Phe Asp Tyr
1 5

<210> 473
<211> 11
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<400> 473

Ser Gly Asp Asn Ile Gly Ser Phe Tyr Val His
1 5 10

<210> 474
<211> 20
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<400> 474

Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly
20

<210> 475
<211> 20

<212> PRT
<213> Homo sapiens

<400> 475

Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp
1 5 10 15

Ser Val Lys Gly
20

<210> 476
<211> 11
<212> PRT
<213> Homo sapiens

<400> 476

Ser Gly Asp Asn Ile Gly Ser Phe Tyr Val His
1 5 10

<210> 477
<211> 14
<212> PRT
<213> Homo sapiens

<400> 477

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 478
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<400> 478

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 479
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<400> 479

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 480
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<212> PRT
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<400> 480

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 481
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<400> 481

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 482
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<212> PRT
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<400> 482

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 483
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<212> PRT
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<400> 483

Thr Gly Thr Ser Ser Asp Val Gly Asp Ile Asn Asp Val Ser
1 5 10

<210> 484
<211> 11
<212> PRT
<213> Homo sapiens

<400> 484

Leu Val Ile Tyr Asp Asp Asn Asn Arg Pro Ser
1 5 10

<210> 485
<211> 11
<212> PRT
<213> Homo sapiens

<400> 485

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 486
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<400> 486

Leu Val Ile Tyr Asp Asp Asn Asn Arg Pro Ser
1 5 10

<210> 487
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<212> PRT
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<400> 487

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 488
<211> 11
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<400> 488

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 489
<211> 11
<212> PRT
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<400> 489

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 490
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Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 491
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<400> 491

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 492
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<400> 492

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 493
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<212> PRT
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<400> 493

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 494
<211> 11
<212> PRT
<213> Homo sapiens

<400> 494

Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser
1 5 10

<210> 495
<211> 10
<212> PRT
<213> Homo sapiens

<400> 495

Gly Ser Trp Ala Gly Ser Ser Gly Ser Tyr
1 5 10

<210> 496
<211> 10
<212> PRT
<213> Homo sapiens

<400> 496

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr
1 5 10

<210> 497
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<212> PRT
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<400> 497

Ala Ser Trp Thr Gly Val Glu Pro Asp Tyr
1 5 10

<210> 498
<211> 10
<212> PRT
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<400> 498

Gln Ser Tyr Ala Gly Ser Tyr Leu Ser Glu
1 5 10

<210> 499
<211> 10
<212> PRT
<213> Homo sapiens

<400> 499

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr
1 5 10

<210> 500
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<212> PRT
<213> Homo sapiens

<400> 500

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr
1 5 10

<210> 501
<211> 10
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<400> 501

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr
1 5 10

<210> 502
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<212> PRT
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<400> 502

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr
1 5 10

<210> 503
<211> 10
<212> PRT
<213> Homo sapiens

<400> 503

Ser Thr Tyr Asp Gly Pro Gly Leu Ser Glu
1 5 10

<210> 504
<211> 10
<212> PRT
<213> Homo sapiens

<400> 504

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr
1 5 10

<210> 505
<211> 10
<212> PRT
<213> Homo sapiens

<400> 505

Ser Ser Tyr Gly Glu Ser Leu Thr Ser Tyr

SeqListing

1 5 10

<210> 506
<211> 124
<212> PRT
<213> Homo sapiens

<400> 506

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Val Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Phe Ile Ser Gly Asp Ser Ser Asn Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Thr Phe Met His Gly His Leu Gly Gly Gly Leu Ser Met Asp
100 105 110

Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 507
<211> 117
<212> PRT
<213> Homo sapiens

<400> 507

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 508
<211> 124
<212> PRT
<213> Homo sapiens

<400> 508

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Val Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Phe Ile Ser Gly Asp Ser Ser Asn Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Thr Phe Met His Gly His Leu Gly Gly Gly Leu Ser Met Asp
100 105 110

Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 509
<211> 117
<212> PRT
<213> Homo sapiens

<400> 509

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val

35 40 45

Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 510
<211> 116
<212> PRT
<213> Homo sapiens

<400> 510

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Val Thr Gly Val His Gly Asp Thr Tyr Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 511
<211> 116
<212> PRT
<213> Homo sapiens

<400> 511

SeqListing

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Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                  10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
            20                  25                  30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Val Ile Gly Asn Trp Gly Asp Thr Tyr Tyr Ala Asp Ser Val Lys
    50                  55                  60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65                  70                  75                  80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser Ser
        115
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<210> 512
<211> 116
<212> PRT
<213> Homo sapiens

<400> 512

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Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                  10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
            20                  25                  30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Val Thr Thr His Gln Gly Tyr Thr Tyr Tyr Ala Asp Ser Val Lys
    50                  55                  60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65                  70                  75                  80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110
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Thr Val Ser Ser
115

<210> 513
<211> 116
<212> PRT
<213> Homo sapiens

<400> 513

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Thr Asn Arg Tyr Gly Tyr Thr Tyr Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 514
<211> 117
<212> PRT
<213> Homo sapiens

<400> 514

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 515
<211> 116
<212> PRT
<213> Homo sapiens

<400> 515

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Val Ile Thr Pro Tyr Gly Asp Thr Tyr Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 516
<211> 116
<212> PRT
<213> Homo sapiens

<400> 516

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser His
20 25 30

Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Val Ile Thr Pro Tyr Gly Asp Thr Tyr Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 517
<211> 110
<212> PRT
<213> Homo sapiens

<400> 517

Asp Ile Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Ser Cys Ser Gly Asp Asn Ile Gly Ser Phe Tyr Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Asp Asp Asn Asn Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gly Ser Trp Ala Gly Ser Ser Gly Ser
85 90 95

Tyr Val Phe Gly Gly Arg Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

<210> 518
<211> 113
<212> PRT
<213> Homo sapiens

<400> 518

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Gly Glu Ser
85 90 95

Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 519
<211> 110
<212> PRT
<213> Homo sapiens

<400> 519

Asp Ile Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Ser Cys Ser Gly Asp Asn Ile Gly Ser Phe Tyr Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Asp Asp Asn Asn Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Thr Gly Val Glu Pro Asp
85 90 95

Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

<210> 520
<211> 113
<212> PRT

<213> Homo sapiens

<400> 520

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Ala Gly Ser
85 90 95

Tyr Leu Ser Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 521
<211> 113
<212> PRT
<213> Homo sapiens

<400> 521

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Gly Glu Ser
85 90 95

Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly

100 105 110

Gln

<210> 522
<211> 113
<212> PRT
<213> Homo sapiens

<400> 522

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Gly Glu Ser
85 90 95

Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 523
<211> 113
<212> PRT
<213> Homo sapiens

<400> 523

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Gly Glu Ser
85 90 95

Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 524
<211> 113
<212> PRT
<213> Homo sapiens

<400> 524

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Gly Glu Ser
85 90 95

Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 525
<211> 113
<212> PRT
<213> Homo sapiens

<400> 525

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile

20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Thr Tyr Asp Gly Pro
85 90 95

Gly Leu Ser Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 526
<211> 113
<212> PRT
<213> Homo sapiens

<400> 526

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Gly Glu Ser
85 90 95

Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 527
<211> 113

SeqListing

<212> PRT
<213> Homo sapiens

<400> 527

Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Asp Ile
20 25 30

Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Thr Tyr Asp Gly Pro
85 90 95

Gly Leu Ser Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln

<210> 528
<211> 372
<212> DNA
<213> Homo sapiens

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agctgcgcgg cctccggatt tacctttttct tcttatgtta tgaattgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcttt atctctggtg attctagcaa tacctattat 180

gcggatagcg tgaaaggccg ttttaccatt tcacgtgata attcgaaaaa caccctgtat 240

ctgcaaatga acagcctgcg tgcggaagat acggccgtgt attattgcgc gcgtactttt 300

atgcatggtc atcttggtgg tggtctttct atggattttt ggggccaagg caccctggtg 360

acggttagct ca 372

<210> 529
<211> 350
<212> DNA
<213> Homo sapiens

<400> 529
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gctgcgcggc ctccggattt acctttcgtt ctcattggct ttcttgggtg cgccaagccc 120

ctgggaaggg tctcgagtgg gtgagcaata tcaattatga tggtagctct acctattatg 180

cggatagcgt gaaaggccgt tttaccattt cacgtgataa ttcgaaaaac accctgtatc 240

tgcaaatgaa cagcctgcgt gcggaagata cggccgtgta ttattgcgcg cgtgatactt 300

atcttcattt tgattattgg ggccaaggca ccctggtgac ggttagctca 350

<210> 530
<211> 372
<212> DNA
<213> Homo sapiens

<400> 530
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agctgcgcgg cctccggatt tacctttctc tcttatgtta tgaattgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcttt atctctggtg attctagcaa tacctattat 180

gcggatagcg tgaaaggccg ttttaccatt tcacgtgata attcgaaaaa caccctgtat 240

ctgcaaatga acagcctgcg tgcggaagat acggccgtgt attattgcgc gcgtactttt 300

atgcatggtc atcttggtgg tggtctttct atggattttt ggggccaagg caccctggtg 360

acggttagct ca 372

<210> 531
<211> 351
<212> DNA
<213> Homo sapiens

<400> 531
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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcaat atcaattatg atggtagctc tacctattat 180

gcggatagcg tgaaaggccg ttttaccatt tcacgtgata attcgaaaaa caccctgtat 240

ctgcaaatga acagcctgcg tgcggaagat acggccgtgt attattgcgc gcgtgatact 300

tatcttcatt ttgattattg gggccaaggc accctggtga cggttagctc a 351

<210> 532
<211> 348
<212> DNA
<213> Homo sapiens

<400> 532
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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcgtt actggtgttc atggtgatac ttattatgct 180

gattctgtta agggtcgttt taccatttca cgtgataatt cgaaaaacac cctgtatctg 240

caaatgaaca gcctgcgtgc ggaagatacg gccgtgtatt attgcgcgcg tgatacttat 300

cttcattttg attattgggg ccaaggcacc ctggtgacgg ttagctca 348

<210> 533
<211> 348
<212> DNA
<213> Homo sapiens

<400> 533
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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcgtt attggtaatt ggggtgatac ttattatgct 180

gattctgtta agggtcgttt taccatttca cgtgataatt cgaaaaacac cctgtatctg 240

caaatgaaca gcctgcgtgc ggaagatacg gccgtgtatt attgcgcgcg tgatacttat 300

cttcattttg attattgggg ccaaggcacc ctggtgacgg ttagctca 348

<210> 534
<211> 348
<212> DNA
<213> Homo sapiens

<400> 534
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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcgtt actactcatc agggttatac ttattatgct 180

gattctgtta agggtcgttt taccatttca cgtgataatt cgaaaaacac cctgtatctg 240

caaatgaaca gcctgcgtgc ggaagatacg gccgtgtatt attgcgcgcg tgatacttat 300

cttcattttg attattgggg ccaaggcacc ctggtgacgg ttagctca 348

<210> 535
<211> 348
<212> DNA
<213> Homo sapiens

<400> 535
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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcgct actaatcgtt atggttatac ttattatgct 180

gattctgtta agggtcgttt taccatttca cgtgataatt cgaaaaacac cctgtatctg 240

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cttcattttg attattgggg ccaaggcacc ctggtgacgg ttagctca 348

