

3D lab skin for chemicals testing, research and repair

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A model system that recreates full-thickness human skin should allow more effective testing of pharmaceuticals and cosmetics, while avoiding the need for animal tests. The system effectively models the

development, cellular structure and barrier properties of skin. This should also make it suitable for analyzing disease states and wound repair processes. Another potential use is as a substrate for repairing complex wounds.

Jochen Salber and colleagues at the Ruhr University Bochum in Germany, with co-workers at the Polytecnico di Torino in Italy, report their work in the open access journal *4open*, published by EDP Sciences.

"We guarantee that our protocol for growing a human skin equivalent is the only one that allows anyone to copy such a complex [model](#) of real skin using relatively simple standard cell culture techniques," says Salber.

Building the system begins by culturing human fibroblast cells that form the basic structure of skin. This is followed by adding keratinocyte [cells](#) that are involved in creating the specialized barrier properties of skin and also supporting immune system interactions. The cultured cell combination grows together to create the realistic three-dimensional model of human skin, although currently without the subcutaneous fat layer or associated structures such as hair follicles, sebaceous glands and sweat glands.

Chemical and microscopy analysis revealed that the major protein components of the skin were present in their appropriate locations, with the natural layers of the skin arranged in the correct manner.

"This is only the beginning," says Salber. The team is now seeking funding to further refine the system and explore wider options involving other tissues and organs. "It would also be very exciting to connect the model [skin](#) to a [blood supply](#) and to integrate nerves and more sophisticated immune functions," adds Salber.

"We selected *4open* to publish our work due to their very transparent selection and publishing process and support of open science," he says. "The reviewers follow the policy of hard but fair evaluation without any subjective or commercially influenced opinions."

More information: Ayesha Idrees et al. Fundamental in vitro 3D human skin equivalent tool development for assessing biological safety and biocompatibility – towards alternative for animal experiments, *4open* (2021). [DOI: 10.1051/fopen/2021001](https://doi.org/10.1051/fopen/2021001)

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