CLAIMS

1. An immortalized stem cell produced by: isolating a stem cell from mammal cells selected from the group consisting of a dental pulp stem cell, a bone marrow stem cell, a umbilical stem cell, an adipose stem cell, an early-developed embryo, and a somatic cell other than mesenchymal stem cell; performing a primary culture of said stem cell to obtain said primarily cultured stem cells; transfecting 4 genes selected from the group consisting of hTERT, bmi-1, E6, E7, Oct3/4, Sox2, Klf4, c-Myc, and p16INK4a into said primarily cultured stem cell to produce gene-transduced cells; and selecting an immortalized stem cell from said gene-transduced cells, which has both abilities for telomere repairing and cell dividing at least 200 times, by using STRO-1 expression amount and bone regeneration ability at a cell doubling time of 20 as indexes.

2. The immortalized stem cell according to the claim 1, wherein said stem cell is any one of a tooth selected from the group consisting of an exfoliated dens deciduous tooth, an exfoliated dens permanence tooth, a removed deciduous tooth, and a removed dens permanence tooth.

3. The immortalized stem cell according to any one of the claims 1, wherein said mammal is selected from the group consisting of human, swine, equine and monkey.

4. The immortalized stem cell according to any one of the claims 1 to 3, wherein at least 40 % of the cells is STRO-1 expression cell and they have neonatal bone quantity production ability equal to that of a primary cultured cell at population doubling times of 20.

5. The immortalized stem cell according to the any one of the claims 4, wherein said immortalized stem cell secretes at least IGF-1, VEGF, TGF-β1 and HGF into a culture

supernatant.

6. A pharmaceutical composition comprising said culture supernatant of said immortalized stem cell according to the claim 1 to 5.

7. A pharmaceutical preparation for restoring damaged tissue comprising said pharmaceutical composition according to the claim 6.

8. The pharmaceutical preparation for restoring damaged tissue according to the claim 7, wherein a dosage form of said pharmaceutical preparation for restoring damaged tissue is any one of that selected from the group consisting of powder form, liquid form, gel form, spray form and percutaneous system form.

9. The pharmaceutical preparation for restoring damaged tissue according to the claim 7, wherein said damaged tissue is any one of that selected from the group consisting of a damaged tissue with ulcer or bedsore, a damaged brain tissue by cell degeneration, a brain tissue damaged by traumatic brain disease, a damaged brain tissue with inflammatory brain disease, a damaged bone tissue, a damaged periodontal tissue, and a damaged tissue by refractory skin disease.

10. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said cell degeneration is caused by the disease selected from the group consisting of Alzheimer disease, Parkinson's disease, cerebral infarction, cerebellar degeneration, diabetes, and hepatitis.

11. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said traumatic brain disease is caused by a traffic accident or fall accident.

12. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said inflammatory brain disease is a disease selected from the group consisting of encephalitis encephalopathy, epileptic, Jakob disease, and polio.

13. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said refractory skin disease is atopic dermatitis.

14. The pharmaceutical preparation for restoring damaged tissue according to the claims 6, the content of the culture supernatant of said immortalized stem cell in the reparation is 50 to 500 % (w/v), when the culture supernatant originally produced by the immortalized stem cell is 100 %; wherein

the immortalized stem cell secretes at least IGF-1, VFGF, TGF-β1, and HGF into the culture supernatant, and it is produced by using a method comprising the steps of:

isolating a stem cell from mammal cells selected from the group consisting of a dental pulp stem cell, a bone marrow stem cell, a umbilical stem cell, an adipose stem cell, an early-developed embryo, and a somatic cell other than mesenchymal stem cell;

performing a primary culture of said stem cell to obtain said primarily cultured stem cells;

transfecting 4 genes selected from the group consisting of hTERT, bmi-1, E6, E7, Oct3/4, Sox2, Klf4, c-Myc, and p16INK4a into said primarily cultured stem cell to produce gene-transduced cells; and

selecting an immortalized stem cell from said gene-transduced cells, which has both abilities for telomere repairing and cell dividing at least 200 times, by using STRO-1 expression amount and bone regeneration ability at a cell doubling time of 20 as an index.

15. A method for producing an immortalized stem cell comprising the steps of:

isolating a stem cell from mammal cells selected from the group consisting of a dental pulp stem cell, a bone marrow stem cell, a umbilical stem cell, and an adipose stem cell, an early-developed embryo, and a somatic cell other than said mesenchymal cell;

culturing said stem cell as primary culture to obtain a primarily cultured cell;

transfecting 4 genes selected from the group consisting of hTERT, bmi-1, E6, E7, Oct3/4, Sox2, Klf4, c-Myc and p16INK4a, into said primarily cultured cell to produce a gene-transduced cell; and

selecting the dental pulp stem cell from said gene-transduced cell, which has both abilities for telomere repairing and cell dividing at least 200 times, by using STRO-1 expression amount and bone regeneration ability at a cell doubling time of 20 as indexes

16. The method for producing an immortalized stem cell according to the claim 15, wherein the dental pulp cell is any one of the teeth selected from the group consisting of exfoliated dens deciduous, exfoliated dens permanence, removed dens deciduous, and removed dens permanence.