<210> 536
<211> 351
<212> DNA
<213> Homo sapiens

<400> 536
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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcaat atcaattatg atggtagctc tacctattat 180

gcggatagcg tgaaaggccg ttttaccatt tcacgtgata attcgaaaaa caccctgtat 240

ctgcaaatga acagcctgcg tgcggaagat acggccgtgt attattgcgc gcgtgatact 300

tatcttcatt ttgattattg gggccaaggc accctggtga cggttagctc a 351

<210> 537
<211> 348
<212> DNA
<213> Homo sapiens

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cctgggaagg gtctcgagtg ggtgagcgtt attactcctt atggtgatac ttattatgct 180

gattctgtta agggtcgttt taccatttca cgtgataatt cgaaaaacac cctgtatctg 240

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cttcattttg attattgggg ccaaggcacc ctggtgacgg ttagctca 348

<210> 538
<211> 348
<212> DNA
<213> Homo sapiens

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agctgcgcgg cctccggatt tacctttcgt tctcattggc tttcttgggt gcgccaagcc 120

cctgggaagg gtctcgagtg ggtgagcgtt attactcctt atggtgatac ttattatgct 180

gattctgtta agggtcgttt taccatttca cgtgataatt cgaaaaacac cctgtatctg 240

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cttcattttg attattgggg ccaaggcacc ctggtgacgg ttagctca 348

<210> 539
<211> 330
<212> DNA
<213> Homo sapiens

<400> 539
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tcgtgtagcg gcgataatat tggttctttt tatgttcatt ggtaccagca gaaacccggg 120

caggcgccag ttcttgtgat ttatgatgat aataatcgtc cctcaggcat cccggaacgc 180

tttagcggat ccaacagcgg caacaccgcg accctgacca ttagcggcac tcaggcggaa 240

gacgaagcgg attattattg cggttcttgg gctggttctt ctggttctta tgtgtttggc 300

ggccgcacga agttaaccgt tcttggccag 330

<210> 540
<211> 339
<212> DNA

<213> Homo sapiens

<400> 540
gatatcgcac tgacccagcc agcttcagtg agcggctcac caggtcagag cattaccatc 60

tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tcttcttatg gtgagtctct tacttcttat 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 541
<211> 330
<212> DNA
<213> Homo sapiens

<400> 541
gatatcgaac tgacccagcc gccttcagtg agcgttgcac caggtcagac cgcgcgtatc 60

tcgtgtagcg gcgataatat tggttctttt tatgttcatt ggtaccagca gaaacccggg 120

caggcgccag ttcttgtgat ttatgatgat aataatcgtc cctcaggcat cccggaacgc 180

tttagcggat ccaacagcgg caacaccgcg accctgacca ttagcggcac tcaggcggaa 240

gacgaagcgg attattattg cgcttcttgg actggtgttg agcctgatta tgtgtttggc 300

ggcggcacga agttaaccgt tcttggccag 330

<210> 542
<211> 339
<212> DNA
<213> Homo sapiens

<400> 542
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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc cagtcttatg ctggttctta tctttctgag 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 543
<211> 339
<212> DNA
<213> Homo sapiens

<400> 543
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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tcttcttatg gtgagtctct tacttcttat 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 544
<211> 339
<212> DNA
<213> Homo sapiens

<400> 544
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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tcttcttatg gtgagtctct tacttcttat 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 545
<211> 339
<212> DNA
<213> Homo sapiens

<400> 545
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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tcttcttatg gtgagtctct tacttcttat 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 546
<211> 339
<212> DNA
<213> Homo sapiens

<400> 546
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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tcttcttatg gtgagtctct tacttcttat 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 547
<211> 339
<212> DNA
<213> Homo sapiens

<400> 547

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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tctacttatg atggtcctgg tctttctgag 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

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<211> 339
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<213> Homo sapiens

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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tcttcttatg gtgagtctct tacttcttat 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 549
<211> 339
<212> DNA
<213> Homo sapiens

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tcgtgtacgg gtactagcag cgatgttggt gatattaatg atgtgtcttg gtaccagcag 120

catcccggga aggcgccgaa acttatgatt tatgatgtta ataatcgtcc ctcaggcgtg 180

agcaaccgtt ttagcggatc caaaagcggc aacaccgcga gcctgaccat tagcggcctg 240

caagcggaag acgaagcgga ttattattgc tctacttatg atggtcctgg tctttctgag 300

gtgtttggcg gcggcacgaa gttaaccgtt cttggccag 339

<210> 550
<211> 469
<212> PRT
<213> Homo sapiens

<400> 550

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

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Ser Ser Tyr Val Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
    50                  55                  60

Glu Trp Val Ser Phe Ile Ser Gly Asp Ser Ser Asn Thr Tyr Tyr Ala
65                  70                  75                  80

Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn
                85                  90                  95

Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Arg Thr Phe Met His Gly His Leu Gly Gly Gly Leu
        115                 120                 125

Ser Met Asp Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
    130                 135                 140

Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser
145                 150                 155                 160

Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
                165                 170                 175

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
            180                 185                 190

Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
        195                 200                 205

Ser Ser Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr
    210                 215                 220

Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr
225                 230                 235                 240

Val Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro
                245                 250                 255

Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
            260                 265                 270

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
        275                 280                 285

Ser His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
    290                 295                 300

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
305                 310                 315                 320
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Thr Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu
325 330 335

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala
340 345 350

Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro
355 360 365

Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln
370 375 380

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
385 390 395 400

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
405 410 415

Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
420 425 430

Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
435 440 445

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
450 455 460

Leu Ser Pro Gly Lys
465

<210> 551
<211> 462
<212> PRT
<213> Homo sapiens

<400> 551

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala
65 70 75 80

SeqListing

```
Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn
                85                  90                  95

Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln
        115                 120                 125

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
    130                 135                 140

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
145                 150                 155                 160

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
                165                 170                 175

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
            180                 185                 190

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
        195                 200                 205

Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
    210                 215                 220

Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val
225                 230                 235                 240

Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe
                245                 250                 255

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
            260                 265                 270

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
        275                 280                 285

Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
    290                 295                 300

Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val
305                 310                 315                 320

Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
                325                 330                 335

Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
            340                 345                 350
```

Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
355 360 365

Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
370 375 380

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
385 390 395 400

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp
405 410 415

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
420 425 430

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
435 440 445

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
450 455 460

<210> 552
<211> 469
<212> PRT
<213> Homo sapiens

<400> 552

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Ser Ser Tyr Val Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Phe Ile Ser Gly Asp Ser Ser Asn Thr Tyr Tyr Ala
65 70 75 80

Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn
85 90 95

Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Thr Phe Met His Gly His Leu Gly Gly Gly Leu
115 120 125

SeqListing

```
Ser Met Asp Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
    130                 135                 140

Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser
145                 150                 155                 160

Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
                165                 170                 175

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
            180                 185                 190

Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
        195                 200                 205

Ser Ser Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr
    210                 215                 220

Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr
225                 230                 235                 240

Val Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro
                245                 250                 255

Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
            260                 265                 270

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
        275                 280                 285

Ser His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
    290                 295                 300

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
305                 310                 315                 320

Thr Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu
                325                 330                 335

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala
            340                 345                 350

Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro
        355                 360                 365

Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln
    370                 375                 380

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
385                 390                 395                 400
```

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
405 410 415

Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
420 425 430

Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
435 440 445

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
450 455 460

Leu Ser Pro Gly Lys
465

<210> 553
<211> 462
<212> PRT
<213> Homo sapiens

<400> 553

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala
65 70 75 80

Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn
85 90 95

Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln
115 120 125

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
130 135 140

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
145 150 155 160

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser

165 170 175

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
180 185 190

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
195 200 205

Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
210 215 220

Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val
225 230 235 240

Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe
245 250 255

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
260 265 270

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
275 280 285

Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
290 295 300

Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val
305 310 315 320

Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
325 330 335

Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
340 345 350

Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
355 360 365

Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
370 375 380

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
385 390 395 400

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp
405 410 415

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
420 425 430

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His

435 440 445

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
450 455 460

<210> 554
<211> 461
<212> PRT
<213> Homo sapiens

<400> 554

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Val Thr Gly Val His Gly Asp Thr Tyr Tyr Ala Asp
65 70 75 80

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
85 90 95

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
100 105 110

Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
130 135 140

Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
145 150 155 160

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
165 170 175

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
180 185 190

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
195 200 205

Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro
210 215 220

```
Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val Glu
225                 230                 235                 240

Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu
                245                 250                 255

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            260                 265                 270

Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Gln
        275                 280                 285

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
    290                 295                 300

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val Leu
305                 310                 315                 320

Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
                325                 330                 335

Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
            340                 345                 350

Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
        355                 360                 365

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
    370                 375                 380

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
385                 390                 395                 400

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp Gly
                405                 410                 415

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
            420                 425                 430

Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
        435                 440                 445

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    450                 455                 460

<210>  555
<211>  461
<212>  PRT
<213>  Homo sapiens

<400>  555
```

SeqListing

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Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1               5                  10                  15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
            20                  25                  30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
        35                  40                  45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
    50                  55                  60

Glu Trp Val Ser Val Ile Gly Asn Trp Gly Asp Thr Tyr Tyr Ala Asp
65                  70                  75                  80

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
                85                  90                  95

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
            100                 105                 110

Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly
        115                 120                 125

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
    130                 135                 140

Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
145                 150                 155                 160

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
                165                 170                 175

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
            180                 185                 190

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
        195                 200                 205

Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro
    210                 215                 220

Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val Glu
225                 230                 235                 240

Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu
                245                 250                 255

