Claims

1. An enriched integrin α10^{high} population of Mesenchymal Stem Cells (MSC) for use in the prevention and/or treatment of subchondral bone sclerosis, traumatic joint injuries, and/or degenerative joint disease (DJD),
wherein at least 60% of the cells of the population of MSCs express integrin α10 subunit, wherein the MSCs are MHCII negative and CD45 negative, and
wherein said MSC is selected from the group consisting of a mesenchymal stem cell, a mesenchymal progenitor cell, and a mesenchymal stromal cell.

2. Use of an enriched integrin α10^{high} population of Mesenchymal Stem Cells (MSC) in the manufacture of a medicament for prevention and/or treatment of subchondral bone sclerosis, traumatic joint injuries, and/or degenerative joint disease (DJD), wherein at least 60% of the cells of the population of MSCs express integrin α10 subunit, wherein the MSCs are MHCII negative and CD45 negative, and
wherein said MSC is selected from the group consisting of a mesenchymal stem cell, a mesenchymal progenitor cell, and a mesenchymal stromal cell.

3. The enriched integrin α10^{high} population of MSCs for use according to claim 1 or the use according to claim 2, wherein the traumatic joint injury comprises sport injuries.

4. The enriched integrin α10^{high} population of MSCs for use according to claim 1 or claim 3 or the use according to claim 2 or claim 3, wherein the degenerative joint disease (DJD) is selected from a group consisting of subchondral bone disease, cartilage degeneration, post-traumatic osteoarthritis, inflammatory arthritis, and congenital malformation and/or deformation of the musculoskeletal system; and wherein the traumatic joint injury is selected from a group consisting of osteochondral damage, tendon damage, and ligament damage.

5. The enriched integrin α10^{high} population of MSCs for use or the use according to claim 4, wherein the osteochondral damage comprises articular cartilage damage and/or bone damage.

6. An enriched integrin α10^{high} population of Mesenchymal Stem Cells (MSCs) for use in inducing fracture healing, ~~,~~ wherein at least 60% of the cells of the population of MSCs express integrin α10 subunit, wherein the MSCs are MHCII negative and CD45 negative,– and wherein said MSC is selected from the group consisting of a mesenchymal stem cell, a mesenchymal progenitor cell, and a mesenchymal stromal cell, and wherein the fracture is associated with joint trauma.

7. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-6 or the use according to any one of claims 2-5 6, wherein at least 65%, such as at least 70%, such as at least 75%, such as at least 80%, such as at least 85%, such as at least 90%, such as at least 95%, such as at least 96%, such as at least 97%, such as at least 98%, such as at least 99%, such as 100% of the total cells comprised in the population express integrin α10 subunit.

8. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-7 or the use according to any one of claims 2-7, wherein said population is an *in vitro* cell culture.

9. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-8 or the use according to any one of claims 2-8, wherein the cells that express integrin α10 are isolated with an anti-integrin α10 antibody.

10. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-9 or the use according to any one of claims 2-9, wherein the anti-integrin α10 antibody is a monoclonal antibody.

11. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-10 or the use according to any one of claims 2-10, wherein the MSCs are further characterized by the presence of CD44, CD90 and CD105.

12. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-11 or the use according to any one of claims 2-11, wherein the cells are derived from adipose tissue, bone marrow, synovial membrane, peripheral blood, cord blood, umbilical cord blood, Wharton's jelly, or amniotic fluid.

13. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-12 or the use according to any one of claims 2-12, wherein the cartilage damage or traumatic joint injury is a break, sprain, bruise, tear, fracture or rupture, a cartilage fissure, a cartilage microfracture, a chondral defect, a tendon rupture, a ligament rupture, a bone fracture or osteochondral damage, and/or wherein the cartilage damage or traumatic joint injury in the joint is in a muscle, tendon, bone, ligament, cartilage, or meniscus.

14. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-13 or the use according to any one of claims 2-13, wherein the MSCs are allogeneic or autologous.

15. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-14 or the use according to any one of claims 2-14, wherein the MSCs are for administration into a joint cavity.

16. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-15 or the use according to any one of claims 2-15, wherein the population of MSCs is for administration via injection.

17. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-16 or the use according to any one of claims 2-16, wherein the population of MSCs is for administration as a cell suspension with a pharmaceutically acceptable excipient.

18. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-17 or the use according to any one of claims 2-17, wherein the population of MSCs is formulated into a cell aggregate prior to administration.

19. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-18 or the use according to any one of claims 2-18, wherein the population of MSCs is for administration at the same time as setting a bone after a break.

20. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-19 or the use according to any one of claims 2-19, wherein the subject is a human, horse, pony, ox, donkey, mule, camelid, cat, dog, pig, or cow.

21. The enriched integrin α10^{high} population of MSCs for use according to any one of claims 1 or 3-20 or the use according to any one of claims 2-20, wherein the administration results in increased collagen production, proteoglycan production, and/or lubricin at the site of administration.

22. An enriched integrin α10^{high} population of Mesenchymal Stem Cells (MSC) wherein at least 60% of the cells of the population of MSCs express integrin α10 subunit; wherein the MSCs are MHCII negative and CD45 negative; and
wherein the MSC is selected from the group consisting of a mesenchymal stem cells, mesenchymal progenitor cells, and mesenchymal stromal cells.

23. The enriched integrin α10^{high} population of MSCs according to claim 22, wherein at least 65%, such as at least 70%, such as at least 75%, such as at least 80%, such as at least 85%, such as at least 90%, such as at least 95%, such as at least 96%, such as at least 97%, such as at least 98%, such as at least 99%, such as at least 100% of the total cells comprised in the population express integrin α10 subunit.

24. The enriched integrin α10^{high} population of MSCs according to claim 22 or claim 23, wherein the cells are induced to express integrin α10 subunit.

25. The enriched integrin α10^{high} population of MSCs according to any one of claims 22-24, wherein said population is an *in vitro* cell culture.

26. The enriched integrin α10^{high} population of MSCs according to any one of claims 22-25, wherein said population further expresses at least one of CD44, CD90 or CD105.

27. The enriched integrin α10^{high} population of MSCs according to any one of claims 22-26, wherein the MSCs are substantially formed into cell aggregates.

28. The enriched integrin α10^{high} population of MSCs according to any one of claims 22-27, wherein the MSCs are human, murine, canine or equine.

29. The enriched integrin α10^{high} population of MSCs according to any one of claims 22-28, wherein the MSCs adhere to plastic culture dish.

30. A MSC isolated from the population of any one of claims 22-29 with an anti-integrin α10 antibody.

31. A method of manufacturing an enriched integrin α10^{high} population of MSCs wherein at least 60% of the cells of the population of MSCs express integrin α10 subunit, the method comprising,

a. isolating a population of stem cells from adipose tissue, bone marrow, synovial membrane, cord blood, Wharton's jelly, or amniotic fluid;

b. culturing the isolated cells in a plastic culture vessel;

c. discarding non-adhered cells;

d. inducing integrin α10 expression by adding culture media, wherein the culture media is a serum-free media or a media comprising mammalian serum, and wherein the culture media comprises platelet lysate;

e. selecting the cells that express integrin α10, and

f. expanding the selected cells, thereby producing an enriched integrin α10^{high} population of MSCs.

32. The method according to claim 31, wherein the culture media in step d. comprises the growth factors FGF2 and/or TGFβ.