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A High Omega-3 Fatty Acid Diet Reduces Retinal Lesions in a Murine Model of Macular Degeneration

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Age-related macular degeneration (AMD) is one of the leading cause of blindness among the elderly; however, current therapy options are limited. Epidemiological studies have shown that a diet that is high in ω -3 polyunsaturated (n-3) fatty acids can slow disease progression in patients with advanced AMD. In this study, we evaluated the effect of such a diet on the retinas of *Ccl2*^{-/-}/*Cx3cr1*^{-/-} mice, a model that develops AMD-like retinal lesions that include focal deep retinal lesions, abnormal retinal pigment epithelium, photoreceptor degeneration, and A2E accumulation. *Ccl2*^{-/-}/*Cx3cr1*^{-/-} mice that ingested a high n-3 fatty acid diet showed a slower progression of retinal lesions compared with the low n-3 fatty acids group. Some mice that were given high levels of n-3 fatty acids had lesion reversion. We found a shunted arachidonic acid metabolism that resulted in decreased pro-inflammatory derivatives (prostaglandin E₂ and leukotriene B₄) and an increased anti-inflammatory derivative (prostaglandin D₂). We also measured lower ocular *TNF- α* and *IL-6* transcript levels in the mice fed a diet of high n-3 fatty acids. Our findings in these mice are in line with human studies of AMD risk reduction by long-chain n-3 fatty acids. This murine model provides a useful tool to evaluate therapies that might delay the development of AMD.

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