Mitochondrial DNA drives inflammation in retinal microvascular endothelial cells

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Video Byte

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Abstract

The blood–retinal barrier is a collection of tightly packed cells that keeps harmful substances from entering the retina. These cells include retinal microvascular endothelial cells, RMECs. RMEC dysfunction contributes to certain inflammatory eye diseases, including diabetic retinopathy, uveitis, and age-related macular degeneration. A recent study examined the effects of one emerging cause of this dysfunction: the leakage of mitochondrial DNA into the cytosol. Pathological stimuli, including hydrogen peroxide (H₂O₂), high glucose (HG), and liposaccharide (LPS), caused mitochondrial DNA to leak out of RMECs from rats through a process known as mitochondrial permeability transition pore opening. Leaked mitochondrial DNA regulated the expression of the signaling molecule cGAS. In turn, cGAS stimulated the expression of the pro-inflammatory molecules CCL4, CXCL10, and IFNB1 and transcription factor IRF1. Further studies could refine scientists' understanding of how mitochondrial DNA activates this signaling pathway and could lead to ways of reducing the retinal damage it causes.