rate in DSc in comparison with that in DPc and fibroblasts (FBc). As a result of categorizing these genes by function using GeneSpring's GeneOntology, many of the genes belonged to the category of vascular-related factors, thereby suggesting involvement between DS and blood vessels. Among these, DSc were found to highly express CD36, and this expression of CD36 by DSc was determined to be correlated with expression of HGF (hepatocyte growth factor) that demonstrates hair growth promotional effects (J. Linder, et al., Federation of American Societies for Experimental Biology, 14(2), 319 (2000): Non-Patent Document 5).

[0009]

In one aspect, there is provided non-therapeutic use of CD36-expressing dermal sheath cells (DSc), optionally in combination with dermal papilla cells (DPc), for regenerating hair follicles in a human or a recipient animal by transplantation. In another aspect, there is provided non-therapeutic use of a combination of CD36-expressing dermal sheath cells (DSc) and dermal papilla cells (DPc) for regenerating hair follicles in a three-dimensional skin model. In another aspect, there is provided a composition consisting of CD36-expressing dermal sheath cells (DSc) for regenerating hair follicles. In a further aspect, there is provided a chimeric animal imparted with regenerated hair follicles obtained by transplantation of the composition of the present invention to a recipient animal, provided that said chimeric animal is not a human being. The present application also provides the following:

[1] A composition for regenerating hair follicles, comprising CD36-expressing dermal sheath (DS) cells.

[2] The composition for regenerating hair follicles of [1], further comprising dermal papilla (DP) cells.

[3] The composition of [2], wherein the ratio of the

number of CD36-expressing DSc to the number of DPc is about 10:1 to 1:10.

[4] The composition of [2] or [3], wherein the CD36-expressing DSc and the DPc are both derived from mice or both derived from rats.

[5] The composition of [2] or [3], wherein the CD36-expressing DSc and the DPc are heterologous cells, and each of them are derived from mice, rats or humans.

[6] A method for regenerating hair follicles, comprising transplanting the composition of any of [1] to [5] to a human.

[7] A method for regenerating hair follicles by transplanting the composition of any of [1] to [5] to a recipient animal.

[8] The method of [7], wherein the recipient animal is an immunosuppressed animal.

[9] The method of [7] or [8], wherein the recipient animal is an immunosuppressed animal selected from the group consisting of a nude mouse, SCID mouse and nude rat.

[10] A method for regenerating hair follicles, comprising producing a three-dimensional skin model containing the composition of any of [2] to [5].

[11] A chimeric animal imparted with regenerated hair follicles by transplanting the composition of any of [1] to [5] to a recipient animal.

[12] The chimeric animal of [11], wherein the recipient animal is an immunosuppressed animal.

[13] The chimeric animal of [11] or [12], wherein the recipient animal is an immunosuppressed animal selected from the group consisting of a nude mouse, SCID mouse and nude rat.

[14] A three-dimensional skin model imparted with regenerated hair follicles by producing a three-dimensional skin model containing the composition of any of [2] to [5].

Effects of the Invention

[0010]

The hair follicle regeneration composition as disclosed herein can be used in transplant surgery for regenerating hair follicles and in research and development on hair follicle reconstruction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a schematic diagram showing the structure of hair follicle tissue.

FIG. 2 indicates expression level of various types of vascular-related factors in various cells.

FIG. 3 is an image obtained by CD36 and CD31 immunohistochemical staining.

FIG. 4 is an image of whole mount stained hair follicles obtained by CD36 and CD31 immunostaining.

FIG. 5 indicates the results of co-culturing CD36-

CLAIMS

1. Non-therapeutic use of CD36-expressing dermal sheath cells (DSc), optionally in combination with dermal papilla cells (DPc), for regenerating hair follicles in a human or a recipient animal by transplantation.

2. The non-therapeutic use according to claim 1, wherein a combination of CD36-expressing DSc and DPc is used, and the ratio of the number of CD36-expressing DSc to the number of DPc is about 10:1 to 1:10.

3. The non-therapeutic use according to claim 1 or 2, wherein a combination of CD36-expressing DSc and DPc is used, and the CD36-expressing DSc and the DPc are both derived from mice, or both derived from rats, or both derived from human.

4. The non-therapeutic use according to claim 1 or 2, wherein a combination of CD36-expressing DSc and DPc is used, the CD36-expressing DSc and the DPc are heterologous cells, and each of them are derived from mice, rats or humans.

5. The non-therapeutic use according to any one of claims 1 to 4, wherein the recipient animal is an immunosuppressed animal.

6. The non-therapeutic use according to any one of claims 1 to 5, wherein the recipient animal is an immunosuppressed animal selected from the group consisting of a nude mouse, SCID mouse and nude rat.

7. Non-therapeutic use of a combination of CD36-expressing dermal sheath cells (DSc) and dermal papilla cells (DPc) for regenerating hair follicles in a three-dimensional skin model.

8. The non-therapeutic use according to claim 7, wherein the ratio of the number of CD36-expressing DSc to the number of DPc is about 10:1 to 1:10.

9. The non-therapeutic use according to claim 7 or 8, wherein the CD36-expressing DSc and the DPc are both derived from mice, or both derived from rats, or both derived from human.

10. The non-therapeutic use according to claim 7 or 8, wherein the CD36-expressing DSc and the DPc are heterologous cells, and each of them are derived from mice, rats or humans.

11. A composition consisting of CD36-expressing dermal sheath cells (DSc) for regenerating hair follicles.

12. A chimeric animal imparted with regenerated hair follicles obtained by transplantation of the composition according to claim 11 to a recipient animal, provided that said chimeric animal is not a human being.