



UCD School of Agriculture, Food Science and Veterinary Medicine  
University College Dublin

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# Biennial Report, 2006-07

The Centre for Veterinary Epidemiology and Risk Analysis  
The TB Diagnostics and Immunology Research Centre  
The Badger Vaccine Project



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The TB Diagnostics and Immunology Research Centre  
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S.J. More and D.M. Collins (editors)

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## PREFACE

The Department of Agriculture, Fisheries and Food (DAFF) provides ongoing financial support to three research units within the School of Agriculture, Food Science and Veterinary Medicine at University College Dublin:

- The Centre for Veterinary Epidemiology and Risk Analysis (CVERA);
- The TB Diagnostics and Immunology Research Centre; and
- The Badger Vaccine Project.

These units each work to support DAFF policy, inspectorate and laboratory staff in the area of animal health. The TB Diagnostics and Immunology Research Centre and the Badger Vaccine Project focus on bovine tuberculosis research. CVERA is a national resource centre, providing policy advice and conducting epidemiological research on a wide range of animal health issues. In addition, CVERA provides general support to government, industry and the veterinary profession (pre- and post-graduation) on these and other animal health issues.

This report documents work conducted by, or in association with, these three UCD-based research units during 2006 and 2007.

Simon More  
Eamonn Gormley  
Leigh Corner

Veterinary Sciences Centre  
School of Agriculture, Food Science and Veterinary Medicine  
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Belfield, Dublin 4, Ireland

# ACKNOWLEDGEMENTS

## THE CENTRE FOR VETERINARY EPIDEMIOLOGY AND RISK ANALYSIS

CVERA works closely with a wide range of organisations, both in Ireland and internationally. The collaborative input of staff from each of these organisations is gratefully acknowledged, including:

- *In Ireland* – DAFF (veterinary policy, inspectorate and laboratory staff – central, regional, local), UCD School of Agriculture, Food Science and Veterinary Medicine, UCD School of Mathematical Sciences, the Irish Cattle Breeders Federation (ICBF), Veterinary Ireland and individual private veterinary practitioners, BirdWatch Ireland, the National Parks and Wildlife Service (within the Department of Environment, Heritage and Local Government), Teagasc, University College Cork, Trinity College Dublin, the Irish Equine Centre, the Marine Institute, a wide range of industry organisations, and individual Irish farmers
- *In Canada* – the University of Guelph
- *In Chile* – Servicio Agrícola y Ganadero (SAG)
- *In Korea* – the National Veterinary Research and Quarantine Service
- *In the Netherlands* – Wageningen University, GD Animal Health Service Deventer, ID Lelystad
- *In New Zealand* – Massey University
- *In Norway* – Norges veterinærhøgskole (Norwegian School of Veterinary Science)
- *In the UK* – the Department of Agriculture and Rural Development of Northern Ireland (DARDNI), veterinary organisations in Northern Ireland (North of Ireland Veterinary Association, Association of Veterinary Surgeons Practicing in Northern Ireland), Defra (the UK Department of Environment, Food and Rural Affairs), Office of the Chief Veterinary Officer in the Welsh Assembly government, the Roslin Institute, Royal Veterinary College, Scottish Agricultural College, Veterinary Laboratories Agency
- *In the US* – Colorado State University.

## THE TB DIAGNOSTICS AND IMMUNOLOGY RESEARCH CENTRE

Staff from the Centre acknowledge the help and support of District Veterinary Office (DVO) staff throughout Ireland for their efforts and assistance in providing samples for the IFN- $\gamma$  assay.

## THE BADGER VACCINE PROJECT

Staff from the Badger Vaccine Project acknowledge Frances Quigley and staff at the mycobacteriology laboratory (Central Veterinary Research Laboratory, Backweston Campus, Celbridge, Co. Kildare, Ireland) for their contributions and assistance in the Badger Vaccine Project, and Paddy Sleeman of University College Cork for fieldcraft. Glyn Hewinson, Mark Chambers and staff at Veterinary Laboratories Agency (VLA, UK) are also thanked for developing and carrying out many of the immunoassays used in the badger vaccine studies, and for contributing technical expertise and advice for the research programme.

*Some photographs in the report kindly supplied by An Bord Bia.*

## FURTHER INFORMATION

In this report, projects are either:

- *Complete*, which includes those projects where relevant peer-reviewed papers, or equivalent, have been published, or
- *Current*, which includes the balance covering the spectrum from conceptual through to final write-up. A number of these latter projects are presented in the *Selected reports* section.

Manuscript preparation is conducted in accordance with Uniform Requirements for Manuscripts Submitted to Biomedical Journals of the International Committee of Medical Journal Editors (previously the Vancouver Group). For further information, see [www.icmje.org](http://www.icmje.org). Guidelines for the transparent reporting of specific study types (for example, the CONSORT statement for transparent reporting of trials, [www.consort-statement.org](http://www.consort-statement.org)) are followed.

