

# Preface

Parasitic diseases pose an enormous threat to human health and welfare. Admirable research efforts and promising advancement in the field of research on protozoan parasites have taken place in last few decades. The diseases caused by *Leishmania* and *Trypanosoma* affect many millions of people in both tropical and subtropical regions of the world. An estimated 700,000–1 million new cases of leishmaniasis and 20,000–30,000 deaths occur annually. There are three main forms of leishmaniasis: visceral leishmaniasis (VL), cutaneous leishmaniasis (CL) and mucocutaneous leishmaniasis. *Leishmania* species are found throughout Latin America, Africa and Asia. African trypanosomiasis (sleeping sickness) is fatal if untreated, and occurs in 36 African countries, particularly in East and Central Africa, where some 50 million people are at risk of acquiring infection. *Trypanosoma cruzi*, the causative agent of Chagas' disease, is endemic in Latin America. Emergence of parasites resistant to many of the available drugs is also responsible for the depressing scenario and cause of death. So the disease is not only complex but also cosmopolitan.

*Leishmania* and *Trypanosoma* share common biological traits and they cause low-priority diseases as they offer few commercial incentives to the pharmaceutical companies. These kinetoplastid protozoan parasites have attracted considerable attention from the scientific community because of their unusual biology. These two organisms have special features. They are characterized by the presence of unusual mitochondrion containing a massive intercatenated network structure of DNA called kinetoplast DNA or kDNA. None of the host organisms of these parasites contain DNA which resembles this unique kDNA. Therefore, these

kDNAs can be excellent targets for development of therapeutic agents.

Measures to control these diseases have not been very successful and attempts to develop effective vaccines are still far from success. Therefore, improved and rational measures for drug development are still desirable.

Recent progress in molecular biology with reference to whole genome sequencing has greatly facilitated drug design, drug delivery and immunotherapy to provide newer intervention strategies against these parasites.

When I was contacted by Hugh Griffin of Caister Academic Press to edit a book, I accepted the invitation and I felt that it is the right time to address the important subject on molecular biology of kinetoplastid parasites. The book contains 13 chapters contributed by eminent scientists working in this field.

The articles deal with the biology and biochemistry of different targets, molecular immunology in relation to immune evasion and immunotherapy, host–parasite interaction, cellular defence mechanism adopted by the parasites for survival, membrane architecture as targets, life cycle and epigenetic regulation of the parasites.

I am thankful to the scientists for their contribution in this book. Finally the book was made possible because of continuous help from my PhD students Sourav Saha and Somenath Roy Chowdhury.

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# About the Editor

Hemanta K. Majumder is a Senior Scientist Platinum Jubilee Fellow of National Academy of Sciences (India) at CSIR-Indian Institute of Chemical Biology, Kolkata. He was the former Head of the Infectious Diseases and Immunology Division of the Institute. He served the State Council of Science and Technology, Government of West Bengal as the Working Chairman from 2004 to 2011. His main research interests include biochemistry and molecular biology of DNA topoisomerases of *Leishmania* in relation to development of therapeutics targeted to these enzymes and understanding the mechanism of programmed cell death in this unicellular protozoan parasite.

Dr Majumder is in the editorial board of many national and international journals. He received his PhD degree in biochemistry in 1975 from Calcutta University. He did his post doctoral studies at Albert Einstein College of Medicine, New York, USA (1976–9), and at the University of Zurich, Switzerland (1979–81). He was a Visiting Associate Research Molecular Biologist at University of California at Berkeley (1988–9). He was also a visiting Fellow at University of Rome, Italy (2008), University of Aarhus, Denmark (2010), Robert Koch Institute at Berlin (2013), LMU Germany



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