CLAIMS:

1. A method of preparing breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC, comprising the steps of:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form one or more spheroid; and

c) harvesting said one or more spheroids, wherein said one or more spheroids comprise or consist of said BSC.

2. The method of claim 1 wherein the step of growing said mixture of cells comprises the proliferation of a cell.

3. The method of claim 1 or claim 2 wherein the step of growing said mixture of cells comprises selective proliferation of said BSC.

4. The method of any one of the preceding claims wherein said at least one spheroid is harvested after growing in suspension culture for up to 12-14 days.

5. The method of any one of the preceding claims wherein said at least one spheroid is harvested after growing in suspension culture for 9 days.

6. The method of any one of the preceding claims, further comprising the step of passaging said at least one spheroid in suspension culture after step (b) and before step (c).

7. The method of claim 6 wherein said passaging comprises dissociating said at least one spheroid.

8. The method of any one of the preceding claims wherein said at least one spheroid is grown in a low-binding cell culture vessel.

9. The method of any one of the preceding claims wherein said at least one spheroid is grown in a feeder-free culture.

10. The method of any one of the preceding claims wherein the step of growing said mixture of cells in suspension culture comprises growing said cells in the presence of any one or more of the following, or combinations thereof: growth factors, insulin, transferrin, selenium, nicotinamide, dexamethasone, fetal bovine serum or non-essential amino acids (NNEA).

11. The method of claim 10, wherein said growth factors are selected from epidermal growth factor and fibroblast growth factor.

12. The method of any one of the preceding claims wherein said BSC is a pluripotent stem cell.

13. The method of any one of the preceding claims wherein the breastmilk is human breastmilk and wherein said BSC is a human pluripotent stem cell.

14. The method of claim 13 wherein said human BSC (hBSC) expresses Oct4, Sox2, Nanog and/or Klf4.

15. The method of claim 13 wherein said human BSC (hBSC) expresses Oct4, Sox2, Nanog, SSEA4 and TRA-1 -60/81.

16. A method of preparing breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC, comprising the steps of:

a) separating cells from non-cellular portions of breastmilk obtained from a subject after initiation of feeding, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form one or more spheroid; and

c) harvesting said one or more spheroids, wherein said one or more spheroids comprise or consist of said BSC.

17. The method of claim 16 wherein said breastmilk is collected after or at the end of said feeding.

18. The method of claim 17 wherein said breastmilk is collected from ~~about~~ 0 minutes to ~~about~~ one hour after said feeding.

19. The method of claim 17 or claim 18 wherein the breastmilk is collected ~~about~~ 25-30 minutes after said feeding.

20. The method of any one of the preceding claims further comprising the step of differentiating said BSC.

21. The method of claim 20 wherein said BSC is differentiated to become a myoepithelial cell, a luminal cell, a lactocyte, a neural cell, a stromal cell, an osteoblast, a chondrocyte, an adipocyte, a cardiomyocyte, a hepatocyte, or a beta islet cell.~~22. Breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC prepared according to the method of any one of claims 1 to 21.~~

~~23. The BSC according to claim 22 wherein said cell is a pluripotent stem cell.~~

~~24. Breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC prepared according to the method of any one of claims 1 to 21 , wherein said cell has low tumorigenicity and does not form teratomas.~~

~~25. Isolated breastmilk stem cell(s) (BSC), wherein said BSC is a pluripotent stem cell or a progenitor or a more committed cell.~~

~~26. The isolated BSC of claim 25 , wherein said BSC is capable of differentiating or has differentiated to become a myoepithelial cell, a luminal cell, a lactocyte, a neural cell, a stromal cell, an osteoblast, a chondrocyte, an adipocyte, a cardiomyocyte, a hepatocyte, or a beta islet cell.~~

~~27. A composition comprising the BSC or the spheroid comprising or consisting of the BSC of any one of claims 22 to 26.~~

~~28~~22. ~~A method of cell treatment in a patient in need thereof comprising administering to said patient an effective amount of the cell or the~~ Use of one of more spheroids comprising or consisting of breastmilk stem cells(s) (BSC), in the preparation of a medicament for cell treatment, wherein said one or more spheroids are prepared by:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form said one or more spheroids; and

c) harvesting said one or more spheroids.

