capable of eliciting a T cell that maximizes the ability to fuse a large number of antigens or antigenic fragments thereof.

Summary

In one aspect, the present disclosure relates to a polypeptide comprising:
a fragment of an invariant chain (INV) of a *Teleostei* consisting of between 16 to 27 contiguous amino acids of the membrane proximal domain (MPD) of an INV of the *Teleostei*, wherein the fragment has T cell response enhancer activity and the MPD is characterized by an amino acid sequence selected from: SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 10, and SEQ ID NO: 11;
and one or more cancer specific antigens or cancer specific neoantigens and/or one or more cancer specific antigenic fragments thereof, and wherein the one or more cancer specific antigens or cancer specific neoantigens and/or one or more cancer specific antigenic fragments thereof are C-terminally of the fragment of the INV.

In one example of the disclosure the disclosure relates to a polypeptide comprising:

(a) a fragment of an invariant chain (INV) of a *Teleostei* comprising or consisting of between 16 to 27 contiguous amino acids of the membrane proximal domain (MPD) of an INV of the *Teleostei*, wherein the fragment has T cell response enhancer activity and the MPD is characterized by an amino acid sequence selected from:

(i) $NQRX_1DIKSLEEQX_2SX_3LX_4X_5X_6X_7TX_8GRSX_9X_{10}$ (SEQ ID NO: 001)
wherein
X_1 is G or N, X_2 is H or N, X_3 is G or N, X_4 is N or Q, X_5 is E or A, X_6 is Q or E, X_7 is L or M, X_8 is K or R, X_9 is A or V and X_{10} is S or A;
and wherein the fragment is preferably at least 60% identical to SEQ ID NO: 3; or

(ii) $DQKQQIQZ_1LQZ_2Z_3NQRZ_4EKQZ_5Z_6Z_7RZ_8RZ_9S$ (SEQ ID NO: 8)
wherein
Z_1 is G or D, Z_2 is T or A, Z_3 is T or S, Z_4 is L or M, Z_5 is M or V, Z_6 is G or S, Z_7 is Q or L, Z_8 is P or S, and Z_9 is E or V;
and wherein the fragment is preferably at least 60% identical to SEQ ID NO: 10;
and optionally one or more antigens and/or one or more antigenic fragments thereof;

or

(b) a full length *Teleostei* INV selected from SEQ ID NO: 2, 5, 9 or 12, or variants thereof, which has T cell response enhancer activity, wherein the amino acid sequence of the MPD of the variant is at least 60% identical to SEQ ID NO: 3 or 10, and one or more antigens and/or one or more antigenic fragments thereof.

In a second aspect the disclosure further relates to a polynucleotide encoding the polypeptide according to the first aspect of the disclosure, wherein the polynucleotide is DNA or RNA, preferably DNA.

In a third aspect the disclosure relates to a vector comprising the polynucleotide according to the second aspect of the disclosure.

Claims

1. A polypeptide comprising:

   a fragment of an invariant chain (INV) of a *Teleostei* consisting of between 16 to 27 contiguous amino acids of the membrane proximal domain (MPD) of an INV of the *Teleostei*, wherein the fragment has T cell response enhancer activity and the MPD is characterized by an amino acid sequence selected from SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 10, and SEQ ID NO: 11;

   and one or more cancer specific antigens or cancer specific neoantigens and/or one or more cancer specific antigenic fragments thereof, and

   wherein the one or more cancer specific antigens or cancer specific neoantigens and/or one or more cancer specific antigenic fragments thereof are C-terminally of the fragment of the INV.

2. The polypeptide according to any one of claim 1, wherein the polypeptide comprises at least five different cancer specific antigens or cancer specific neoantigens and/or cancer specific antigenic fragments thereof.

3. A polynucleotide encoding the polypeptide according to any one of claims 1 to 2, wherein the polynucleotide is DNA or RNA, preferably DNA.

4. A vector comprising the polynucleotide according to claim 3.

5. A collection of two or more different vectors, wherein the different vectors each comprise a polynucleotide according to claim 3 encoding a different polypeptide according to claims 1 to 2.

6. The vector of claim 4 or the collection of vectors of claim 5, wherein the vector in each case is independently selected from the group consisting of a plasmid; a cosmid; a liposomal particle, a viral vector or a virus like particle; preferably an alphavirus vector, a venezuelan equine encephalitis (VEE) virus vector, a sindbis (SIN) virus vector, a semliki forest virus (SFV) virus vector, a simian or human cytomegalovirus (CMV) vector, a Lymphocyte

choriomeningitis virus (LCMV) vector, a retroviral vector, a lentiviral vector, an adenoviral vector, an adeno-associated virus vector, a poxvirus vector, a vaccinia virus vector and a modified vaccinia ankara (MVA) vector, wherein the adenoviral vector is preferably a Great Apes adenoviral vector, more preferably a chimpanzee or bonobo or gorilla adenoviral vector.

7. A pharmaceutical composition comprising the polypeptide of any one of claims 1 to 2, the polynucleotide of claim 3, or a vector/vector collection of any one of claims 4 to 6, a pharmaceutically acceptable excipient and optionally one or more adjuvants.

8. The pharmaceutical composition of claim 7 comprising at least one immunomodulatory, or at least one polynucleotide encoding the immunomodulatory, or a vector or liposomal particle comprising the polynucleotide encoding the immunomodulatory.

9. A kit of parts comprising the pharmaceutical composition of any one of claims 7 to 8 and separately packaged at least one immunomodulatory, or at least one polynucleotide encoding the immunomodulator, or a vector comprising the polynucleotide encoding the immunomodulator.

10. The pharmaceutical composition of claim 8 or the kit of parts of claim 9, wherein:

(i) the immunomodulator is a modulator of immunological check point molecules (MCM) and is selected from:

(a) an agonist of a tumor necrosis factor (TNF) receptor superfamily member, preferably of CD27, CD40, OX40, GITR or CD137; and/or

(b) an antagonist of PD-1, CD274, A2AR, B7-H3, B7-H4, BTLA, CTLA-4, IDO, KIR, LAG3, TIM-3, or VISTA or an antagonist of a B7-CD28 superfamily member, preferably of CD28 or ICOS;

and/or

(ii) the immunomodulator is a T cell growth factor, preferably IL-2, IL-12, or IL-15.

11. A polypeptide according to any one of claims 1 to 2, the polynucleotide according to claim 3, a vector or a collection of vectors according to any one of claims 4 to 6, or a

pharmaceutical composition or kits comprising such pharmaceutical compositions according to any one of claims 7 to 10 for use in preventing or treating a cancer.

12. Use of the polypeptide according to claims 1 to 2, the polynucleotide according to claim 3 or the pharmaceutical composition or kits comprising such pharmaceutical compositions according to any one of claims 7 to 10 in the manufacture of a medicament for preventing or treating a cancer.

13. The use of claim 12, wherein the cancer is selected from the group consisting of malignant neoplasms of lip, oral cavity, pharynx, a digestive organ, respiratory organ, intrathoracic organ, bone, articular cartilage, skin, mesothelial tissue, soft tissue, breast, female genital organs, male genital organs, urinary tract, brain and other parts of central nervous system, thyroid gland, endocrine glands, lymphoid tissue, and haematopoietic tissue.