CLAIMS

1. Use of an exosome for the preparation of a pharmaceutical composition to promote or enhance hair growth.

2. Use according to Claim 1, in which the pharmaceutical composition enhances would healing.

3. Use according to Claim 1 or, in which the pharmaceutical composition promotes or enhances human wound healing or human hair growth, or both.

4. Use according to Claim 1, 2 or 3, in which the exosome is derived from a stem cell, such as a mesenchymal stem cell (MSC).

5. Use according to any preceding claim, in which the percentage of a group of test animals, for example C57BL/6J female mice, to which the pharmaceutical composition is applied which show growth of thick, straight hair is 50% or higher, such as 55% or higher, such as 60% or higher, such as 65% or higher, such as 70% or higher, such as 75% or higher.

6. Use according to Claim 5, in which the percentage of a group of control animals to which the pharmaceutical composition is not applied which show growth of thick, straight hair is 40% or lower, such as 35% or lower, such as 30% or lower, such as 25% or lower, such as 20% or lower, such as 15% or lower.

7. Use according to any preceding claim, in which the time taken for a wound to completely heal (complete wound closure) in a test animal to which the pharmaceutical composition is applied is 90% or shorter, 85% or shorter, 80% or shorter, 75% or shorter, 70% or shorter, 65% or shorter or 50% or shorter than the time taken for complete wound closure in a control animal on which the pharmaceutical composition is not applied.

8. Use according to any preceding claim, in which the mean time taken for complete wound healing in a group of test animals to which the pharmaceutical composition is applied is 90% or shorter, 85% or shorter, 80% or shorter, 75% or shorter, 70% or shorter, 65% or shorter or 50% or shorter than the mean time taken for complete wound closure in a control group of animals on which the pharmaceutical composition is not applied.

9. Use according to any preceding claim, in which the mean time for complete wound healing in a group of test animals is 14.6 days or 13 days, or in which the mean time for complete wound healing in a group of control animals is 17 days, or both.

10. Use according to any preceding claim, in which the test animal or group of test animals comprise(s) a C57BL/6J female mouse and the wound comprises a biopsy punch of 177 mm^2 (15-mm diameter wound).

11. Use according to any of Claims 5 to 10, in which an amount of pharmaceutical composition containing 10μg or less, such as 5μg or less, such as 2μg or less, such as 1μg or less, such as 0.5μg or less, such as 0.3 μg of exosome is applied to the test animal.

12. Use according to any preceding claim, in which the pharmaceutical composition comprises 40 μg/ml or less, 20 μg/ml or less, 8 μg/ml or less, 4 μg/ml or less, 2 μg/ml or less or 1.2 μg/ml or less of exosome.

13. Use according to any preceding claim, in which the pharmaceutical composition is subcutaneously injected or applied topically.

14. Use according to any preceding claim, in which the exosome:

(a) has a size of between 50 nm and 100 nm as determined by electron microscopy;

(b) comprises a complex of molecular weight >100 kDa, for example comprising proteins of <100 kDa;

(c) comprises a complex of molecular weight > 300 kDa, for example comprising proteins of < 300 kDa;

(d) comprises a complex of molecular weight > 1000 kDa;

(e) has a size of between 2 nm and 200 nm, such as a size of between 50 nm and 150 nm or a size of between 50 nm and 100 nm, for example as determined by filtration against a 0.2μM filter and concentration against a membrane with a molecular weight cut-off of 10 kDa; or

(f) a hydrodynamic radius of below 100 nm, such as between about 30 nm and about 70 nm, between about 40 nm and about 60 nm, such as between about 45 nm and

about 55 nm, such as about 50 nm, for example as determined by laser diffraction or dynamic light scattering.

15. A use substantially as hereinbefore described with reference to and as shown in Figures 1 to 5 of the accompanying drawings.

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CLAIMS

1. Use of an exosome derived from a mesenchymal stem cell (MSC) in the preparation of a pharmaceutical composition to therapeutically promote or enhance hair growth or regrowth, or to prevent hair loss, or both.

2. Use according to Claim 1, in which the pharmaceutical composition is capable of treating or preventing hair loss, sparse hair growth, short hair growth, thin hair growth, partial or complete hair loss on the scalp, alopecia, androgenic alopecia, alopecia androgenetica, male pattern baldness, female pattern baldness, non-androgenic alopecia, alopecia areata, alopecia totalis, alopecia universalis, radiation induced alopecia, alopecia due to radiotherapy, drug induced alopecia, alopecia due to chemotherapy, traumatic alopecia, scarring alopecia, psychogenic alopecia, stress related alopecia or anagen effluvium.

3. A cosmetic use of an exosome derived from a mesenchymal stem cell (MSC) for promoting or enhancing hair growth or regrowth or preventing hair loss, or both.

4. A cosmetic use according to Claim 3 for treating or preventing loss of hair, absence of hair growth, shortness of hair growth, thinness of hair growth, sparseness of hair growth or balding.

5. Use according to any preceding claim, in which the exosome is administered to a human.

6. Use according to any preceding claim, in which the exosome is subcutaneously injected or applied topically.

7. Use according to any preceding claim, in which the exosome is comprised in a composition comprising a pharmaceutically acceptable carrier or a cosmetically acceptable carrier.

8. Use according to Claim 7, in which the composition further comprises a hair stimulating agent such as Procapil.

9. Use according to any preceding claim, in which the exosome is applied to the skin, scalp, eyebrow or eyelashes.

10. Use according to any preceding claim, which improves the appearance of hairs to which the exosome is applied, for example by thickening the hair and improving the lustre, condition and manageability of the hair.

11. Use according to Claim 7 or 8, in which the composition comprises 40 μg/ml or less, 20 μg/ml or less, 8 μg/ml or less, 4 μg/ml or less, 2 μg/ml or less or 1.2 μg/ml or less of exosome.

12. Use according to Claim 7, 8 or 11, in which the composition comprises 0.01 to 10 w/w % of exosome applied to the area to be treated from 1 to 4 times daily or 1 to 3 w/w% of exosome applied once or twice daily.

13. Use according to any preceding claim, in which the exosome:

(a) has a size of between 50 nm and 100 nm as determined by electron microscopy;

(b) comprises a complex of molecular weight >100 kDa, for example comprising proteins of <100 kDa;

(c) comprises a complex of molecular weight > 300 kDa, for example comprising proteins of < 300 kDa;

(d) comprises a complex of molecular weight > 1000 kDa;

(e) has a size of between 2 nm and 200 nm, such as a size of between 50 nm and 150 nm or a size of between 50 nm and 100 nm, for example as determined by filtration against a 0.2μM filter and concentration against a membrane with a molecular weight cut-off of 10 kDa; or

(f) a hydrodynamic radius of below 100 nm, such as between about 30 nm and about 70 nm, between about 40 nm and about 60 nm, such as between about 45 nm and about 55 nm, such as about 50 nm, for example as determined by laser diffraction or dynamic light scattering.

14. An exosome derived from a mesenchymal stem cell (MSC) comprised in a topical dosage form packaged for retail distribution, in association with instructions advising the consumer how to use the product to promote hair growth.