

WHAT IS CLAIMED IS:

1. A defined culture medium comprising a basal medium and an effective amount of a knockout serum replacement (KoSR) and ITS (Insulin, Transferrin and Selenium), wherein the culture medium is serum-free, and further wherein the culture medium is capable of promoting differentiation of pluripotent stem cells (PSCs) into mesenchymal stem cells (MSCs) or supporting expansion of MSCs.
2. A culture medium comprising a basal medium comprising DMEM/F12 and MEM alpha at a volume ratio ranging between 0.4 to 2.3 DMEM/F12 to MEM alpha, wherein the culture medium is capable of promoting differentiation of pluripotent stem cells (PSCs) into mesenchymal stem cells (MSCs) or supporting expansion of MSCs.
3. The culture medium of claim 1, wherein said basal medium comprises DMEM/F12.
4. The culture medium of claim 1, wherein said basal medium comprises DMEM high glucose (DMEM HG).
5. The culture medium of claim 2, wherein said volume ratio of said DMEM/F12 to said MEM alpha ranges between 0.6 to 1.5 DMEM/F12 to MEM alpha.
6. The culture medium of claim 2 or 5, further comprising at least one of knockout serum replacement (KoSR) and ITS (Insulin, Transferrin and Selenium).
7. The culture medium of any one of claims 1, 3, 4 or 6, wherein a concentration of said KoSR is 2.5-15 %.
8. The culture medium of any one of claims 1, 3, 4, 6 or 7, wherein a concentration of said ITS is 0.1-3 %.
9. The culture medium of any one of claims 1, 3 or 7-8, further comprising at least one of glucose, L-ascorbic acid and Sodium pyruvate.

10. The culture medium of claim 9, wherein a concentration of said glucose is 1 gr/Liter - 5 gr/Liter.
11. The culture medium of claim 9, wherein a concentration of said L-ascorbic acid is 20 - 200 $\mu\text{g/ml}$.
12. The culture medium of claim 9, wherein a concentration of said Sodium pyruvate acid is 20 - 200 $\mu\text{g/ml}$.
13. The culture medium of any one of claims 2, 5 or 6-8, further comprising serum.
14. The culture medium of claim 13, wherein a concentration of said serum is 3-30 %.
15. The culture medium of any one of claims 1-14, further comprising basic fibroblast growth factor (bFGF).
16. The culture medium of claim 15, wherein said bFGF comprises FGF2 or FGF4.
17. The culture medium of claim 15, wherein said bFGF comprises FGF2 and FGF4.
18. The culture medium of any one of claims 16-17, wherein said FGF2 is at a concentration of 1-100 ng/ml.
19. The culture medium of any one of claims 16-17, wherein said FGF4 is at a concentration of 1-100 ng/ml.
20. The culture medium of any one of claims 1-19, further comprising at least one of platelet-derived growth factor (PDGF), transforming growth factor beta ($\text{TGF}\beta$), epidermal growth factor (EGF) and WNT-3a.
21. The culture medium of claim 20, wherein said PDGF comprises PDGF-BB.
22. The culture medium of any one of claims 20-21, wherein said PDGF is at a concentration of 5-100 ng/ml.

23. The culture medium of claim 20, wherein said TGF β comprises TGF β 1 or TGF β 3.
24. The culture medium of any one of claims 20 or 23, wherein said TGF β is at a concentration of 5-50 ng/ml.
25. The culture medium of claim 20, wherein said EGF is at a concentration of 1-100 ng/ml.
26. The culture medium of claim 20, wherein said WNT-3a is at a concentration of 10 - 200 ng/ml.
27. A defined culture medium comprising a basal medium comprising DMEM/F12, knockout serum replacement (KoSR) at a concentration of at least 5 %, and ITS (Insulin, Transferrin and Selenium) at a concentration of at least 0.5 %, wherein the culture medium is serum-free, and further wherein the culture medium is capable of promoting differentiation of pluripotent stem cells (PSCs) into mesenchymal stem cells (MSCs) or supporting expansion of MSCs.
28. A culture medium comprising a basal medium comprising DMEM/F12 and MEM alpha at a volume ratio ranging between 0.6 to 1.5 DMEM/F12 to MEM alpha, a knockout serum replacement (KoSR) at a concentration of at least 3 %, ITS (Insulin, Transferrin and Selenium) at a concentration of at least 0.1 %, and serum at a concentration of at least 5 %, and further wherein the culture medium is capable of promoting differentiation of pluripotent stem cells (PSCs) into mesenchymal stem cells (MSCs) or supporting expansion of MSCs.
29. A defined culture medium comprising a basal medium comprising DMEM/F12, knockout serum replacement (KoSR) at a concentration of at least 5 %, ITS (Insulin, Transferrin and Selenium) at a concentration of at least 0.5 % and L-ascorbic acid at a concentration of at least 25 μ g/ml, wherein the culture medium is serum-free, and further wherein the culture medium is capable of promoting differentiation of pluripotent stem cells (PSCs) into mesenchymal stem cells (MSCs) or supporting expansion of MSCs.
30. A defined culture medium comprising a basal medium comprising DMEM HG, knockout serum replacement (KoSR) at a concentration of at least 5 %, ITS (Insulin, Transferrin and Selenium) at a concentration of at least 0.5 %, L-ascorbic acid at a concentration of at least 25 μ g/ml and Sodium pyruvate at a concentration of at least 25 μ g/ml, wherein the culture medium is serum-

