CLAIMS

What is claimed is:

1. A growth medium for culturing mesenchymal stem cells comprising:

    a) a serum from 1 percent to 10 percent by volume;

    b) a fibroblast growth factor from 1 ng/ml to 10 ng/ml;

    c) either:

        i) an L-cysteine from 0.5 nM to 5mM; or

        ii) a glutathione from 0.5 nM to 5 mM;

    d) an epidermal growth factor from 1 ng/ml to 10 ng/ml;

    e) hydrocortisone from 10 ng/mL to 100 ng/mL;

    f) calcium chloride from 0.01 mM to 0.1 mM;

    g) insulin from 0.5 mg/mL to 5 mg/mL;

    h) pituitary extract from 10 µg/mL to 100 µg/mL;

    i) selenium from 0.1 µg/mL to 1 µg/mL;

    j) stromal-derived factor from 1 ng/mL to 10 ng/mL;

    k) sodium pyruvate from 2 mg/mL to 20 mg/mL;

    l) transferrin from 0.1 mg/mL to 1 mg/mL; and

    m) serum free medium balanced to 100 percent volume; and

wherein a cultured mesenchymal stem cell is morphologically identical to a mesenchymal stem cell of a previous generation.

2. An attachment medium for culturing mesenchymal stem cells comprising:

a) a minimum essential medium;

b) a fibroblast growth factor; and

c) either:

i) an L-cysteine;

ii) a glutathione; or

iii) an N-acetyl cysteine.

3. The attachment medium of claim 2, further comprising at least one of:

a) an insulin;

b) a selenium;

c) a sodium pyruvate; or

d) a transferrin.

4. The attachment medium of claim 3, wherein the attachment medium comprises components, if present, in the following amounts:

a) insulin from 1 ng/mL to 100 mg/mL;

b) selenium from 1 pg/mL to 100 mg/mL;

c) sodium pyruvate from 1 ng/mL to 100 mg/mL; and

d) transferrin from 1 ng/mL to 100 mg/mL.

5. The attachment medium of claim 3, wherein the attachment medium comprises components, if present, in the following amounts:

a) insulin from 0.5 mg/mL to 5 mg/mL;

b) selenium from 0.1 µg/mL to 1 µg/mL;

c) sodium pyruvate from 2 mg/mL to 20 mg/mL; and

d) transferrin from from 0.1 mg/mL to 1 mg/mL.

6. The stem cell growth medium of claim 1, wherein the serum is human serum.

7. The stem cell growth medium of claim 1, wherein the serum is fetal bovine serum.

8. The stem cell growth medium of claim 1, wherein at least one of the fibroblast growth factor or the epidermal growth factor is recombinant.

9. The stem cell growth medium of claim 1, wherein the stromal-derived factor is recombinant stromal-derived factor.

10. The stem cell growth medium of claim 1, wherein at least one of the insulin or the transferrin is recombinant.

11. The stem cell growth medium of claim 1, wherein said medium contains L-cysteine.

12. The stern cell growth medium of claim 1, wherein said medium contains glutathione.