Research Highlight

Foveal Morphology and the Macular Carotenoids

Billy Randall Hammond
Department of Psychology, University of Georgia, Athens, Georgia, United States; bhammond@uga.edu

Primate foveas have several features that are relatively unique. One is the paucity of anterior vasculature in an area in which photoreceptor density, and hence metabolic activity, is strongly peaking (declining in number exponentially as one moves from the foveola). This area is called the foveal avascular zone (FAZ). Another is the dramatic accumulation of dietary carotenoids, specifically lutein and zeaxanthin, also strongly peaking in the very center of the fovea (called macular pigment [MP]). This accumulation can be as high as 1000 times the amount in serum for some individuals (the highest accumulation of carotenoids in the body) or nearly indetectable for others. This large variation in the optical density and spatial distribution of MP is matched by large variation in the width of the FAZ and central retinal thickness. What has been unclear until now is how all of these widely varying anatomical features relate to each other. In the current study by Balaratnasingam and colleagues,1 these relationships were quantified. Consistent with some past results, these authors found that MP significantly correlated with the width of the FAZ and central retinal thickness. Because all of these features have been independently linked to retinal health/disease, their relation to each other is significant. The results also prompt questions regarding how the morphology reflects the physiology. Does, for instance, MP aide in oxygen utilization in the relatively hypoxic anterior layers of the fovea? Or is a more narrow FAZ the result of the hypoxia resulting from a thicker retina and the resulting distance from the posterior blood supply? The data by Balaratnasingam et al.1 are a good reminder that the architecture of the fovea is not based on a collection of independent variables but rather a complex set of interacting features.

References


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