Objective
To evaluate drug permeability of topically applied eye drop formulations and monitor the effects on tissue viability with the EpiCorneal in vitro human tissue model.

Methods
Upon receipt, tissues were equilibrated overnight as per MatTek’s EpiCorneal Drug Delivery Protocol. 50 μl of Xalatan® (Pfizer) or Monopost® (Thea Pharmaceuticals), both containing 50 µg/ml of latanoprost* prodrug, were topically applied to the tissues (n=3) and incubated at 37˚C, 5% CO₂ (Figure 1). Receiver solution samples were collected over a 12 hour period and analyzed for latanoprost acid using an HPLC-PDA method.

The apparent permeability (Papp) was calculated by the following equation:

\[
Papp \text{ (cm/s)} = \frac{J}{(3600 \times C_{\text{Don}})}
\]

Where: J – the steady state flux (nmol·cm⁻²·h⁻¹), \(C_{\text{Don}}\) - the initial donor compartment concentration of latanoprost acid (nmol/cm³).

*Latanoprost acid is an effective agent in treating glaucoma. Latanoprost isopropyl ester prodrug is more lipophilic and better absorbed through the cornea.

Results
Xalatan® eye drops (containing 0.02% BAC solution as a preservative) had a high permeation rate, \(Papp = 5.3 \times 10^{-5}\) compared to Monopost® (a preservative-free formulation), \(Papp = 6.9 \times 10^{-6}\) (Figure 2). Xalatan® eye drops had a significant effect on tissue viability (60.5% of negative control) and reduced the barrier property (Table 1).

Table 1. Summarized results of the Latanoprost Acid permeation

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Abbr.</th>
<th>Steady state period (h)</th>
<th>Steady state Flux (nmol·cm⁻²·h⁻¹)</th>
<th>(P_{app}) (cm/s)</th>
<th>% Viability (MTT assay)</th>
<th>% Permeability (LY assay)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xalatan®</td>
<td>XLT</td>
<td>0.54±0.55 (0.466)</td>
<td>1.16±0.20</td>
<td>7.3±1.4</td>
<td>83.8±2.4</td>
<td>2.2±0.5</td>
</tr>
<tr>
<td>Monopost®</td>
<td>MNP</td>
<td>0.55±0.956</td>
<td>0.68±0.918</td>
<td>6.8±1.0</td>
<td>83.8±2.4</td>
<td>1.4±0.1</td>
</tr>
</tbody>
</table>

Conclusion
Permeation assessment of topically-applied ophthalmic formulations with the EpiCorneal in vitro human tissue model is suitable and comparable to an intact human cornea for ocular drug delivery studies.