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Skin Organoids Platform for Human Skin Research

Stanford researchers have developed a groundbreaking platform that replicates the full complexity of human skin in a lab setting. This innovative system is the first to preserve all the native elements of human skin, including epithelial, stromal, and immune cells, for extended periods. Unlike current models that rely on animal systems or incomplete in vitro methods, this technology provides a near-native human skin model that is ideal for research, testing, and therapeutic development.

The platform uses an air-liquid interface culture method to grow human skin tissue from small fragments embedded in collagen gel. This approach allows the system to sustain the natural organization and function of human skin for up to three months—far surpassing the one-week lifespan of existing models. By maintaining all critical components of skin biology, this technology offers unparalleled accuracy and reliability for studying skin diseases, testing drugs or cosmetics, and advancing precision medicine.

Stage of Development: Research - in vitro

Applications

- Test drug safety, effectiveness, and skincare products directly on human skin tissue
- Predict clinical responses using patient-derived skin biopsies
- Model inflammatory conditions, cancer, wound healing, and other skin diseases

Advantages

- First system to grow human skin with all native components intact

- Long-term viability (up to three months), far surpassing existing models lasting only one week
- Eliminates reliance on animal models while providing an accurate representation of human biology

Patents

- Published Application: WO2026044134

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