Relationship Between Foveal Cone Specialization and Pit Morphology in Albinism

The paper by Wilk et al.¹ is a detailed study comparing various retinal parameters in control and albinotic adults. Several quantitative aspects of their data were not analyzed adequately. The authors focus intensively on the high variability of their albinotic data without quantifying their assessments. For foveal cone density, they present means and SDs for both controls and albinos. Surprisingly, they did not perform a $t$-test to evaluate whether the two groups differed with respect to cone density. Instead, they just emphasized the overlap of the control and albinotic cone density distributions.

Using their means, SDs, and n/group, it was easy to perform a two-tailed independent $t$-test comparing foveal cone density. The statistics revealed that peak cone densities for the albinotic and control groups differed significantly ($t = 4.26$, $df = 17$, $P = 0.0008$). A Levene homogeneity of variance test was done after digitizing their density data (their Fig. 4, inset). The Levene statistic was 0.009 ($P = 0.927$). Thus, the variances for the two groups were not different. The author’s conclusion regarding unusual differences in variability in the data of controls and albinos is unwarranted.

The adaptive optics scanning light ophthalmoscopy (AO-SLO) images of cone inner segments in Figure 3 are superb. However, it is unclear what the limits of AOSLO are with respect to quantifying cone densities. In this paper, the highest control density was 165,000 cones/mm². Many subjects were excluded because their images lacked clarity. Human cone densities in excess of 300,000 cones/mm² have been reported in histologic material.² The inability of AOSLO to image cone densities above 165,000 cones/mm² may create a ceiling effect. Therefore, mean density in the control sample reported here may underestimate the mean and maximum cone density in the control population.

Variability issues notwithstanding, this paper documents that albinos, as a group, have significantly lower cone densities at the fovea than do controls. Furthermore, the expectation that significant group differences are supported only by nonoverlapping data distributions is unrealistic.

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References


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