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Resolvins in inflammation: emergence of the pro-resolving superfamily of mediators.

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Abstract

Countless times each day, the acute inflammatory response protects us from invading microbes, injuries, and insults from within, as in surgery-induced tissue injury. These challenges go unnoticed because they are self-limited and naturally resolve without progressing to chronic inflammation. Peripheral blood markers of inflammation are present in many common diseases, including inflammatory bowel disease, cardiovascular disease, neurodegenerative disease, and cancer. While acute inflammation is protective, excessive swarming of neutrophils amplifies collateral tissue damage and inflammation. Hence, understanding the mechanisms that control the resolution of acute inflammation provides insight into preventing and treating inflammatory diseases in multiple organs. This Review focuses on the resolution phase of inflammation with identification of specialized pro-resolving mediators (SPMs) that involve three separate biosynthetic and potent mediator families, which are defined using the first quantitative resolution indices to score this vital process. These are the resolvins, protectins, and maresins: bioactive metabolomes that each stimulate self-limited innate responses, enhance innate microbial killing and clearance, and are organ-protective. We briefly address biosynthesis of SPMs and their activation of endogenous resolution programs as terrain for new therapeutic approaches that are not, by definition, immunosuppressive, but rather new immunoresolvent therapies.

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