

CLAIMS

1. A fusion target-binding protein comprising a target binding moiety, an intracellular signalling region and a domain that promotes synthesis of arginine or an arginine precursor.
2. The fusion target-binding protein according to claim 1, wherein the domain that promotes synthesis of arginine or an arginine precursor comprises an enzyme domain.
3. The fusion target-binding protein according to claim 2, wherein the enzyme domain is selected from the group consisting of: an ASS-1 domain; an OTC domain; an ASL domain; an OCD1 domain; an ArgG domain; an ArgH domain; and an ArgF domain.
4. The fusion target-binding protein according to claim 3, wherein the ASS-1 domain comprises the amino acid sequence of SEQ ID NO. 1.
5. The fusion target-binding protein according to claim 3 or claim 4, wherein the OTC domain comprises the amino acid sequence of SEQ ID NO. 2.
6. The fusion target-binding protein according to any of claims 3 to 5, wherein the ASL domain comprises the amino acid sequence encoded by SEQ ID NO. 30.
7. The fusion target-binding protein according to any of claims 3 to 6, wherein the ODC1 domain comprises the amino acid sequence encoded by SEQ ID NO. 31.
8. The fusion target-binding protein according to any of claims 3 to 7, wherein the ArgG domain comprises the amino acid sequence encoded by SEQ ID NO. 32.
9. The fusion target-binding protein according to any of claims 3 to 8, wherein the ArgH domain comprises the amino acid sequence encoded by SEQ ID NO. 33.
10. The fusion target-binding protein according to any of claims 3 to 9, wherein the ArgF domain comprises the amino acid sequence encoded by SEQ ID NO. 34.
11. A fusion target-binding protein comprising a target binding moiety, an intracellular signalling region and a domain that promotes synthesis of tryptophan or a tryptophan precursor.

12. The fusion target-binding protein according to claim 11, wherein the domain that promotes synthesis of tryptophan or a tryptophan precursor comprises an enzyme domain.
13. The fusion target-binding protein according to claim 11 or claim 12, wherein the enzyme domain is selected from the group consisting of: an TRP5 domain; and an IDO domain;
14. The fusion target-binding protein according to claim 13, wherein the TRP5 domain comprises the amino acid sequence encoded by SEQ ID NO. 35.
15. The fusion target-binding protein according to claim 13 or claim 14, wherein the IDO domain comprises the amino acid sequence encoded by SEQ ID NO. 36.
16. The fusion target-binding protein according to any preceding claim, wherein the target binding moiety is selected from the group consisting of: a GD2 target binding moiety; a CD33 target binding moiety; a mesothelin target binding moiety; and an EGFRvIII target binding moiety.
17. The fusion target-binding protein according to claim 16, wherein the GD2 target binding moiety comprises the amino acid sequence of SEQ ID NO. 3.
18. The fusion target-binding protein according to claim 16, wherein the CD33 target binding moiety comprises the amino acid sequence of SEQ ID NO. 4.
19. The fusion target-binding protein according to claim 16, wherein the mesothelin target binding moiety comprises the amino acid sequence of SEQ ID NO. 5.
20. The fusion target-binding protein according to claim 16, wherein the EGFRvIII target binding moiety comprises the amino acid sequence of SEQ ID NO. 6
21. The fusion target-binding protein according to any preceding claim, wherein the intracellular signalling region comprises a region selected from the group consisting of: a 4-1BB signalling region; an OX-40 signalling region; a CD28 signalling region; an ICOS signalling region; and a CD3 ζ signalling region.
22. The fusion target-binding protein according to claim 21, wherein the intracellular signalling region comprises a 4-1BB signalling region.

23. The fusion target-binding protein according to claim 21 or claim 22, wherein the 4-1BB intracellular signalling region comprises the amino acid sequence of SEQ ID NO. 7.
24. The fusion target-binding protein according to any of claims 21 to 23, wherein the intracellular signalling region comprises a CD3 ζ domain.
25. The fusion target-binding protein according to claim 24, wherein the CD3 ζ domain comprises the amino acid sequence of SEQ ID NO: 11 or SEQ ID NO: 40.
26. The fusion target-binding protein according to any of claims 21 to 25, comprising both a 4-1BB domain and a CD3 ζ domain.
27. The fusion target-binding protein according to any preceding claim, comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 12 to 23.
28. The fusion target-binding protein according to any preceding claim, for use as a medicament.
29. The fusion target-binding protein for use according to claim 28, for use in the prevention or treatment of cancer.
30. A cell comprising a fusion target-binding protein comprising a target binding moiety, an intracellular signalling region and a domain that promotes synthesis of arginine or an arginine precursor.
31. The cell according to claim 30, wherein the fusion target-binding protein is as defined in any of claims 1 to 10, or 16 to 27.
32. A cell comprising a fusion target-binding protein comprising a target binding moiety, an intracellular signalling region and a domain that promotes synthesis of tryptophan or a tryptophan precursor.
33. The cell according to claim 32, wherein the fusion target-binding protein is as defined in any of claims 11 to 27.
34. A cell according to any of claims 30 to 33, for use as a medicament.

35. The cell for use according to claim 34, for use in the prevention or treatment of cancer.
36. A nucleic acid encoding a fusion target-binding protein comprising a target binding moiety, an intracellular signalling region and a domain that promotes synthesis of arginine or an arginine precursor.
37. A nucleic acid according to claim 36, wherein the fusion-target binding protein is as defined in any of claims 1 to 10, or 16 to 27.
38. A nucleic acid according to claim 36 or claim 37, comprising the DNA sequence of SEQ ID NO: 38, SEQ ID NO: 39; or SEQ ID NO: 37.
39. A nucleic acid encoding a fusion target-binding protein comprising a target binding moiety, an intracellular signalling region and a domain that promotes synthesis of tryptophan or a tryptophan precursor.
40. A nucleic acid according to claim 39, wherein the fusion target-binding protein is as defined in any of claims 11 to 27.
41. A nucleic acid according to any of claims 36 to 40, for use as a medicament.
42. The nucleic acid for use according to claim 41, for use in the prevention or treatment of cancer.
43. A pharmaceutical composition comprising a fusion target-binding protein according to any of claims 1 to 30; and/or a cell according to any of claims 30 to 35; and/or a nucleic acid according to any of claims 36 to 42.
44. A pharmaceutical composition according to claim 43, for use as a medicament.
45. The pharmaceutical composition for use according to claim 44, for use in the prevention or treatment of cancer.
46. A method of treating a condition in a subject in need thereof, the method comprising providing the subject with a fusion target-binding protein according to any of claims 1 to 29.

47. The method according to claim 45, wherein the fusion target-binding protein is provided by cellular expression of a nucleic acid sequence according to any of claims 37 to 43.
48. A method of treating a condition in a subject in need thereof, the method comprising providing the subject with a cell according to any of claims 30 to 35.
49. A method of treating a condition in a subject in need thereof, the method comprising providing the subject with a nucleic acid according to any of claims 36 to 42.
50. The method according to any of claims 46 to 49, in the treatment of cancer.
51. The method according to any of claims 46 to 50, in the treatment of viral infection.