

**Additional file 4: Figure S4.** (TOP) Published, non-codon optimized (NCO)  $\alpha$ Syn transgenic lines [ref. 18] show significantly reduced expression ( $\sim 20$ -fold) compared to the codon-optimized (CO) transgene. (BOTTOM)  $Rh1 > \alpha$ Syn<sup>NCO</sup> shows highly-attenuated retinal toxicity. ERG depolarization amplitude is preserved with aging. On retinal histology minimal vacuolar changes are observed (compare with Fig. 2 and Fig. 3); frontal and tangential sections are shown for 30 day old  $Rh1 > \alpha$ Syn<sup>NCO</sup> animals).