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            260                 265                 270
```

Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Gln
275 280 285

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
290 295 300

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val Leu
305 310 315 320

Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
325 330 335

Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
340 345 350

Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
355 360 365

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
370 375 380

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
385 390 395 400

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp Gly
405 410 415

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
420 425 430

Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
435 440 445

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
450 455 460

<210> 556
<211> 461
<212> PRT
<213> Homo sapiens

<400> 556

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

SeqListing

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Val Thr Thr His Gln Gly Tyr Thr Tyr Tyr Ala Asp
65 70 75 80

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
85 90 95

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
100 105 110

Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
130 135 140

Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
145 150 155 160

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
165 170 175

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
180 185 190

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
195 200 205

Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro
210 215 220

Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val Glu
225 230 235 240

Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu
245 250 255

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
260 265 270

Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Gln
275 280 285

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
290 295 300

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val Leu
305 310 315 320

Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
325 330 335

Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
340 345 350

Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
355 360 365

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
370 375 380

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
385 390 395 400

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp Gly
405 410 415

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
420 425 430

Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
435 440 445

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
450 455 460

<210> 557
<211> 465
<212> PRT
<213> Homo sapiens

<400> 557

Met Lys His Leu Trp Phe Phe Leu Leu Leu Val Ala Ala Pro Arg Trp
1 5 10 15

Val Leu Ser Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Ala Thr Asn Arg Tyr Gly Tyr Thr Tyr Tyr Ala Asp
65 70 75 80

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
85 90 95

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr

100 105 110

Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Leu Val Thr Val Ser Ser Ala Lys Thr Thr Ala Pro Ser Val Tyr
130 135 140

Pro Leu Ala Pro Val Cys Gly Asp Thr Thr Gly Ser Ser Val Thr Leu
145 150 155 160

Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Leu Thr Trp
165 170 175

Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu
180 185 190

Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Thr Ser Ser
195 200 205

Thr Trp Pro Ser Gln Ser Ile Thr Cys Asn Val Ala His Pro Ala Ser
210 215 220

Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Pro Thr Ile Lys
225 230 235 240

Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro Asn Leu Leu Gly Gly Pro
245 250 255

Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser
260 265 270

Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser Glu Asp Asp
275 280 285

Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val His Thr
290 295 300

Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val
305 310 315 320

Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu
325 330 335

Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg
340 345 350

Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val
355 360 365

Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr

370 375 380

Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr
385 390 395 400

Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu
405 410 415

Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys
420 425 430

Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu
435 440 445

Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly
450 455 460

Lys
465

<210> 558
<211> 462
<212> PRT
<213> Homo sapiens

<400> 558

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Asn Ile Asn Tyr Asp Gly Ser Ser Thr Tyr Tyr Ala
65 70 75 80

Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn
85 90 95

Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln
115 120 125

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
130 135 140

```
Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
145                 150                 155                 160

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
                165                 170                 175

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
            180                 185                 190

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
        195                 200                 205

Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
    210                 215                 220

Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val
225                 230                 235                 240

Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe
                245                 250                 255

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
            260                 265                 270

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
        275                 280                 285

Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
    290                 295                 300

Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val
305                 310                 315                 320

Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
                325                 330                 335

Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
            340                 345                 350

Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
        355                 360                 365

Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
    370                 375                 380

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
385                 390                 395                 400

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp
                405                 410                 415
```

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
420 425 430

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
435 440 445

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
450 455 460

<210> 559
<211> 461
<212> PRT
<213> Homo sapiens

<400> 559

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Val Ile Thr Pro Tyr Gly Asp Thr Tyr Tyr Ala Asp
65 70 75 80

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
85 90 95

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
100 105 110

Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
130 135 140

Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
145 150 155 160

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
165 170 175

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
180 185 190

SeqListing

```
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
        195                 200                 205

Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro
    210                 215                 220

Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val Glu
225                 230                 235                 240

Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu
                245                 250                 255

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            260                 265                 270

Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Gln
        275                 280                 285

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
    290                 295                 300

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val Leu
305                 310                 315                 320

Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
                325                 330                 335

Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
            340                 345                 350

Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
        355                 360                 365

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
    370                 375                 380

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
385                 390                 395                 400

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp Gly
                405                 410                 415

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
            420                 425                 430

Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
        435                 440                 445

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    450                 455                 460
```

SeqListing

<210> 560
<211> 461
<212> PRT
<213> Homo sapiens

<400> 560

Met Ala Trp Val Trp Thr Leu Pro Phe Leu Met Ala Ala Ala Gln Ser
1 5 10 15

Val Gln Ala Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
20 25 30

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
35 40 45

Arg Ser His Trp Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
50 55 60

Glu Trp Val Ser Val Ile Thr Pro Tyr Gly Asp Thr Tyr Tyr Ala Asp
65 70 75 80

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
85 90 95

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
100 105 110

Tyr Cys Ala Arg Asp Thr Tyr Leu His Phe Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
130 135 140

Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
145 150 155 160

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
165 170 175

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
180 185 190

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
195 200 205

Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro
210 215 220

Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys Cys Val Glu
225 230 235 240

```
Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu
                245                 250                 255

Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            260                 265                 270

Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Gln
        275                 280                 285

Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
    290                 295                 300

Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val Ser Val Leu
305                 310                 315                 320

Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
                325                 330                 335

Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
            340                 345                 350

Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
        355                 360                 365

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
    370                 375                 380

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
385                 390                 395                 400

Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp Gly
                405                 410                 415

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
            420                 425                 430

Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
        435                 440                 445

His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    450                 455                 460


<210>  561
<211>  130
<212>  PRT
<213>  Homo sapiens

<400>  561

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1               5                   10                  15

Gly Thr Arg Cys Asp Ile Glu Leu Thr Gln Pro Pro Ser Val Ser Val
```

20 25 30

Ala Pro Gly Gln Thr Ala Arg Ile Ser Cys Ser Gly Asp Asn Ile Gly
35 40 45

Ser Phe Tyr Val His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val
50 55 60

Leu Val Ile Tyr Asp Asp Asn Asn Arg Pro Ser Gly Ile Pro Glu Arg
65 70 75 80

Phe Ser Gly Ser Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly
85 90 95

Thr Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gly Ser Trp Ala Gly
100 105 110

Ser Ser Gly Ser Tyr Val Phe Gly Gly Arg Thr Lys Leu Thr Val Leu
115 120 125

Gly Gln
130

<210> 562
<211> 237
<212> PRT
<213> Homo sapiens

<400> 562

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1 5 10 15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
20 25 30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
35 40 45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
50 55 60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65 70 75 80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
85 90 95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser
100 105 110

Tyr Gly Glu Ser Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu
115 120 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
130 135 140

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145 150 155 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
165 170 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
180 185 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
195 200 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
210 215 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225 230 235

<210> 563
<211> 234
<212> PRT
<213> Homo sapiens

<400> 563

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1 5 10 15

Gly Thr Arg Cys Asp Ile Glu Leu Thr Gln Pro Pro Ser Val Ser Val
20 25 30

Ala Pro Gly Gln Thr Ala Arg Ile Ser Cys Ser Gly Asp Asn Ile Gly
35 40 45

Ser Phe Tyr Val His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val
50 55 60

Leu Val Ile Tyr Asp Asp Asn Asn Arg Pro Ser Gly Ile Pro Glu Arg
65 70 75 80

Phe Ser Gly Ser Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly
85 90 95

Thr Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Thr Gly
100 105 110

Val Glu Pro Asp Tyr Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
115 120 125

Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
130 135 140

Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
145 150 155 160

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
165 170 175

Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
180 185 190

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
195 200 205

Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
210 215 220

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225 230

<210> 564
<211> 237
<212> PRT
<213> Homo sapiens

<400> 564

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1 5 10 15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
20 25 30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
35 40 45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
50 55 60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65 70 75 80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
85 90 95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser
100 105 110

Tyr Ala Gly Ser Tyr Leu Ser Glu Val Phe Gly Gly Gly Thr Lys Leu
115 120 125

```
Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
    130                 135                 140

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145                 150                 155                 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
                165                 170                 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
            180                 185                 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
        195                 200                 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
    210                 215                 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225                 230                 235
```

<210> 565
<211> 237
<212> PRT
<213> Homo sapiens

<400> 565

```
Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1               5                   10                  15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
            20                  25                  30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
        35                  40                  45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
    50                  55                  60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65                  70                  75                  80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
                85                  90                  95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser
            100                 105                 110

Tyr Gly Glu Ser Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu
        115                 120                 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
```

130 135 140

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145 150 155 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
165 170 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
180 185 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
195 200 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
210 215 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225 230 235

<210> 566
<211> 237
<212> PRT
<213> Homo sapiens

<400> 566

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1 5 10 15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
20 25 30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
35 40 45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
50 55 60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65 70 75 80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
85 90 95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser
100 105 110

Tyr Gly Glu Ser Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu
115 120 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
130 135 140

```
Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145                 150                 155                 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
                165                 170                 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
            180                 185                 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
        195                 200                 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
    210                 215                 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225                 230                 235
```

<210> 567
<211> 237
<212> PRT
<213> Homo sapiens

<400> 567

```
Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1               5                   10                  15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
            20                  25                  30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
        35                  40                  45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
    50                  55                  60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65                  70                  75                  80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
                85                  90                  95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser
            100                 105                 110

Tyr Gly Glu Ser Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu
        115                 120                 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
    130                 135                 140
```

```
Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145                 150                 155                 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
                165                 170                 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
            180                 185                 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
        195                 200                 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
    210                 215                 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225                 230                 235
```

<210> 568
<211> 237
<212> PRT
<213> Homo sapiens

<400> 568

```
Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1               5                   10                  15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
            20                  25                  30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
        35                  40                  45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
    50                  55                  60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65                  70                  75                  80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
                85                  90                  95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser
            100                 105                 110

Tyr Gly Glu Ser Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu
        115                 120                 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
    130                 135                 140
```

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145 150 155 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
165 170 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
180 185 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
195 200 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
210 215 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225 230 235

<210> 569
<211> 237
<212> PRT
<213> Homo sapiens

<400> 569

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1 5 10 15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
20 25 30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
35 40 45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
50 55 60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65 70 75 80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
85 90 95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Thr
100 105 110

Tyr Asp Gly Pro Gly Leu Ser Glu Val Phe Gly Gly Gly Thr Lys Leu
115 120 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
130 135 140

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu

145 150 155 160

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
165 170 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
180 185 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
195 200 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
210 215 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225 230 235

<210> 570
<211> 237
<212> PRT
<213> Homo sapiens

<400> 570

Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1 5 10 15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
20 25 30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
35 40 45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
50 55 60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65 70 75 80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
85 90 95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser
100 105 110

Tyr Gly Glu Ser Leu Thr Ser Tyr Val Phe Gly Gly Gly Thr Lys Leu
115 120 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
130 135 140

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145 150 155 160

