CLAIMS

1. A composition for regeneration of an intervertebral disc, comprising a monovalent metal salt of alginic acid and human bone marrow-derived high-purity mesenchymal stem cells, wherein the human bone marrow-derived high-purity mesenchymal stem cells are a cultured cell population of LNGFR (CD271)-positive, or LNGFR (CD271) and Thy-1 (CD90) double-positive, rapidly proliferating mesenchymal stem cell clones, said cultured cell population satisfying at least one of the following characteristic (a) or characteristics (a) and (b):

(a) the coefficient of variation of forward scattered light in flow cytometry is 40% or less; and

(b) the average cell size is 20 μm or less.

2. A composition for regeneration of an intervertebral disc, comprising a monovalent metal salt of alginic acid and human bone marrow-derived high-purity mesenchymal stem cells, wherein the human bone marrow-derived high-purity mesenchymal stem cells are a cell population of rapidly proliferating mesenchymal stem cell clones that are separated using, as an indicator, the feature that the cells are LNGFR (CD271)-positive, or LNGFR (CD271) and Thy-1 (CD90) double-positive cells, said cell population satisfying at least one of the following characteristic (a) or characteristics (a) and (b):

(a) the coefficient of variation of forward scattered light in flow cytometry is 40% or less; and

(b) the average cell size is 20 μm or less.

3. The composition according to claim 1 or 2, wherein the monovalent metal salt of alginic acid is a low endotoxin monovalent metal salt of alginic acid.

4. The composition according to any one of claims 1 to 3, wherein the monovalent metal salt of alginic acid has a weight average molecular weight (absolute molecular weight) of 80,000 or more, as measured by a GPC-MALS method.

5. The composition according to any one of claims 1 to 4, wherein the concentration of the monovalent metal salt of alginic acid is 0.5 w/w% to 5.0 w/w%.

6. The composition according to any one of claims 1 to 5 for use in regeneration of the intervertebral disc, wherein regeneration of a nucleus pulposus of the intervertebral disc is promoted via activation of nucleus pulposus cells by the mesenchymal stem cells and/or differentiation of the mesenchymal stem cells into the nucleus pulposus cells.

7. The composition for use according to claim 6, wherein the composition is to be applied to the intervertebral disc of a subject and, after the application thereof, a crosslinking agent is to be brought into contact with at least a part of a surface of the composition, and wherein the composition has fluidity upon the application thereof.

8. The composition for use according to claim 7, wherein the composition is to be applied to a nucleus pulposus site of the intervertebral disc.

9. The composition for use according to claim 8, wherein application of the composition to the nucleus pulposus site comprises filling of the composition into a defective site of the nucleus pulposus.

10. The composition for use according to any one of claims 7 to 9, wherein the crosslinking agent is a divalent or higher valent metal ion compound.

11. The composition for use according to any one of claims 6 to 10, wherein the use is in treatment, prevention or recurrence suppression of intervertebral disc degeneration and/or intervertebral disc damage.

12. The composition for use according to claim 11, wherein the intervertebral disc degeneration and/or the intervertebral disc damage are at least one selected from the group consisting of intervertebral disc herniation, discopathy, degenerative spondylolisthesis, pyogenic discitis, spondylosis deformans, spinal canal stenosis, and intervertebral disc damage.

13. A composition for use in regeneration of an intervertebral disc, comprising a monovalent metal salt of alginic acid and human bone marrow-derived high-purity mesenchymal stem cells, wherein the composition is to be applied to a nucleus pulposus site of the intervertebral disc of a subject in a state in which the composition has fluidity, wherein the human bone marrow-derived high-purity

mesenchymal stem cells are a cultured cell population of LNGFR (CD271)-positive, or LNGFR (CD271) and Thy-1 (CD90) double-positive, rapidly proliferating mesenchymal stem cell clones, said cultured cell population satisfying at least one of the following characteristic (a) or characteristics (a) and (b):

(a) the coefficient of variation of forward scattered light in flow cytometry is 40% or less; and

(b) the average cell size is 20 μm or less.

