CLAIMS

1. A method of making an extracellular matrix composition comprising one or more embryonic proteins comprising:

culturing fibroblast cells under hypoxic conditions of about 1-5% oxygen for at least 2 weeks on a surface of beads in a suitable growth medium, thereby producing a soluble and a non-soluble fraction comprising one or more embryonic proteins.

2. The method of claim 1, wherein the growth medium comprises serum.

3. The method of claim 1, wherein the growth medium is serum-free.

4. The method of claim 1, wherein collagen species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.

5. The method of claim 4, wherein the collagen is selected from type V alpha 1; IX alpha 1; IX alpha 2; VI alpha 2; VIII alpha 1; IV, alpha 5; VII alpha 1; XVIII alpha 1; or XII alpha 1.

6. The method of claim 1, wherein Wnt species are upregulated as compared with media-produced in oxygen conditions of about 15-20% oxygen.

7. The method of claim 6, wherein the Wnt species are wnt 7a and wnt 11.

8. The method of claim 1, wherein laminin species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.

9. The method of claim 8, wherein the laminin species is laminin 8.

10. The method of claim 1, wherein the cell-free supernatant is dialyzed, lyophilized and reconstituted in a buffer.

11. The method of claim 1, wherein the cell-free supernatant is dialyzed, desiccated and reconstituted in a buffer.

~~12. The method of claim 1, wherein the cells are fibroblasts.~~

~~13~~12. The method of claim 1~~2~~, wherein the fibroblasts are neonatal fibroblasts.

~~14~~13. The method of claim 1, wherein the surface is three-dimensional.

~~15~~14. The method of claim ~~14~~13, wherein the surface comprises mesh.

~~16~~15. The method of claim 1, wherein the surface is two-dimensional.

~~17~~16. The method of claim ~~16~~15, wherein the surface comprises beads.

~~18~~17. The method of claim 1, wherein the cells are species specific.

~~19. A hypoxic tissue culture system including a composition as in claim 1.~~

~~20. The tissue culture system of claim 19, wherein the system is used to support the growth of stem cells.~~

~~21. The tissue culture system of claim 20, wherein the stem cells are embryonic stem cells, mesenchymal stem cells or neuronal stem cells.~~

~~22~~18. A method of producing ~~a Wnt protein and~~ a vascular endothelial growth factor (VEGF) comprising:

culturing fibroblast cells under hypoxic conditions of about 1-5% oxygen for at least 2 weeks on a surface of beads in a suitable growth medium, thereby producing ~~the Wnt protein and~~ the VEGF.

~~23~~19. The method of claim ~~22~~18, wherein the growth medium is serum-free.

~~24. The method of claim 22, wherein Wnt species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.~~

~~25. The method of claim 24, wherein the Wnt species are wnt 7a and wnt 11.~~

~~26~~20. The method of claim ~~22~~18, wherein VEGF species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.

~~27~~21. The method of claim ~~26~~20, wherein the VEGF species is VEGF-A or isoform thereof.

~~28. The method of claim 22, wherein the cells are fibroblasts.~~

~~29~~22. The method of claim ~~22~~18, wherein the surface is three-dimensional.

~~30~~23. The method of claim ~~29~~22, wherein the surface comprises mesh.

~~31~~24. The method of claim ~~22~~18, wherein the surface is two-dimensional.

~~32~~25. The method of claim ~~31~~24, wherein the surface comprises beads.

CLAIMS

1. A method of making an extracellular matrix composition comprising one or more embryonic proteins comprising:

culturing fibroblast cells under hypoxic conditions of about 1-5% oxygen for at least 2 weeks on a surface of beads in a suitable growth medium, thereby producing a soluble and a non-soluble fraction comprising one or more embryonic proteins.

2. The method of claim 1, wherein the growth medium comprises serum.

3. The method of claim 1, wherein the growth medium is serum-free.

4. The method of claim 1, wherein collagen species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.

5. The method of claim 4, wherein the collagen is selected from type V alpha 1; IX alpha 1; IX alpha 2; VI alpha 2; VIII alpha 1; IV, alpha 5; VII alpha 1; XVIII alpha 1; or XII alpha 1.

6. The method of claim 1, wherein Wnt species are upregulated as compared with media-produced in oxygen conditions of about 15-20% oxygen.

7. The method of claim 6, wherein the Wnt species are wnt 7a and wnt 11.

8. The method of claim 1, wherein laminin species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.

9. The method of claim 8, wherein the laminin species is laminin 8.

10. The method of claim 1, wherein the cell-free supernatant is dialyzed, lyophilized and reconstituted in a buffer.

11. The method of claim 1, wherein the cell-free supernatant is dialyzed, desiccated and reconstituted in a buffer.

12. The method of claim 1, wherein the fibroblasts are neonatal fibroblasts.

13. The method of claim 1, wherein the surface is three-dimensional.

14. The method of claim 13, wherein the surface comprises mesh.

15. The method of claim 1, wherein the surface is two-dimensional.

16. The method of claim 15, wherein the surface comprises beads.

17. The method of claim 1, wherein the cells are species specific.

18. A method of producing a vascular endothelial growth factor (VEGF) comprising:

culturing fibroblast cells under hypoxic conditions of about 1-5% oxygen for at least 2 weeks on a surface of beads in a suitable growth medium, thereby producing the VEGF.

19. The method of claim 18, wherein the growth medium is serum-free.

20. The method of claim 18, wherein VEGF species are upregulated as compared with media produced in oxygen conditions of about 15-20% oxygen.

21. The method of claim 20, wherein the VEGF species is VEGF-A or isoform thereof.

22. The method of claim 18, wherein the surface is three-dimensional.

23. The method of claim 22, wherein the surface comprises mesh.

24. The method of claim 18, wherein the surface is two-dimensional.

25. The method of claim 24, wherein the surface comprises beads.