WHAT IS CLAIMED IS:

1. A method of culturing a mammalian cell, the method comprising:

perfusion culturing a mammalian cell comprising a recombinant protein-encoding nucleic acid under conditions sufficient to produce the recombinant protein, wherein

perfusion culturing comprises culturing in a liquid medium comprising poloxamer-188 at a concentration of 1.8 g/L or at a greater concentration than 1.8 g/L and wherein the poloxamer-188 is present in the medium and/or is added to the medium prior to the culturing step and/or is added to the medium during the culturing step.

2. The method of claim 1, wherein the medium comprises poloxamer-188 at a concentration of 1.8 g/L or at a greater concentration than 1.8 g/L.

3. The method of claim 2, wherein the medium comprises poloxamer-188 at a concentration of 2.8 g/L or at a greater concentration than 2.8 g/L.

4. The method of claim 3, wherein the medium comprises poloxamer-188 at a concentration of 4.0 g/L or at a greater concentration than 4.0 g/L.

5. The method of claim 4, wherein the medium comprises poloxamer-188 at a concentration of 6.0 g/L or at a greater concentration than 6.0 g/L.

6. The method of claim 5, wherein the medium comprises poloxamer-188 at a concentration of 8.0 g/L or at a greater concentration than 8.0 g/L.

7. The method of claim 6, wherein the medium comprises polaxamer-188 at a concentration of 10.0 g/L or at a greater concentration than 10.0 g/L.

8. The method of any one of claims 1-7, wherein the medium further comprises antifoam and the ratio of antifoam (g/L) to poloxamer-188 (g/L) in the medium is between about 0.5% to about 6.0% in the liquid medium.

9. The method of claim 8, wherein the ratio of antifoam (g/L) to poloxamer-188 (g/L) in the medium is between about 1.0% to about 5.5%.

10. The method of claim 9, wherein the ratio of antifoam (g/L) to poloxamer-188 (g/L) in the medium is between about 1.5% to about 5.0%.

11. The method of claim 1, wherein the method comprises adding poloxamer-188 to the medium prior to the culturing step and/or adding polaxamer-188 to the medium during the culturing step to provide in the medium poloxamer-188 at a concentration of 1.8 g/L or at a greater concentration than 1.8 g/L.

12. The method of claim 1 or 11, wherein poloxamer-188 is present in the medium.

13. The method of claim 11 or 12, wherein the method comprises adding poloxamer-188 to the medium prior to the culturing step and/or adding poloxamer-188 to the medium during the culturing step to provide in the medium poloxamer-188 at a concentration of 2.8 g/L or at a greater concentration than 2.8 g/L.

14. The method of claim 13, wherein the method comprises adding poloxamer-188 to the medium prior to the culturing step and/or adding poloxamer-188 to the medium during the culturing step to provide in the medium poloxamer-188 at a concentration of 4.0 g/L or at a concentration of greater than 4.0 g/L.

15. The method of claim 14, wherein the method comprises adding poloxamer-188 to the medium prior to the culturing step and/or adding poloxamer-188 to the

medium during the culturing step to provide in the medium poloxamer-188 at a concentration of 6.0 g/L or at a greater concentration than 6.0 g/L.

16. The method of claim 15, wherein the method comprises adding poloxamer-188 to the medium prior to the culturing step and/or adding poloxamer-188 to the medium during the culturing step to provide in the medium poloxamer-188 at a concentration of 8.0 g/L or at a concentration that 8.0 g/L.

17. The method of claim 16, wherein the method comprises adding poloxamer-188 to the medium prior to the culturing step and/or adding poloxamer-188 to the medium during the culturing step to provide in the medium poloxamer-188 at a concentration of 10.0 g/L or at a greater concentration than 10.0 g/L.

18. The method of any one of claims 1-17, wherein the method comprises increasing the poloxamer-188 concentration in the medium over time.

19. The method of claim 1-18, wherein perfusion culturing comprises:

providing a vessel comprising mammalian cells disposed in a first liquid medium;

incubating the vessel with agitation and for a culturing period of at least about 7 days at a temperature between about 32 °C to about 40 °C; and

continuously or periodically after the first 48 to 96 hours of the culturing period removing a first volume of the first liquid medium and adding to the first liquid medium a second volume of a second liquid medium, wherein the first and second volumes are about equal.

20. The method of claim 19, wherein the second liquid medium comprises poloxamer-188 at greater concentration than that in the first liquid medium.

