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# Preface

## ADENOSINE: 100 YEARS OLD AND GOING STRONG!

The purine nucleoside adenosine is a modulatory substance that has been intensively studied for about a century by investigators from different biomedical areas because of the plethora of its actions on organs and tissues. Several lines of evidence now indicate that the ability of adenosine to control inflammatory cells plays a key role in the modulatory effects of adenosine in both health and disease. Adenosine indeed has a major impact on the functions of the inflammatory and immune systems. There are many promising emerging therapeutic approaches that focus on the modulation of adenosine, including compounds that interfere with the breakdown of adenosine, as well as specific agonists and antagonists of various adenosine subtypes. Some of these compounds are in intense preclinical investigations, whereas others have already entered clinical trials. In recent years it also became apparent that adenosine is responsible for the anti-inflammatory effect of some compounds that are in therapeutic use, including the antirheumatic disease-modifying agent methotrexate.

This recent interest and emerging widespread awareness of the effect of adenosine in the control of the inflammatory and immune systems covers some of the most active areas of biomedical research (heart, vessels, lung, intestine, kidney, skin, and brain). It is expected that this basic knowledge will generate new therapeutic modalities in the very near future for pathologies with large incidence and of major socioeconomic impact such as ischemia and reperfusion (vascular injury and transplants), atrial fibrillation, heart disease, wound healing, tumors, atherosclerosis, pain, and a variety of central nervous system diseases (Parkinson's and Alzheimer's diseases, epilepsy, mood disorders, and sleep disorders).

The data on the role of adenosine in inflammatory and immune responses are being published in a large number of generalist and specialist scientific journals and have not yet been compiled comprehensively into a single publication. This book contains a compilation of reviews on how adenosine, acting at its cellular receptors, regulates immune responses. The book provides the reader with a general overview of adenosine receptors, covering aspects of molecular biology, cell biology, and pharmacology. Separate chapters focus on the role of adenosine receptors in regulating the function of the various cell types that are involved in immune responses. Further chapters delineate the role of purinergic signaling in the pathophysiology of a variety of disease states that are associated with an overzealous or insufficient immune response. These include autoimmune diseases, asthma, atherosclerosis, ischemia-reperfusion injury, and cancer. The current book is intended to serve as a useful starting point for investigators entering the field of adenosine and inflammatory disease, and also as a handy reference for those already active in the field.