free, and further wherein the culture medium is capable of promoting differentiation of pluripotent stem cells (PSCs) into mesenchymal stem cells (MSCs) or supporting expansion of MSCs.

31. The culture medium of any one of claims 27-30, further comprising basic fibroblast growth factor (bFGF) at a concentration of at least 1 ng/ml.

32. A method of expanding mesenchymal stem cells (MSCs) without differentiation, the method comprising culturing the MSCs in the culture medium of any one of claims 1-31, thereby culturing the MSCs under culturing conditions which allow expansion of the MSCs without differentiation.

33. The method of claim 32, wherein said culturing comprise a 2D culture.

34. The method of claim 32, wherein said culturing comprise a suspension (3D) culture.

35. The method of any one of claims 32-34, wherein said culturing is for at least 5 passages.

36. The method of any one of claims 32-35, wherein said culturing is for up to 25 passages.

37. The method of any one of claims 32-36, wherein said MSCs are capable of differentiating into any one of an adipogenic lineage, an osteoblastic lineage, and a chondrogenic lineage.

38. A method of generating mesenchymal stem cells (MSCs) from pluripotent stem cells (PSCs), the method comprising culturing the PSCs in a suspension culture in the culture medium of any one of claims 1-31 under culturing conditions suitable for differentiation of the PSCs to MSCs, thereby generating the MSCs.

39. A method of generating mesenchymal stem cells (MSCs) from pluripotent stem cells (PSCs), the method comprising culturing the PSCs in a suspension culture in a culture medium comprising a basal medium comprising MEM alpha, serum and ITS (Insulin, Transferrin and Selenium), under culturing conditions suitable for differentiation of the PSCs to MSCs, thereby generating the MSCs.

40. A method of generating mesenchymal stem cells (MSCs) from pluripotent stem cells (PSCs), the method comprising culturing the PSCs in a suspension culture in a culture medium comprising a basal medium comprising MEM alpha, serum at a concentration of at least 5 %, and ITS (Insulin, Transferrin and Selenium) at a concentration of at least 1 %, under culturing conditions suitable for differentiation of the PSCs to the MSCs, thereby generating the MSCs.

41. The method of any one of claims 38-40, wherein said culturing is affected under culturing conditions devoid of substrate adherence.

42. The method of any one of claims 38-41, wherein said suspension culture of PSCs comprises clumps.

43. The method of claim 42, wherein said suspension culture comprising said clumps comprises cell clusters comprising more than about 250 pluripotent stem cells.

44. The method of any one of claims 38-41, wherein said suspension culture of PSCs is devoid of clumps.

45. The method of claim 44, wherein said suspension culture devoid of said clumps comprises single cells or small clusters, each of said small clusters comprising no more than about 200 pluripotent stem cells.

46. An isolated population of mesenchymal stem cells (MSCs) in a suspension culture generated according to the method of any one of claims 38-45.

47. A cell culture comprising MSCs and the culture medium of any one of claims 1-31.

48. A cell culture comprising pluripotent stem cells (PSCs) and the culture medium of any one of claims 1-31.

49. A cell culture comprising pluripotent stem cells (PSCs) and a culture medium comprising a basal medium comprising MEM alpha, serum and ITS (Insulin, Transferrin and Selenium).

50. A cell culture comprising pluripotent stem cells (PSCs) and a culture medium comprising a basal medium comprising MEM alpha, serum at a concentration of at least 5 %, and ITS (Insulin, Transferrin and Selenium) at a concentration of at least 1 %.