Claims

1. A culture medium for growing anchorage-dependent cells comprising:

the amino acids L-Arginine; L-Cystine; L-Cysteine; L-Glutamine; Glycine; L-Histidine; L-Isoleucine; L-Leucine; L-Lysine; L-Methionine; L-Phenylalanine; L-serine; L-Threonine; L-tryptophan; L-tyrosine; L-Valine; L-Alanine; L-Asparagine; L-Aspartic Acid; L-Glutamic Acid; L-Proline; and L-Taurine;

the vitamins D-calcium pantothenate; choline chloride; folic acid; I-inositol; niacinamide; pyridoxal; riboflavin; thiamine; d-Biotin; pyridoxine; and Vitamin B_{12} (cyanocobalamin);

the salts calcium chloride, potassium chloride, magnesium sulfate, sodium chloride, and one or more sodium phosphate salts;

at least 0.0001 g/L of thymidine, and at least 0.005 g/L of each of adenosine, cytidine, uridine, and guanosine;

insulin; transferrin; lipoic acid/thioctic acid; ethanolamine; sodium selenite; and one or more energy substrate.

2. The culture medium of claim 1, wherein the medium further comprises one or more additional trace minerals.

3. The culture medium of claim 2, wherein the medium comprises from about 5×10^{-8} g/L to about 3×10^{-4} g/L of each of the trace minerals.

4. The culture medium of claims 2 or 3, wherein the trace minerals are ferric nitrate, copper sulfate, and zinc sulfate.

5. The culture medium of claim 4, wherein the medium comprises ferric nitrate ($9H_2O$), copper(II)sulfate pentahydrate ($CuSO_4.5H_2O$) and Zinc sulfate, heptahydrate ($ZnSO_4.7H_2O$).

6. The culture medium of any one of claims 1-5, wherein the medium further comprises putrescine, a stabilizer, and/or an anti-foaming agent.

7. The culture medium of any one of claims 1-6, wherein the energy substrate is glucose and/or sodium pyruvate.

8. The culture medium of claim 7, wherein the medium comprises at least 0.8 g/L of D-glucose and at least 0.1 g/L of sodium pyruvate.

9. The culture medium of any one of claims 1-8, wherein the medium comprises:

from about 0.0006 g/L to about 0.1 g/L of each of the amino acids; or

from about 5×10^{-6} g/L to about 0.015 g/L of each of the vitamins.

10. The culture medium of any one of claims 1-8, wherein the medium comprises:

from about 0.0006 g/L to about 0.1 g/L of each of the amino acids; and

from about 5×10^{-6} g/L to about 0.015 g/L of each of the vitamins.

11. The culture medium of any one of claims 1-9, wherein the culture medium comprises:

at least 0.05 g/L of L-Arginine; at least 0.02 g/L of L-Cystine; at least 0.2 g/L of L-Glutamine; at least 0.01 g/L Glycine; at least 0.02 g/L of L-Histidine; at least 0.09 g/L of L-Isoleucine; at least 0.09 g/L of L-Leucine; at least 0.09 g/L of L-Lysine; at least 0.02 g/L of L-Methionine; at least 0.05 g/L of L-Phenylalanine; at least 0.03 g/L of L-serine; at least 0.08 g/L of L-Threonine; at least 0.009 g/L of L-tryptophan; at least 0.08 g/L of L-tyrosine; at least 0.08 g/L of L-Valine; at least 0.005 g/L L-Cysteine; at least 0.0004 g/L of L-Alanine; at least 0.01 g/L of L-Asparagine; at least 0.006 g/L of L-Aspartic Acid; at least 0.03 g/L of L-Glutamic Acid; at least 0.005 g/L L-Proline; and at least 0.0003 g/L of L-Taurine;

from 5×10^{-6} g/L to 0.015 g/L of each of the vitamins;

at least 0.05 g/L of Calcium Chloride, Anhydrous, at least 0.1 g/L of potassium chloride; at least 0.2 g/L of magnesium sulfate, at least 0.08 g/L of sodium phosphate, monobasic, H_2O and at least 0.0005 g/L of sodium phosphate, dibasic heptahydrate ($Na_2HPO_4.7H_2O$); and

at least 0.003 g/L of insulin, at least 0.05 g/L of transferrin, at least 5×10^{-6} g/L of lipoic acid/thioctic acid, at least 0.05 g/L of ethanolamine, and at least 0.00004 g/L of sodium selenite.

12. The culture medium of any one of claims 1-11, wherein the anchorage-dependent cells are selected from the group consisting of umbilical cord tissue-derived cells, mesenchymal stem

cells, bone marrow derived stem cells, cells derived from placental tissue, adherent cells derived from non-marrow tissues, cells derived from the dental pulp of teeth, and cells derived from amniotic fluid.

13. The culture medium of claim 12, wherein the anchorage dependent cells are umbilical cord tissue-derived cells.

14. The culture medium of claim 13, wherein the umbilical cord tissue-derived cells are isolated from human umbilical cord tissue substantially free of blood, are capable of self-renewal and expansion in culture, have the potential to differentiate, express CD13, CD90, HLA-ABC, and do not express CD34, CD117, and HLA-DR.

15. The culture medium of any one of claims 1-14, wherein the medium further comprises albumin.

16. The culture medium of claim 15, wherein the albumin is bovine serum albumin.

17. The cell culture medium of any one of claims 1-16, wherein the culture medium does not contain exogenously added factors that promote growth of undifferentiated cells.

18. The cell culture medium of any one of claims 1-17, wherein the culture medium does not comprise a fibroblast growth factor.

19. A kit for growing for growing anchorage-dependent cells comprising a culture medium of any one of claims 1-18 and a serum free-nutrient solution.

20. The kit of claim 19, wherein the serum-free nutrient solution comprises:

the amino acids L-Arginine, L-Cystine, L-Cysteine, Glycine, L-Histidine, L-Isoleucine, L-Leucine, L-Lysine, L-Methionine, L-Phenylalanine, L-serine, L-Threonine, L-tryptophan, L-tyrosine, L-Valine, L-Alanine, L-Asparagine, L-Aspartic Acid, L-Glutamic Acid, L-Proline, and L-Taurine;

the vitamins D-calcium pantothenate; choline chloride; folic acid; I-inositol; niacinamide; pyridoxal; riboflavin; thiamine; d-Biotin; pyridoxine; and Vitamin B_{12} (cyanocobalamin);

the salts sodium phosphate, monobasic and sodium phosphate, dibasic heptahydrate;

the nucleosides adenosine, cytidine, uridine and guanosine; and

insulin; transferrin; lipoic acid/thioctic acid; ethanolamine; and sodium selenite.

21. The kit of claim 20, wherein the serum-free nutrient solution comprises one or more of:

from at least 0.0001 g/L to at least 0.03 g/L of each of the amino acids;

from 5×10^{-6} g/L to 0.001 g/L of each of the vitamins;

from 0.0005 g/L to 0.001 g/L of the phosphate salts; and

at least 0.0001 g/L to at least 0.005 g/L of the each of the nucleosides.

22. The kit of any one of claims 19-21, wherein the serum-free nutrient solution further comprises putrescine, a stabilizer, and/or an anti-foaming agent.