14. A composition for use in regeneration of an intervertebral disc, comprising a monovalent metal salt of alginic acid and human bone marrow-derived high-purity mesenchymal stem cells, wherein the composition is to be applied to a nucleus pulposus site of the intervertebral disc of a subject in a state in which the composition has fluidity, wherein the human bone marrow-derived high-purity mesenchymal stem cells are a cell population of rapidly proliferating mesenchymal stem cell clones that are separated using, as an indicator, the feature that the cells are LNGFR (CD271)-positive, or LNGFR (CD271) and Thy-1 (CD90) double-positive cells, said cell population satisfying at least one of the following characteristics (a) and (b):

(a) the coefficient of variation of forward scattered light in flow cytometry is 40% or less; and

(b) the average cell size is 20 μm or less

15. The composition for use according to claim 13 or 14, wherein the composition is to be then used without bringing a crosslinking agent into contact with the composition.

16. The composition for use according to claim 13 to 15, wherein regeneration of a nucleus pulposus of the intervertebral disc is promoted via activation of nucleus pulposus cells by the human bone marrow-derived high-purity mesenchymal stem cells and/or differentiation of the human bone marrow-derived high-purity mesenchymal stem cells into the nucleus pulposus cells.

17. The composition for use according to any one of claims 13 to 16, wherein the human bone marrow-derived high-purity mesenchymal stem cells are in an undifferentiated state upon the application thereof and/or are to be applied without treatments of induction of differentiation.

18. The composition for use according to any one of claims 13 to 17, wherein the monovalent metal salt of alginic acid is a low endotoxin monovalent metal salt of alginic acid.

19. The composition for use according to any one of claims 13 to 18, wherein the monovalent metal salt of alginic acid has a weight average molecular weight (absolute molecular weight) of 80,000 or more, as measured by a GPC-MALS method.

20. The composition for use according to any one of claims 13 to 19, wherein the concentration of the monovalent metal salt of alginic acid is 0.5 w/w% to 5.0 w/w%.

21. The composition for use according to any one of claims 13 to 20, wherein the use is in treatment, prevention or recurrence suppression of intervertebral disc degeneration and/or intervertebral disc damage.

22. The composition for use according to claim 21, wherein the intervertebral disc degeneration and/or the intervertebral disc damage are at least one selected from the group consisting of intervertebral disc herniation, discopathy, degenerative spondylolisthesis, pyogenic discitis, chronic low back pain, spondylosis deformans, spinal canal stenosis, lumbar spinal stenosis, intervertebral disc herniation associated with lumbar spinal stenosis (combined lumbar spinal stenosis), and intervertebral disc damage.

23. The composition for use according to claim 21 or 22, wherein the intervertebral disc degeneration and/or the intervertebral disc damage are associated with chronic low back pain.

24. The composition for use according to any one of claims 13 to 20, wherein the use is to suppress intervertebral disc pain.

25. Use of the composition according to any one of claims 1 to 5 in the manufacture of a medicament for regeneration of the intervertebral disc, wherein regeneration of a nucleus pulposus of the intervertebral disc is promoted via activation of nucleus pulposus cells by the mesenchymal stem cells and/or differentiation of the mesenchymal stem cells into the nucleus pulposus cells.

26. The use according to claim 25, wherein the medicament is to be applied to the intervertebral disc of a subject and, after the application thereof, a crosslinking agent is to be brought into contact with at least a part of a surface of the medicament, and wherein the medicament has fluidity upon the application thereof.

27. The use according to claim 26, wherein the medicament is to be applied to a nucleus pulposus site of the intervertebral disc.

28. The use according to claim 27, wherein application of the medicament to the nucleus pulposus site comprises filling of the medicament into a defective site of the nucleus pulposus.

29. The use according to any one of claims 26 to 28, wherein the crosslinking agent is a divalent or higher valent metal ion compound.

30. The use according to any one of claims 25 to 29, wherein the medicament is for treatment, prevention or recurrence suppression of intervertebral disc degeneration and/or intervertebral disc damage.

