

# Illustrated Dictionary of Parasitology in the Post-genomic Era

<https://doi.org/10.21775/9781910190678>

Edited by

Hany M. Elsheikha

School of Veterinary Medicine and Science  
Faculty of Medicine and Health Sciences  
University of Nottingham  
Nottingham  
UK

[hany.elsheikha@nottingham.ac.uk](mailto:hany.elsheikha@nottingham.ac.uk)

Edward L. Jarroll

Department of Biological Sciences  
Lehman College  
City University of New York  
New York, NY  
USA

[edward.jarroll@lehman.cuny.edu](mailto:edward.jarroll@lehman.cuny.edu)



Copyright © 2017

Caister Academic Press  
Norfolk, UK

[www.caister.com](http://www.caister.com)

British Library Cataloguing-in-Publication Data  
A catalogue record for this book is available from the British Library

ISBN: 978-1-910190-67-8 (paperback)

ISBN: 978-1-910190-68-5 (ebook)

Description or mention of instrumentation, software, or other products in this book does not imply endorsement by the author or publisher. The author and publisher do not assume responsibility for the validity of any products or procedures mentioned or described in this book or for the consequences of their use.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher. No claim to original U.S. Government works.

Cover design adapted from the following figures: balantidiasis, copulatory bursa and midges (courtesy: Parasitic Diseases, 6th edn. Despommier, D.D., D. Griffin, R.W. Gwadz, P.J. Hotez, C. Knirsch. Parasites Without Borders, Pubs. 2017); hard ticks (courtesy: Elsheikha H.M., Khan N.A. Essentials of Veterinary Parasitology, 1st edition, Caister Academic Press. 2011.); erratic parasite (courtesy: Vito Colella, University of Bari, Bari, Italy); and giant cell.

### **Ebooks**

Ebooks supplied to individuals are single-user only and must not be reproduced, copied, stored in a retrieval system, or distributed by any means, electronic, mechanical, photocopying, email, internet or otherwise.

Ebooks supplied to academic libraries, corporations, government organizations, public libraries, and school libraries are subject to the terms and conditions specified by the supplier.

# Contents

Preface	v
Photo Credits	vii
Illustrated Dictionary of Parasitology in the Post-genomic Era	1
Appendix 1 Abbreviations and Acronyms Used in Parasitology	307
Appendix 2 Common Names of Parasites	313
Appendix 3 Word Roots in Parasitology and Biology	317
Appendix 4 The Greek Alphabet	325
Appendix 5 Parasitology and Related Journals	327
Appendix 6 Important Organizations and Databases	329
Appendix 7 Additional Readings	331

# Current Books of Interest

Bacterial Evasion of the Host Immune System	2017
Next-generation Sequencing and Bioinformatics for Plant Science	2017
The CRISPR/Cas System: Emerging Technology and Application	2017
Brewing Microbiology: Current Research, Omics and Microbial Ecology	2017
Metagenomics: Current Advances and Emerging Concepts	2017
<i>Bacillus</i> : Cellular and Molecular Biology (Third Edition)	2017
Cyanobacteria: Omics and Manipulation	2017
Foot-and-Mouth Disease Virus: Current Research and Emerging Trends	2017
Brain-eating Amoebae: Biology and Pathogenesis of <i>Naegleria fowleri</i>	2016
<i>Staphylococcus</i> : Genetics and Physiology	2016
Chloroplasts: Current Research and Future Trends	2016
Microbial Biodegradation: From Omics to Function and Application	2016
Influenza: Current Research	2016
MALDI-TOF Mass Spectrometry in Microbiology	2016
<i>Aspergillus</i> and <i>Penicillium</i> in the Post-genomic Era	2016
The Bacteriocins: Current Knowledge and Future Prospects	2016
Omics in Plant Disease Resistance	2016
Acidophiles: Life in Extremely Acidic Environments	2016
Climate Change and Microbial Ecology: Current Research and Future Trends	2016
Biofilms in Bioremediation: Current Research and Emerging Technologies	2016
Microalgae: Current Research and Applications	2016
Gas Plasma Sterilization in Microbiology: Theory, Applications, Pitfalls and New Perspectives	2016
Virus Evolution: Current Research and Future Directions	2016
Arboviruses: Molecular Biology, Evolution and Control	2016
<i>Shigella</i> : Molecular and Cellular Biology	2016
Aquatic Biofilms: Ecology, Water Quality and Wastewater Treatment	2016
Alphaviruses: Current Biology	2016
Thermophilic Microorganisms	2015
Flow Cytometry in Microbiology: Technology and Applications	2015
Probiotics and Prebiotics: Current Research and Future Trends	2015
Epigenetics: Current Research and Emerging Trends	2015
<i>Corynebacterium glutamicum</i> : From Systems Biology to Biotechnological Applications	2015
Advanced Vaccine Research Methods for the Decade of Vaccines	2015
Antifungals: From Genomics to Resistance and the Development of Novel Agents	2015

Full details at [www.caister.com](http://www.caister.com)

