CLAIMS

1. An agonist polypeptide of IL-2, characterized by 95% homology with the sequence of the native IL-2 and wherein the said polypeptide is at least 1000 times less effective in stimulating *in vitro* and/or *in vivo* regulatory T cells and shows greater *in vivo* therapeutic efficacy.
2. The polypeptide of claim 1 which comprises mutations R38K, F42I, Y45N, E62L, E68V.
3. The polypeptide of claim 1 which comprises mutations R38K, F42Q, Y45E, E68V.
4. The polypeptide of claim 1 which comprises mutations R38A, F42I, Y45N, E62L, E68V.
5. The polypeptide of claim 1 which comprises mutations R38K, F42k, Y45R, E62L, E68V.
6. The polypeptide of claim 1 which comprises mutations R38K, F42Q, Y45E, E68V.
7. The polypeptide of claim 1 which comprises mutations R38A, F42A, Y45A, E62A.
8. A fusion protein comprising the immunomodulatory polypeptide of any of the claims from 1 to 7, coupled to a carrier protein.
9. The fusion protein of claim 8 wherein the carrier protein is Albumin.
10. The fusion protein of claim 8 wherein the carrier protein is the Fc region of human immunoglobulins.
11. A pharmaceutical composition useful in the treatment of cancer and chronic infectious diseases, characterized by comprising as active ingredient the polypeptide of any of the claims from 1 to 7.
12. The pharmaceutical composition of claim 11, characterized by comprising as active ingredient one or several polypeptides described in claims from 1 to 7.
13. A pharmaceutical composition useful in the treatment of cancer and chronic infectious diseases, which comprises as active principle the fusion protein described in any one of claims from 8 to 10.
14. Use of any of the polypeptides from claims 1 to 7 for the direct treatment of malignant tumors in replacement of native IL-2.
15. Use of any of the polypeptides from claims 1 to 7 to enhance the cellular and/or humoral response to vaccines used to replace native IL2.
16. Use according to claim 15 when the vaccine to promote is a therapeutic vaccine for cancer.

17. Use according to claim 15 when the vaccine to enhance is a vaccine for infectious diseases where regulatory T cells are relevant.
18. The polypeptide of any of the claims from 1 to 7 for the manufacture of a medicament useful in the treatment of chronic diseases.
19. The polypeptide of any of claims from 1 to 7 for the manufacture of a medicament useful in cancer therapy.
20. The polypeptide of any of the claims from 1 to 7 for the manufacture of a medicament useful in the therapy of chronic infectious diseases.
21. Use of the polypeptide of any of the claims from 1 to 11 for the therapy of chronic diseases.
22. Use of the polypeptide of any of the claims from 1 to 11 for cancer therapy.
23. Use of the polypeptide of any of the claims from 1 to 11 for the therapy of chronic infectious diseases.
24. Use of the fusion protein of any of the claims from 8 to 10 for the therapy of chronic diseases.
25. Use of the fusion protein of any one of the claims from 8 to 10 for cancer therapy.
26. Use of the fusion protein of any one of claims from 8 to 10 for the therapy of chronic diseases.
27. The polypeptide of any of the claims from 1 to 7 for the manufacture of a drug that modulates the immune system.
28. The polypeptide of any one of the claims from 1 to 7 and their applications when new mutations that increase their binding affinity to the different components of IL-2 are introduced.

Claims

1. An isolated agonist polypeptide of IL-2, characterized by 95% identity with the sequence of the native IL-2 and wherein the polypeptide is selected from the group consisting of (i) the polypeptide comprising mutations R38K, F42I, Y45N, E62L and E68V (SEQ ID NO. 1); (ii) the polypeptide comprising mutations R38K, F42Q, Y45E and E68V (SEQ ID NO. 2); (iii) the polypeptide comprising mutations R38A, F42I, Y45N, E62L and E68V (SEQ ID NO. 3); (iv) the polypeptide comprising mutations R38K, F42K, Y45R, E62L and E68V (SEQ ID NO. 4); (v) the polypeptide comprising mutations R38K, F42Q, Y45E and E68V (SEQ ID NO. 5); (vi) R38A, F42A, Y45A and E62A (SEQ ID NO. 6).

2. A fusion protein comprising any one of the polypeptide of claim 1 coupled to a carrier protein.

3. The fusion protein of claim 2 wherein the carrier protein is albumin.

4. The fusion protein of claim 2 wherein the carrier protein is the Fc region of human immunoglobulins.

5. A pharmaceutical composition for use in the treatment of cancer and chronic infectious diseases, characterized by comprising as active ingredient any one of the polypeptide of claim 1.

6. A pharmaceutical composition for use in the treatment of cancer and chronic infectious diseases, which comprises as active principle the fusion protein of any one of claims 2 to 4.

7. The use of any of the polypeptide of claim 1 for the manufacture of a medicament for the treatment of cancer.

8. The use of any of the polypeptide of claim 1 for the manufacture of a medicament for the treatment of chronic infectious diseases.

9. The polypeptide of claim 1 for use to enhance the cellular and/or humoral response to cancer vaccines.

10. The use of the fusion proteins of any of claims 2 to 4 for the manufacture of a medicament for the treatment of cancer.

11. The use of the fusion proteins of any of claims 2 to 4 for the manufacture of a medicament for the treatment of chronic infectious diseases.

12. The fusion proteins of any of claims 2 to 4 for use to enhance the cellular and/or humoral response to cancer vaccines.