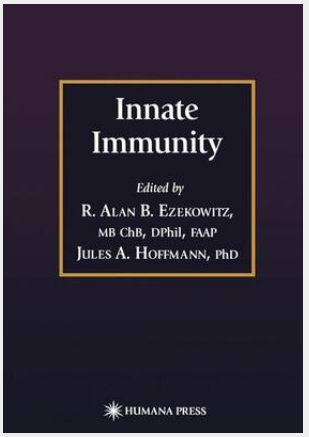
Hoffmann / Ezekowitz

Innate Immunity



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The concept of innate immunity refers to the first-line host defense that serves to limit infection in the early hours after exposure to microorganisms. Recent data have highlighted similarities between pathogen recognition, signaling pathways, and effector mechanisms of innate immunity in Drosophila and mammals, pointing to a common ancestry of these defenses. In addition to its role in the early phase of defense, innate immunity in mammals appears to playa key role in stimulating the subsequent clonal response of adaptive immunity. Recent exciting information has determined that the templates that are laid down in primitive life forms, like flowering plants and insects, form the basic principles of first line host defense that are conserved in mammalian systems. The next frontier in the field is to understand the dynamic adaptive changes that occur as a result of the inter play between host defenses and infectious agents. One emerging theme is that microorganisms are constantly seeking ways to co-opt host defenses. On the other hand, host defense to infection is mediated by the coordinate action of pattern recognition molecules and receptors that, in mammals, are important and probably necessary antecedents to the development of an adaptive immune response. Innate Immunity aims to explore the intersection between host pathogen interactions across an evolutionary spectrum that will inform our understanding of the dynamic interplay between infectious agents and host defense in man.

Humans share a common template for innate immunity-the first-line defense that serves to limit infection immediately after exposure to microorganisms-with life forms as diverse as flowering plants and insects. In Innate Immunity, leading basic researchers explore host-pathogen interactions across an evolutionary spectrum to elucidate the origins of the human defense system against infection. Bringing together the latest research in the field, the authors review four significant research areas: plant immunity, invertebrate host defense immunity, pattern recognition receptors in mammalian host defense, and the links between innate and adaptive immunity in mammals. They find that the similarities among insect, plant, and mammalian immunological systems shed light on the complex mechanisms involved in adaptive immunity, thereby increasing our understanding of mammalian host defense. Their description of various systems, pathways, molecules, and proteins engaged in the process of host defense suggests that innate and adaptive immunity can no longer be seen as two different systems, but rather as working in tandem to surround and destroy foreign agents that enter the body. The authors also discuss those templates of innate immunity found in primitive systems that are now driving most novel research on human innate immunity. Innovative and cutting-edge, Innate Immunity demonstrates new ways to explore this system in plants, invertebrates, and mammals, and, by illuminating the dynamic interplay between infectious agents and host defense, clearly reveals the potential for improved therapies to treat infectious diseases.

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