Vaccines and Diagnostics for Transboundary Animal Diseases


Bearbeitet von
J.A. Roth, J.A. Richt, I.A. Morozov

ISBN 978 3 318 02365 7
Gewicht: 430 g
Vaccines and Diagnostics for Transboundary Animal Diseases
Developments in Biologicals

Vol. 135


Organized and published by the International Alliance for Biological Standardization (IABS)

Board of IABS

J. Petricciani, USA, President
J. Löwer, Germany, Immediate Past President and Treasurer
D. Gaudry, USA & France, Secretary
W. Egan, USA
B. Fritzell, France
E. Griffiths, Canada
I. Gust, Australia
T. Hayakawa, Japan
C. Jungbäck, Germany
A. Lubniecki, USA
J. Robertson, UK
J. Vandeputte, Belgium
G. Vyas, USA

Vaccines and Diagnostics for Transboundary Animal Diseases

Ames, Iowa
17-19 September 2012

Volume editors

James A. Roth, DVM, PhD, DACVM
Center for Food Security and Public Health, College of Veterinary Medicine, Iowa State University, Ames, IA, USA

Juergen A. Richt, DVM, PhD
Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD), College of Veterinary Medicine, Kansas State University, Manhattan, KS, USA

Igor A. Morozov, DVM, PhD
Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD), College of Veterinary Medicine, Kansas State University, Manhattan, KS, USA

Technical editors

Jane Galyon, MS
Center for Food Security and Public Health, College of Veterinary Medicine, Iowa State University, Ames, IA, USA

Betty Dodet, PharmD, PhD
IABS

Proceedings of an International Symposium organized by:
- US Department of Homeland Security, Science and Technology Directorate
- DHS Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD) at Kansas State University
- Center for Food Security and Public Health_Institute for International Cooperation in Animal Biologics at Iowa State University
- World Organisation for Animal Health (OIE)
- International Alliance for Biological Standardization (IABS)

14 figures and 16 tables, 2013

Scientific Committee

James A. Roth, CFSPH, ISU/CVM, USA (co-chair)
Juergen A. Richt, CEEZAD, KSU/CVM, USA (co-chair)
Soren Alexandersen, NCFAD, Canada
Heinz Feldmann, NIH, USA
Cyril Gérard Gay, ARS/USDA, USA
Richard Hill, CVB, APHIS/USDA, USA
Beth Lautner, NVSL, APHIS/USDA, USA
Samia Metwally, FAO, Italy
Igor A. Morozov, CEEZAD, KSU/CVM, USA
Gerrit Viljoen, FAO/IAEA, Austria

DHS Liaison

Michelle M. Colby, DHS Science and Technology Directorate, Washington, DC, USA

Organization of the Proceedings

Preface

Session I
Roles and responsibilities – Facilitation and cooperation

Session II
State of the art, progress and gaps in development of vaccines and diagnostics for high priority transboundary animal diseases for the National Veterinary Stockpile
Acknowledgements

The Vaccines and Diagnostics for Transboundary Animal Diseases Workshop was made possible by financial support from the following organizations:

US Department of Homeland Security, Science and Technology Directorate, Grant Award Number 2010-ST-061-AG001

DHS Center of Excellence for Emerging & Zoonotic Animal Diseases (CEEZAD), Kansas State University, College of Veterinary Medicine, Manhattan, KS

Center for Food Security & Public Health, Institute for International Cooperation in Animal Biologics, College of Veterinary Medicine, Iowa State University, Ames, IA.

Industry Support:
Benchmark Biolabs
Boehringer Ingelheim Vetmedica, Inc.
Pfizer Animal Health
Merial Limited

Other Sponsorship:
World Organisation for Animal Health (OIE), Paris, France
International Alliance for Biological Standardization, Geneva, Switzerland
Contents

Preface .................................................................................................................. IX
J.A. Roth, J.A. Richt, I.A. Morozov

Session I

Roles and responsibilities; facilitation and cooperation ................................. 1
The Role of the Department of Homeland Security, Science and Technology Directorate in the Development of Vaccines and Diagnostics for Transboundary Animal Diseases .......................................................... 3
M. Colby, M. Coats, D. Brake, J. Fine
The Perspective of USDA APHIS Veterinary Services Emergency Management and Diagnostics in Preparing and Responding to Foreign Animal Diseases – Plans, Strategies, and Countermeasures ............................................................. 15
J.R. Diez, D.K. Styles
Agricultural Research Service: Biodefense Research ........................................ 23
C.G. Gay
Biologics Industry Challenges for Developing Diagnostic Tests for the National Veterinary Stockpile ................................................................. 39
J.M. Hardham, C.M. Lamichhane
Translating Research into Licensed Vaccines and Validated and Licensed Diagnostic Tests .............................................................. 53
R.E. Hill, Jr, P.L. Foley, N.E. Clough, L.R. Ludemann, D.C. Murtle

