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Innate Immunity and Inflammation

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Preface

THE FIELDS OF INNATE IMMUNITY AND inflammation have undergone dramatic transformation over the past 15 years. From relatively minor research areas, they have developed into large, vibrant, and exciting fields of investigation that span multiple traditional disciplines ranging from cell biology and gene regulation to neurophysiology and chronic diseases. The discoveries of innate immune recognition mechanisms and their role in controlling adaptive immunity have placed the innate immune system at the foundation of modern immunology. We now have a reasonably good idea of the complexity of the innate immune sensing pathways. However, we also appreciate that much remains to be learned, especially regarding the initiation of type 2 immunity and allergic responses. Similarly, the mechanisms of sensing of pathogen virulence activities remain enigmatic, which complicates our understanding of host–microbiota interactions. It is likely that new concepts that go beyond pattern recognition theory will be required to develop a more general paradigm of the innate immune system.

The discovery of the innate immune signaling pathways also had a major impact on our understanding of inflammation. Indeed, the best-characterized mechanisms of initiating inflammatory responses are the ones involved in pathogen sensing during an infection. It has been well appreciated for almost a century that inflammation plays a fundamental role in host defense from pathogens. However, over the past decade or so, it has become increasingly clear that inflammation plays a more fundamental role in mammalian biology and human diseases. Indeed, almost every human disease is accompanied by inflammation even in the absence of infection or tissue injury. The origins of these inflammatory responses remain enigmatic, but advances in multiple areas of inflammation research suggest that we may be on the verge of a reconceptualization of the entire phenomenon, perhaps along the lines envisioned by Élie Metchnikoff when he introduced the concept of physiological inflammation about a century ago.

Given these developments in both empirical and conceptual knowledge, the goal of this collection of articles is to summarize what is now firmly established in key areas of innate immunity and inflammation. Given the space and time limitations, a collection like this is necessarily incomplete, and dozens of additional topics could have been covered. However, without being comprehensive, this book presents some of the most mature areas of innate immunity and inflammation written by the authorities who have made essential contributions to their respective research areas.

I would like to thank all the authors who contributed their time and knowledge to this volume. I would also like to thank Richard Sever, Barbara Acosta, and their colleagues at Cold Spring Harbor Laboratory Press for their excellent editorial and managerial efforts to envision, supervise, and complete this project.

RUSLAN MEDZHITOV

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