17. The method for producing an immortalized stem cell according to the claim 15, wherein the mammal is any one of the animal selected from the group consisting of human, swine, equine, and monkey.

CLAIMS

1. An immortalized stem cell produced by isolating a stem cell from mammal cells selected from the group consisting of a dental pulp stem cell, a bone marrow stem cell, a umbilical stem cell, and an adipose stem cell; performing a primary culture of said stem cell to obtain said primarily cultured stem cells; transfecting 4 genes selected from the group consisting of hTERT, bmi-1, E6, and E7, into said primarily cultured stem cell to produce gene-transduced cells; and selecting an immortalized stem cell from said gene-transduced cells, which has both abilities for telomere repairing and cell dividing at least 200 times, by using STRO-1 expression as an index.

2. The immortalized stem cell according to the claim 1, wherein said stem cell is any one of teeth selected from the group consisting of an exfoliated dens deciduous tooth, an exfoliated dens permanence tooth, a removed deciduous tooth, and a removed dens permanence tooth.

3. The immortalized stem cell according to the claim 1, wherein said mammal is selected from the group consisting of human, swine, equine and monkey.

4. The immortalized stem cell according to any one of the claims 1 to 3, wherein at least 40 % of the cells are STRO-1 expression cells and they have neonatal bone quantity production ability equal to that of a primary cultured cell at population doubling times of 20.

5. The immortalized stem cell according to the claim 4, wherein said immortalized stem cell secretes at least IGF-1, VEGF, TGF-β1 and HGF into a culture supernatant.

6. A pharmaceutical composition comprising said culture supernatant of said immortalized stem cell according to any one of the claims 1 to 5.

7. A pharmaceutical preparation for restoring damaged tissue comprising said pharmaceutical composition according to the claim 6.

8. The pharmaceutical preparation for restoring damaged tissue according to the claim 7, wherein a dosage form of said pharmaceutical preparation for restoring damaged tissue is any one of that selected from the group consisting of powder form, liquid form, gel form, spray form and percutaneous system form.

9. The pharmaceutical preparation for restoring damaged tissue according to the claim 7, wherein said damaged tissue is any one of that selected from the group consisting of a damaged tissue with ulcer or bedsore, a damaged brain tissue by cell degeneration, a brain tissue of which is partially lost by a surgical operation, a brain tissue damaged by traumatic brain disease, a damaged brain tissue with inflammatory brain disease, a damaged bone tissue, a damaged periodontal tissue, and a damaged tissue by refractory skin disease.

10. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said cell degeneration is caused by the disease selected from the group consisting of Alzheimer disease, Parkinson's disease, cerebral infarction, cerebellar degeneration, diabetes, and hepatitis.

11. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said traumatic brain disease is caused by a traffic accident or fall accident.

12. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said inflammatory encephalopathy is caused by a disease selected from the group consisting of encephalitis encephalopathy, epileptic, Jakob disease, and polio.

13. The pharmaceutical preparation for restoring damaged tissue according to the claim 9, wherein said refractory skin disease is atopic dermatitis.

14. The pharmaceutical preparation for restoring damaged tissue according to the claim 6, the content of the culture supernatant of said immortalized stem cell in the reparation is 50 to 500 % (w/v), when the culture supernatant originally produced by the immortalized stem cell is 100 %; wherein

the immortalized stem cell secretes at least IGF-1, VFGF, TGF-β1, and HGF into the culture supernatant, and it is produced by using a method comprising the steps of:

isolating a stem cell from mammal cells selected from the group consisting of a dental pulp stem cell, a bone marrow stem cell, a umbilical stem cell, and an adipose stem cell;

performing a primary culture of said stem cell to obtain said primarily cultured stem cells;

transfecting 4 genes selected from the group consisting of hTERT, bmi-1, E6, and E7, into said primarily cultured stem cell to produce gene-transduced cells; and

selecting an immortalized stem cell from said gene-transduced cells, which has both abilities for telomere repairing and cell dividing at least 200 times, by using STRO-1 expression amount and bone regeneration ability at a cell doubling time of 20 as an index.

15. A method for producing an immortalized stem cell comprising the steps of:

isolating a stem cell from mammal cells selected from the group consisting of a dental pulp stem cell, a bone marrow stem cell, a umbilical stem cell, and an adipose stem cell;

culturing said stem cell primarily to obtain a primarily cultured cell;

transfecting 4 genes selected from the group consisting of hTERT, bmi-1, E6 and

E7, into said primarily cultured cell to produce a gene-transduced cell; and

selecting the dental pulp stem cell from said gene-transduced cell, which has both abilities for telomere repairing and cell dividing at least 200 times, by using STRO-1 expression amount and bone regeneration ability at a cell doubling time of 20 as indexes.

16. The method for producing an immortalized stem cell according to the claim 15, wherein the dental pulp cell is any one of teeth selected from the group consisting of an exfoliated dens deciduous tooth, an exfoliated dens permanence tooth, a removed dens deciduous tooth, and a removed dens permanence tooth.

17. The method for producing an immortalized stem cell according to the claim 15, wherein said mammal is any one of animals selected from the group consisting of human, swine, equine, and monkey.