```
Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
                165                 170                 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
            180                 185                 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
        195                 200                 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
    210                 215                 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225                 230                 235
```

<210> 571
<211> 237
<212> PRT
<213> Homo sapiens

<400> 571

```
Met Ser Val Leu Thr Gln Val Leu Ala Leu Leu Leu Leu Trp Leu Thr
1               5                   10                  15

Gly Thr Arg Cys Asp Ile Ala Leu Thr Gln Pro Ala Ser Val Ser Gly
            20                  25                  30

Ser Pro Gly Gln Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp
        35                  40                  45

Val Gly Asp Ile Asn Asp Val Ser Trp Tyr Gln Gln His Pro Gly Lys
    50                  55                  60

Ala Pro Lys Leu Met Ile Tyr Asp Val Asn Asn Arg Pro Ser Gly Val
65                  70                  75                  80

Ser Asn Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr
                85                  90                  95

Ile Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Thr
            100                 105                 110

Tyr Asp Gly Pro Gly Leu Ser Glu Val Phe Gly Gly Gly Thr Lys Leu
        115                 120                 125

Thr Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro
    130                 135                 140

Pro Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu
145                 150                 155                 160
```

Ile Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp
165 170 175

Ser Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln
180 185 190

Ser Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu
195 200 205

Gln Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly
210 215 220

Ser Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
225 230 235

<210> 572
<211> 1410
<212> DNA
<213> Homo sapiens

<400> 572
atggcttggg tgtggacctt gccattcctg atggcagctg cccaaagcgt gcaggcccag 60

gtgcagctgg tcgagtctgg cggcggactg gtgcagcctg gcggcagcct gagactgagc 120

tgcgccgcca gcggcttcac cttcagcagc tacgtgatga actgggtgcg gcaggccct 180

ggcaagggcc tggagtgggt gtccttcatc agcggcgaca gcagcaacac ctactacgcc 240

gacagcgtga agggccggtt caccatcagc cgggacaaca gcaagaacac cctgtacctg 300

cagatgaaca gcctgcgggc cgaggacacc gccgtgtact actgcgcccg gaccttcatg 360

cacggccacc tgggcggagg actgagcatg gatttctggg gccagggcac cctggtcacc 420

gtctcctcag cttccaccaa gggcccatcc gtcttccccc tggcgccctg ctccaggagc 480

acctccgaga gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg 540

acggtgtcgt ggaactcagg cgctctgacc agcggcgtgc acaccttccc agctgtccta 600

cagtcctcag gactctactc cctcagcagc gtggtgacag tgccctccag caacttcggc 660

acccagacct acacctgcaa cgtagatcac aagcccagca acaccaaggt ggacaagaca 720

gttgagcgca aatgttgtgt cgagtgccca ccgtgcccag caccacctgt ggcaggaccg 780

tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccg gacccctgag 840

gtcacgtgcg tggtggtgga cgtgagccac gaagaccccg aggtccagtt caactggtac 900

gtggacggcg tggaggtgca taatgccaag acaaagccac gggaggagca gttcaacagc 960

acgttccgtg tggtcagcgt cctcaccgtt gtgcaccagg actggctgaa cggcaaggag 1020

tacaagtgca aggtctccaa caaaggcctc ccagccccca tcgagaaaac catctccaaa 1080

accaaagggc agccccgaga accacaggtg tacaccctgc ccccatcccg ggaggagatg 1140

accaagaacc aggtcagcct gacctgcctg gtcaaaggct tctaccccag cgacatcgcc 1200

gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacacc tcccatgctg 1260

gactccgacg gctccttctt cctctacagc aagctcaccg tggacaagag caggtggcag 1320

caggggaacg tcttctcatg ctccgtgatg catgaggctc tgcacaacca ctacacgcag 1380

aagagcctct ccctgtctcc gggtaaatga 1410

<210> 573
<211> 1389
<212> DNA
<213> Homo sapiens

<400> 573
atggcttggg tgtggacctt gccattcctg atggcagctg cccaaggtgt ccaggcccag 60

gtgcagctgg tcgagagcgg cggagggctg gtgcagcctg gcggcagcct gagactgagc 120

tgcgccgcca gcggcttcac cttcagaagc cactggctgt cctgggtgcg gcaggccct 180

ggcaagggcc tggaatgggt gtccaacatc aactacgacg gcagcagcac ctactacgcc 240

gacagcgtga agggccggtt caccatcagc cgggacaaca gcaagaacac cctgtacctg 300

cagatgaaca gcctgcgggc cgaggacacc gccgtgtact actgcgccag ggacacctac 360

ctgcacttcg actactgggg ccagggcacc ctggtcaccg tctcctcagc ttccaccaag 420

ggcccatccg tcttcccct ggcgccctgc tccaggagca cctccgagag cacagcggcc 480

ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc 540

gctctgacca gcggcgtgca caccttccca gctgtcctac agtcctcagg actctactcc 600

ctcagcagcg tggtgacagt gccctccagc aacttcggca cccagaccta cacctgcaac 660

gtagatcaca agcccagcaa caccaaggtg gacaagacag ttgagcgcaa atgttgtgtc 720

gagtgcccac cgtgcccagc accacctgtg gcaggaccgt cagtcttcct cttccccca 780

aaacccaagg acaccctcat gatctcccgg acccctgagg tcacgtgcgt ggtggtggac 840

gtgagccacg aagaccccga ggtccagttc aactggtacg tggacggcgt ggaggtgcat 900

aatgccaaga caaagccacg ggaggagcag ttcaacagca cgttccgtgt ggtcagcgtc 960

ctcaccgttg tgcaccagga ctggctgaac ggcaaggagt acaagtgcaa ggtctccaac 1020

aaaggcctcc cagccccat cgagaaaacc atctccaaaa ccaaagggca gccccgagaa 1080

ccacaggtgt acaccctgcc cccatcccgg gaggagatga ccaagaacca ggtcagcctg 1140

acctgcctgg tcaaaggctt ctaccccagc gacatcgccg tggagtggga gagcaatggg 1200

cagccggaga acaactacaa gaccacacct cccatgctgg actccgacgg ctccttcttc 1260

ctctacagca agctcaccgt ggacaagagc aggtggcagc aggggaacgt cttctcatgc 1320

tccgtgatgc atgaggctct gcacaaccac tacacgcaga agagcctctc cctgtctccg 1380

ggtaaatga 1389

<210> 574
<211> 1410
<212> DNA
<213> Homo sapiens

<400> 574
atggcttggg tgtggacctt gccattcctg atggcagctg cccaaagcgt gcaggcccag 60

gtgcagctgg tcgagtctgg cggcggactg gtgcagcctg gcggcagcct gagactgagc 120

tgcgccgcca gcggcttcac cttcagcagc tacgtgatga actgggtgcg gcaggcccct 180

ggcaagggcc tggagtgggt gtccttcatc agcggcgaca gcagcaacac ctactacgcc 240

gacagcgtga agggccggtt caccatcagc cgggacaaca gcaagaacac cctgtacctg 300

cagatgaaca gcctgcgggc cgaggacacc gccgtgtact actgcgcccg gaccttcatg 360

cacggccacc tgggcggagg actgagcatg gatttctggg gccagggcac cctggtcacc 420

gtctcctcag cttccaccaa gggcccatcc gtcttccccc tggcgccctg ctccaggagc 480

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acggtgtcgt ggaactcagg cgctctgacc agcggcgtgc acaccttccc agctgtccta 600

cagtcctcag gactctactc cctcagcagc gtggtgacag tgccctccag caacttcggc 660

acccagacct acacctgcaa cgtagatcac aagcccagca acaccaaggt ggacaagaca 720

gttgagcgca aatgttgtgt cgagtgccca ccgtgcccag caccacctgt ggcaggaccg 780

tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccg gacccctgag 840

gtcacgtgcg tggtggtgga cgtgagccac gaagaccccg aggtccagtt caactggtac 900

gtggacggcg tggaggtgca taatgccaag acaaagccac gggaggagca gttcaacagc 960

acgttccgtg tggtcagcgt cctcaccgtt gtgcaccagg actggctgaa cggcaaggag 1020

tacaagtgca aggtctccaa caaaggcctc ccagccccca tcgagaaaac catctccaaa 1080

accaaagggc agccccgaga accacaggtg tacaccctgc ccccatcccg ggaggagatg 1140

accaagaacc aggtcagcct gacctgcctg gtcaaaggct tctaccccag cgacatcgcc 1200

gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacacc tcccatgctg 1260

gactccgacg gctccttctt cctctacagc aagctcaccg tggacaagag caggtggcag 1320

caggggaacg tcttctcatg ctccgtgatg catgaggctc tgcacaacca ctacacgcag 1380

aagagcctct ccctgtctcc gggtaaatga 1410

<210> 575
<211> 1389
<212> DNA
<213> Homo sapiens

<400> 575
atggcttggg tgtggacctt gccattcctg atggcagctg cccaaggtgt ccaggcccag 60

gtgcagctgg tcgagagcgg cggagggctg gtgcagcctg gcggcagcct gagactgagc 120

tgcgccgcca gcggcttcac cttcagaagc cactggctgt cctgggtgcg gcaggcccct 180

ggcaagggcc tggaatgggt gtccaacatc aactacgacg gcagcagcac ctactacgcc 240

gacagcgtga agggccggtt caccatcagc cgggacaaca gcaagaacac cctgtacctg 300

cagatgaaca gcctgcgggc cgaggacacc gccgtgtact actgcgccag ggacacctac 360

ctgcacttcg actactgggg ccagggcacc ctggtcaccg tctcctcagc ttccaccaag 420

ggcccatccg tcttcccccc ggcgccctgc tccaggagca cctccgagag cacagcggcc 480

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caggccgagg acgaggccga ctactactgc agcacctacg acggccctgg cctgagcgag 360

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20 25 30

Ala Thr Glu Ile Ile Pro Glu Leu Gly Glu Tyr Pro Glu Pro Pro Pro
35 40 45

Glu Leu Glu Asn Asn Lys Thr Met Asn Arg Ala Glu Asn Gly Gly Arg
50 55 60

Pro Pro His His Pro Phe Glu Thr Lys Asp Val Ser Glu Tyr Ser Cys
65 70 75 80

Arg Glu Leu His Phe Thr Arg Tyr Val Thr Asp Gly Pro Cys Arg Ser
85 90 95

Ala Lys Pro Val Thr Glu Leu Val Cys Ser Gly Gln Cys Gly Pro Ala
100 105 110

Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser
115 120 125

Gly Pro Asp Phe Arg Cys Ile Pro Asp Arg Tyr Arg Ala Gln Arg Val
130 135 140

Gln Leu Leu Cys Pro Gly Gly Glu Ala Pro Arg Ala Arg Lys Val Arg
145 150 155 160

Leu Val Ala Ser Cys Lys Cys Lys Arg Leu Thr Arg Phe His Asn Gln
165 170 175

Ser Glu Leu Lys Asp Phe Gly Thr Glu Ala Ala Arg Pro Gln Lys Gly
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Leu Glu Asn Ala Tyr
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Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Gln Arg Asp Ser Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys
50 55 60

Asn Thr Val Tyr Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala
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Val Tyr Arg Cys Tyr Phe Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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Ser Leu Arg Leu Ser Cys Val Gly Ser Gly Arg Thr Phe Ser Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Leu Ala Pro Gly Lys Glu Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Thr Ala Ser
50 55 60

Asn Arg Gly Tyr Leu His Met Asn Asn Leu Thr Pro Glu Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
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Gln Val Thr Val Ser Ser
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Ser Leu Lys Leu Ser Cys Ala Leu Thr Gly Gly Ala Phe Thr Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Thr Pro Gly Arg Glu Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys
50 55 60

Asn Met Val Tyr Leu Arg Met Asn Ser Leu Ile Pro Glu Asp Ala Ala
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Val Tyr Ser Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
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20 25 30

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35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asp Ala Lys
50 55 60

Asn Thr Val Trp Leu His Gly Ser Thr Leu Lys Pro Glu Asp Thr Ala
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Val Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
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Ser Leu Arg Leu Ala Cys Ala Ala Ser Glu Arg Ile Phe Asp Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Tyr Arg Gln Gly Pro Gly Asn Glu Arg Glu Leu Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Met Asp Tyr Thr Lys
50 55 60

Gln Thr Val Tyr Leu His Met Asn Ser Leu Arg Pro Glu Asp Thr Gly
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Asp Val Lys Phe Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
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Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Asn Phe Asp Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Glu Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Ser Glu Lys Asp Lys
50 55 60

Asn Ser Val Tyr Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala
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Leu Tyr Ile Cys Ala Gly Xaa Xaa Xaa Xaa Xaa Trp Gly Arg Gly Thr
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20 25 30

Xaa Xaa Xaa Trp Tyr Arg Gln Tyr Pro Gly Lys Gln Arg Ala Leu Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ala Arg Asp Ser Thr Lys
50 55 60

Asp Thr Phe Cys Leu Gln Met Asn Asn Leu Lys Pro Glu Asp Thr Ala
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Val Tyr Tyr Cys Tyr Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Pro Arg Glu Gly Val
35 40 45

Ser Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Thr Asp Asn Ala Lys
50 55 60

Asn Thr Val His Leu Leu Met Asn Arg Val Asn Ala Glu Asp Thr Ala
65 70 75 80

Leu Tyr Tyr Cys Ala Val Xaa Xaa Xaa Xaa Xaa Trp Gly Arg Gly Thr
85 90 95

Arg Val Thr Val Ser Ser
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1 5 10 15

Ser Leu Arg Leu Ser Cys Gln Ala Ser Gly Asp Ile Ser Thr Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Tyr Arg Gln Val Pro Gly Lys Leu Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Gly Asp Asn Ala Lys
50 55 60

Arg Ala Ile Tyr Leu Gln Met Asn Asn Leu Lys Pro Asp Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Asn Arg Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Pro
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Gln Val Pro Val Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Phe Cys Ala Val Pro Ser Phe Thr Ser Thr Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asn Ala Thr Lys
50 55 60

Asn Thr Leu Thr Leu Arg Met Asp Ser Leu Lys Pro Glu Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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<400> 621

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Phe Cys Thr Val Ser Gly Gly Thr Ala Ser Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Glu Lys Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ala Arg Glu Asn Ala Gly
50 55 60

Asn Met Val Tyr Leu Gln Met Asn Asn Leu Lys Pro Asp Asp Thr Ala
65 70 75 80

Leu Tyr Thr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Arg Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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<210> 622

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1               5                   10                  15

Ser Gln Thr Leu Ser Cys Ala Ala Ser Gly Arg Thr Asn Ser Xaa Xaa
            20                  25                  30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Val Phe Leu
        35                  40                  45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Ser Ala Lys
    50                  55                  60

Asn Met Met Tyr Leu Gln Met Asn Asn Leu Lys Pro Gln Asp Thr Ala
65                  70                  75                  80

Val Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
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Gln Val Thr Val Ser Ser
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1 5 10 15

Ser Leu Arg Leu Ser Cys Val Val Ser Gly Leu Thr Ser Ser Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Thr Pro Trp Gln Glu Arg Asp Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Tyr Lys
50 55 60

Asp Thr Val Leu Leu Glu Met Asn Phe Leu Lys Pro Glu Asp Thr Ala
65 70 75 80

Ile Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Thr Ser Thr Arg Thr Leu Asp Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Arg Asp Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Val Ser Arg Asp Ser Ala Glu
50 55 60

Asn Thr Val Ala Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Arg Val Thr Val Ser Ser
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Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Val Ser Arg Leu Thr Ala His Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Ala Val
35 40 45

Ser Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Tyr Ala Gly
50 55 60

Asn Thr Ala Phe Leu Gln Met Asp Ser Leu Lys Pro Glu Asp Thr Gly
65 70 75 80

Val Tyr Tyr Cys Ala Thr Xaa Xaa Xaa Xaa Xaa Trp Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser

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Glu Val Gln Leu Val Glu Ser Gly Gly Glu Leu Val Gln Ala Gly Gly
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Ser Leu Lys Leu Ser Cys Thr Ala Ser Gly Arg Asn Phe Val Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Arg Ala Pro Gly Lys Glu Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Val Ser Arg Asp Asn Gly Lys
50 55 60

Asn Thr Ala Tyr Leu Arg Met Asn Ser Leu Lys Pro Glu Asp Thr Ala
65 70 75 80

Asp Tyr Tyr Cys Ala Val Xaa Xaa Xaa Xaa Xaa Leu Gly Ser Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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<210> 627
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Ala Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Val Arg Gln Ala Pro Gly Lys Val Leu Glu Trp Val
35 40 45

Ser Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys
50 55 60

Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Val Lys Xaa Xaa Xaa Xaa Xaa Gly Ser Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
100

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Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
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Ser Leu Arg Leu Ser Cys Val Cys Val Ser Ser Gly Cys Thr Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Val Arg Gln Ala Pro Gly Lys Ala Glu Glu Trp Val
35 40 45

Ser Xaa Xaa Xaa Xaa Xaa Arg Phe Lys Ile Ser Arg Asp Asn Ala Lys
50 55 60

Lys Thr Leu Tyr Leu Gln Met Asn Ser Leu Gly Pro Glu Asp Thr Ala
65 70 75 80

Met Tyr Tyr Cys Gln Arg Xaa Xaa Xaa Xaa Xaa Arg Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Leu Pro Gly Gly
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Ser Leu Thr Leu Ser Cys Val Phe Ser Gly Ser Thr Phe Ser Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Val Arg His Thr Pro Gly Lys Ala Glu Glu Trp Val
35 40 45

Ser Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys
50 55 60

Asn Thr Leu Tyr Leu Glu Met Asn Ser Leu Ser Pro Glu Asp Thr Ala
65 70 75 80

Met Tyr Tyr Cys Gly Arg Xaa Xaa Xaa Xaa Xaa Arg Ser Lys Gly Ile

85 90 95

Gln Val Thr Val Ser Ser
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Ala Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
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Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Thr Phe Ser Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Phe Val
35 40 45

Ala Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys
50 55 60

Asn Thr Val Tyr Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Ala Ala Xaa Xaa Xaa Xaa Xaa Arg Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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<223> Xaa is any amino acid

<400> 631

Asp Val Gln Leu Val Glu Ser Gly Gly Asp Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Asp Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Leu Arg Gln Thr Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Xaa Xaa Xaa Xaa Xaa Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys
50 55 60

Asn Met Leu Tyr Leu His Leu Asn Asn Leu Lys Ser Glu Asp Thr Ala
65 70 75 80

Val Tyr Tyr Cys Arg Arg Xaa Xaa Xaa Xaa Xaa Leu Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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<223> Xaa is any amino acid

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Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Cys Val Ser Ser Gly Cys Thr Xaa Xaa
20 25 30

Xaa Xaa Xaa Trp Val Arg Gln Ala Pro Gly Lys Ala Glu Glu Trp Val
35 40 45

Ser Xaa Xaa Xaa Xaa Xaa Arg Phe Lys Ile Ser Arg Asp Asn Ala Lys
50 55 60

Lys Thr Leu Tyr Leu Gln Met Asn Ser Leu Gly Pro Glu Asp Thr Ala
65 70 75 80

Met Tyr Tyr Cys Gln Arg Xaa Xaa Xaa Xaa Xaa Arg Gly Gln Gly Thr
85 90 95

Gln Val Thr Val Ser Ser
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<212> PRT
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<220>
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<400> 633

Gln Val Gln Arg Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Thr Ser Ser
20 25 30

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<220>
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<400> 634

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Thr Gly Asp
1 5 10 15

Ser Leu Ser Leu Ser Cys Ser Ala Ser Gly Arg Thr Phe Ser
20 25 30

<210> 635
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<400> 635

Gln Val Lys Leu Glu Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Thr Gly Arg Ala Phe Gly
20 25 30

<210> 636
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<212> PRT
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<220>
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<400> 636

Ala Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Glu
1 5 10 15

Ser Leu Gly Leu Ser Cys Val Ala Ser Gly Arg Asp Phe Val
20 25 30

<210> 637
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<212> PRT
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<400> 637

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Glu Val Leu Gly Arg Thr Ala Gly
20 25 30

<210> 638
<211> 30
<212> PRT
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<220>
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<400> 638

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Glu Thr Ile Leu Ser
20 25 30

<210> 639
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<212> PRT
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<220>
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<400> 639

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Thr Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Asn Leu Ser Cys Val Ala Ser Gly Asn Thr Phe Asn
20 25 30

<210> 640
<211> 30
<212> PRT
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<220>
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<400> 640

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Gln Pro Gly Gly
1 5 10 15

Ser Leu Gln Leu Ser Cys Ser Ala Pro Gly Phe Thr Leu Asp
20 25 30

<210> 641
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<220>
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<400> 641

Ala Gln Glu Leu Glu Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Thr Phe Asn
20 25 30

<210> 642
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<220>
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<400> 642

Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu
1 5 10 15

Ser Cys Ala Ala Ser Gly
20

<210> 643
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<220>
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<400> 643

Val Asp Ser Gly Gly Gly Leu Val Gln Ala Gly Asp Ser Leu Lys Leu
1 5 10 15

Ser Cys Ala Leu Thr Gly
20

<210> 644
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<212> PRT
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<220>
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<400> 644

Val Asp Ser Gly Gly Gly Leu Val Gln Ala Gly Asp Ser Leu Arg Leu
1 5 10 15

Ser Cys Ala Ala Ser Gly
20

<210> 645
<211> 22
<212> PRT
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<220>
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<400> 645

Val Asp Ser Gly Gly Gly Leu Val Glu Ala Gly Gly Ser Leu Arg Leu
1 5 10 15

Ser Cys Gln Val Ser Glu
20

<210> 646
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<220>
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<400> 646

Gln Asp Ser Gly Gly Gly Ser Val Gln Ala Gly Gly Ser Leu Lys Leu
1 5 10 15

Ser Cys Ala Ala Ser Gly
20

<210> 647