Session II

State of the art, progress and gaps in development of vaccines and diagnostics for high priority transboundary diseases for the NVS ................................. 59

Vaccination for the Control of Rift Valley Fever in Enzootic and Epizootic Situations ................................................................. 61
B. Dungu, M. Donadou, M. Boulou
Diagnostic Approaches for Rift Valley Fever ..................................................... 73
Current Status and Future Needs in Diagnostics and Vaccines for High Pathogenicity Avian Influenza .......................................................... 79
D.E. Swayne, E. Spackman
Newcastle Disease: Progress and Gaps in the Development of Vaccines and Diagnostic Tools ................................................................. 95
C.L. Afonso, P.J. Miller
Novel Approaches to Foot-and-Mouth Disease Vaccine Development .................. 107
A. Lubi, L. Rodriguez
Diagnosis of Foot-and-Mouth Disease ................................................................. 117
D.J. Paton, D.P. King
Passive Immunization and Active Vaccination against Hendra and Nipah Viruses. 125
C.C. Broder
Current Status of Diagnostic Methods for Henipavirus ................................. 139
A. Tamin, P.A. Rota

Prospects for Development of African Swine Fever Virus Vaccines ......................... 147
H.H. Takamatsu

African Swine Fever Diagnosis Update ................................................................. 159
J.M. Sánchez-Vizcaíno, L. Mur

Classical Swine Fever ......................................................................................... 167
V. Moennig, P. Becher, M. Beer

Schnellenberg Virus .................................................................................................. 175
K. Wernike, B. Hoffmann, M. Beer

Q Fever Diagnosis and Control in Domestic Ruminants ............................................. 183
H.I.J. Roest, A. Bossers, J.M.J. Rebel

Opportunities in Diagnostic and Vaccine Approaches to Mitigate Potential Heartwater Spreading and Impact on the American Mainland ......................................................... 191
N. Vachiéry, I. Marcelino, D. Martinez, T. Lefrançois

Ebola: Facing a New Transboundary Animal Disease? ............................................ 201
F. Feldmann, H. Feldmann

Review of Ebola Virus Infections in Domestic Animals ............................................. 211
H.M. Weingartl, C. Nfon, G. Kobinger
Preface

Transboundary animal diseases (TADs) are highly contagious or transmissible, have the potential to spread very rapidly irrespective of national borders, and cause high morbidity and mortality in susceptible animal populations. It has become clear that TADs seriously threaten world food security and can severely affect national economies. Therefore, the development and availability of effective vaccines and diagnostic tools is essential to control TADs.

In 2002, a meeting titled ‘Vaccines for OIE List A and Emerging Animal Diseases’ was organized by Iowa State University and held in Ames, Iowa. The following year a book with the same title was published by Karger. Then in 2005, a complementary meeting titled ‘Marker Vaccines and Differential Diagnostic Tests in Disease Control and Eradication’ was held in Ames.

Since these earlier meetings a number of advances have been made in the development of vaccines and diagnostic tools to control important TADs. An interdisciplinary group of approximately 180 scientists from academia, industry and government met from September 17-19, 2012 in Ames, Iowa for a workshop entitled ‘Vaccines and Diagnostics for Transboundary Animal Diseases’. The workshop was sponsored by the US Department of Homeland Security, Science and Technology Directorate, as well as the Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD; www.ceezad.org/) at Kansas State University, and three other organizations—the Center for Food Security and Public Health at Iowa State University (www.cfsph.iastate.edu), the World Organization for Animal Health (OIE; www.oie.int), and the International Alliance for Biological Standardization (IABS; www.iabs.org).

The primary objective of the recent workshop was to discuss ‘State of the Art’ measures that the Department of Homeland Security (and it’s Centers of Excellence) and the USDA can take to better position themselves to serve US and international needs related to vaccine and diagnostic tool development for significant transboundary diseases. The workshop goals included sharing progress on cutting-edge research to help inform the decision making process; presenting academic scientists with tools to help them work on translational research; enabling government officials from each agency working in this area to convey their roles and responsibilities to a broad audience; and bringing together scientists from academia, industry and government in order to stimulate cross-talk.
The papers in this publication address the roles and responsibilities of government agencies, the challenges that the biologics industry faces, and progress on the development of vaccines and diagnostics for 11 diseases. The diseases include: highly pathogenic avian influenza; exotic Newcastle disease; foot and mouth disease; Rift Valley fever; Nipah and Hendra virus; African swine fever; classical swine fever; heartwater; Q fever, Ebola, and Schmallenberg virus.

It is our hope that this publication will serve as a useful resource for researchers, government officials and industry scientists who are working to develop effective control tools for these important transboundary animal diseases.

*J.A. Roth, J.A. Richt, I.A. Morozov*