~~the cells of any one of claims 22 to 26 or of the composition of claim 27.~~

~~29.~~23 The ~~method~~ use of claim ~~28~~22, wherein the cells of said one or more spheroids are ~~is~~ autologous to the patient.

~~30.~~24 The ~~method~~ use of claim ~~28~~22, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant's mother.

~~31.~~25 ~~A method of treating milk production deficiency in a lactating female in need thereof comprising administering to said female~~ Use of one or more spheroids comprising or consisting of breastmilk stem cell(s) (BSC) in the manufacture of a medicament for treating milk production deficiency in a lactating female~~the cell or the spheroid comprising or consisting of the cells of any one of claims 22 to 26 or of the composition of claim 27 in an amount effective to treat said milk production deficiency~~, wherein said one or more spheroids are prepared by:

a) separating cells from non-cellular portions of breastmilk obtained from a subject wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form said one or more spheroids;and

c) harvesting said one or more spheroids.

26. The method of claim 25, wherein the cell is autologous to the lactating female.~~32. The method of claim 31, wherein the cell is autologous to the patient.~~

~~33. The method of claim 31, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant's mother.~~

~~34~~27. ~~A method of treating a disease condition in a patient in need thereof comprising the step of administering to the patient an effective amount of~~ Use of one or more spheroids comprising or consisting of breastmilk stem cell(s) (BSC) ~~the cell or the spheroid comprising or consisting of the cells of any one of claims 22 to 26 or of the composition of claim 27~~in the manufacture of a medicament for treating a disease condition selected from the group consisting of:~~, wherein the disease is a~~ cardiovascular disease~~s;~~, diabetes~~;~~, inborn errors in metabolism~~;~~, cancer~~;~~, ~~a~~ neurological disease~~s;~~, ~~a~~ chronic disease~~s;~~, ~~a~~ liver disease~~s;~~, ~~a~~ fatal infant disease~~s;~~, ~~or~~and any organ/tissue disease~~s~~ for which administration of said cell is beneficial, and wherein said one or more spheroids are prepared by:

a) separating cells from non-cellular portions of breastmilk obtained from a subhect, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form said one or more spheroids; and

c) harvesting said one or more spheroids.

~~35~~28. The use ~~method~~ of claim ~~34~~27, wherein the cell is autologous to the patient.

~~36~~29. The method of claim ~~34~~27, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant's mother.

CLAIMS:

1. A method of preparing breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC, comprising the steps of:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture form one or more spheroid; and

c) harvesting said one or more spheroids, wherein said one or more spheroids comprise or consist of said BSC.

2. The method of claim 1 wherein the step of growing said mixture of cells comprises the proliferation of a cell.

3. The method of claim 1 or claim 2 wherein the step of growing said mixture of cells comprises selective proliferation of said BSC.

4. The method of any one of the preceding claims wherein said at least one spheroid is harvested after growing in suspension culture for up to 12-14 days.

5. The method of any one of the preceding claims wherein said at least one spheroid is harvested after growing in suspension culture for 9 days.

6. The method of any one of the preceding claims, further comprising the step of passaging said at least one spheroid in suspension culture after step (b) and before step (c).

7. The method of claim 6 wherein said passaging comprises dissociating said at least one spheroid.

8. The method of any one of the preceding claims wherein said at least one spheroid is grown in a low-binding cell culture vessel.

9. The method of any one of the preceding claims wherein said at least one spheroid is grown in a feeder-free culture.

10. The method of any one of the preceding claims wherein the step of growing said mixture of cells in suspension culture comprises growing said cells in the presence of any one or more of the following, or combinations thereof: growth factors, insulin, transferrin, selenium, nicotinamide, dexamethasone, fetal bovine serum or non-essential amino acids (NNEA).

11. The method of claim 10, wherein said growth factors are selected from epidermal growth factor and fibroblast growth factor.

