

Abstract

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Neuroprotectin D1 Modulates the Induction of Pro-Inflammatory Signaling and Promotes Retinal Pigment Epithelial Cell Survival During Oxidative Stress.

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BACKGROUND: Retinal pigment epithelial (RPE) cells are the most restrictive layer of the three components of the outer Blood-Retina Barrier, preventing the passage of biomolecules in relation to size and charge and thus preserving a controlled environment for the photoreceptors. The retinal pigment epithelium is a tight structure that, when disrupted as a cause or consequence of pathological conditions, deeply affects the neural retina. Since adult human RPE cells are not replicative cells, their preservation is of major interest for the biomedical field due to their loss in many retino-degenerative pathologies.

DISCUSSION: There are several triggers that elicit reactive oxygen species (ROS) formation in normal and pathological circumstances. When the production of these species overwhelms the scavenging and detoxifying systems, their activity results in programmed cell death. Docosahexaenoic acid (DHA) is an essential lipid that is conspicuously accumulated in photoreceptors and RPE cells in the retina.

CONCLUSION: DHA and its oxygenation product, neuroprotectin D1 (NPD1), are major players in the protection of these cells and the retina. NPD1 promotes the synthesis of anti-apoptotic proteins of certain members of the Bcl-2 family and blocks the expression of pro-inflammatory proteins like cyclooxygenase-2.

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