**The Phenion® Full-Thickness Skin Model**

**Biological characteristics**

The Phenion® Full-Thickness Skin Model is a 3D tissue-construct that simulates histological and physiological properties of human skin. Different cell types, derived from human skin, build up a dermal and epidermal compartment. Growing inside a collagen scaffold fibroblasts form the connective tissue as basis for overlying epithelial cell layers like under *in vivo* conditions. During maturation *de novo*-synthesis of collagen and an elastic fiber network consisting of proteins like elastin and fibrillin-1 can be observed.

Keratinocytes are seeded on top of the dermal part. The differentiation of this cell type into a multilayered stratified epithelium can be visualized by the detection of specific markers like cytokeratin 10, filaggrin, transglutaminase and involucrin. The expression of collagen IV and laminin in the borderline between the compartments confirms integrity of an existing basement membrane (see pictures below).

<table>
<thead>
<tr>
<th>Phenion® FT Skin Model</th>
<th>Skin biopsy</th>
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<tbody>
<tr>
<td><strong>Epidermis</strong></td>
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<tr>
<td>- Stratum corneum</td>
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<tr>
<td>- Str. granulosum</td>
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<tr>
<td>- Str. spinosum</td>
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<tr>
<td>- Str. basale</td>
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<tr>
<td><strong>Dermis</strong></td>
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- Cytokeratin 10
- Collagen IV
- Elastin/Fibulin
Quality standards

Cells used for tissue engineering are derived from a single donor (foreskin biopsy) and routinely tested for exclusion of HIV, hepatitis B/C and mycoplasma. The cultivation based on a robust collagen scaffold facilitates easy handling. With surface dimension of 1.5 cm\(^2\) the skin models enable convenient application and testing of substances and formulations.

Field of application

The Phenion\textsuperscript{®} Full-Thickness Skin Model is an excellent \textit{in vitro} test system to answer questions in efficacy + safety assessment. Effects following topical or system application can be monitored exceeding the period of one week. A wide range of use implies histological processing, protein analysis and gene expression. Further examination is possible by penetration assays, cytokine release, intracellular ATP measurement or genotoxicity assessment. The viable tissues show specific metabolic activity and high capacity for regeneration processes that support wound healing experiments.

Contact and ordering

Further information regarding the Phenion\textsuperscript{®} Full-Thickness Skin Model, e.g. protocols for histological processing, protein isolation and RNA extraction and order placement is provided through

Lars Vierkotten
phone +49 (0) 211/797-9744
email lars.vierkotten@henkel.com

Please find below publications showing exemplary use of the Phenion\textsuperscript{®} Full-Thickness Skin Model.


\textbf{Ackermann et al. (2010)} The Phenion\textsuperscript{®} Full-Thickness Skin Model for Percutaneous Absorption Testing. \textit{Skin Pharmacol Physiol}; 23:105-112

\textbf{Mewes et al. (2007)} Elastin Expression in a Newly Developed Full-Thickness Skin Equivalent. \textit{Skin Pharmacol Physiol}; 20:85–95