12. The method of any one of the preceding claims wherein said BSC is a pluripotent stem cell.

13. The method of any one of the preceding claims wherein the breastmilk is human breastmilk and wherein said BSC is a human pluripotent stem cell.

14. The method of claim 13 wherein said human BSC (hBSC) expresses Oct4, Sox2, Nanog and/or Klf4.

15. The method of claim 13 wherein said human BSC (hBSC) expresses Oct4, Sox2, Nanog, SSEA4 and TRA-1-60/81.

16. A method of preparing breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC, comprising the steps of:

a) separating cells from non-cellular portions of breastmilk obtained from a subject after initiation of feeding, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture form one or more spheroid; and

c) harvesting said one or more spheroids, wherein said one or more spheroids comprise or consist of said BSC.

17. The method of claim 16 wherein said breastmilk is collected after or at the end of said feeding.

18. The method of claim 17 wherein said breastmilk is collected from about 0 minutes to about one hour after said feeding.

19. The method of claim 17 or claim 18 wherein the breastmilk is collected about 25-30 minutes after said feeding.

20. The method of any one of the preceding claims further comprising the step of differentiating said BSC.

21. The method of claim 20 wherein said BSC is differentiated to become a myoepithelial cell, a luminal cell, a lactocyte, a neural cell, a stromal cell, an osteoblast, a chondrocyte, an adipocyte, a cardiomyocyte, a hepatocyte, or a beta islet cell.

22. Breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC prepared according to the method of any one of claims 1 to 21.

23. The BSC according to claim 22 wherein said cell is a pluripotent stem cell.

24. Breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC prepared according to the method of any one of claims 1 to 21, wherein said cell has low tumorigenicity and does not form teratomas.

25. Isolated breastmilk stem cell(s) (BSC), wherein said BSC is a pluripotent stem cell or a progenitor or a more committed cell.

26. The isolated BSC of claim 25 , wherein said BSC is capable of differentiating or has differentiated to become a myoepithelial cell, a luminal cell, a lactocyte, a neural cell, a stromal cell, an osteoblast, a chondrocyte, an adipocyte, a cardiomyocyte, a hepatocyte, or a beta islet cell.

27. A composition comprising the BSC or the spheroid comprising or consisting of the BSC of any one of claims 22 to 26.

28. A method of cell treatment in a patient in need thereof comprising administering to said patient an effective amount of the cell or the spheroid comprising or consisting of the cells of any one of claims 22 to 26 or of the composition of claim 27.

29. The method of claim 28, wherein the cell is autologous to the patient.

30. The method of claim 28, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant's mother.

31. A method of treating milk production deficiency in a lactating female in need thereof comprising administering to said female the cell or the spheroid comprising or consisting of the cells of any one of claims 22 to 26 or of the composition of claim 27 in an amount effective to treat said milk production deficiency.

32. The method of claim 31, wherein the cell is autologous to the patient.

33. The method of claim 31, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant's mother.

34. A method of treating a disease condition in a patient in need thereof comprising the step of administering to the patient an effective amount of the cell or the spheroid comprising or consisting of the cells of any one of claims 22 to 26 or of the composition of claim 27, wherein the disease condition is a cardiovascular disease, diabetes, inborn errors in metabolism, cancer, a neurological disease, a chronic disease, a liver disease, a fatal infant disease, or any organ/tissue disease for which administration of said cell is beneficial.

35. The method of claim 34, wherein the cell is autologous to the patient.

36. The method of claim 34, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant's mother.

CLAIMS:

1. A method of preparing breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC, comprising the steps of:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form one or more spheroid; and

c) harvesting said one or more spheroids, wherein said one or more spheroids comprise or consist of said BSC.

2. The method of claim 1 wherein the step of growing said mixture of cells comprises the proliferation of a cell.

3. The method of claim 1 or claim 2 wherein the step of growing said mixture of cells comprises selective proliferation of said BSC.

4. The method of any one of the preceding claims wherein said at least one spheroid is harvested after growing in suspension culture for up to 12-14 days.