31. The use according to claim 30, wherein the intervertebral disc degeneration and/or the intervertebral disc damage are at least one selected from the group consisting of intervertebral disc herniation, discopathy, degenerative spondylolisthesis, pyogenic discitis, spondylosis deformans, spinal canal stenosis, and intervertebral disc damage.

32. Use of a composition comprising a monovalent metal salt of alginic acid and human bone marrow-derived high-purity mesenchymal stem cells in the manufacture of a medicament for regeneration of an intervertebral disc, wherein the medicament is to be applied to a nucleus pulposus site of the intervertebral disc of a subject in a state in which the medicament has fluidity, wherein the human bone marrow-derived high-purity mesenchymal stem cells are a cultured cell population of LNGFR (CD271)-positive, or LNGFR (CD271) and Thy-1 (CD90) double-positive, rapidly proliferating mesenchymal stem cell clones, said cultured cell population satisfying at least one of the following characteristic (a) or characteristics (a) and (b):

(a) the coefficient of variation of forward scattered light in flow cytometry is 40% or less; and

(b) the average cell size is 20 μm or less.

33. Use of a composition comprising a monovalent metal salt of alginic acid and human bone marrow-derived high-purity mesenchymal stem cells in the manufacture of a medicament for regeneration of an intervertebral disc, wherein the medicament is to be applied to a nucleus pulposus site of the intervertebral disc of a subject in a state in which the medicament has fluidity, wherein the human bone marrow-derived high-purity mesenchymal stem cell clones that are separated using, as an indicator, the feature that the cells are LNGFR (CD271)-positive, or LNGFR (CD271) and Thy-1 (CD90) double-positive cells, said cell population satisfying at least one of the following characteristic (a) or characteristics (a) and (b):

(a) the coefficient of variation of forward scattered light in flow cytometry is 40% or less; and

(b) the average cell size is 20 μm or less.

34. The use according to claim 32 or 33, wherein the medicament is to be then used without bringing a crosslinking agent into contact with the medicament.

35. The use according to claim 32 to 34, wherein regeneration of a nucleus pulposus of the intervertebral disc is promoted via activation of nucleus pulposus cells by the human bone marrow-derived high-purity mesenchymal stem cells and/or differentiation of the human bone marrow-derived high-purity mesenchymal stem cells into the nucleus pulposus cells.

36. The use according to any one of claims 32 to 35, wherein the human bone marrow-derived high-purity mesenchymal stem cells are in an undifferentiated state upon the application thereof and/or are to be applied without treatments of induction of differentiation.

37. The use according to any one of claims 32 to 36, wherein the monovalent metal salt of alginic acid is a low endotoxin monovalent metal salt of alginic acid.

38. The use according to any one of claims 32 to 37, wherein the monovalent metal salt of alginic acid has a weight average molecular weight (absolute molecular weight) of 80,000 or more, as measured by a GPC-MALS method.

39. The use according to any one of claims 32 to 38, wherein the concentration of the monovalent metal salt of alginic acid is 0.5 w/w% to 5.0 w/w%.

40. The use according to any one of claims 32 to 39, wherein the medicament is for treatment, prevention or recurrence suppression of intervertebral disc degeneration and/or intervertebral disc damage.

41. The use according to claim 40, wherein the intervertebral disc degeneration and/or the intervertebral disc damage are at least one selected from the group consisting of intervertebral disc herniation, discopathy, degenerative spondylolisthesis, pyogenic discitis, chronic low back pain, spondylosis deformans, spinal canal stenosis, lumbar spinal stenosis, intervertebral disc herniation associated with lumbar spinal stenosis (combined lumbar spinal stenosis), and intervertebral disc damage.

42. The use according to claim 40 or 41, wherein the intervertebral disc degeneration and/or the intervertebral disc damage are associated with chronic low back pain.

43. The use according to any one of claims 32 to 39, wherein the medicament is to suppress intervertebral disc pain.