LabCyte CORNEA-MODEL is a 3-D human cultured corneal epithelial tissue produced from normal human corneal epithelial cells. LabCyte CORNEA-MODEL was developed by applying cell culture techniques to differentiate and stratify corneal epithelial cells to form a tissue structure similar to that of the normal human cornea. LabCyte CORNEA-MODEL can be used in the hazard identification of irritant chemicals by the eye irritation test. Moreover, CORNEA-MODEL can also be used to evaluate biological processes, such as the production of mucin and the expression of adhesion molecules, in response to different test substances.

■ Model features

3-D culture of human corneal epithelial cells

Can be used for eye irritation tests. Enables the analysis of proteins specifically expressed in the corneal epithelium.

Low lot-to-lot variability

Developed and manufactured at J-TEC using cell culture techniques fostered in house.

■ Reproducing the corneal epithelial structure

HE staining

Cell differentiation and stratification.

Transmission electron microscopy

Observation of microvilli and glycocalyx (arrows) on the outermost layer of cells.

Immunohistochemistry

Detection of proteins expressed at different cells layers of the corneal epithelial.

- Mucin-1
- Mucin-16
- Desmoglein-3
- Laminin V
LabCyte CORNEA-MODEL was accepted by the OECD to be used in the eye irritancy assessment of chemical substances under the test guideline 492. The OECD test guidelines are internationally accepted testing methods used by government, industry and independent laboratories to identify and characterize potential hazards of chemicals. OECD test guideline 492 describes an in vitro procedure that may be used for the hazard identification of eye irritant chemicals using reconstructed human cornea-like epithelium that closely mimics the biochemical and physiological properties of the outermost layer of the human corneum epithelium.

**Test procedure**

1. Pre-incubation
2. Application of test substance, rinsing, and post-exposure incubation (conditions differ according to the physical state of the tested chemical)
3. Cell viability measurement (WST-8 assay)
4. Determine whether results meet acceptance criteria
   1. Cell viability: $0.5 \leq \text{mean OD (A450/650)} \text{ measured value for negative control} \leq 1.6$
   2. Positive control: mean tissue viability for positive control $\leq 40$
   3. SD: SD (negative control and positive control) of tissue viability of three identical replicates $\leq 18$

**Classification criteria**

- Tissue viability $\leq 40\%$ Category 1 or 2 (irritant)
- Tissue viability $> 40\%$ Non Category (non-irritant)

**Concordance with in vivo classification**

<table>
<thead>
<tr>
<th>in vitro prediction</th>
<th>in vivo classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>irritant</td>
</tr>
<tr>
<td>irritant</td>
<td>76</td>
</tr>
<tr>
<td>Non-irritant</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
</tr>
</tbody>
</table>

- **Sensitivity(%):** 100
- **Specificity(%):** 73.0
- **Accuracy(%):** 87.8
LabCyte CORNEA-MODEL can be used to study histological features of the corneal epithelium.

LabCyte CORNEA-MODEL reproduces microstructural features of the corneal epithelium.

Apoptosis induction by benzalkonium chloride application assessed by TUNEL staining

Disruption of cell-cell adhesion promoted by benzalkonium chloride

<table>
<thead>
<tr>
<th>Benzalkonium chloride</th>
<th>PBS</th>
<th>0.1%</th>
<th>1%</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claudin-1 Tight Junction component</td>
<td><img src="image1" alt="Image of Claudin-1 Tight Junction component" /></td>
<td><img src="image2" alt="Image of Claudin-1 Tight Junction component" /></td>
<td><img src="image3" alt="Image of Claudin-1 Tight Junction component" /></td>
<td><img src="image4" alt="Image of Claudin-1 Tight Junction component" /></td>
</tr>
<tr>
<td>Desmoglein-3 Tight Junction component</td>
<td><img src="image5" alt="Image of Desmoglein-3 Tight Junction component" /></td>
<td><img src="image6" alt="Image of Desmoglein-3 Tight Junction component" /></td>
<td><img src="image7" alt="Image of Desmoglein-3 Tight Junction component" /></td>
<td><img src="image8" alt="Image of Desmoglein-3 Tight Junction component" /></td>
</tr>
<tr>
<td>E-cadherin Adherens Junction component</td>
<td><img src="image9" alt="Image of E-cadherin Adherens Junction component" /></td>
<td><img src="image10" alt="Image of E-cadherin Adherens Junction component" /></td>
<td><img src="image11" alt="Image of E-cadherin Adherens Junction component" /></td>
<td><img src="image12" alt="Image of E-cadherin Adherens Junction component" /></td>
</tr>
</tbody>
</table>

Disruption of cell-cell adhesion by benzalkonium chloride is concentration-dependent.