5. The method of any one of the preceding claims wherein said at least one spheroid is harvested after growing in suspension culture for 9 days.

6. The method of any one of the preceding claims, further comprising the step of passaging said at least one spheroid in suspension culture after step (b) and before step (c).

7. The method of claim 6 wherein said passaging comprises dissociating said at least one spheroid.

8. The method of any one of the preceding claims wherein said at least one spheroid is grown in a low-binding cell culture vessel.

9. The method of any one of the preceding claims wherein said at least one spheroid is grown in a feeder-free culture.

10. The method of any one of the preceding claims wherein the step of growing said mixture of cells in suspension culture comprises growing said cells in the presence of any one or more of the following, or combinations thereof: growth factors, insulin, transferrin, selenium, nicotinamide, dexamethasone, fetal bovine serum or non-essential amino acids (NNEA).

11. The method of claim 10, wherein said growth factors are selected from epidermal growth factor and fibroblast growth factor.

12. The method of any one of the preceding claims wherein said BSC is a pluripotent stem cell.

13. The method of any one of the preceding claims wherein the breastmilk is human breastmilk and wherein said BSC is a human pluripotent stem cell.

14. The method of claim 13 wherein said human BSC (hBSC) expresses Oct4, Sox2, Nanog and/or Klf4.

15. The method of claim 13 wherein said human BSC (hBSC) expresses Oct4, Sox2, Nanog, SSEA4 and TRA-1-60/81.

16. A method of preparing breastmilk stem cell(s) (BSC) or a spheroid comprising or consisting of BSC, comprising the steps of:

a) separating cells from non-cellular portions of breastmilk obtained from a subject after initiation of feeding, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form one or more spheroid; and

c) harvesting said one or more spheroids, wherein said one or more spheroids comprise or consist of said BSC.

17. The method of claim 16 wherein said breastmilk is collected after or at the end of said feeding.

18. The method of claim 17 wherein said breastmilk is collected from 0 minutes to one hour after said feeding.

19. The method of claim 17 or claim 18 wherein the breastmilk is collected 25-30 minutes after said feeding.

20. The method of any one of the preceding claims further comprising the step of differentiating said BSC.

21. The method of claim 20 wherein said BSC is differentiated to become a myoepithelial cell, a luminal cell, a lactocyte, a neural cell, a stromal cell, an osteoblast, a chondrocyte, an adipocyte, a cardiomyocyte, a hepatocyte, or a beta islet cell.

22. Use of one or more spheroids comprising or consisting of breastmilk stem cell(s) (BSC), in the preparation of a medicament for cell treatment, wherein said one or more spheroids are prepared by:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form said one or more spheroids; and

c) harvesting said one or more spheroids.

23. The use of claim 22, wherein the cells of said one or more spheroids are autologous to the patient.

24. The use of claim 22, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant’s mother.

25. Use of one or more spheroids comprising or consisting of breastmilk stem cell(s) (BSC) in the manufacture of a medicament for treating milk production deficiency in a lactating female , wherein said one or more spheroids are prepared by:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form said one or more spheroids; and

c) harvesting said one or more spheroids.

26. The method of claim 25, wherein the cell is autologous to the lactating female.

27. Use of one or more spheroids comprising or consisting of breastmilk stem cell(s) (BSC) in the manufacture of a medicament for treating a disease condition selected from the group consisting of: cardiovascular diseases; diabetes; inborn errors in metabolism; cancer; neurological diseases; chronic diseases; liver diseases; fatal infant diseases; and any organ/tissue diseases for which administration of said one or more spheroids is beneficial, and wherein said one or more spheroids are prepared by:

a) separating cells from non-cellular portions of breastmilk obtained from a subject, wherein said cells comprise a mixture of cells;

b) growing the mixture of cells in suspension culture to form said one or more spheroids; and

c) harvesting said one or more spheroids.

28. The use of claim 27, wherein the cell is autologous to the patient.

29. The method of claim 27, wherein the patient is an infant and the cell is obtained from the breastmilk of the infant’s mother.