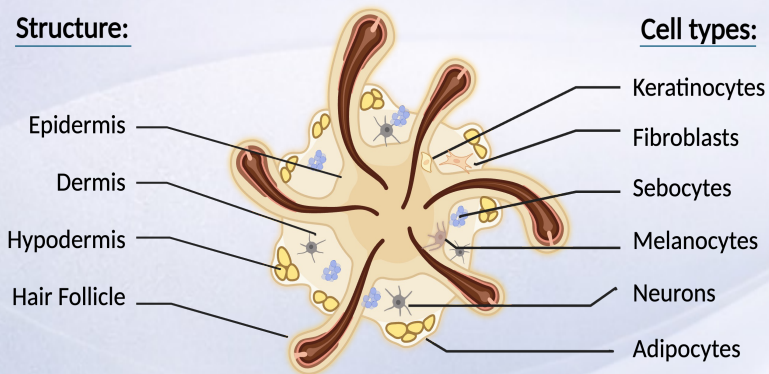


## → What is a Skin Organoid?

**Skin Organoid:** a three-dimensional human biological model derived from stem cells that recapitulates the key architecture and functions of real skin.



## Applications:

- Anti-aging & Longevity actives
- Hydration & skin barrier function
- Pigmentation / Brightening actives
- Scalp care & hair growth
- Sensitive skin and inflammatory conditions

## BioHive recent advances:

Neuro-functional skin models ; Organoids for topical testing ;  
Atopic Dermatitis patient-derived Organoids

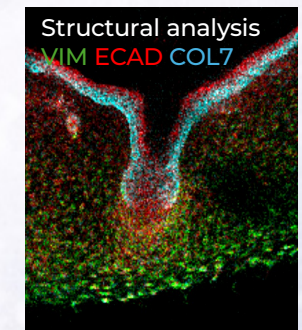
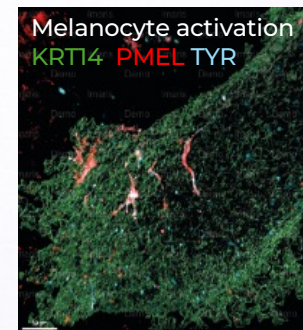
## → Bridging Science and Brand Value

- **Human skin diversity** – Patient-derived, multi-ethnic models
- **Controlled stress testing** – UV, oxidative stress, inflammation
- **Long-term exposure** – Up to 90 days
- **Mechanistic validation** – Mode-of-action confirmed
- **Claim-ready data** – Robust, human-relevant evidence



- **De-risk active development** – Smarter early decisions
- **Accelerate validation** – Fast-track high-potential actives
- **Elevate premium positioning** – Support inclusive innovation
- **Strengthen scientific claims** – Enhance credibility & differentiation

## Functional readouts:



KRT14: Keratin 14, PMEL: Premelanosome protein (GP100), TYR: Tyrosinase, TUJ1: bIII-tubulin (TUBB3), VIM: Vimentin, ECAD: E-Cadherin (CDH1), COL7: Collagen 7, HF: Hair follicle



# Human Skin Organoids: Predictive platform for premium dermocosmetic testing

**BIOHIVE**  
Innovations

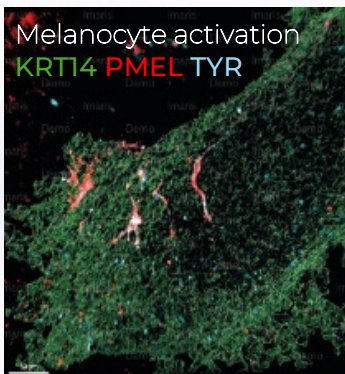
Translate biological mechanisms into robust, claim-ready evidence  
powered by human skin organoids

Claims	Mechanisms	Readouts / Biomarkers	Assays
<b>Cytotoxicity</b>	Cell viability	<i>Metabolic activity / Cell viability (%)</i>	MTT
<b>Antioxidant / Stress</b>	Oxidative stress & cellular redox balance	<i>ROS level, NAD<sup>+</sup>/NADH ratio, LDH release</i>	Biochemistry
<b>Hair growth / Hair strength</b>	Hair follicle organization & growth dynamics	<i>Follicle structure, density / proliferation</i>	RT-qPCR / 3D imaging / Immunohistochemistry (IHC)
<b>Skin-brain axis / Well-being</b>	Neuro-cutaneous signaling & stress response	<i>Serotonin, Cortisol, Substance P, TRPV1</i>	RT-qPCR / ELISA / 3D imaging / IHC
<b>Skin structure / Skin barrier function</b>	Epidermal differentiation & barrier integrity*	<i>Keratins 14 &amp; 10, Filaggrin, Desmoglein 1</i>	3D imaging / IHC
<b>Longevity / Regeneration</b>	Extracellular matrix maintenance & dermal remodeling	<i>Elastin, Collagen I, MMPs</i>	RT-qPCR / 3D imaging / IHC
<b>Pigmentation / Brightening</b>	Melanocyte activation & melanin synthesis	<i>PMEL, TYR, Melanin</i>	3D imaging / IHC
<b>Sensitive skin / Anti-inflammatory</b>	Inflammatory signaling & immune activation	<i>Cytokines and mediators</i>	RT-qPCR / ELISA

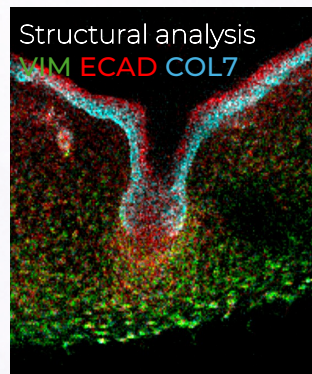
\*Barrier integrity assays are performed using air-liquid interface flat organoid models.

All experiments are conducted in 3-5 biological replicates and include both positive and negative controls to ensure robust and reliable results.

## Functional readouts in human tissues:



KRT14: Keratin 14, PMEL: Premelanosome protein (GP100), TYR: Tyrosinase, TUJ1:  $\beta$ III-tubulin (TUBB3), VIM: Vimentin, ECAD: E-Cadherin (CDH1), COL7: Collagen 7, KRT17: Keratin 17, Ki-67: proliferation marker, HF: Hair follicle



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