CLAIMS

What is claimed is:

1. A defined cell culture formulation for the culture, maintenance, and expansion of pluripotent stem cells, wherein the defined cell culture formulation comprises basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, and ascorbic acid; and wherein culturing stem cells in the defined cell culture formulation maintains the pluripotency and karyotypic stability of the cells for at least 10 passages.

2. The defined cell culture formulation of claim 1, wherein the cell culture formulation further comprises insulin growth factor 1 (IGF-1).

3. The defined cell culture formulation of claim 1 or 2, wherein the cell culture formulation comprises DMEM-F12.

4. The defined cell culture formulation of claim 1, wherein the cell culture formulation further comprises Trace Elements C, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid, lithium chloride, glucose, Defined Lipids, and L-alanyl-L-glutamine dipeptide.

5. The defined cell culture formulation of claim 4, wherein the cell culture formulation comprises MCDB-131.

6. The defined cell culture formulation of any one of claims 1 to 5, wherein ITS-X provides the insulin, transferrin, and selenium.

7. The defined cell culture formulation of any one of claims 1 to 6, wherein the fatty acid free albumin is reagent grade.

8. The defined cell culture formulation of any one of claims 1 to 7, wherein the TGF-β ligand is TGF-β1.

9. A defined cell culture formulation consisting essentially of DMEM-F12 basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, and IGF-1.

10. A defined cell culture formulation consisting essentially of DMEM-F12 basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, IGF-1, and ascorbic acid.

11. A defined cell culture formulation consisting essentially of MCDB-131, Trace Elements C, ascorbic acid, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid, lithium chloride, glucose, defined lipids, insulin, transferrin, selenium, fatty acid free albumin, a TGF-β ligand, bFGF, and L-alanyl-L-glutamine dipeptide.

12. A method for the expansion of human pluripotent stem cells, wherein the method comprises culturing the human pluripotent stem cells on a feeder-free matrix in a defined cell culture formulation; wherein the defined cell culture formulation comprises basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, and ascorbic acid; and wherein culturing the stem cells in the defined cell culture formulation maintains the pluripotency and karyotypic stability of the cells for at least 10 passages.

13. The method of claim 12, wherein the defined cell culture formulation further comprises insulin growth factor 1 (IGF-1).

14. The method of claim 12 or 13, wherein the cell culture formulation comprises DMEM-F12.

15. The method of claim 12, wherein the defined cell culture formulation further comprises Trace Elements C, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid, lithium chloride, glucose, Defined Lipids, and L-alanyl-L-glutamine dipeptide.

16. The method of claim 15, wherein the defined cell culture formulation comprises MCDB-131.

17. An in vitro population of pluripotent cells cultured in DMEM/F12 medium comprising ITS-X, fatty acid-free albumin, TGF-B1, bFGF, and IGF-1, wherein at least 70% of the cells in the population are Oct4+, NANOG+, SOX2+, KI67+, FOXA2+, and ZFP42-.

CLAIMS

What is claimed is:

1. A defined cell culture formulation for the culture, maintenance, and expansion of pluripotent stem cells, wherein the defined cell culture formulation comprises basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, and ascorbic acid; and wherein culturing stem cells in the defined cell culture formulation maintains the pluripotency and karyotypic stability of the cells for at least 10 passages.

2. The defined cell culture formulation of claim 1, wherein the cell culture formulation further comprises insulin growth factor 1 (IGF-1).

3. The defined cell culture formulation of claim 1 or 2, wherein the cell culture formulation comprises DMEM-F12.

4. The defined cell culture formulation of claim 1, wherein the cell culture formulation further comprises Trace Elements C, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid, lithium chloride, glucose, Defined Lipids, and L-alanyl-L-glutamine dipeptide.

5. The defined cell culture formulation of claim 4, wherein the cell culture formulation comprises MCDB-131.

6. A defined cell culture formulation consisting essentially of DMEM-F12 basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, and IGF-1.

7. A defined cell culture formulation consisting essentially of DMEM-F12 basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, IGF-1, and ascorbic acid.

8. A defined cell culture formulation consisting essentially of MCDB-131, Trace Elements C, ascorbic acid, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid, lithium chloride, glucose, defined lipids, insulin, transferrin, selenium, fatty acid free albumin, a TGF-β ligand, bFGF, and L-alanyl-L-glutamine dipeptide.

9. A method for the expansion of human pluripotent stem cells, wherein the method comprises culturing the human pluripotent stem cells on a feeder-free matrix in a defined cell culture formulation; wherein the defined cell culture formulation comprises basal medium, insulin, transferrin, selenium, fatty-acid free albumin, a TGF-β ligand, bFGF, and ascorbic acid; and wherein culturing the stem cells in the defined cell culture formulation maintains the pluripotency and karyotypic stability of the cells for at least 10 passages.

10. The method of claim 9, wherein the defined cell culture formulation further comprises insulin growth factor 1 (IGF-1).

11. The method of claim 9 or 10, wherein the cell culture formulation comprises DMEM-F12.

12. The method of claim 9, wherein the defined cell culture formulation further comprises Trace Elements C, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid, lithium chloride, glucose, Defined Lipids, and L-alanyl-L-glutamine dipeptide.

13. The method of claim 12, wherein the defined cell culture formulation comprises MCDB-131.

14. An in vitro population of pluripotent cells cultured in DMEM/F12 medium comprising ITS-X, fatty acid-free albumin, TGF-B1, bFGF, and IGF-1, wherein at least 70% of the cells in the population are Oct4+, NANOG+, SOX2+, KI67+, FOXA2+, and ZFP42-.