Methods in Enzymology
Volume 292

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Volume 292

ABC Transporters: Biochemical, Cellular, and Molecular Aspects

EDITED BY

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ACADEMIC PRESS

San Diego London Boston New York Sydney Tokyo Toronto

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0076-6879/98 $25.00

Academic Press
525 B Street, Suite 1900, San Diego, California 92101-4495, USA
http://www.academicpress.com

Academic Press Limited
24-28 Oval Road, London NW1 7DX, UK
http://www.hbuk.co.uk/ap/

International Standard Book Number: 0-12-182193-5

PRINTED IN THE UNITED STATES OF AMERICA
98 99 00 01 02 03 MM 9 8 7 6 5 4 3 2 1

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Preface

Since the cloning of mammalian multidrug resistance (MDR) genes in 1986, there has been tremendous progress in the identification and characterization of the members of the superfamily of ATP-binding cassette (ABC) transporters also known as traffic ATPases. More than eighty ABC transporters have been identified. However, the function of many of these transporters is unknown, and as genome mapping of a number of organisms proceeds, open reading frames encoding new family members continue to be identified. The ABC superfamily members transport a wide variety of substrates, which include ions, sugars, amino acids, glycans, peptides, proteins, phospholipids, toxins, antibiotics, and hydrophobic cytotoxic natural product drugs. The minimal functional transport unit appears to be composed of two membrane-associated domains, each containing six putative transmembrane helices and two nucleotide-binding domains or ATP binding/utilization sites. Among these family members, multiple structural configurations have been found, including a single polypeptide chain, homo- or heterodimers, and multisubunit systems, all of which include both the required membrane and ATP domains. Several of the ABC transporters are linked to diseases in humans, including cancer, cystic fibrosis, Stargardt disease, age-related macular degeneration (AMD), adrenoleukodystrophy, Zellweger's syndrome, rheumatoid arthritis, insulin-dependent diabetes, persistent hypoglycemia of infancy, Dubin-Johnson syndrome, and progressive familial intrahepatic cholestasis.

With the increased interest in ABC transporters, there was a real need for a guide that presents step-by-step protocols and methods that can be used for studying various aspects—including their physiological role—of these proteins. The articles in this *Methods in Enzymology* volume provide detailed descriptions of such methods. In addition, some articles include overviews from experts in the field which provide detailed summaries of various aspects of these transporters that should be useful not only to the novice but also to researchers interested in entering this field.

We would like to express our sincere thanks to all the contributing authors for their efforts and cooperation during the production of this book. We also thank Shirley Light of Academic Press for providing advice and encouragement in the preparation of this volume.

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