21. The method of claim 19, wherein the first liquid medium comprises poloxamer-188 at a concentration of 1.8 g/L or at a concentration less than 1.8 g/L, and

the second liquid medium comprises poloxamer-188 at a greater concentration than 1.8 g/L.

22. The method of claim 21, wherein the second liquid medium comprises poloxmer-188 at a greater concentration than 2.8 g/L.

23. The method of claim 22, wherein the second liquid medium comprises poloxamer-188 at a greater concentration than 4.0 g/L poloxamer-188.

24. The method of claim 23, wherein the second liquid medium comprises poloxamer-188 at a greater concentration than 6.0 g/L poloxamer-188.

25. The method of claim 24, wherein the second liquid medium comprises poloxamer-188 at a greater concentration than 8.0 g/L poloxamer-188.

26. The method of claim 25, wherein the second liquid medium comprises poloxamer-188 at a greater concentration than 10.0 g/L.

27. The method of claim 19, wherein the method comprises, before or after adding the second volume of the second liquid medium to the first liquid medium, adding poloxamer-188 to the second liquid medium to provide in the second medium poloxamer-188 at a concentration of 1.8 g/L or at a greater concentration that 1.8 g/L.

28. The method of claim 27, wherein adding poloxamer-188 to the second liquid medium provides in the second medium poloxamer-188 at a greater concentration than 2.8 g/L.

29. The method of claim 28, wherein adding poloxamer-188 to the second liquid medium provides in the second medium poloxamer-188 at a greater concentration than 4.0 g/L.

30. The method of claim 29, wherein adding poloxamer-188 to the second liquid medium provides in the second liquid medium poloxamer-188 at a greater concentration than 6.0 g/L .

31. The method of claim 30, wherein adding poloxamer-188 to the second liquid medium provides in the second liquid medium poloxamer-188 at a greater concentration than 8.0 g/L.

32. The method of claim 31, wherein adding poloxamer-188 to the second liquid medium provides in the second liquid medium poloxamer-188 at a greater concentration than 10.0 g/L.

33. The method of any one of claims 19-32 further comprising:

collecting recombinant protein from the mammalian cells, from the first liquid medium, or the second liquid medium, or any combination thereof.

34. The method of claim 33, further comprising formulating the collected recombinant protein into a pharmaceutical composition.

35. The method of claim 33, wherein collecting is performed after the culturing achieves a viable cell density of greater than 30 x 10^6 cells/mL.

36. The method of claim 35, wherein collecting is performed after the culturing achieves a viable cell density of greater than 50 x 10^6 cells/mL.

37. The method of claim 36, wherein collecting is performed after the culturing achieves a viable cell density of greater than 100 x 10^6 cells/mL.

38. The method of claim 37, wherein collecting is performed after the culturing achieves a viable cell density of greater than 150 x 10^6 cells/mL.

39. The method of claim 38, wherein collecting is performed after the culturing achieves a viable cell density of greater than 200 x 10^6 cells/mL.

40. The method of claim 19, wherein the vessel is a perfusion bioreactor.

41. The method of claim 40, wherein the perfusion bioreactor has a volume between about 1.5 L to about 25,000 L.

42. The method of claim 19, wherein the culturing period is greater than 10 days.

43. The method of claim 19, wherein removing the first volume of the first liquid medium and adding the second volume of the second liquid medium in (c) is performed continuously.

44. The method of claim 19, wherein removing the first volume of the first liquid medium and adding the second volume of the second liquid medium in (c) is performed periodically.

45. The method of claim 19, wherein the first volume of the first liquid medium removed and the second volume of the second liquid medium added in (c) are increased over time.

46. The method of claim 19, wherein the first liquid medium and/or second liquid medium is selected from the group consisting of: a chemically-defined liquid culture medium, a serum-free liquid culture medium, a serum-containing liquid culture medium, an animal-derived component free liquid culture medium, and a protein-free medium.

47. The method of claim 19, wherein after about the first 48 to 96 hours of the period of time, in each 24-hour period, the first volume of the first liquid medium removed and the second volume of the second liquid medium added in (c) is about 0.3x to about 10x of the volume of the first liquid medium or the volume of the vessel.

48. The method of any one of claims 1-47, wherein the mammalian cell is a Chinese hamster ovary (CHO) cell, a human embryonic kidney (HEK) cell, an NSO cell, a baby hamster kidney (BHK) cell, a PerC6 cell, a Vero cell, or a HT-1080 cell line.

49. The method of any one of claims 1-48, wherein the recombinant protein is an immunoglobulin, an enzyme, a growth factor, a protein fragment, or an engineered protein.