

The background of the entire advertisement is a dark, monochromatic image of several jellyfish. The jellyfish are translucent with visible internal structures and are scattered across the frame, some appearing larger and more detailed than others. The overall aesthetic is scientific and naturalistic.

# Life Sciences

Books and Journals from  
Cambridge University Press

Cambridge is one of the leading publishers in ecology and conservation biology and publishes high quality texts and research across the breadth of the life sciences, focusing particularly on animal behaviour, biological anthropology, evolutionary biology, computational and systems biology, as well as statistics and professional development titles for biologists.

We also have an extensive portfolio of established journals in agriculture, ecology and conservation, and animal science.

For further details visit:

[cambridge.org/core-life-sciences](http://cambridge.org/core-life-sciences)

Cambridge  
Core



CAMBRIDGE  
UNIVERSITY PRESS



# Medicine

Books and Journals from  
Cambridge University Press

The Cambridge Medicine programme focuses its book publishing in a defined set of core clinical areas with our great strength in the clinical brain sciences. Other specialties of significant focus include reproductive medicine/obstetrics and gynaecology, anaesthesia and critical care, emergency medicine and pathology.

Our journals programme covers a broad spectrum of medical disciplines including emergency and disaster medicine, epidemiology and infectious diseases, biomedical science, genetics, nutrition, mental health and psychiatry, and neuroscience.

We partner with many learned societies including The Society for Healthcare Epidemiology of America, and the Neuroscience Education Institute, and the Royal College of Obstetricians and Gynaecologists.

For further details visit:

[cambridge.org/core-medicine](http://cambridge.org/core-medicine)

Cambridge  
Core



CAMBRIDGE  
UNIVERSITY PRESS

## Parasitology

**Back volumes.** Vols. 1–71: Inquiries should be addressed to Wm. Dawson & Sons Ltd, Cannon House, Folkestone, Kent. Vols. 72 onwards: quotations for parts still in print may be obtained from Cambridge or the American Branch of Cambridge University Press.

**Copying.** This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to C.C.C. of the per-copy fee of \$16.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0031–1820/2018 \$16.00.

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions.

**ISI Tear Sheet Service.** 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only.

**For all other use,** permission should be sought from Cambridge or the American Branch of Cambridge University Press.

**Claims** for missing issues can only be considered if made immediately after receipt of the subsequent issue.

**Advertising.** Details of advertising in *Parasitology* may be obtained from the publisher.

**Online submission.** Authors are encouraged to submit their manuscripts online. Go to <http://mc.manuscriptcentral.com/par/> to open an author's account for *Parasitology*. Manuscript Central is helping to improve the speed of the publication process for the journal.

**Front Cover illustration:** A schematic illustration of direct and indirect effects of helminths and their products on host immune cells. As shown here, apoptosis occurs in various immune cells during infection with helminths. Helminth-induced apoptosis plays an essential role in parasite survival not only through suppression of anti-parasite immunity, but also via inhibition of immune-mediated tissue injury. From Zakeri, Vol. 144 (13) pp. 1663–1676.

© Cambridge University Press 2018

University Printing House, Cambridge CB2 8BS, United Kingdom  
1 Liberty Plaza, Floor 20, New York, NY 10006, USA  
477 Williamstown Road, Port Melbourne, VIC 3207, Australia  
C/O Orense, 4, Planta 13 28020 Madrid, Spain  
Lower Ground Floor, Nautica Building, The Water Club, Beach Road,  
Granger Bay, 8005 Cape Town, South Africa

*Printed in the UK by Bell & Bain*

# PARASITOLOGY

## CONTENTS

### REVIEW ARTICLES

**The role of metalloproteases in *Leishmania* species infection in the New World: a systematic review**

Leticia Sayuri Murase, João Vítor Perez de Souza, Quirino Alves de Lima Neto, Tatiane França Perles de Mello, Bruna Muller Cardoso, Daniele Stéfanie Sara Lopes Lera-Nonose, Jorge Juarez Vieira Teixeira, Maria Valdrinez Campana Lonardoni and Izabel Galhardo Demarchi 1499

**Can the tea tree oil (Australian native plant: *Melaleuca alternifolia* Cheel) be an alternative treatment for human demodicosis on skin?**

Nelson Siu Kei Lam, Xin Xin Long, Robert C Griffin, Mu-Kai Chen and James CG Doery 1510