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<220>
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<400> 647

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Val Gln Ser Gly Gly Arg Leu Val Gln Ala Gly Asp Ser Leu Arg Leu
1 5 10 15

Ser Cys Ala Ala Ser Glu
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<210> 648
<211> 22
<212> PRT
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<220>
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<400> 648

Val Glu Ser Gly Gly Thr Leu Val Gln Ser Gly Asp Ser Leu Lys Leu
1 5 10 15

Ser Cys Ala Ser Ser Thr
20

<210> 649
<211> 22
<212> PRT
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<220>
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<400> 649

Met Glu Ser Gly Gly Asp Ser Val Gln Ser Gly Gly Ser Leu Thr Leu
1 5 10 15

Ser Cys Val Ala Ser Gly
20

<210> 650
<211> 22
<212> PRT
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<220>
<223> KERE-class Nanobody FW1 sequence

<400> 650

Gln Ala Ser Gly Gly Gly Leu Val Gln Ala Gly Gly Ser Leu Arg Leu
1 5 10 15

Ser Cys Ser Ala Ser Val
20

<210> 651
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<212> PRT
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<223> KERE-class Nanobody FW2 sequence

<400> 651

Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Phe Val Ala
1 5 10

<210> 652
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<223> KERE-class Nanobody FW2 sequence

<400> 652

Trp Phe Arg Gln Thr Pro Gly Arg Glu Arg Glu Phe Val Ala
1 5 10

<210> 653
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<220>
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<400> 653

Trp Tyr Arg Gln Ala Pro Gly Lys Gln Arg Glu Met Val Ala
1 5 10

<210> 654
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<220>
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<400> 654

Trp Tyr Arg Gln Gly Pro Gly Lys Gln Arg Glu Leu Val Ala
1 5 10

<210> 655
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<220>
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<400> 655

Trp Ile Arg Gln Ala Pro Gly Lys Glu Arg Glu Gly Val Ser
1 5 10

<210> 656
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<220>
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<400> 656

Trp Phe Arg Glu Ala Pro Gly Lys Glu Arg Glu Gly Ile Ser
1 5 10

<210> 657
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<220>
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<400> 657

Trp Tyr Arg Gln Ala Pro Gly Lys Glu Arg Asp Leu Val Ala
1 5 10

<210> 658
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<400> 658

Trp Phe Arg Gln Ala Pro Gly Lys Gln Arg Glu Glu Val Ser
1 5 10

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<220>
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<400> 659

Trp Phe Arg Gln Pro Pro Gly Lys Val Arg Glu Phe Val Gly
1 5 10

<210> 660
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> KERE-class Nanobody FW3 sequence

<400> 660

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Arg Cys Tyr Phe
20 25 30

<210> 661
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<212> PRT
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<220>
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<400> 661

Arg Phe Ala Ile Ser Arg Asp Asn Asn Lys Asn Thr Gly Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Glu Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 662
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<220>
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<400> 662

Arg Phe Thr Val Ala Arg Asn Asn Ala Lys Asn Thr Val Asn Leu Glu
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 663
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<212> PRT
<213> Artificial Sequence

<220>
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<400> 663

Arg Phe Thr Ile Ser Arg Asp Ile Ala Lys Asn Thr Val Asp Leu Leu
1 5 10 15

Met Asn Asn Leu Glu Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 664
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<220>
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<400> 664

Arg Leu Thr Ile Ser Arg Asp Asn Ala Val Asp Thr Met Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 665
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<220>
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<400> 665

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asp Asn Val Lys Pro Glu Asp Thr Ala Ile Tyr Tyr Cys Ala Ala
20 25 30

<210> 666
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<220>
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<400> 666

Arg Phe Thr Ile Ser Lys Asp Ser Gly Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Thr Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Thr
20 25 30

<210> 667
<211> 32
<212> PRT
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<220>
<223> KERE-class Nanobody FW3 sequence

<400> 667

Arg Phe Thr Ile Ser Arg Asp Ser Ala Lys Asn Met Met Tyr Leu Gln
1 5 10 15

Met Asn Asn Leu Lys Pro Gln Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 668
<211> 32
<212> PRT
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<220>
<223> KERE-class Nanobody FW3 sequence

<400> 668

Arg Phe Thr Ile Ser Arg Glu Asn Asp Lys Ser Thr Val Tyr Leu Gln
1 5 10 15

Leu Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 669
<211> 32
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<220>
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<400> 669

Arg Phe Thr Ile Ser Arg Asp Tyr Ala Gly Asn Thr Ala Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Gly Val Tyr Tyr Cys Ala Thr
20 25 30

<210> 670
<211> 11
<212> PRT
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<220>
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<400> 670

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 671
<211> 11
<212> PRT
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<220>
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<400> 671

Trp Gly Lys Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 672
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
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<400> 672

Arg Gly Gln Gly Thr Arg Val Thr Val Ser Ser
1 5 10

<210> 673
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
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<400> 673

Trp Gly Leu Gly Thr Gln Val Thr Ile Ser Ser
1 5 10

<210> 674
<211> 30
<212> PRT
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<220>
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<400> 674

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
20 25 30

<210> 675
<211> 30
<212> PRT
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<220>
<223> GLEW-class Nanobody FW1 sequence

<400> 675

Glu Val His Leu Val Glu Ser Gly Gly Gly Leu Val Arg Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Phe Gly Phe Ile Phe Lys
20 25 30

<210> 676
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
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<400> 676

Gln Val Lys Leu Glu Glu Ser Gly Gly Gly Leu Ala Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser
20 25 30

<210> 677
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<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW1 sequence

<400> 677

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Cys Val Ser Ser Gly Cys Thr
20 25 30

<210> 678
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW1 sequence

<400> 678

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Leu Pro Gly Gly
1 5 10 15

Ser Leu Thr Leu Ser Cys Val Phe Ser Gly Ser Thr Phe Ser
20 25 30

<210> 679
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW1 sequence

<400> 679

Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu
1 5 10 15

Ser Cys Ala Ala Ser Gly
20

<210> 680
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW1 sequence

<400> 680

Glu Glu Ser Gly Gly Gly Leu Ala Gln Pro Gly Gly Ser Leu Arg Leu
1 5 10 15

Ser Cys Val Ala Ser Gly
20

<210> 681
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW1 sequence

<400> 681

Val Glu Ser Gly Gly Gly Leu Ala Leu Pro Gly Gly Ser Leu Thr Leu
1 5 10 15

Ser Cys Val Phe Ser Gly
20

<210> 682
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 682

Trp Val Arg Gln Ala Pro Gly Lys Val Leu Glu Trp Val Ser
1 5 10

<210> 683
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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<400> 683

Trp Val Arg Arg Pro Pro Gly Lys Gly Leu Glu Trp Val Ser
1 5 10

<210> 684
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 684

Trp Val Arg Gln Ala Pro Gly Met Gly Leu Glu Trp Val Ser
1 5 10

<210> 685
<211> 14

<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 685

Trp Val Arg Gln Ala Pro Gly Lys Glu Pro Glu Trp Val Ser
1 5 10

<210> 686
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 686

Trp Val Arg Gln Ala Pro Gly Lys Asp Gln Glu Trp Val Ser
1 5 10

<210> 687
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 687

Trp Val Arg Gln Ala Pro Gly Lys Ala Glu Glu Trp Val Ser
1 5 10

<210> 688
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 688

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala
1 5 10

<210> 689
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW2 sequence

<400> 689

Trp Val Arg Gln Ala Pro Gly Arg Ala Thr Glu Trp Val Ser
1 5 10

<210> 690
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
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<400> 690

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Val Lys
20 25 30

<210> 691
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
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<400> 691

Arg Phe Thr Ile Ser Arg Asp Asn Ala Arg Asn Thr Leu Tyr Leu Gln
1 5 10 15

Met Asp Ser Leu Ile Pro Glu Asp Thr Ala Leu Tyr Tyr Cys Ala Arg
20 25 30

<210> 692
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
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<400> 692

Arg Phe Thr Ser Ser Arg Asp Asn Ala Lys Ser Thr Leu Tyr Leu Gln
1 5 10 15

Met Asn Asp Leu Lys Pro Glu Asp Thr Ala Leu Tyr Tyr Cys Ala Arg
20 25 30

<210> 693
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW3 sequence

<400> 693

Arg Phe Ile Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr Leu Gln
1 5 10 15

SeqListing

Met Asn Ser Leu Gly Pro Glu Asp Thr Ala Met Tyr Tyr Cys Gln Arg
20 25 30

<210> 694
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW3 sequence

<400> 694

Arg Phe Thr Ala Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Ser Glu Asp Thr Ala Arg Tyr Tyr Cys Ala Arg
20 25 30

<210> 695
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW3 sequence

<400> 695

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr Leu Gln
1 5 10 15

Met Asp Asp Leu Gln Ser Glu Asp Thr Ala Met Tyr Tyr Cys Gly Arg
20 25 30

<210> 696
<211> 11
<212> PRT
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<220>
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<400> 696

Gly Ser Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 697
<211> 11
<212> PRT
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<220>
<223> GLEW-class Nanobody FW4 sequence

<400> 697

Leu Arg Gly Gly Thr Gln Val Thr Val Ser Ser
1 5 10

SeqListing

<210> 698
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW4 sequence

<400> 698

Arg Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 699
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> GLEW-class Nanobody FW4 sequence

<400> 699

Arg Ser Arg Gly Ile Gln Val Thr Val Ser Ser
1 5 10

<210> 700
