WHAT IS CLAIMED:

1. A kit for improved culture of cells in vitro comprising a first container comprising a serum replacement and one or more separate containers comprising labile factor cocktail, the labile factor cocktail comprising two or more labile factors, wherein one or more of the labile factor cocktails contains at least transferrin or TT3 and one other labile factor and instructions for use.

2. The kit of claim 1, wherein the serum replacement comprises, i) liposomes and ii) base nutritive media.

3. The kit of claim 2, wherein the liposome is a nanoparticle

4. The kit of claim 3, wherein the nanoparticles have a mean diameter ranging from about 50 nm to about 500 nm.

5. The kit of claim 2, 3 or 4, wherein the liposome comprises lipids, fatty acids, sterols and/or free fatty acids.

6. The kit of any one of claims 1 to 5, wherein the labile factor is in frozen, liquid or lyophilized form.

7. The kit of any one of claims 1 to 6, wherein the kit comprises two, three, four, five, or six or more labile factors.

8. The kit of any one of claims 1 to 7, wherein the labile factor is selected from the group consisting of a growth factor, cytokine, a chemokine, a steroid hormone, a peptide hormone, an iron transporter, a peptide factor and a steroid.

9. The kit of any one of claims 1 to 8, wherein the labile factor is selected from the group consisting of insulin growth factor, epidermal growth factor, fibroblast growth factor, somatostatin, and triiodo-L-thyronine.

10. The kit of claim 9, wherein the labile factor is packaged such that a final concentration of the growth factor when added to the media is in the range of 0.05 to 250 ng/ml.

11. The kit of any one of claims 1 to 10, further comprising an iron source or iron transporter.

12. The kit of claim 11, wherein the iron source or iron transporter is selected from the group consisting of transferrin, lactoferrin, ferrous sulphate, ferrous citrate, ferric citrate, ferric ammonium citrate, ferric ammonium oxalate, ferric ammonium fumarate, ferric ammonium malate and ferric ammonium succinate

13. The kit of any one of claims 1 to 12, further comprising a copper source.

14. The kit of any one of claims 1 to 13, wherein the serum replacement media and one or more labile factors do not cause differentiation of the cells in culture.

15. The kit of any one of claims 1 to 14, further comprising a container comprising an agent for promoting cell adhesion.

16. The kit of claim 15, wherein the agent that promotes cell adhesion is selected from the group consisting of collagen, fibronectin, vitronectin, synthetic microcarriers and wrapped carbon tubes.

17. The kit of any one of claims 1 to 16, wherein the labile factor cocktail comprises two or more of insulin growth factor (IGF), epidermal growth factor (EGF), fibroblast growth factor (FGF), transferrin, somatostatin, and triiodo-L-thyronine.

18. The kit of claim 17, wherein the final concentration of IGF is from 0.5 to 3 ng/ml, the final concentration of EGF is from 1-10 ng/ml, the final concentration of FGF is from 3-10 ng/ml, the final concentration of transferrin is from 3-10 ng/ml, and the final concentration of somatostatin and triiodo-L-thyronine are from 5-15 ng/ml.

19. The kit of claim 16, wherein the vitronectin is at a final concentration range from 100-500 ng/ml.

20. The kit of any one of claims 1 to 19, wherein the serum replacement is animal-component free.

21. The kit of any one of claims 1 to 20, wherein the separately packaged labile factor has a longer half-life when introduced into serum replacement than the same labile factor when pre-packaged in serum replacement.

22. The kit of any one of claims 1 to 21, wherein packaging the one or more labile factors separate from the serum replacement improves the growth of the cell in cell culture compared to culture with a media pre-packaged with the labile factor.

23. The kit of any one of claims 1 to 22, wherein the cell is selected from the group consisting of pluripotent stem cells, embryonic stem cells, bone marrow stromal cells, hematopoietic progenitor cells, lymphoid stem cells, myeloid stem cells, T cells, B cells, macrophages, hepatic cells, pancreas cells, a carcinoma cell and cell lines.

24. The kit of claim 23, wherein the cell line is selected from the group consisting of CHO, CHOK1, DXB-11, DG-44, CHO/-DHFR, CV1, COS-7, HEK293, BHK, TM4, VERO, HELA, MDCK, BRL 3A, W138, Hep G2, SK-Hep, MMT, TRI, MRC 5, FS4, a T cell line, a B cell line, 3T3, RIN, A549, PC12, K562, PER.C6, SP2/0, NS-0, U20S, HT1080, a hybridoma and a cancer cell line.

25. The kit of any one of claims 1 to 24, wherein the serum replacement and the two or more labile factors are combined within 1, 2, 3, 4, 5, 6 or 7 days of use in the cell culture.

26. The kit of any one of claims 1 to 25, wherein the serum replacement is packaged in a volume of 50 ml, 100 ml, 500 ml or 1L.

27. The kit of any one of claims 1 to 26, wherein the serum replacement is packaged in a 1X, 5X, 10X or 20X solution.

28. The kit of any one of claims 1 to 27, further comprising a container comprising a selection or induction agent.

29. The kit of any one of claims 1 to 28, wherein the container is selected from the group consisting of a tube, vial, ampoule, and bottle.

30. The kit of any one of claims 1 to 29, wherein the container comprising the labile factor is coated to prevent loss of protein activity.

31. The kit of any one of claims 1 to 30, wherein the kit further comprises cells packaged in a separate container.

32. The kit of any one of claims 1 or 3 to 31, wherein the serum replacement and labile factor are added to a basic media.

