Volume 10 June 1 2009

ISSN 1466-2523

Animal Health Research Reviews



CAMBRIDGE UNIVERSITY PRESS

https://doi.org/10.1017/S1466252309990041 Published online by Cambridge University Press

Animal Health Research Reviews

Editor-in-Chief

Carlton L. Gyles University of Guelph, Canada

Founding Editor

Robert P. Ellis

Colorado State University, USA

Section Editors

Physiology and Pharmacology Gerhard Breves, Veterinary School of Hannover, Germany Parasitology Katherine M. Kocan, Oklahoma State University, USA Bacteriology Janet MacInnes, University of Guelph, Canada
Food and Environmental Safety Qijing Zhang, Iowa State University, USA Epidemiology M. D. Salman, Colorado State University, USA Virology Y. M. Saif, Obio State University, USA

Editorial Board

Franklin A. Ahrens, Iowa State University, USA

Sang-Nae Cho, Yonsei University, Republic of Korea Lynette B. Corbeil, University of California-San Diego Medical Center, USA

Joachim Frey, University of Berne, Switzerland Ian Gardner, University of California-Davis, USA Mario Jacques, University of Montreal, Canada Vivek Kapur, Pennsylvania State University, USA Joan K. Lunney, USDA-Livestock and Poultry Sciences

Institute, USA

Prem S. Paul, University of Nebraska-Lincoln, USA Brian Perry, International Livestock Research Institute, Kenya Leon N. D. Potgieter, University of Tennessee, USA Donald L. Reynolds, University of Prince Edward Island, Canada
Linda J. Saif, Obio State University, USA
Alejandro Schudel, University of Buenos Aires, Argentina
Ronald D. Schultz, University of Wisconsin, USA
Bruce S. Seal, USDA-Poultry Microbiological Safety Research Unit, USA
J. Glenn Songer, University of Arizona, USA
Bert E. Stromberg, University of Minnesota, USA
Francisco Suárez-Güemes, Universidad Nacional Autonoma de México, México
Richard W. Titball, Defence Evaluation and Research Agency, UK James A. Will, University of Wisconsin, USA

Aims and Scope

Animal Health Research Reviews provides an international vehicle for the publication of reviews and commentaries on all aspects of animal health. The Journal covers both infectious and non-infectious diseases in companion, production and wild animals. Articles may be in-depth reviews of a specific aspect of a disease or pathogen, or may cover all aspects of a disease, but must include new findings or advance new concepts and hypotheses. The Journal publishes both solicited and unsolicited articles. Reviews will normally be 5000–6000 words in length. The Journal is also produced electronically and is available on the Internet. If you wish to write a review please contact the editors at ahrjournal@cambridge.org.

Subscriptions

Animal Health Research Reviews (ISSN 1466-2523) is published twice a year. The subscription price for institutions of Volume 10 (2009) which includes electronic access and delivery by air is £255 (US \$495 in the USA, Canada and Mexico); the electronic only price for institutions is £205 (US \$395 in the USA, Canada and Mexico).

Orders, which must be accompanied by payment, may be sent to a bookseller, subscription agent or direct to the publisher: Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, UK; or in the USA, Canada and Mexico: Cambridge University Press, Journals Fulfillment Department, 100 Brook Hill Drive, West Nyack, New York, 10994-2133. EU subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number. Japanese prices for institutions are available from Kinokuniya Company Ltd, P. O. Box 55, Chitose, Tokyo 156, Japan.

Copies of the journal for subscribers in the USA, Canada and Mexico are sent by air to New York to arrive with minimum delay. Periodicals postage paid at New York, NY, and at additional mailing offices. Postmaster: send address changes in the USA, Canada and Mexico to: *Animal*, Cambridge University Press, 100 Brook Hill Drive, West Nyack, New York 10994-2133. Claims for missing issues should be made immediately on receipt of the subsequent issue.

Advertising

Advertising queries for all parts of the world *except* the USA, Canada and Mexico to the Journals Advertising Co-ordinator: Rebecca Curtis, ad_sales@cambridge.org Address enquiries in the USA, Mexico and Canada *only* to: journals_advertising@cup.org

Copying

This journal is registered with the Copyright Clearance Centre, 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 U.S. Copyright law) subject to promotional or commercial purposes. Code 0266-4674/2009 \$16.00.

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

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions. *For all other use*, permission should be sought from Cambridge or the American Branch of Cambridge University Press.

Internet Access

This journal is included in the Cambridge Journals Online Service which can be found at www.journals.cambridge.org