

# Skin Deep

*How skin forms layers.*

**HHMI RESEARCHERS HAVE NEW EVIDENCE THAT PUSHES ASIDE OLD THEORIES** about how skin is able to create layers of different cell types while simultaneously forming a continuously self-renewing, protective barrier.

The discovery helps to explain how skin becomes “stratified” into different layers. The finding may yield new insights into the basic processes by which stem cells can both self-replicate to produce more stem cells and also mature and differentiate to form a tissue.

HHMI investigator Elaine Fuchs and colleague Terry Lechler at the Rockefeller University demonstrated that skin stratifies into layers in an unusual process involving asymmetric cell division—a fundamental developmental mechanism in which a mother cell gives rise to two distinctly different daughter cells. They published their findings on August 10, 2005, in an advance online edition of *Nature*.

While their discovery of the basic process of skin stratification does not have immediate clinical implications, says Fuchs, insights from these studies may be applicable to asymmetric cell division in human stem cells.

“Understanding the processes of asymmetric and symmetric divisions in stem cells are of central importance to the stem cell field,” she says. “It seems likely that the basic mechanistic process that we’ve documented in the embryonic skin stem cell will be utilized by other tissues and cell types, particularly stem cells.”

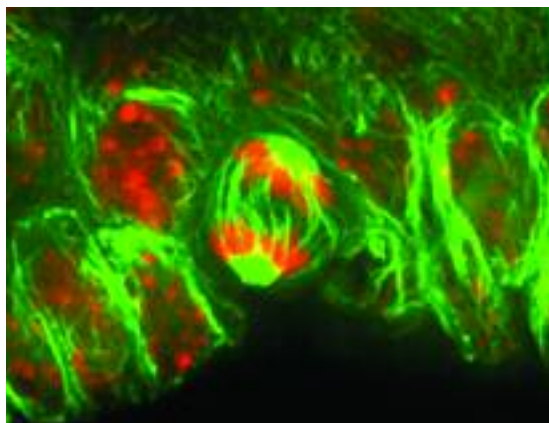
-Dennis Meredith-

“Understanding the processes of asymmetric and symmetric divisions in stem cells are of central importance to the stem cell field.”

ELAINE FUCHS

”

RIGHT \_ SOME BASAL SKIN CELLS, AS SHOWN IN THIS CROSS-SECTION OF MOUSE SKIN, DIVIDE IN A PERPENDICULAR AND ASYMMETRIC FASHION, RESULTING IN ONE DAUGHTER CELL THAT REMAINS IN THE BASAL LAYER AND A SECOND, SUPRABASAL DAUGHTER CELL THAT MIGRATES TO HIGHER LAYERS OF THE EPIDERMIS. MICROTUBULES (GREEN) FORM THE MITOTIC SPINDLE ALONG WHICH DNA (RED) SEGREGATES DURING CELL DIVISION.



COURTESY OF TERRY LECHLER



FUCHS

COURTESY OF ROCKEFELLER UNIVERSITY