

METHODS IN MOLECULAR BIOLOGY

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Eosinophils

Methods and Protocols

Edited by

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 **Humana Press**

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ISSN 1064-3745 ISSN 1940-6029 (electronic)
ISBN 978-1-4939-1015-1 ISBN 978-1-4939-1016-8 (eBook)
DOI 10.1007/978-1-4939-1016-8
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2014940964

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Printed on acid-free paper

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Preface

Eosinophils were first described in the blood of various species as “course granule cells” in 1846 by Wharton Jones. The striking hues exhibited by eosinophils when stained with acidophilic dyes were first described in 1879 by Paul Ehrlich who termed them “eosinophils” on the basis of their strong avidity for eosin, and to the present day eosinophils retain a continuing ability to fascinate. However despite the passage of more than 130 years and a considerable body of research endeavour, a complete understanding of the function of these cells in health and disease remains elusive. Some basic characteristics of eosinophils are well established and widely accepted. Like all leukocytes eosinophils develop in the bone marrow from pluripotent progenitors from where they are released into the circulation as phenotypically mature granulocytes. Eosinophils spend only a brief time in the peripheral blood before migrating to the thymus or the gastrointestinal tract, where they reside under homeostatic conditions, while in inflammatory conditions the majority of their functions are exerted in the tissues. Perhaps one of the most fascinating aspects of the eosinophil is how accumulating knowledge has changed the perception of its function from a passive bystander to modulator of inflammation, to potent pro-inflammatory cell loaded with histotoxic substances through to the more recent recognition that it can act as both a positive and a negative regulator of complex events in innate and adaptive immunity. It is a basic evolutionary principle that eosinophils did not develop to induce human pathology. Although there are questions about the long-held belief that eosinophils make a major contribution to immunity against parasitic helminthic worms, recent findings on the antimicrobial and antiviral activities of eosinophils suggest that the pathology in eosinophilic diseases might be a consequence of collateral damage related to host defence or inappropriate accumulation. There therefore remains much to be understood about the properties and functions of the eosinophil. It is timely therefore that the current volume presents a series of comprehensive and clear step-by-step protocols whose goal is to facilitate research into this fascinating cell. Written by acknowledged authorities each protocol is aimed at the beginner in this field with each technique spelt out in very simple terms, assuming no previous knowledge of the method without the need to find information elsewhere. The protocols cover established and more novel in vitro and in vivo methodologies. It is hoped that this book will help extend our knowledge on eosinophil function that may in turn lead to new hypotheses for future examination of this intriguing cell.

Aberdeen, Scotland, UK

Garry M. Walsh

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