

WHAT IS CLAIMED IS:

1. ~~An isolated VGLL1 peptide of 35 amino acids in length or less comprising an amino acid sequence having at least 90% sequence identity to SEQ ID NO: 1, wherein the peptide is capable of inducing cytotoxic T lymphocytes (CTLs).~~
- 5 2. ~~The peptide of claim 1, wherein the peptide comprises an amino acid sequence having at least 95% sequence identity to SEQ ID NO:1.~~
3. ~~The peptide of claim 1, wherein the peptide comprises an amino acid sequence of SEQ ID NO:1.~~
4. ~~The peptide of claim 1 or claim 2, wherein the peptide binds to a human class I HLA protein.~~
- 10 5. ~~The peptide of claim 4, wherein the human class I HLA protein is from the HLA-A1 family, the HLA-A29 family, the HLA-A30 family, the HLA-B18 family, or the HLA-B44 family.~~
6. ~~The peptide of claim 4, wherein the human class I HLA protein is from the HLA-A1 family.~~
- 15 7. ~~The peptide of claim 4, wherein the human class I HLA protein is HLA-A*0101, HLA-A*0102, HLA-A*0103, HLA-A*2902, HLA-A*3002, HLA-B*1801, or HLA-B*4403.~~
8. ~~The peptide of claim 4, wherein the human class I HLA protein is HLA-A*0101.~~
- 20 9. ~~The peptide of any one of claims 1-5, wherein the peptide is 30 amino acids in length or less.~~
10. ~~The peptide of any one of claims 1-5, wherein the peptide is 25 amino acids in length or less.~~
11. ~~The peptide of any one of claims 1-5, wherein the peptide is 20 amino acids in length or less.~~
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12. ~~The peptide of any one of claims 1-5, wherein the peptide is 15 amino acids in length or less.~~
13. ~~The peptide of claim 1, wherein the peptide consists of SEQ ID NO:1 and wherein the peptide selectively binds HLA-A*0101.~~
- 5 14. ~~A pharmaceutical composition comprising the isolated peptide of any one of claims 1-13 and a pharmaceutical carrier.~~
15. ~~The composition of claim 14, wherein the pharmaceutical composition is formulated for parenteral administration, intravenous injection, intramuscular injection, inhalation, or subcutaneous injection.~~
- 10 16. ~~The composition of claim 14, wherein the peptide is comprised in a liposome, lipid-containing nanoparticle, or in a lipid-based carrier.~~
17. ~~The composition of claim 14, wherein the pharmaceutical preparation is formulated for injection or inhalation as a nasal spray.~~
18. ~~An isolated nucleic acid encoding the VGLL1 peptide of any one of claims 1-13.~~
- 15 19. ~~A vector comprising a contiguous sequence consisting of the nucleic acid of claim 18.~~
20. ~~A method of promoting an immune response in a subject, comprising administering an effective amount of the peptide of any one of claims 1-13 to the subject, wherein the peptide induces VGLL1-specific T cells in the subject.~~
21. ~~The method of claim 20, wherein the subject is diagnosed with cancer.~~
- 20 22. ~~The method of claim 21, wherein the cancer is pancreatic, ovarian, gastric, or breast cancer.~~
23. ~~The method of claim 20, wherein the subject is a human.~~
24. ~~The method of claim 20, further comprising administering at least a second anti-cancer therapy.~~

25. ~~The method of claim 24, wherein the second anti-cancer therapy is selected from the group consisting of a chemotherapy, a radiotherapy, an immunotherapy, or a surgery.~~

26. ~~The method of claim 25, wherein the immunotherapy is an immune checkpoint inhibitor.~~

27. ~~The method of claim 26, wherein the immune checkpoint inhibitor is an anti-PD1 monoclonal antibody.~~

28. ~~A method of producing VGLL1-specific T cells comprising:~~

~~(a) obtaining a starting population of T cells; and~~

~~(b) contacting the starting population of T cells with the VGLL1 peptide of any one of claims 1-13, thereby generating VGLL1-specific T cells.~~

29. ~~The method of claim 28, wherein contacting is further defined as co-culturing the starting population of T cells with antigen presenting cells (APCs), wherein the APCs present the VGLL1 peptide of claim 1 on their surface.~~

30. ~~The method of claim 29, wherein the APCs are dendritic cells.~~

31. ~~The method of claim 28, wherein the starting population of T cells are CD8⁺ T cells.~~

32. ~~The method of claim 28, wherein the T cells are cytotoxic T lymphocytes (CTLs).~~

33. ~~The method of claim 28, wherein obtaining comprises isolating the starting population of T cells from peripheral blood mononuclear cells (PBMCs).~~

34. ~~A pharmaceutical composition comprising the VGLL1-specific T cells produced according to any one of claims 28-33.~~

