

# *Acanthamoeba*

Biology and Pathogenesis

Second Edition

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Cover design adapted from Figure D.11 and Figure D.14.

To my beloved late father, Muhammad Hafeez Khan, and my dear mother, Khalida Khanum – you are the best parents ever.

And to my beloved wife, Ruqaiyyah Siddiqui, and my lovely children, Salahuddin Ahmed Khan and Mohammad Hafeez Khan, who make this life worth living.

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# Preface to the First Edition

This book provides the first comprehensive review of *Acanthamoeba* research, published to date. Everything that is known about *Acanthamoeba* is reviewed and divided into easy to follow sections in a thought-provoking manner. This book presents the current state of research on every aspect of this organism, detailing major advances in areas such as genomics, molecular and cellular biology, life cycle, geographical distribution, role in ecosystem, morphology, motility, phylogenetics, genotyping, metabolism, regulation of morphogenesis, host–parasite interactions, the molecular and immunological basis of pathogenesis, methods of transmission, epidemiology, clinical manifestation, diagnosis, treatment, new target identification and drug development and drug resistance, as well as its role as a Trojan horse of the microbial world, including viral, bacterial, protists and fungal pathogens. There is a significant emphasis on our knowledge of *Acanthamoeba* infections that has grown in the molecular era. In addition, this book provides a historical perspective on *Acanthamoeba* research that will be of interest. This compilation will serve as an essential reference for microbiologists, immunologists, and physicians in the field of basic and medical microbiology, as well as an invaluable reference for new and experienced researchers who wish to understand this organism better. This book is the definitive guide to current research in this increasingly important organism.

Naveed Khan  
University of Nottingham, 2009

# Preface

The preface to the first edition of this book discusses the significance of *Acanthamoeba* research for various branches of science. All the principles discussed in the first edition apply to the second edition, but the passage of 5 years has inevitably led to changes in the material presented. In particular, the completion of the *Acanthamoeba* genome is of special emphasis. When the first edition was completed in 2009, it was clear that molecular tools would continue to have profound effects in *Acanthamoeba*. Using genome information, we are now able to make proper use of molecular methods in discussing *Acanthamoeba* development, molecular and cellular biology in relation to metabolism and morphogenesis, classification, ecology and role in the ecosystem, host–pathogen interactions, virulence factors and immunological basis of pathogenesis, clinical manifestation, diagnosis, treatment, new target development and drug resistance and its interactions with other microbes in the environment.

I am indebted to Professor Brendan Loftus (University College Dublin) for superbly composing the entire *Acanthamoeba* genome chapter. I am very grateful to colleagues who read or commented upon chapters or sections and provided illustrations for the first edition of the book, including Professor David Warhurst (LSHTM), Professor David Lloyd (Cardiff University), Professor Ed Jarroll (City University New York), Dr Sutherland Maciver (University of Edinburgh), many researchers working in my laboratory over the years and to my colleagues, Gulafroze Jessa, Irfan Baig and Ali Moosa, for the editorial support, comments and suggestion, so essential to complete this project. Finally, I am thankful to the Aga Khan University for the freedom and understanding to embark on this project.

As before, this compilation will serve as an essential reference for microbiologists, immunologists, and physicians in the field of basic and medical microbiology, as well as an invaluable reference for new and experienced researchers who wish to understand this organism better. This book is the definitive guide to current research in this increasingly important organism.

Naveed Khan  
Aga Khan University, 2015