CLAIMS

1. A composition comprising an expanded population of cells for use in therapy, in which the cells have been expanded by a method comprising:

(i) obtaining an isolated population of hematopoeitic stem and progenitor cells (HSPC);

(ii) culturing the isolated population of HSPC in the presence of a histone deacetylase inhibitor (HDAC inhibitor), to form a cultured population;

(iii) adding an aminothiol compound having the formula $RNH(C_nH_{2n})NH(C_nH_{2n})SX$, in which R is hydrogen, an aryl, an acyl, or an alkyl group containing from 1 to 7 carbon atoms, each n has a value of from 2 to 6 and X is H or PO_3H_2; or a pharmaceutically acceptable salt thereof, to the cultured population of HSPC to form expanded cells.

2. A composition for use according to Claim 1, in which the composition is for use in the treatment of a haematological disorder, immune disorder, metabolic disorder, or neurodegenerative disorder.

3. A composition for use according to Claim 1 or 2, in which the therapy comprises repopulating mammalian bone marrow.

4. A composition for use according to Claim 1, 2 or 3, in which the composition is for use in the treatment of acute myelogeneous leukemia, acute lymphoblastic leukemia, chronic lymphocytic leukemia, chronic myelogeneous leukemia, non-Hodgkin lymphoma, severe aplastic anaemia, severe combined immunodeficiency or sickle cell disease.

5. A composition for use according to Claim 1, in which the composition is for use in gene therapy.

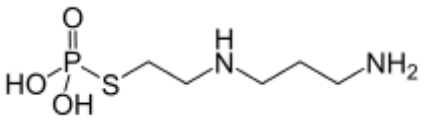
6. A composition for use according to any preceding claim, in which step (i) comprises selecting for cells which are CD133+.

7. A composition for use according to any preceding claim, in which step (i) comprises selecting for cells which are CD34+.

8. A composition for use according to any preceding claim, in which the HDAC inhibitor is scriptaid or quisinostat.

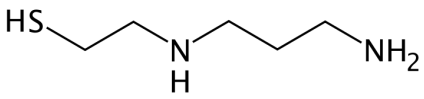
9. A composition for use according to any preceding claim, in which the HDAC inhibitor is scriptaid.

10. A composition for use according to any preceding claim, in which the aminothiol compound is amifostine:



or

WR1065:



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11. A composition for use according to any preceding claim, in which the aminothiol compound is WR1065.

12. A composition for use according to any preceding claim, in which the isolated population is obtained from umbilical cord blood.

13. A composition for use according to any preceding claim, in which the isolated population is obtained from peripheral blood.

14. A composition for use according to any of Claims 1 to 12, in which the isolated population obtained from bone marrow.

15. A composition for use according to any preceding claim, in which the steps (ii) and (iii) are carried out over a total time of 5 to 10 days to form expanded cells.

16. A composition for use according to any preceding claim, in which the cells are cultured in a serum free or feeder free tissue culture system.

17. A composition for use according to any preceding claim, in which the cells are obtained from a mammal, preferably a human.

18. A composition for use according to any preceding claim, in which the expanded cells are enriched for hematopoietic stem cells (HSC).

19. A composition for use according to any preceding claim, in which the expanded cells are enriched for; Lin-, CD38-, CD34+, CD133+, CD45RA-, CD90+ and CD49f+.

20. A composition for use according to any preceding claim, in which the total cell expansion is between 2-fold to 20-fold.

21. A composition for use according to any preceding claim, in which the expansion of Lin-, CD38-, CD34+, CD133+, CD45RA-, CD90+ and CD49f+ cells is about 500-fold.

22. A composition for use according to any preceding claim, in which the HDAC inhibitor is used at a concentration of 0.01-50 μM.

23. A composition for use according to any preceding claim, in which the aminothiol compound is used at a concentration of 50-500 μM.

24. Use of a composition comprising an expanded population of cells in the manufacture of a medicament for use in therapy, in which the cells have been expanded by a method comprising:

(i) obtaining an isolated population of HSPC;

(ii) culturing the isolated population of HSPC in the presence of a histone deacetylase inhibitor (HDAC inhibitor), to form a cultured population;

(iii) adding an aminothiol compound having the formula $RNH(C_nH_{2n})NH(C_nH_{2n})SX$, in which R is hydrogen, an aryl, an acyl, or an alkyl group containing from 1 to 7 carbon atoms, each n has a value of from 2 to 6 and X is H or PO_3H_2; or a pharmaceutically acceptable salt thereof, to the cultured population of HSPC to form expanded cells.

25. Use according to Claim 24 comprising any of the additional features of Claims 2 to 23.