

Scientists grow Skin *with* Hair follicles

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New Research

Scientists have officially grown new skin that developed, on its own, hair follicles and sebaceous glands...Scientists have officially grown new skin that developed, on its own, hair follicles and sebaceous glands...French doctors are claiming a potential breakthrough for treating baldness, severe burns and skin cancer after successfully growing skin with hair follicles using stem cells taken from adult mice.

"We grew a piece of skin with hair follicles and sebaceous glands for the first time," said Dr Yann Barrandon, a cell specialist at the National Institute for Science and Medical Research and Paris's elite Ecole Normale Supérieure. Stem cells are premature cells that develop into various organs. The most spectacular are found in embryos at their very earliest days of development. Embryo stem cells can grow into almost any part of the body, a finding that raises hopes they can eventually be "programmed" into growing replacement limbs or internal organs in a laboratory. Dr Barrandon said the five-year research effort had isolated stem cells in the hair roots of adult mice that were able to develop into the entire range of cells needed for the outer layer of skin, including the sebaceous glands and follicles for producing hair or fur. Each follicle, whether in mice, rats or humans, contained about 1,500 stem cells, which could migrate and develop into glands, hair or skin, called keratinocytes.

"We now have the first direct proof of the ability of these cells to grow skin," Dr Barrandon said. The researchers' next goal is to find compounds that will guide the cells towards specific tasks, such as promoting the growth of skin, which could be used for burns victims, whose grafts are often unsightly as they are shiny and hairless. Another goal would be a treatment to encourage the stem cells to promote hair growth for bald people or conversely to destroy selected cells in order to discourage hair growth.

"Half of humanity wants to have more hair on its head and the other half wants to have less hair on its legs," said a colleague of Dr Barrandon, Ms Ariane Rochat.

Official Abstract of the Study

Morphogenesis and Renewal of Hair Follicles from Adult Multipotent Stem Cells. Hideo Oshima¹, Ariane Rochat¹, Cécile Kedzia¹, Koji Kobayashi², and Yann Barrandon¹. Cell, Vol. 104, 233-245, January, 2001

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The upper region of the outer root sheath of vibrissal follicles of adult mice contains multipotent stem cells that respond to morphogenetic signals

to generate multiple hair follicles, sebaceous glands, and epidermis, i.e., all the lineages of the hairy skin. At the time when hair production ceases and when the lower region of the follicle undergoes major structural changes, the lower region contains a significant number of clonogenic keratinocytes, and can then respond to morphogenetic signals. This demonstrates that multipotent stem cells migrate to the root of the follicle to produce whisker growth. Moreover, our results indicate that the clonogenic keratinocytes are closely related, if not identical, to the multipotent stem cells, and that the regulation of whisker growth necessitates a precise control of stem cell

trafficking.
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