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
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<400> 700

Trp Gly Lys Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 701
<211> 11
<212> PRT
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<220>
<223> GLEW-class Nanobody FW4 sequence

<400> 701

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 702
<211> 30
<212> PRT
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<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 702

Ala Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Thr Phe Ser
20 25 30

<210> 703
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
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<400> 703

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Met Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asp Phe Gly
20 25 30

<210> 704
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 704

Glu Val His Leu Val Glu Ser Gly Gly Gly Leu Val Arg Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Phe Gly Phe Ile Phe Lys
20 25 30

<210> 705
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 705

Gln Val Gln Leu Ala Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Arg Thr Ile Val Ser
20 25 30

<210> 706
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

SeqListing

<400> 706

Gln Glu His Leu Val Glu Ser Gly Gly Gly Leu Val Asp Ile Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Glu Arg Ile Phe Ser
20 25 30

<210> 707
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 707

Gln Val Lys Leu Glu Glu Ser Gly Gly Gly Leu Ala Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser
20 25 30

<210> 708
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 708

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Cys Val Ser Ser Gly Cys Thr
20 25 30

<210> 709
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 709

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Leu Pro Gly Gly
1 5 10 15

Ser Leu Thr Leu Ser Cys Val Phe Ser Gly Ser Thr Phe Ser
20 25 30

<210> 710
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 710

Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly Ser Leu Arg Leu
1 5 10 15

Ser Cys Ala Ala Ser Gly
20

<210> 711
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW1 sequence

<400> 711

Ala Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Lys Leu
1 5 10 15

Ser Cys Ala Ala Ser Arg
20

<210> 712
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 712

Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Phe Val Ala
1 5 10

<210> 713
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 713

Trp Val Arg Gln Ala Pro Gly Lys Val Leu Glu Trp Val Ser
1 5 10

<210> 714
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 714

Trp Val Arg Arg Pro Pro Gly Lys Gly Leu Glu Trp Val Ser
1 5 10

<210> 715
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 715

Trp Ile Arg Gln Ala Pro Gly Lys Glu Arg Glu Gly Val Ser
1 5 10

<210> 716
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 716

Trp Val Arg Gln Tyr Pro Gly Lys Glu Pro Glu Trp Val Ser
1 5 10

<210> 717
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 717

Trp Phe Arg Gln Pro Pro Gly Lys Glu His Glu Phe Val Ala
1 5 10

<210> 718
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 718

Trp Tyr Arg Gln Ala Pro Gly Lys Arg Thr Glu Leu Val Ala
1 5 10

<210> 719
<211> 14
<212> PRT
<213> Artificial Sequence

<220>

SeqListing

<223> P,R,S 103-class Nanobody FW2 sequence

<400> 719

Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val Ser
1 5 10

<210> 720
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 720

Trp Leu Arg Gln Thr Pro Gly Lys Gly Leu Glu Trp Val Gly
1 5 10

<210> 721
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW2 sequence

<400> 721

Trp Val Arg Gln Ala Pro Gly Lys Ala Glu Glu Phe Val Ser
1 5 10

<210> 722
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 722

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 723
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 723

Arg Phe Thr Ile Ser Arg Asp Asn Ala Arg Asn Thr Leu Tyr Leu Gln
1 5 10 15

Met Asp Ser Leu Ile Pro Glu Asp Thr Ala Leu Tyr Tyr Cys Ala Arg
20 25 30

<210> 724
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 724

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Glu Met Tyr Leu Gln
1 5 10 15

Met Asn Asn Leu Lys Thr Glu Asp Thr Gly Val Tyr Trp Cys Gly Ala
20 25 30

<210> 725
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 725

Arg Phe Thr Ile Ser Ser Asp Ser Asn Arg Asn Met Ile Tyr Leu Gln
1 5 10 15

Met Asn Asn Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 726
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 726

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Met Leu Tyr Leu His
1 5 10 15

Leu Asn Asn Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys Arg Arg
20 25 30

<210> 727
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 727

SeqListing

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Thr Val Tyr Leu Arg
1 5 10 15

Leu Asn Ser Leu Asn Pro Glu Asp Thr Ala Val Tyr Ser Cys Asn Leu
20 25 30

<210> 728
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 728

Arg Phe Lys Ile Ser Arg Asp Asn Ala Lys Lys Thr Leu Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Gly Pro Glu Asp Thr Ala Met Tyr Tyr Cys Gln Arg
20 25 30

<210> 729
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW3 sequence

<400> 729

Arg Phe Thr Val Ser Arg Asp Asn Gly Lys Asn Thr Ala Tyr Leu Arg
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Asp Tyr Tyr Cys Ala Val
20 25 30

<210> 730
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW4 sequence

<400> 730

Arg Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 731
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW4 sequence

<400> 731

SeqListing

Leu Arg Gly Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 732
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW4 sequence

<400> 732

Gly Asn Lys Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 733
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW4 sequence

<400> 733

Ser Ser Pro Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 734
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW4 sequence

<400> 734

Ser Ser Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 735
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> P,R,S 103-class Nanobody FW4 sequence

<400> 735

Arg Ser Arg Gly Ile Gln Val Thr Val Ser Ser
1 5 10

<210> 736
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

SeqListing

<400> 736

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Ser Ile Phe Ser
20 25 30

<210> 737
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 737

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Ala Thr Gly Arg Thr Ser Ser
20 25 30

<210> 738
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 738

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Thr Ser Gly Phe Thr Phe Ser
20 25 30

<210> 739
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 739

Lys Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Thr Phe Ser
20 25 30

<210> 740
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 740

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Thr Gly Arg Thr Ser Ser
20 25 30

<210> 741
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 741

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Arg Thr Leu Arg
20 25 30

<210> 742
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 742

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Thr Cys Ala Ala Ser Gly Arg Thr Phe Ser
20 25 30

<210> 743
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 743

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Leu Thr Phe Asn
20 25 30

<210> 744
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> FR1 sequence

<400> 744

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Thr Gly Arg Thr Ser Ser
20 25 30

<210> 745
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 745

Asp Asn Val Met Gly
1 5

<210> 746
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 746

Ile Tyr Asn Met Asp
1 5

<210> 747
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 747

Arg Phe Asp Met Ser
1 5

<210> 748
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 748

Ser Tyr Phe Met Gly
1 5

<210> 749
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 749

Ile Tyr Asn Met Asp
1 5

<210> 750
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 750

Arg Tyr Val Thr Gly
1 5

<210> 751
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 751

Ser Phe Val Ile Gly
1 5

<210> 752
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 752

Gln Tyr Thr Ile Thr
1 5

<210> 753
<211> 5
<212> PRT
<213> Artificial Sequence

<220>

<223> CDR sequence

<400> 753

Ile Tyr Asn Met Asp
1 5

<210> 754
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 754

Trp Tyr Arg Gln Ala Pro Gly Lys Gln Arg Glu Leu Val Ala
1 5 10

<210> 755
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 755

Trp Phe Arg Gln Thr Pro Gly Lys Glu Arg Glu Leu Ile Ala
1 5 10

<210> 756
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 756

Trp Phe Arg Gln Ala Pro Gly Lys Gln Arg Glu Phe Ile Ala
1 5 10

<210> 757
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 757

Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Val Val Ala
1 5 10

<210> 758
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 758

Trp Phe Leu Gln Ala Pro Gly Lys Glu Arg Glu Leu Ile Ala
1 5 10

<210> 759
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 759

Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Val Val Ala
1 5 10

<210> 760
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 760

Trp Phe Arg Gln Ala Pro Gly Lys Gln Arg Glu Val Val Ala
1 5 10

<210> 761
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 761

Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Phe Val Ala
1 5 10

<210> 762
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FR2 sequence

<400> 762

Trp Phe Arg Gln Gly Ser Gly Lys Gly Arg Glu Leu Ile Ala
1 5 10

<210> 763
<211> 16

<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 763

Thr Ile Trp Ser Ser Gly His Thr Asn Tyr Ala Asp Ser Val Lys Gly
1 5 10 15

<210> 764
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 764

Arg Leu Trp Trp Arg Ser Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 765
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 765

Thr Ile Phe Ser Gly Gly Asp Thr Asp Tyr Ile Asp Ser Val Lys Gly
1 5 10 15

<210> 766
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 766

Thr Ile Arg Trp Ser Asp Gly Ser Thr Tyr Tyr Glu Asp Ser Val Lys
1 5 10 15

Gly

<210> 767
<211> 17
<212> PRT
<213> Artificial Sequence

<220>

<223> CDR sequence

<400> 767

Arg Ile Trp Trp Arg Ser Gly Ala Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 768
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 768

Ser Ile Ser Trp Ser Gly Glu Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 769
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 769

Ser Ile Thr Ser Gly Gly Ser Thr Tyr Tyr Glu Asp Ser Gly Lys Gly
1 5 10 15

<210> 770
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 770

Ala Val Ser Trp Ser Gly Ser Ser Glu Ser Val Ser Asn Ser Val Lys
1 5 10 15

Gly

<210> 771
<211> 17
<212> PRT
<213> Artificial Sequence

<220>

<223> CDR sequence

<400> 771

Arg Ile Trp Trp Arg Ser Gly Glu Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 772
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 772

