

BactiVac, the Bacterial Vaccines Network: Workshop

Challenges in developing bacterial vaccines for veterinary infections

11 August 2025: 1100 – 1600 hrs

Hilton Vienna Park Hotel: Suite 7

14th International Veterinary Immunology Symposium (IVIS)

Bacterial zoonoses exert significant societal and economic costs, including through foodborne illness and direct contact of humans with infected animals. Animal hosts of zoonotic pathogens can suffer the same diseases observed in humans, providing further motivation to control infections as well as tractable models to understand the basis of pathogenesis and protection. For many such pathogens, a wealth of knowledge exists on their genome sequences and virulence factors, yet strategies to prevent infections in animals have often proven to be elusive. Vaccines could play a critical role in control of zoonoses in animal reservoirs, but progress has been hindered by the cost of such research, lack of correlates of vaccine success or failure, and challenges in the deployment of such vaccines - particularly where benefits to farmers are limited. This session aims to explore challenges in the design of veterinary vaccines for bacterial zoonoses, and in particular the role that immunologists can play in solving these.

Programme

Time	BactiVac Session
11.00	Introduction and Aims of the Session – Professor Adam Cunningham (Chair)
11.15	Salmonella in livestock: interventions to protect animal and public health <i>Dr Francesca Martelli, Lead Scientist for Bacterial Diseases and Food Safety, Animal and Plant Health Agency (APHA), UK</i>
11.45	Opportunities & challenges in the development of Salmonella vaccines for farmed animals <i>Professor Mark Stevens, Chair of Microbial Pathogenesis & Deputy Director, The Roslin Institute, University of Edinburgh, UK</i>
12.15	Harnessing Salmonella Porins for Vaccine Development: A One Health Strategy Against Salmonella Infections and Antimicrobial Resistance <i>Professor Constantino López-Macías, Head of Medical Research Unit, Instituto Mexicano del Seguro Social (IMSS), Mexico</i>
12.45	Lunch and networking
13.45	Field evaluation of a prototype subunit vaccine to control Escherichia coli O157 in cattle <i>Professor Tom McNeilly, Scientific Director of Moredun Research Institute; Chief Executive Officer of The Moredun Foundation, UK</i>
14.15	Tackling bacterial livestock diseases in sub-Saharan Africa - Spotlight on Contagious bovine and caprine pleuropneumonia (CBPP and CCPP) <i>Dr Elise Schieck, Scientist, International Livestock Research Institute, ILRI, Kenya</i>
14.45	Panel Discussion – Professor Peter Borriello (Chair)
15.50	Session Wrap-up by Workshop Chair – Professor Adam Cunningham
16.00	Session Closes

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Speaker Biographies



Dr Francesca Martelli, Lead Scientist for Bacterial Diseases and Food Safety, Animal and Plant Health Agency (APHA), UK

Dr Francesca Martelli is a veterinarian with a PhD in epidemiology and control of zoonotic diseases and a master's in public health. Francesca has worked at the Animal and Plant Health Agency in the United Kingdom since 2008 and is currently lead scientist for bacterial diseases and food safety, being responsible for the strategic direction and delivery of surveillance and research activities of this multidisciplinary portfolio.

Francesca's research focuses on applied methods for the control of *Salmonella* and AMR in livestock, in particular poultry and pigs, and she is author of several peer reviewed publications on the subject. Francesca is the designated expert of the World Organization for Animal Health's Reference Laboratory for salmonellosis at APHA.



Prof Mark Stevens, Chair of Microbial Pathogenesis & Deputy Director, The Roslin Institute, University of Edinburgh, UK

Professor Mark Stevens is Chair of Microbial Pathogenesis and a Deputy Director at The Roslin Institute, within the Royal (Dick) School of Veterinary Studies at the University of Edinburgh, UK. His laboratory studies *Salmonella*, *Campylobacter* and *E. coli* infections in farmed animals, with emphasis on the bacterial and host factors that influence persistence, pathogenesis and protection. This has included the use of novel strategies to assign roles to thousands of bacterial genes in colonisation of farmed animals to inform the design of vaccines and other control strategies.



Prof Constantino López-Macías, Head of Medical Research Unit, Instituto Mexicano del Seguro Social (IMSS), Mexico

Professor López-Macías is an immunologist specialising in vaccine development. He is Head of the Medical Research Unit on Immunochemistry at the Mexican Institute for Social Security —the country's main healthcare institution—and also serves as a lecturer at the National Autonomous University of Mexico. He was formerly a Visiting Professor of Immunology at the University of Oxford and currently serves on the Network Management Oversight Board of BactiVac in the United Kingdom.

