How the phagocyte NADPH oxidase regulates innate immunity

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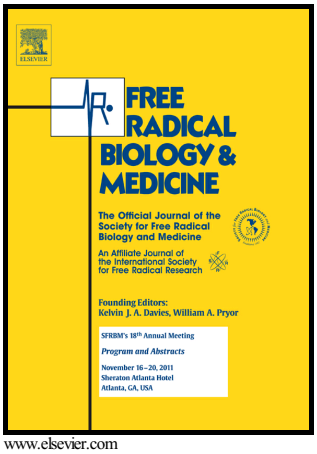

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How the phagocyte NADPH oxidase regulates innate immunity

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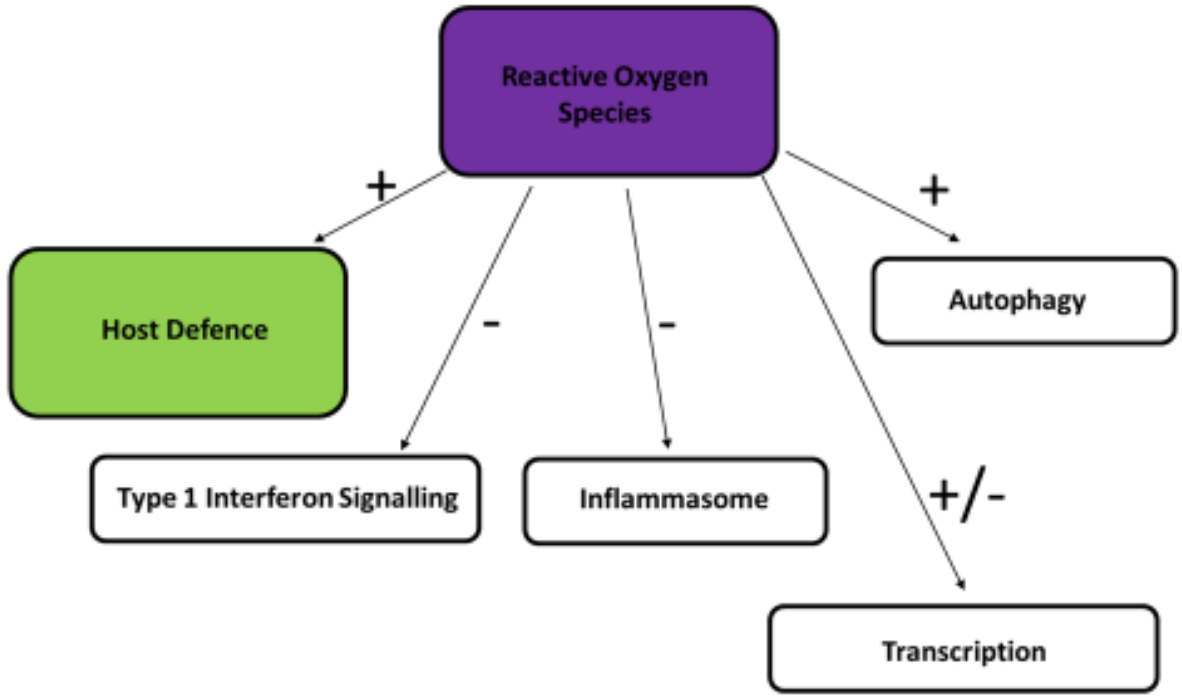
Abstract:

The phagocyte NADPH oxidase is a multi subunit protein complex that generates reactive oxygen species at cell membranes and within phagosomes. It is essential for host defence as evidenced by the severe immunodeficiency syndrome caused by a loss of one of the subunits. This is known as chronic granulomatous disease (CGD). However, the phagocyte NADPH oxidase also has a key role to play in regulating immunity and it is notable that chronic granulomatous disease is also characterised by autoimmune and autoinflammatory manifestations. This is because reactive oxygen species play a role in regulating signalling through their ability to post-translationally modify amino acid residues such as cysteine and methionine. In this review, I will outline the major aspects of innate immunity that are regulated by the phagocyte NADPH oxidase, including control of transcription, autophagy, the inflammasome and type 1 interferon signalling.

Graphical abstract



Keywords: reactive oxygen species; chronic granulomatous disease; autophagy; inflammasome; type 1 interferon

The discovery and characterisation of the phagocyte NADPH oxidase (also known as Nox2) represents a major milestone in our understanding of host defence. It was accomplished through the convergence of elegant biochemical analysis coupled to the description of immunodeficient patients who lack specific subunits of the enzyme