Abstract Title: **Evaluation of Retinal Function Using Full-Field Electroretinography during Cataractogenesis in the Galactosemic Rat Model**

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Purpose: To evaluate amplitude of a-b or oscillatory potential (OP) waves in full-field ERG's (ffERG's) and determine how these functional parameters are influenced by progression of cataractogenesis.

Methods: The 50% D-galactose-fed rat model develops accelerated bilateral end-stage nuclear cataracts by 21 days of galactose feeding. Weanling male Sprague-Dawley rats (n=12) were fed a 50%-starch diet for two weeks. Then, after an overnight fast, half of the rats (n=6) were transferred to a diet consisting of 50% D-galactose while 6 rats remained on the 50% starch diet (control group). To correspond with cataract development, ffERG's were performed intervals between 3 and 30 days after starting the D-galactose diet. The change in amplitude between a- and b-waves was calculated. Changes in OP amplitude were also calculated as a composite of four peaks. The day 3 ffERG amplitude was used as reference for the subsequent time points. Cataract progression was evaluated by measurement of digital images collected from slit-lamp biomicroscopy on the same day as the ffERG evaluation.

Results: Early vacuole formation of lens epithelium was evident by day 3 of galactose feeding and progressed to end-stage nuclear cataracts by day 21. Despite cataract progression, there was no significant reduction in a-b waves or OP amplitude at any time point, when compared to the control group that did not develop cataracts. For example, at day 3, the a-b ERG amplitude was 296±20 µV, which was not different from 290±22 µV at day 30 (*p=0.9).* Additional measurements at 7, 9, 12 and 20 days were also not significantly different *(p=0.3).* Likewise, there were no significant differences in the OP amplitudes between the intervals of day 3 (176±11 µV) through day 30 (171±14 µV, *p>0.1*).

Conclusions: In this model, the amplitudes of a-b or OP waves from ffERG are not affected with progression of cataract formation. The results of this study also suggest that ffERG's can measure retinal function in patients where direct fundus examination is precluded due to the presence of a cataract.

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