# Preface

The number of infectious diseases in the world today seems to be increasing rather than decreasing as one would hope, especially new and emerging viral diseases that either did not exist previously or were not recognized. Despite this, malaria, a parasitic disease caused by *Plasmodium* spp., remains the number one infectious disease worldwide. Almost 12 years have elapsed since the *Dictionary of Parasitology* by Peter J Gosling was published, more than a decade marked by extensive discoveries and developments related to the field of parasitology. The dramatic shift from a parasite-focused subject to a field in which the emphasis is on the interaction between the parasite and its host organism has led to major breakthroughs in understanding the pathobiology of many parasites at a more in-depth level. More exciting is the discovery of the mechanisms by which some helminthic parasites modulate host immune response and their applications in medicine to cure chronic diseases, which are now being translated into therapies that are not only symptomatic but also potentially disease modifying. These research advances have stimulated a broader interest in parasitology among many researchers in other fields, such as medicine and bioscience. Historically, parasitologists have maintained a unique parasite nomenclature (e.g. *Dictyocaulus*, *Dracunculus*, *Leishmania*, *Angiostrongylus*) and terminology (e.g. hypobiosis, vector, xenodiagnosis) that has often puzzled their colleagues in other fields, causing them to associate parasitology to a black box. In the meantime, like most scientific disciplines, parasitology

has become more cross-disciplinary with fast-growing vocabularies, which are new to parasitologists. Therefore, it is necessary to develop a new dictionary to help both parasitologists and non-parasitologists to grasp the contemporary concepts and terms used in modern parasitology and associated scientific areas.

The first edition of the *Illustrated Dictionary of Parasitology in the Post-genomic Era* comes at a time when the topic of 'one health' and its medical, veterinary and environmental impacts are at the forefront of news stories and political discussions. Successful implementation of the 'one health' initiative requires cross-fertilization between different disciplines, which will improve our understanding of the mechanisms underlying host-pathogen dynamic interactions. With over 4500 entries, illustrated with more than 170 images and line drawings, and reflecting ground-breaking advances in parasitology research this dictionary provides, in a single-volume, up-to-date resources for the many terms encountered in contemporary parasitological literature. The dictionary also covers many pertinent terms from related fields of veterinary medicine and life sciences, such as microbiology, genetics, biochemistry, biotechnology, infectious diseases, epidemiology, zoonosis, public health, molecular biology, zoology, pharmaceutical science, environmental science, taxonomy, and population genetics.

This dictionary will serve as a guide for students, academic staff, medical and veterinary professionals, and life scientists, as well as for members of industrial establishments,

governmental agencies and research foundations involved in research activities relating to parasitology and associated scientific fields.

Finally, this book could not have been

delivered in such a professional way without the help of the professional staff of Caister Academic Press and Prepress Projects Ltd. Their help is deeply appreciated.

Hany M. Elsheikha  
School of Veterinary Medicine and Science  
Faculty of Medicine and Health Sciences  
University of Nottingham  
Nottingham  
UK

Edward L. Jarroll  
Department of Biological Sciences  
Lehman College  
City University of New York  
New York, NY  
USA

# Photo Credits

Courtesy: Parasitic Diseases, 6th edn. Des-pommier, D.D., D. Griffin, R.W. Gwadz, P.J. Hotez, C. Knirsch. Parasites Without Borders, Pubs. 2017.

- amoebic liver abscess, babesiosis, balantidiasis, Bancroftian filariasis, bed bugs, Chagas disease, clonorchiasis, coccidia, copulatory bursa, cryptosporidiosis, crypts, cutaneous leishmaniasis, cyclophyllidea, cyclozoonosis, cysticercoid, egg capsule, egg membrane, *Enterobius vermicularis*, erythrocytic asexual-stage schizonts, gametocyte, hepatosplenic schistosomiasis, inner shell, Kato–Katz method, lymphatic filariasis, metacyclic promastigotes, midges, miracidia hatching, nurse cell, *Onchocerca cervicalis*, *Onchocerca ochengi*, operculum, polar plugs, proglottid, promastigote, proto-scolex, pulicide, rostellum, salivarian, scolex, soil-transmitted helminths, sporocyst, strongyloidiasis, sucking disk, taeniasis, toxocariasis, triatomid bug, *Trichinella spiralis*, *Trichuris trichura*, trypomastigote, tsetse fly, urinary schistosomiasis, vacuole, xenodiagnosis.

Courtesy: Elsheikha H.M., Khan N.A. Essentials of Veterinary Parasitology, 1st edition, Caister Academic Press. 2011.

- *Anoplocephala perfoliata*, bottle jaw, bursa, cestodes, cyst, *Haematobia irritans*, haematophagous, hard ticks, hexacanth embryo, hydatid cyst, hydatid sand, paramphistome, psoroptic mange, pyriform apparatus, strobilation, thelaziosis, tick pyaemia of sheep, whipworms.

Courtesy: Veterinary Business Development Ltd.

- acetabulum, blowfly, Branchiura, *Ctenocephalides felis*, ciliata, Crustacea, insect pupa, leishmaniasis, macronucleus, myiasis, nemathelminthes, puparium, *Varroa*, zoonosis.

Courtesy: Bristol University tick ID online resource with the kind permission of Professor Richard Wall.

- *Dermacentor reticulatus*, *Ixodes ricinus*, *Rhipicephalus sanguineus*.

Courtesy: Bayer Animal health.

- angiostrongylosis, aelurostrongylosis.

Courtesy: Dr JP Dubey, USDA, Beltsville, Maryland, USA.

- bradyzoite.

Courtesy: Emma Drinkall, University of Nottingham, Nottingham, UK.

- life cycle, *Ligula intestinalis*.

Courtesy: Vito Colella, University of Bari, Bari, Italy.

- erratic parasite.