



TITLE:

Expanded Utilization of the EpiOcular™ Human Corneal Tissue Model for Ocular Irritation Testing

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ABSTRACT:

Purpose: All pharmaceutical formulations, whether intended for ophthalmic use or not, must be screened for potential ocular irritation and/or damage to the eye. This work focuses on using the organotypic model of the human corneal tissue, EpiOcular (OCL-200), to develop and validate a method to determine the ocular irritancy of raw materials and final formulations that could intentionally or accidentally contact the eye.

Methods: Tissue reproducibility is monitored using a standardized Quality Control (QC) test that measures the exposure time needed for a positive control (0.3% Triton X-100) to reduce tissue viability to 50% (ET-50). For unknown chemicals and formulations, a new protocol for testing formulations spanning a range of chemical categories and irritancies has been developed. Materials are topically applied to the 3-dimensional tissue model and the MTT tissue viability assay is used to discriminate between ocular irritants and non-irritants. 96 materials (liquids and solids) including alcohols, hydrocarbons, amines, esters, surfactants, and ketones were evaluated.

Results: Since 1996, yearly average ET-50 values for the QC test have ranged from 22.0 to 27.3 minutes. Testing performed on 76 liquid materials resulted in 94.4% sensitivity and 67.5% specificity. Testing of 20 solid materials resulted in 100% sensitivity and 70% specificity. An interlaboratory study investigating assay transferability was successfully performed in 3 US and 4 European labs.

Conclusions: The EpiOcular tissue model has been reproducible and stable since 1996. A new protocol will allow industry to address multiple concerns including: i) consumer safety, ii) public concern for animal welfare, iii) rapidity of test results, and iv) testing cost.

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