33. The kit of any one of claims 1 to 31, wherein the serum replacement is a complete media.

34. Use of a kit of any one of claims 1 to 33 for culture of cells in vitro.

CLAIMS

1. A kit for improved culture of cells in vitro comprising a first container comprising a serum replacement and one or more separate containers comprising a labile factor cocktail consisting of at least two and up to six labile factors wherein said labile factor cocktail comprises: (i) transferrin; or (ii) triiodo-L-thyronine and

at least one other labile factor selected from the group consisting of insulin growth factor, epidermal growth factor, fibroblast growth factor, somatostatin, transferrin and triiodo-Lthyronine and instructions for use.

2. The kit of claim 1, wherein the serum replacement comprises, i) liposomes and ii) base nutritive media.

3. The kit of claim 2, wherein the liposome is a nanoparticle

4. The kit of claim 3, wherein the nanoparticles have a mean diameter ranging from about 50 nm to about 500 nm.

5. The kit of claim 2, 3 or 4, wherein the liposome comprises lipids, fatty acids, sterols and/or free fatty acids.

6. The kit of any one of claims 1 to 5, wherein the labile factor is in frozen, liquid or lyophilized form.

7. The kit of any one of claims 1 to 6, wherein the kit comprises two, three, four, five, or six or more labile factors.

8. The kit of any one of claims 1-7, wherein the labile factor is packaged such that a final concentration of the growth factor when added to the media is in the range of 0.05 to 250 ng/ml.

9. The kit of any one of claims 1 to 8, further comprising an iron source or iron transporter.

10. The kit of claim 9, wherein the iron source or iron transporter is selected from the group consisting of transferrin, lactoferrin, ferrous sulphate, ferrous citrate, ferric citrate, ferric ammonium citrate, ferric ammonium oxalate, ferric ammonium fumarate, ferric ammonium malate and ferric ammonium succinate

11. The kit of any one of claims 1 to 10, further comprising a copper source.

12. The kit of any one of claims 1 to 11, wherein the serum replacement media and one or more labile factors do not cause differentiation of the cells in culture.

13. The kit of any one of claims 1 to 12, further comprising a container comprising an agent for promoting cell adhesion.

14. The kit of claim 13, wherein the agent that promotes cell adhesion is selected from the group consisting of collagen, fibronectin, vitronectin, synthetic microcarriers and wrapped carbon tubes.

15. The kit of any one of claims 1 to 14, wherein the labile factor cocktail comprises two or more of insulin growth factor (IGF), epidermal growth factor (EGF), fibroblast growth factor (FGF), transferrin, somatostatin, and triiodo-L-thyronine.

16. The kit of claim 15, wherein the final concentration of IGF is from 0.5 to 3 ng/ml, the final concentration of EGF is from 1-10 ng/ml, the final concentration of FGF is from 3-10 ng/ml, the final concentration of transferrin is from 3-10 ng/ml, and the final concentration of somatostatin and triiodo-L-thyronine are from 5-15 ng/ml.

17. The kit of claim 14, wherein the vitronectin is at a final concentration range from 100-500 ng/ml.

18. The kit of any one of claims 1 to 17, wherein the serum replacement is animal component free.

19. The kit of any one of claims 1 to 18, wherein the separately packaged labile factor has a longer half-life when introduced into serum replacement than the same labile factor when pre-packaged in serum replacement.

20. The kit of any one of claims 1 to 19, wherein packaging the one or more labile factors separate from the serum replacement improves the growth of the cell in cell culture compared to culture with a media pre-packaged with the labile factor.

21. The kit of any one of claims 1 to 20, wherein the cell is selected from the group consisting of pluripotent stem cells, embryonic stem cells, bone marrow stromal cells, hematopoietic progenitor cells, lymphoid stem cells, myeloid stem cells, T cells, B cells, macrophages, hepatic cells, pancreas cells, a carcinoma cell and cell lines.

22. The kit of claim 21, wherein the cell line is selected from the group consisting of CHO, CHOK1, DXB-11, DG-44, CHO/-DHFR, CV1, COS-7, HEK293, BHK, TM4, VERO, HELA, MDCK,

BRL 3A, W138, Hep G2, SK-Hep, MMT, TRI, MRC 5, FS4, a T cell line, a B cell line, 3T3, RIN, A549, PC12, K562, PER.C6, SP2/0, NS-0, U20S, HT1080, a hybridoma and a cancer cell line.

23. The kit of any one of claims 1 to 22, wherein the serum replacement and the two or more labile factors are combined within 1, 2, 3, 4, 5, 6 or 7 days of use in the cell culture.

24. The kit of any one of claims 1 to 23, wherein the serum replacement is packaged in a volume of 50 ml, 100 ml, 500 ml or 1L.

25. The kit of any one of claims 1 to 24, wherein the serum replacement is packaged in a IX, 5X, 10X or 20X solution.

26. The kit of any one of claims 1 to 25, further comprising a container comprising a selection or induction agent.

27. The kit of any one of claims 1 to 26, wherein the container is selected from the group consisting of a tube, vial, ampoule, and bottle.

28. The kit of any one of claims 1 to 27, wherein the container comprising the labile factor is coated to prevent loss of protein activity.

29. The kit of any one of claims 1 to 28, wherein the kit further comprises cells packaged in a separate container.

30. The kit of any one of claims 1 or 3 to 29, wherein the serum replacement and labile factor are added to a basic media.

31. The kit of any one of claims 1 to 29, wherein the serum replacement is a complete media.

32. Use of a kit of any one of claims 1 to 31 for culture of cells in vitro.