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Asn Leu
20 25 30

<210> 773
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 773

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ser Val Tyr Ile Cys Thr Ala
20 25 30

<210> 774
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 774

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Cys Pro
20 25 30

<210> 775
<211> 32

<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 775

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 776
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 776

Arg Phe Thr Ile Ser Arg Gly Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Gly Val Tyr His Cys Thr Ala
20 25 30

<210> 777
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 777

Arg Phe Ala Ile Ser Arg Asp Asn Ala Lys Asn Ala Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Asn Leu Glu Asp Thr Gly Val Tyr Tyr Cys Ala Glu
20 25 30

<210> 778
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 778

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Arg Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 779
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 779

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Ala Tyr Leu Ala
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ala
20 25 30

<210> 780
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FR3 sequence

<400> 780

Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu Gln
1 5 10 15

Met Asn Ser Leu Lys Pro Glu Asp Thr Asn Val Tyr His Cys Ala Ala
20 25 30

<210> 781
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 781

Gly Thr Ile Val Thr Gly Thr Trp Arg Ser Asp Tyr
1 5 10

<210> 782
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 782

Gly Asp Thr Gly Gly Ala Ala Tyr Gly Tyr
1 5 10

<210> 783
<211> 6

<212> PRT
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<220>
<223> CDR sequence

<400> 783

Leu Gly Ile Glu Tyr Ala
1 5

<210> 784
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<400> 784

Ala Lys Gly Ile Gly Val Tyr Gly Tyr
1 5

<210> 785
<211> 10
<212> PRT
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<220>
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<400> 785

Gly Val Thr Gly Gly Ala Ala Tyr Gly Tyr
1 5 10

<210> 786
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 786

Ala Glu Leu Pro Gly Thr Tyr Asp Tyr
1 5

<210> 787
<211> 9
<212> PRT
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<220>
<223> CDR sequence

<400> 787

Ala Glu Pro Ala Gly Val Tyr Asp Val
1 5

<210> 788
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR sequence

<400> 788

Asp Arg Arg Gly Leu Ala Ser Thr Arg Ala Ala Asp Tyr Asp Tyr
1 5 10 15

<210> 789
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<400> 789

Gly Asp Thr Gly Gly Ala Ser Tyr Gly Tyr
1 5 10

<210> 790
<211> 11
<212> PRT
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<220>
<223> FR4 sequence

<400> 790

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 791
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 791

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 792
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 792

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 793
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 793

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 794
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 794

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 795
<211> 11
<212> PRT
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<220>
<223> FR4 sequence

<400> 795

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 796
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 796

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 797
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 797

SeqListing

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 798
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> FR4 sequence

<400> 798

Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
1 5 10

<210> 799
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 799

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Ser Ile Phe Ser Asp Asn
20 25 30

Val Met Gly Trp Tyr Arg Gln Ala Pro Gly Lys Gln Arg Glu Leu Val
35 40 45

Ala Thr Ile Trp Ser Ser Gly His Thr Asn Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Asn
85 90 95

Leu Gly Thr Ile Val Thr Gly Thr Trp Arg Ser Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Gln Val Thr Val Ser Ser
115 120

<210> 800
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

SeqListing

<400> 800

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Ala Thr Gly Arg Thr Ser Ser Ile Tyr
20 25 30

Asn Met Asp Trp Phe Arg Gln Thr Pro Gly Lys Glu Arg Glu Leu Ile
35 40 45

Ala Arg Leu Trp Trp Arg Ser Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ser Val Tyr Ile Cys
85 90 95

Thr Ala Gly Asp Thr Gly Gly Ala Ala Tyr Gly Tyr Trp Gly Gln Gly
100 105 110

Thr Gln Val Thr Val Ser Ser
115

<210> 801
<211> 114
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 801

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Thr Ser Gly Phe Thr Phe Ser Arg Phe
20 25 30

Asp Met Ser Trp Phe Arg Gln Ala Pro Gly Lys Gln Arg Glu Phe Ile
35 40 45

Ala Thr Ile Phe Ser Gly Gly Asp Thr Asp Tyr Ile Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys Cys
85 90 95

SeqListing

Pro Leu Gly Ile Glu Tyr Ala Trp Gly Gln Gly Thr Gln Val Thr Val
100 105 110

Ser Ser

<210> 802
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 802

Lys Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Thr Phe Ser Ser Tyr
20 25 30

Phe Met Gly Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Val Val
35 40 45

Ala Thr Ile Arg Trp Ser Asp Gly Ser Thr Tyr Tyr Glu Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Ala Ala Lys Gly Ile Gly Val Tyr Gly Tyr Trp Gly Gln Gly Thr
100 105 110

Gln Val Thr Val Ser Ser
115

<210> 803
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 803

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Thr Gly Arg Thr Ser Ser Ile Tyr
20 25 30

SeqListing

Asn Met Asp Trp Phe Leu Gln Ala Pro Gly Lys Glu Arg Glu Leu Ile
35 40 45

Ala Arg Ile Trp Trp Arg Ser Gly Ala Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Gly Asn Ala Lys Asn Thr Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Gly Val Tyr His Cys
85 90 95

Thr Ala Gly Val Thr Gly Gly Ala Ala Tyr Gly Tyr Trp Gly Gln Gly
100 105 110

Thr Gln Val Thr Val Ser Ser
115

<210> 804
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 804

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Arg Thr Leu Arg Arg Tyr
20 25 30

Val Thr Gly Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Val Val
35 40 45

Ala Ser Ile Ser Trp Ser Gly Glu Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Ala Ile Ser Arg Asp Asn Ala Lys Asn Ala Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Asn Leu Glu Asp Thr Gly Val Tyr Tyr Cys
85 90 95

Ala Glu Ala Glu Leu Pro Gly Thr Tyr Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Gln Val Thr Val Ser Ser
115

<210> 805
<211> 117

<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 805

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Thr Cys Ala Ala Ser Gly Arg Thr Phe Ser Ser Phe
20 25 30

Val Ile Gly Trp Phe Arg Gln Ala Pro Gly Lys Gln Arg Glu Val Val
35 40 45

Ala Ser Ile Thr Ser Gly Gly Ser Thr Tyr Tyr Glu Asp Ser Gly Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Arg Val Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Ala Ala Glu Pro Ala Gly Val Tyr Asp Val Trp Gly Gln Gly Thr Gln
100 105 110

Val Thr Val Ser Ser
115

<210> 806
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 806

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Leu Thr Phe Asn Gln Tyr
20 25 30

Thr Ile Thr Trp Phe Arg Gln Ala Pro Gly Lys Glu Arg Glu Phe Val
35 40 45

Ala Ala Val Ser Trp Ser Gly Ser Ser Glu Ser Val Ser Asn Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Ala Tyr
65 70 75 80

Leu Ala Met Asn Ser Leu Lys Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Ala Asp Arg Arg Gly Leu Ala Ser Thr Arg Ala Ala Asp Tyr Asp
100 105 110

Tyr Trp Gly Gln Gly Thr Gln Val Thr Val Ser Ser
115 120

<210> 807
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Nanobody

<400> 807

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Ala Gly Asp
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Thr Gly Arg Thr Ser Ser Ile Tyr
20 25 30

Asn Met Asp Trp Phe Arg Gln Gly Ser Gly Lys Gly Arg Glu Leu Ile
35 40 45

Ala Arg Ile Trp Trp Arg Ser Gly Glu Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Pro Glu Asp Thr Asn Val Tyr His Cys
85 90 95

Ala Ala Gly Asp Thr Gly Gly Ala Ser Tyr Gly Tyr Trp Gly Gln Gly
100 105 110

Thr Gln Val Thr Val Ser Ser
115

<210> 808
<211> 213
<212> PRT
<213> Homo sapiens

<400> 808

Met Gln Leu Pro Leu Ala Leu Cys Leu Val Cys Leu Leu Val His Thr
1 5 10 15

Ala Phe Arg Val Val Glu Gly Gln Gly Trp Gln Ala Phe Lys Asn Asp

20 25 30

Ala Thr Glu Ile Ile Pro Glu Leu Gly Glu Tyr Pro Glu Pro Pro Pro
35 40 45

Glu Leu Glu Asn Asn Lys Thr Met Asn Arg Ala Glu Asn Gly Gly Arg
50 55 60

Pro Pro His His Pro Phe Glu Thr Lys Asp Val Ser Glu Tyr Ser Cys
65 70 75 80

Arg Glu Leu His Phe Thr Arg Tyr Val Thr Asp Gly Pro Cys Arg Ser
85 90 95

Ala Lys Pro Val Thr Glu Leu Val Cys Ser Gly Gln Cys Gly Pro Ala
100 105 110

Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser
115 120 125

Gly Pro Asp Phe Arg Cys Ile Pro Asp Arg Tyr Arg Ala Gln Thr Val
130 135 140

Gln Leu Leu Cys Pro Gly Gly Glu Ala Pro Arg Ala Arg Lys Val Arg
145 150 155 160

Leu Val Ala Ser Cys Lys Cys Lys Arg Leu Thr Arg Phe His Asn Gln
165 170 175

Ser Glu Leu Lys Asp Phe Gly Thr Glu Ala Ala Arg Pro Gln Lys Gly
180 185 190

Arg Lys Pro Arg Pro Arg Ala Arg Ser Ala Lys Ala Asn Gln Ala Glu
195 200 205

Leu Glu Asn Ala Tyr
210

<210> 809
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Recombinant sclerostin

<400> 809

Met Pro Leu Leu Leu Leu Leu Pro Leu Leu Trp Ala Gly Ala Leu Ala
1 5 10 15

His His His His His His His Gln Gly Trp Gln Ala Phe Lys Asn Asp
20 25 30

SeqListing

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Ala Thr Glu Ile Ile Pro Glu Leu Gly Glu Tyr Pro Glu Pro Pro Pro
        35                  40                  45

Glu Leu Glu Asn Asn Lys Thr Met Asn Arg Ala Glu Asn Gly Gly Arg
    50                  55                  60

Pro Pro His His Pro Phe Glu Thr Lys Asp Val Ser Glu Tyr Ser Cys
65                  70                  75                  80

Arg Glu Leu His Phe Thr Arg Tyr Val Thr Asp Gly Pro Cys Arg Ser
                85                  90                  95

Ala Lys Pro Val Thr Glu Leu Val Cys Ser Gly Gln Cys Gly Pro Ala
            100                 105                 110

Arg Leu Leu Pro Asn Ala Ile Gly Arg Gly Lys Trp Trp Arg Pro Ser
        115                 120                 125

Gly Pro Asp Phe Arg Cys Ile Pro Asp Arg Tyr Arg Ala Gln Arg Val
    130                 135                 140

Gln Leu Leu Cys Pro Gly Gly Glu Ala Pro Arg Ala Arg Lys Val Arg
145                 150                 155                 160

Leu Val Ala Ser Cys Lys Cys Lys Arg Leu Thr Arg Phe His Asn Gln
                165                 170                 175

Ser Glu Leu Lys Asp Phe Gly Thr Glu Ala Ala Arg Pro Gln Lys Gly
            180                 185                 190

Arg Lys Pro Arg Pro Arg Ala Arg Ser Ala Lys Ala Asn Gln Ala Glu
        195                 200                 205

Leu Glu Asn Ala Tyr
    210
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