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n-3 Fatty Acid-Derived Lipid Mediators in the Brain: New Weapons Against Oxidative Stress and Inflammation.

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Source

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Abstract

Neuroprotectins, resolvins, and maresins are subfamilies of endogenous oxygenated metabolites derived from n-3 or ω-3 fatty acids(eicosapentaenoic and docosahexaenoic acids). These metabolites are associated with signal transduction processes involved in downregulation of oxidative stress, neuroinflammation and apoptosis. Eicosapentaenoic acid-derived E-series resolvins (RvE1 and RvE2) and docosahexaenoic acid-derived D-series resolvins (RvD1 and RvD2) and neuroprotectins have potent anti-inflammatory and proresolution, and antioxidant properties. They not only retard excessive inflammatory process, but also promote resolution by enhancing clearance of apoptotic cells and debris from inflamed brain tissue and vasculature leading to tissue homeostasis. These actions may underlie the beneficial effects of eicosapentaenoic acid and docosahexaenoic acid in normal human health, neurotraumatic and neurodegenerative diseases. Aspirin initiates resolution not only by exerting antithrombotic actions, but also triggering biosynthesis of specific and stereoselective epimers of resolvins, protectins, and maresins. In addition during the onset of resolution, these lipid mediators also display potent protective roles in neural systems, liver, lungs, and eyes. Potent anti-inflammatory actions of resolvins, and protectins in models of chronic human diseases indicate that down-regulation in resolution pathways may contribute to the decrease in the intensity of many chronic neurodegenerative and visceral diseases.