

Book Proposal Form

Please return to:

Janet Slobodien
Editor, Life Sciences
Springer
233 Spring Street
New York, NY 10013
Janet.Slobodien@springer.com
212-460-1525
www.springer.com

- 1) *Please provide your name, title, affiliation, and contact information, as well as this information for any co-editor or author:*

Co-editors:

Matthew J. Gray, Ph.D., Associate Professor, Center for Wildlife Health, Department of Forestry, Wildlife and Fisheries, 274 Ellington Plant Sciences Building, University of Tennessee, Knoxville TN 37920. mgray11@utk.edu, 865-974-2740.

V. Gregory Chinchar, Ph.D., Professor, Department of Microbiology, University of Mississippi Medical Center, 2500 North State Street, Jackson, MS 39216.
vchinchar@umc.edu, 601-984-1743.

- 2) *Please provide the proposed title of your book:*

Ranaviruses: Lethal Pathogens of Ectothermic Vertebrates

- 3) *Please describe this work and its purpose. Take at least 2-4 paragraphs to set the project in context, and list 3-5 unique features that make it distinctive:*

We are proposing to organize the first book on ranaviruses. Ranaviruses are double-stranded DNA viruses that cause hemorrhagic disease in amphibians, reptiles and fish. Ranaviruses have caused mass die-offs of ectothermic vertebrates in wild and captive populations around the globe. There is evidence that this pathogen is emerging and responsible for population declines in certain locations. Considering that amphibians and freshwater turtles are suitable hosts and the most imperiled vertebrate taxa in the world, ranaviruses can have significant impacts on biodiversity and ecosystem function. Additionally, many fish that are raised in aquaculture facilities and traded internationally are suitable hosts; thus, the potential economic impact of ranaviruses is significant. Ranaviruses also serve as a model for replication and gene function of large double-stranded DNA viruses. There is an urgent need to assemble the contemporary information on ranaviruses, and provide guidance on how to assess its threat in populations.

Through the Global Ranavirus Consortium, we organized 24 experts from 6 countries to write the first book on ranaviruses. The book will begin with a discussion on the global

extent of ranaviruses, case histories of infection and disease in ectothermic vertebrates, and current phylogeny. Basic principles of ranavirus ecology and evolution will be covered next, with a focus on host-pathogen interactions and how the virus emerges in the environment. There are two chapters that will discuss the molecular biology of ranaviruses, host immune responses to infection, and genes responsible for immune system evasion. One chapter will establish standards for testing for infection and diagnosing ranaviral disease. The book will end by providing guidance on how to design ranavirus surveillance studies and analyze data to determine risk, and discussing the role of the Global Ranavirus Consortium in organizing research and outreach activities.

Unique features of this book:

- First book on ranaviruses.
- First publication to assemble all information on ranaviruses across three vertebrate classes and multiple professional disciplines, including ecology, conservation biology, microbiology and veterinary medicine.
- Cutting edge topic that has conservation and economic significance.
- Intent is to update this eBook every 3-4 years so it remains relevant and becomes the desktop reference that is used by professionals and the public.
- Writing is organized by co-editors that have extensive experience with ranaviruses and are executive board members of a consortium that has an outstanding record of rapidly producing deliverables.

4) *Please provide a draft Table of Contents for the proposed book, along with authors. Please note if authors are confirmed or unconfirmed:*

NOTE: All authors confirmed participation.

I. Introduction (5 pp)

Matthew J. Gray, Ph.D., Center for Wildlife Health, University of Tennessee
V. Gregory Chinchar, Ph.D., Department of Microbiology, University of Mississippi Medical Center

II. Distribution and Phylogeny of Ranaviruses (45 pp)

Amanda L. J. Duffus, Ph.D., Department of Biology, Gordon State College
Thomas B. Waltzek, D.V.M., Ph.D., Department of Infectious Diseases and Pathology, College of Veterinary Medicine, University of Florida
Rachel Marschang, PD Dr. med. vet., Laboklin GmbH & Co. KG, Bad Kissingen, Germany
Matthew Allender, D.V.M., Ph.D., Department of Comparative Biosciences, College of Veterinary Medicine, University of Illinois
Anke Stöhr, Dr. med. vet., Institute of Environmental and Animal Hygiene, University of Hohenheim
Richard Whittington, B.V.Sc., Ph.D., Farm Animal Health, University of Sydney
Megan Hines, University of Wisconsin-Madison, School of Veterinary Medicine

Rolando Mazzoni, D.V.M., Ph.D., Laboratório de Diagnóstico de Doenças de Organismos Aquáticos, Universidade Federal de Goiás
Yumi Une, D.V.M., Ph.D., School of Veterinary Medicine, Azabu University
V. Gregory Chinchar, Ph.D., Department of Microbiology, University of Mississippi Medical Center

5) *What is the primary audience for this work?*

Primary Audience = ecologists, conservation biologists, veterinarians, microbiologists, virologists, and epidemiologists

6) *What are the secondary audiences for this work?*

Secondary Audience = natural resource professionals, policy makers, and the public

7) *Please list 4-6 key words that best describe the subject matter of the book:*

emerging infectious disease, species declines, pathogen pollution, ranavirus, viral ecology

8) *What is the estimated number of total pages?*

300

9) *When do you expect to submit the finished manuscript?*

July 2014

10) *Please list related or competing titles, if any. If appropriate, please list differences between these books and the proposed work:*

There are no books devoted only to ranaviruses.

