

# Researchers report epidermal cell differentiation findings

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To ensure the barrier function of the skin, mutual regulation of connections between epidermal cells and a receptor for growth factors is necessary. These findings can help to reduce the effects of inflammatory skin diseases and the decreased barrier function of the aged skin. The mechanism was described by a team of researchers led by Carien Niessen of the Cluster of Excellence for aging research, CECAD/Cologne. The results have been published in *Nature Communications*.

The [epidermis](#), the outermost layer of the skin, is the most important protection against the outside world. The ability to survive depends on an intact epidermal barrier. To keep the barrier functioning, every single cell needs has a specific function. That is especially difficult to maintain in the epidermis, which constantly renews itself. The process behind it is little understood so far.

Especially tight connections between the cells are vitally important for building the epidermis. The so-called tight junctions close the space between cells and control the transportation of molecules. The plan to form tight junctions can be found in every layer of the epidermis; nevertheless, they are only developed in the outer layer, which has been little understood. Matthias Rübsam first author of the study, says, "Using new microscopy techniques, we could show that the receptor of a well known growth factor, EGF, plays an important role in tight junction barrier formation in the epidermis. Actually, EGF is responsible for the cell division, and was so far only described in the lower layers of the

epidermis."

Another aspect has something to do with mechanobiology, a more recent field of cell biology. "Similar to railway coupling, [cells](#) can feel via connections among each other whether they are under pressure or under tension," the scientist explains. "The coupling triggers a signal which regulates the receptor. The activity of the coupling mechanism, the receptor and of the [barrier](#) molecules must always be at equilibrium."

Disruption of this balance could cause known skin diseases like neurodermatitis or psoriasis. The new findings that coupling mechanisms and the receptor are important for keeping the balance may explain why common anti-tumor treatments targeting the receptor have heavy side effects for the skin. With this knowledge, tumor therapies could be improved.

**More information:** Matthias Rübsam et al, E-cadherin integrates mechanotransduction and EGFR signaling to control junctional tissue polarization and tight junction positioning, *Nature Communications* (2017). [DOI: 10.1038/s41467-017-01170-7](https://doi.org/10.1038/s41467-017-01170-7)

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