

CLAIMS:

1. An affinity polypeptide ligand comprising:
one to ten of Subunit-1, wherein Subunit-1 has at least 90% identity to SEQ ID NO: 17; and
one to ten of Subunit-2, wherein Subunit-2 has at least 90% identity to SEQ ID NO: 18, wherein residues at positions 5 and 34 of Subunit-2 are cysteine, wherein there is a disulfide bond between the two cysteine residues;
and wherein the affinity polypeptide ligand comprises at least two of Subunit-1 or at least two of Subunit-2, wherein at least one Subunit-1 is between any two of Subunit-2.
2. The affinity polypeptide ligand of Claim 1 comprising an amino acid spacer between Subunit--1 and Subunit-1, and between Subunit--1 and Subunit-2, wherein the spacer comprises 5 to 20 residues.
3. The affinity polypeptide ligand according to Claim 2 further comprising a C-terminal amino acid residue which immobilizes the ligand to a solid support.
4. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 3, and having a disulfide bond between the cysteine residues at positions 48 and 77, and at positions 125 and 154.
5. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 1, and having a disulfide bond between the cysteine residues at positions 48 and 77.
6. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 2, and having a disulfide bond between the cysteine residues at positions 48 and 77, and at positions 125 and 154.
7. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 4, and having a disulfide bond between the cysteine residues at positions 48 and 77, at positions 125 and 154, and at positions 202 and 231.
8. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 5, and having a disulfide bond between the cysteine residues at positions 48 and 77, at positions 125 and 154, and at positions 202 and 231.
9. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 6, and having a disulfide bond between the cysteine residues at positions 48 and 77, at positions 125 and 154, at positions 202 and 231, and at positions 279 and 308.

10. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 7, and having a disulfide bond between the cysteine residues at positions 48 and 77, at positions 125 and 154, at positions 202 and 231, and at positions 279 and 308.
11. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 8, and having a disulfide bond between the cysteine residues at positions 48 and 77, at positions 125 and 154, at positions 202 and 231, at positions 279 and 308, and at positions 356 and 385.
12. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 9, and having a disulfide bond between the cysteine residues at positions 10 and 39, and at positions 87 and 116.
13. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 10, and having a disulfide bond between the cysteine residues at positions 10 and 39, and at positions 87 and 116.
14. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 11, and having a disulfide bond between the cysteine residues at positions 10 and 39, at positions 87 and 116, and at positions 164 and 193.
15. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 12, and having a disulfide bond between the cysteine residues at positions 10 and 39, at positions 87 and 116, and at positions 164 and 193.
16. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 13, and having a disulfide bond between the cysteine residues at positions 10 and 39, at positions 87 and 116, at positions 164 and 193, and at positions 241 and 270.
17. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 14, and having a disulfide bond between the cysteine residues at positions 10 and 39, at positions 87 and 116, at positions 164 and 193, and at positions 241 and 270.
18. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 15, and having a disulfide bond between the cysteine residues at positions 10 and 39, at positions 87 and 116, at positions 164 and 193, at positions 241 and 270, and at positions 318 and 347.
19. The affinity polypeptide ligand according to Claim 1 having at least 90% identity to SEQ ID NO: 16, and having a disulfide bond between the cysteine residues at positions 10 and 39, at positions 87 and 116, at positions 164 and 193, at positions 241 and 270, and at positions 318 and 347.

20. A method for isolating a polypeptide ligand of Claim 1, wherein the polypeptide ligand is purified using cationic additives, hydrophobic interaction chromatography, and/or ion exchange chromatography.
21. A solid support that is porous in nature to which the affinity polypeptide ligand of Claim 1 is immobilized.
22. The solid support of Claim 21 wherein the solid support is functionalized with an aldehyde moiety to which the affinity polypeptide ligand is attached.
23. The solid support of Claim 21 wherein the solid support is functionalized with an epoxy moiety to which the affinity polypeptide ligand is attached.
24. The solid support of Claim 21, wherein the ligand has at least 90% identity to SEQ ID NO: 3, and having a disulfide bond between the cysteine residues at positions 48 and 77, and at positions 125 and 154.
25. The solid support of Claim 21, wherein the ligand has at least 90% identity to SEQ ID NOs: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or 16, wherein disulfide bonds stabilize the helical nature of the polypeptide and wherein the ligand is bound to the solid support.
26. The solid support of Claim 21 wherein the support binds greater than 30 g/L of immunoglobulin protein analyte.
27. The solid support of Claim 21 wherein the support withstands 0.1M to 1.0M sodium hydroxide alkaline cleaning solutions.
28. The solid support of Claim 21 wherein upon addition of positively charged polymers, host cell impurities are removed.
29. A method for isolating an analyte comprising: applying a sample containing the analyte through the solid support of Claim 21 to adsorb the analyte to the support; and eluting the adsorbed analyte from the support.
30. The method according to Claim 29 further comprising washing impurities with a buffer before eluting the adsorbed analyte from the support.
31. The method according to Claim 29, wherein the analyte is an immunoglobulin.
32. The method according to Claim 30 wherein the buffer contains additives.

33. The method according to Claim 32, wherein the additives comprise 1% to 10% propylene glycol; 0.1M to 1M Arginine; 0.1% to 1% of tween 20; 0.1M to 1M of guanidine HCl; 1% to 10% of IPA and/or 1M to 3M of urea.
34. A method of cleaning the solid support of Claim 21 where the support is contacted with a cleaning solution comprising 0.01 N to 1.0 N sodium hydroxide .
35. The method of Claim 34 wherein the cleaning solution comprises a carbohydrate, a polyol, a glycol and an amino acid.
36. The method of Claim 35 wherein the carbohydrate is sucrose and/or trehalose.
37. The method of Claim 35 wherein the glycol is ethylene glycol and/or propylene glycol.
38. The method of Claim 35 wherein the amino acid is arginine and/or acetyl arginine.
39. The method of Claim 34 the cleaning solution comprises 1.0M Ethylene glycol with 1.0N NaOH; 1.0M Propylene glycol with 1.0N NaOH; and 1.0M Sucrose with 1.0N NaOH.