

CLAIMS:

1. A method for purifying a binding protein that binds free light chain not associated with heavy chain from a Chinese Hamster Ovary (CHO) cell culture comprising the
5 binding protein, the method comprising:
 - binding the binding protein from the CHO cell culture to a Protein A resin of neutral pH;
 - washing the Protein A resin with a basic wash buffer having a pH of at least 2.5 to 5 above neutral pH to wash free light chain not associated
10 with heavy chain from the composition; and
 - eluting binding protein bound to the Protein A resin with an elution buffer.
2. A method of purifying a binding protein from free light chain not associated with
15 heavy chain, the method comprising:
 - loading a composition comprising the binding protein and free light chain not associated with heavy chain onto an equilibrated affinity chromatography column of neutral pH to bind the binding proteins in the composition to the affinity chromatography column;
 - 20 - washing the affinity chromatography column with a basic wash buffer having a pH of at least 2.5 to 5 above neutral pH to wash free light chain not associated with heavy chain from the composition; and
 - eluting binding proteins bound to the affinity chromatography column with an elution buffer.
- 25 3. The method of claim 1 or claim 2, wherein the binding protein comprises an antibody.
4. The method of claim 1 or claim 2, wherein the binding protein is an antibody.
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5. The methods of claim 3 or claim 4, wherein the antibody is an anti-kappa myeloma antigen (KMA) antibody.
6. The method of claim 5, wherein the antibody preferentially binds KMA over free
35 light chain not associated with heavy chain.

7. The method according to any one of claims 1 to 6, wherein the basic wash buffer has a pH of 9 to 11.
8. The method of claim 1 or 2, wherein the basic wash buffer has a pH of 9.5 to 10.5.
- 5 9. The method of any one of claims 1 to 4, wherein the basic wash buffer comprises 0.1M to 0.2M sodium carbonate.
- 10 10. The method of claim 5, wherein the basic wash buffer further comprises 1M sodium chloride.
- 15 11. The method of any one of claims 1 to 6, wherein washing the affinity chromatography to wash free light chain not associated with heavy chain comprises washing the affinity chromatograph column twice with a basic wash buffer.
12. The method of claim 11, wherein in the first wash the basic wash buffer comprises 0.2M sodium chloride and in the second wash the basic wash buffer comprises 0.1M sodium chloride.
- 20 13. The method of claim 12, wherein the basic wash buffers have the same pH.
14. The method of any one of claims 1 to 13, wherein washing the affinity chromatography column comprises washing with an acidic wash buffer.
- 25 15. The method of claim 14, wherein the acidic wash buffer has a pH of 5.5 to 6.5.
16. The method of claim 14 or 15, wherein the acidic wash buffer comprises about 35 mM sodium phosphate.
- 30 17. The method of any one of claims 1 to 16, wherein the elution buffer is acidic.
18. The method of any one of claims 14 to 16, wherein the elution buffer has a pH lower than the acidic wash buffer.
- 35 19. The method of any one of claims 1 to 18, wherein the elution buffer has a pH of 2.5 to 3.5.

20. The method of any one of claims 1 to 19, wherein the elution buffer comprises about 10 mM sodium phosphate.
- 5 21. The method of any one of claims 2 to 20, wherein the affinity chromatography column is a protein A chromatography column.
22. The method of any one of claims 1 to 21, wherein the method further comprises a viral inactivation step.
- 10 23. The method of any one of claims 1 to 22, wherein the method further comprises a viral filtration step.
24. The method of any one of claims 2 to 23, wherein the composition comprising the
15 binding protein and free light chain not associated with heavy chain is cell culture fluid obtained from the cell culture of Chinese Hamster Ovary (CHO) cells which express the binding protein.
25. The method of any one of claims 1 to 24, wherein the eluted binding protein is
20 subject to cation exchange chromatography to remove any potential high molecular weight species.
26. The method of any one of claims 1 to 25, wherein the free light chain not associated with heavy chain is a kappa light chain.
- 25 27. The method of any one of claims 1 to 25, wherein the free light chain not associated with heavy chain is a kappa light chain dimer.
28. The method of any one of claims 1 to 27, wherein the molecular weight of the free
30 light chain not associated with heavy chain is between 22 and 100 kD.
29. The method of any one of claims 1 to 28, wherein the method further comprises a step of formulating the eluted binding protein into a pharmaceutical composition or diagnostic composition.
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30. A pharmaceutical composition comprising a binding protein produced by a method of any one of claims 1 to 29.
31. The method of any one of claims 1 to 29, or pharmaceutical composition of claim 30, wherein the binding protein comprises:
- a VH region set forth in SEQ ID NO:1 and a VL region set forth in SEQ ID NO:3 or binds the same epitope of kappa myeloma antigen (KMA) as an antibody comprising a VH region set forth in SEQ ID NO:1 and a VL region set forth in SEQ ID NO:3.
32. The method of any one of claims 1 to 29, wherein the eluted binding proteins are at least 75% unbound antibody relative to antibody bound to free light chain not associated with heavy chain as determined by SEC-HPLC and/or BioCore assay.
33. The method of any one of claims 1 to 29, wherein the eluted binding proteins are at least 85% unbound binding protein relative to binding protein bound to free light chain not associated with heavy chain as determined by SEC-HPLC and/or BioCore assay.
34. The method of any one of claims 1 to 29, wherein the eluted binding proteins are at least 90% unbound binding protein relative to binding protein bound to free light chain not associated with heavy chain as determined by SEC-HPLC and/or BioCore assay.
35. The method of any one of claims 1 to 29, wherein the eluted binding proteins are between 85% and 95% unbound binding protein relative to binding protein bound to free light chain not associated with heavy chain as determined by SEC-HPLC and/or BioCore assay.
36. A composition comprising an anti-KMA binding protein, wherein less than 20% of the binding proteins in the composition are binding proteins in complex with free light chain not associated with heavy chain.
37. The composition of claim 36, wherein less than 15%, less than 10%, less than 6% of the binding proteins in the composition are antibodies in complex with free light chain not associated with heavy chain.

38. The composition of claim 36 or 37, wherein the binding proteins comprise a VH region set forth in SEQ ID NO:1 and a VL region set forth in SEQ ID NO:3 or binds the same epitope of kappa myeloma antigen (KMA) as an antibody
5 comprising a VH region set forth in SEQ ID NO:1 and a VL region set forth in SEQ ID NO:3.
39. The composition according to any one of claims 36 to 38, wherein the binding proteins are produced by CHO cells.
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40. The composition according to any one of claims 36 to 39, wherein the binding proteins comprise an antibody.
41. The composition according to any one of claims 39 to 43, wherein the binding
15 proteins are antibodies.