**A new landscape of host–protozoa interactions involving the extracellular vesicles world**

Bruno Gavinho, Izadora Volpato Rossi, Ingrid Evans-Osses, Jameel Inal and Marcel I. Ramirez 1521

### RESEARCH ARTICLES

**Recombinant adenylate kinase 3 from liver fluke *Clonorchis sinensis* for histochemical analysis and serodiagnosis of clonorchiasis**

Soon Bin Kwon, Paul Kim, Hae Sun Woo, Tae Yun Kim, Ju Yeong Kim, Hye Min Lee, Yun Soo Jang, Eun-Min Kim, Tai-Soon Yong and Baik Lin Seong 1531

**Gametogony of *Eimeria macusaniensis* Guerrero, Hernandez, Bazalar and Alva, 1971 in llama (*Lama glama*)**

J.P. Dubey 1540

**Endemic infection of the common mynah *Acridotheres tristis* with *Trichomonas gallinae* the agent of avian trichomonosis**

Hassan Ali Farooq, Hammad Ahmad Khan, Abdulwahed Fahad Alrefaei and Kevin Morris Tyler 1548

**First record of *Halocercus* sp. (Pseudaliidae) lungworm infections in two stranded neonatal orcas (*Orcinus orca*)**

A. Reckendorf, E. Ludes-Wehrmeister, P. Wohlsein, R. Tiedemann, U. Siebert and K. Lehnert 1553

**Rarely reported, widely distributed, and unexpectedly diverse: molecular characterization of mermithid nematodes (Nematoda: Mermithidae) infecting bumble bees (Hymenoptera: Apidae: *Bombus*) in the USA**

Amber D. Tripodi and James P. Strange 1558

**Proximity to parasites reduces host fitness independent of infection in a *Drosophila*–*Macrocheles* system**

Collin J. Horn and Lien T. Luong 1564

**Phylogenetic and ecological factors affecting the sharing of helminths between native and introduced rodents in Central Chile**

Carlos Landaeta-Aqueveque, María del Rosario Robles, AnaLia Henríquez, Andrea Yáñez-Meza, Juana Paola Correa, Daniel González-Acuña and Pedro Eduardo Cattán 1570

**The first multilocus genotype analysis of *Giardia intestinalis* in humans in the Czech Republic**

L. Lecová, F. Weisz, P. Tůmová, V. Tolarová and E. Nohýnková 1577

**Genotyping of individual *Ceratomyxa shasta* (Cnidaria: Myxosporaea) myxospores reveals intra-spore ITS-1 variation and invalidates the distinction of genotypes II and III**

Stephen D. Atkinson, Sascha L. Hallett and Jerri L. Bartholomew 1588

**Development and assessment of an improved recombinant multi-epitope antigen-based immunoassay to diagnose chronic Chagas disease**

Luz María Peverengo, Valeria Garcia, Luz María Rodeles, Diego Mendicino, Miguel Vicco, Claudia Lagier, Verónica Gonzalez, Luis Gugliotta and Iván Marcipar 1594

**Characterization of mitochondrion-targeted GTPases in *Plasmodium falciparum***

Kirti Gupta, Ankit Gupta, Afreen Haider and Saman Habib 1600

**Genetic diversity and phylogeography of the elusive, but epidemiologically important *Echinococcus granulosus sensu stricto* genotype G3**

Liina Kinkar, Teivi Laurimäe, Ibrahim Balkaya, Adriano Casulli, Houria Zait, Malik Irshadullah, Mitra Sharbatkhori, Hossein Mirhendi, Mohammad Rostami-Nejad, Francisco Ponce-Gordo, Steffen Rehbein, Eshrat Beigom Kia, Sami Simsek, Viliam Šnábel, Gérald Umhang, Antonio Varcasia and Urmas Saarna 1613

**Phylogenetic heritability of geographic range size in haematophagous ectoparasites: time of divergence and variation among continents**

Boris R. Krasnov, Georgy I. Shenbrot, Luther van der Mescht, Elizabeth M. Warburton and Irina S. Khokhlova 1623

**Low fertility, fecundity and numbers of mated female offspring explain the lower reproductive success of the parasitic mite *Varroa destructor* in African honeybees**

Beatrice T. Nganso, Ayuka T. Fombong, Abdullahi A. Yusuf, Christian W. W. Pirk, Charles Stuhl and Baldwyn Torto 1633