35. ~~A method of treating cancer in a subject comprising administering an effective amount of the VGLL1-specific T cells produced according to any one of claims 28-33 to the subject.~~

36. ~~The method of claim 35, wherein the cancer is pancreatic, ovarian, gastric, or breast cancer.~~

37. ~~The method of claim 35, wherein the subject is a human.~~

38. ~~The method of claim 35, wherein the VGLL1-specific T cells are autologous.~~

39. ~~The method of claim 35, further comprising lymphodepletion of the subject prior to administration of the VGLL1-specific T cells.~~

5 40. ~~The method of claim 39, wherein lymphodepletion comprises administration of cyclophosphamide and/or fludarabine.~~

41. ~~The method of claim 35, further comprising administering at least a second therapeutic agent.~~

10 42. ~~The method of claim 41, wherein the at least a second therapeutic agent comprises chemotherapy, immunotherapy, surgery, radiotherapy, or biotherapy.~~

43. ~~The method of claim 42, wherein the immunotherapy is an immune checkpoint inhibitor.~~

44. ~~The method of claim 43, wherein the immune checkpoint inhibitor is an anti-PD1 monoclonal antibody.~~

15 45. ~~The method of claim 41, wherein the VGLL1-specific T cells and/or the at least a second therapeutic agent are administered intravenously, intraperitoneally, intratracheally, intratumorally, intramuscularly, endoscopically, intralesionally, percutaneously, subcutaneously, regionally, or by direct injection or perfusion.~~

20 46. ~~The method of claim 35, wherein the subject is determined to have cancer cells which express VGLL1.~~

47. ~~A composition comprising an effective amount of the VGLL1-specific T cells of claim 34 for the treatment of cancer in a subject.~~

48. ~~The method of claim 47, wherein the cancer is pancreatic, ovarian, gastric, or breast cancer.~~

25 49. ~~The method of claim 47, wherein the subject is a human.~~

50. ~~The method of claim 47, wherein the VGLL1-specific T cells are autologous.~~

1. An isolated VGLL1 peptide of 35 amino acids in length or less comprising an amino acid sequence having at least 90%, preferably at least 95%, sequence identity to SEQ ID NO: 1, wherein the peptide is capable of inducing cytotoxic T lymphocytes (CTLs).

2. The peptide of claim 1, wherein the peptide comprises an amino acid sequence of SEQ ID NO:1.

3. The peptide of claim 1 or claim 2, wherein the peptide binds to a human class I HLA protein.

4. The peptide of claim 3, wherein the human class I HLA protein is from the HLA-A1 family, the HLA-A29 family, the HLA-A30 family, the HLA-B18 family, or the HLA-B44 family.

5. The peptide of claim 4, wherein the human class I HLA protein is HLA-A*0101, HLA-A*0102, HLA-A*0103, HLA-A*2902, HLA-A*3002, HLA-B*1801, or HLA-B*4403, preferably HLA-A*0101.

6. The peptide of any one of claims 1-4, wherein the peptide is 30, 25, 20, or 15 amino acids in length or less.

7. The peptide of claim 1, wherein the peptide consists of SEQ ID NO:1 and wherein the peptide selectively binds HLA-A*0101.

8. A pharmaceutical composition comprising the isolated peptide of any one of claims 1-7 and a pharmaceutical carrier.

9. The composition of claim 8, wherein the pharmaceutical composition is formulated for parenteral administration, intravenous injection, intramuscular injection, inhalation, or subcutaneous injection.

10. The composition of claim 8, wherein the peptide is comprised in a liposome, lipid-containing nanoparticle, or in a lipid-based carrier.

11. An isolated nucleic acid encoding the VGLL1 peptide of any one of claims 1-7.
12. A vector comprising a contiguous sequence consisting of the nucleic acid of claim 11.
13. An *in vitro* or *ex vivo* method of producing VGLL1-specific T cells comprising:
- 5 (a) obtaining a starting population of T cells; and
- (b) contacting the starting population of T cells with the VGLL1 peptide of any one
- of claims 1-7, thereby generating VGLL1-specific T cells.
14. The method of claim 13, wherein contacting is further defined as co-culturing the
- starting population of T cells with antigen presenting cells (APCs), wherein the APCs
- present the VGLL1 peptide of claim 1 on their surface.
- 10 15. The method of claim 14, wherein the APCs are dendritic cells.
16. The method of claim 13, wherein obtaining comprises isolating the starting population
- of T cells, preferably CD8⁺ T cells, from peripheral blood mononuclear cells (PBMCs).
17. A pharmaceutical composition comprising the VGLL1-specific T cells produced
- according to any one of claims 13-16.
- 15 18. A pharmaceutical composition according to any one of claims 8-10 and 17 for use in
- therapy.
19. Use of a pharmaceutical composition according to any one of claims 8-10 and 17 in
- the manufacture of a medicament for the treatment of cancer.