Professor López-Macías is a co-inventor on vaccine patents for *Salmonella*, Influenza, and COVID-19, all of which have been tested in humans. The COVID-19 vaccine has received regulatory approval in Mexico. He is also a member of the Editorial Board of *Vaccine* and serves as an Associate Editor for *Frontiers in Immunology*. He is a member of both the Mexican Academy of Sciences and the National Academy of Medicine and previously served as President of the Mexican Society of Immunology.



Professor Tom McNeilly, Scientific Director of Moredun Research Institute; Chief Executive Officer of The Moredun Foundation, Honorary Professor at the Royal (Dick) School of Veterinary Studies, University of Edinburgh, UK

Professor Tom McNeilly, a qualified veterinary surgeon, is an immunologist and infectious disease biologist with expertise in translational aspects of ruminant immunology, including vaccine development and population-based studies on immune variation in livestock species. He has been involved in the development vaccines to control parasitic, viral and bacterial infections in both cattle and sheep, including those which have progressed to field evaluation. His work has used advanced surgical and culture-based methods in ruminant species to define key host-pathogen interactions at the mucosal interface and has identified several heritable immune biomarkers in ruminants associated with increased resistance to disease. He has published over 135 refereed publications in international peer-reviewed journals.

His current interests are: 1. The use of *in vivo* and *in vitro* study systems to understand host-pathogen interactions at mucosal surfaces; 2. The development of vaccines against major endemic pathogens of sheep and cattle; 3. The causes and consequences of immune variation in ruminant populations.



Dr Elise Schieck

Scientist, International Livestock Research Institute, ILRI, Nairobi, Kenya

Dr Elise Schieck is a scientist in the Animal and Human Health program at the International Livestock Research Institute (ILRI, Kenya), where she leads the research on vaccine improvements for contagious bovine pleuropneumonia (CBPP) and contagious caprine pleuropneumonia (CCPP). She has been involved in using synthetic genomic tools to delineate the role of the mycoplasma polysaccharide capsule, a potential vaccine candidate for *Mycoplasma mycoides*, and is working on challenge models and *in vivo* vaccine efficacy studies for both CCPP and CBPP. Elise has an MSc in biomedicine from Uppsala University, and a PhD in molecular biology from the University of Heidelberg. Before joining ILRI she studied antigenic variation in malaria.

Chair Biographies



Prof Adam Cunningham, BactiVac Network Director, Professor of Functional Immunity, University of Birmingham, UK

Professor Adam Cunningham gained his PhD from Southampton University for studies on antibody responses to *Chlamydia pneumoniae*. After a short-term position in The Gambia, funded by the WHO, he had his first post-doctoral position in Birmingham studying the cell wall of *Mycobacterium tuberculosis*. From here, he started work in Prof. Ian MacLennan's group examining how antibody responses develop and are regulated. During this time, he incorporated the use of *Salmonella* and its component antigens into this work, leading to an independent position as a RCUK Roberts Academic Fellow, studying how immune responses develop to pathogens and vaccines. He was made Professor of Functional Immunity in August 2011, and his research is focused on how adaptive immunity to pathogens and their component antigens are induced, maintained and function. These studies help us understand why some responses are protective, whilst others are not or can even be harmful.



Prof Peter Borriello CB, Trustee of Safe Medicines for Animals - regulatory training (SMart), UK

Professor Peter Borriello CB was Chief Executive, Veterinary Laboratories Agency from 2008 and was then appointed Chief Executive Officer, Veterinary Medicines Directorate in September 2011. He has received numerous awards and prizes for both human and animal health, the most prestigious of which was the Queen's Honours award of Companion of the Order of the Bath (CB) for contributions to international animal health and to antimicrobial resistance.

He is currently a member of the UK Food Standards Agency Science Council, member of the BactiVac Network Advisory Board, Chair of the Independent Scientific Advisory Group for RUMA (Responsible Use of Medicines in Agriculture) and on Council of the British Society of Antimicrobial Chemotherapy.

His previous roles include Director, Health Protection Agency, Centre for Infections; Director, Public Health Laboratory Service, Central Public Health Laboratory; Founding Director, Institute of Infections and Immunity, University of Nottingham; Head, Medical Research Council Hospital Infection Group and Microbial Pathogenicity Research Group.