A chapter on ranaviruses appears in:

Hurst, C. J., editor. 2011. *Studies in viral ecology*, Wiley-Blackwell.

and,

Van Etten, J., editor. 2009. *Lesser known large dsDNA viruses*, Springer-Verlag, Berlin.

These chapters focus primarily on molecular biology of ranaviruses, which is the focus of only one chapter in the proposed book. Additionally, some of the information in the above books is outdated.

- 11) *Would your proposed work be suitable for use in a university classroom or seminar? If yes, please list courses (and level) in which your book could be used as a required or supplemental text:*

Yes. This book could be used upper division undergraduate and post-graduate courses, spanning the disciplines of ecology, microbiology and veterinary medicine.

For example, possible courses at the University of Tennessee and University of Mississippi might include:

WFS 433/533: Amphibian Ecology and Conservation

EEB 474: Ichthyology

MICRO 430: Immunology

MICRO 440: Virology

CEM/WFS 530: Wildlife Diseases

CEM 609: Mechanisms of Disease

VM 813: Infection and Immunity – Virology

Additionally, Dr. Gray is considering offering an online special topics course on ranaviruses that would use this text and involve experts around the world that would deliver guest lectures via SMART® classroom technology.

- 12) *Please provide a list of journals to which you would like Springer to send your book for review upon publication:*

EcoHealth, Virology, Viruses, Conservation Biology, Journal of Wildlife Diseases, Diseases of Aquatic Organisms, The Veterinary Journal, Journal of Veterinary Diagnostic Investigation, and Microbe

- 13) *Have you served as an editor or have you authored a book in the past? If so, please list the title and publisher below:*

M. Gray has served as an associate editor of the *Journal of Wildlife Management* (Wiley-Blackwell).

V. Chinchar is an associate editor of *Diseases of Aquatic Organisms* (Inter-Research) and serves on the editorial board of the *Journal of Virology* (Am. Soc. Microbiology). He has served on the editorial boards of *Archives of Virology* (Springer) and *Developmental and Comparative Immunology* (Elsevier). He also served as a guest editor for a special issue in *Viruses* (MDPI AG).

- 14) *Please provide the names of three to five suggested reviewers:*

Richard Condit, Ph.D.
Department of Molecular Genetics and Microbiology
University of Florida
Gainesville, FL 32610
condit@mgm.ufl.edu; 352-273-9523

Trent Garner, Ph.D.
Zoological Society of London
Institute of Zoology
trent.garner@ioz.ac.uk; 0041 (0) 207 4496687

David Lesbarrères, Ph.D.
Laurentian University
Department of Biology
dlesbarreres@laurentian.ca; +1 (705) 675-1151 ext. 2275

David E. Green, D.V.M.
U.S. Geological Survey, National Wildlife Health Center
degreen@usgs.gov; 608-270-2482

Jinlu Wu, Ph.D.
Department of Biological Sciences
National University of Singapore
dbswjl@nus.edu.sg; 011-65168476

15) *Additional information:*

Below are preliminary outlines for each chapter drafted by the authors.

Chapter I: Introduction (Gray and Chinchar)

- I. Significance of Ranaviruses
 - i. Conservation Threat
 - ii. Economic Importance
- II. Purpose of Book

Chapter II: Distribution and Phylogeny of Ranaviruses (Duffus et al.)

- I. Global Distribution of Ranaviruses
- II. Biology of Amphibian Ranaviruses
- III. Biology of Piscine Ranaviruses
- IV. Biology of Reptilian Ranaviruses
- V. Phylogenetics of Ranaviruses

Chapter III: Ranavirus Ecology and Evolution (Brunner et al.)

- I. Outbreaks and Hosts
- II. Outcomes of Infection
- III. Transmission
- IV. Epidemic Dynamics
- V. Evolutionary Dynamics
- VI. Research Needs

Chapter IV: Molecular Biology of Ranaviruses (Chinchar et al.)

- I. Ranavirus Taxonomy
- II. Ranavirus Genomes
- III. Ranavirus Replication
- IV. Impact of Infection on the Host Cell
- V. Viral Gene Function

Chapter V: Immune Evasion and Host Immunity (Robert et al.)

- I. Introduction
- II. Innate immune responses to ranavirus infections
- III. Antiviral immune responses to ranavirus infections
- IV. Adaptive immune responses to ranavirus infections
- V. Mechanisms of ranavirus immune evasion and pathogenicity
- VI. Macrophages: possible vectors of ranavirus infection and quiescence
- VII. Future Directions

Chapter VI: Pathology and Diagnostics of Ranaviruses (Pessier and Miller)

- I. Pathology
 - a. Introduction
 - b. Field, clinical and gross signs
 - c. Histopathological changes
- II. Diagnostics
 - a. Introduction
 - b. Necropsy and sample collection
 - c. Tests
 - i. Polymerase chain reaction and ELISA
 - ii. Virus Isolation
 - iii. Transmission Electron Microscopy
 - iv. Immunohistochemistry and In-situ Hybridization

Chapter VII: Study Design and Analysis (Gray et al.)

- I. Introduction: Assessing the Risk of Ranaviruses in Wild Populations
- II. Identifying the Appropriate Research or Conservation Question
- III. Study Design
- IV. Required Sample Size
- V. Data Analysis
- VI. Use of Models
- VII. Risk Analysis of Ranavirus

Chapter VIII: Global Ranavirus Consortium (Gray et al.)

- I. Mission of the GRC
- II. Organization, Infrastructure, and Resources
- III. Regional Discussion Groups
- IV. International Symposia on Ranaviruses
- V. Future Initiatives