Information about published papers is available at:

BMC Genomics  
 Clinical and Experimental Immunology  
 Irish Veterinary Journal  
 Journal of Veterinary Medicine Series A  
 Preventive Veterinary Medicine  
 Research in Veterinary Science  
 UK Vet Livestock  
 Vaccine  
 Veterinary Anaesthesia and Analgesia  
 Veterinary Immunology and Immunopathology  
 Veterinary Microbiology  
 Veterinary Record

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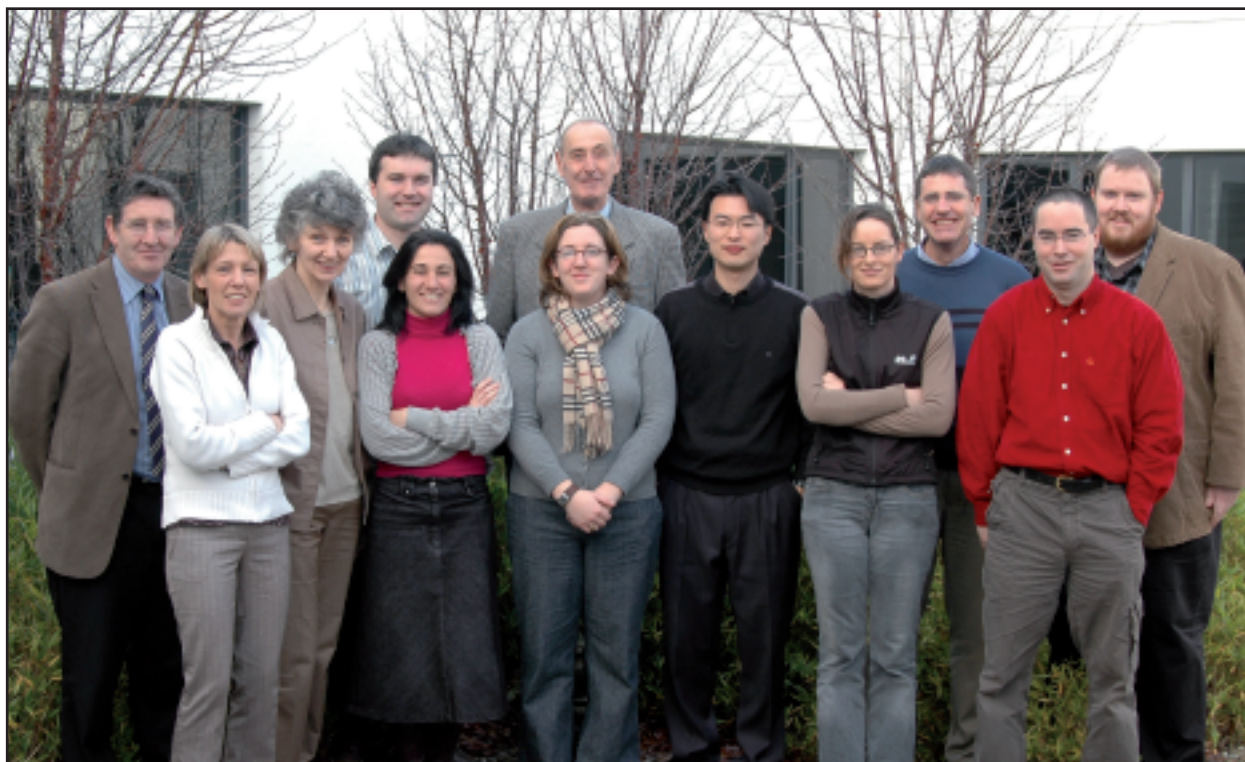
## THE BADGER VACCINE PROJECT

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Elvira Ramovic (*from April 2006*)  
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**DR. ROBERT F. HAMMOND**

Dr. Robert F. Hammond died tragically in a road traffic accident whilst abroad last February. Bob was an integral member of CVERA (formerly the Tuberculosis Investigation Unit) since its establishment in 1989. He retired in April, 2004. Bob brought a wide range of skills and expertise, and made a major contribution to the development of the Centre and its interdisciplinary approach to research and investigation. His courtesy, enthusiasm and willingness to be of assistance were much appreciated by his colleagues and all who worked with him. He had an abiding interest in new technologies and played a major role in the development and application of Geographical Information Systems technology in the study of the epidemiology of animal diseases, as a result of which the Centre is now recognised internationally as a leader in this field. Bob made a valuable contribution to our research on the nature and control of such major animal diseases as tuberculosis and brucellosis in cattle and the epidemiology of bovine spongiform encephalopathy in Ireland. For these many contributions, and for his enduring support and friendliness, he will always be fondly remembered by his colleagues here at UCD and in the wider agricultural community.

To his wife Adrienne and sons Ian and Alan, we offer our sincere sympathy.



UCD Veterinary Sciences Centre, December 2006

Martin Hayes, Tracy Clegg, Isabella Higgins, Paul White, Inma Aznar, Bob Hammond, Mary Canty, Lee Byeong-yong, Elizabeth Lane, Simon More, Guy McGrath and Daniel Collins



# OVERVIEW

## CENTRE FOR VETERINARY EPIDEMIOLOGY AND RISK ANALYSIS

The Centre for Veterinary Epidemiology and Risk Analysis (CVERA) is the national resource centre for veterinary epidemiology in Ireland, located within the School of Agriculture, Food Science and Veterinary Medicine at University College Dublin. The Centre was initially established as the Tuberculosis Investigation Unit, but in recent years has broadened its remit to cover a wide range of international, national and local animal health matters, including:

- Epidemiological support for the control and eradication of regulatory animal diseases, which includes national programmes for bovine tuberculosis, bovine brucellosis and bovine spongiform encephalopathy;
- Work towards the establishment of a national herd health initiative, to provide a proactive, coordinated and industry-led approach in Ireland to non-regulatory animal health concerns (such as mastitis, fertility and infectious bovine rhinotracheitis); and
- Epidemiological support for emergency animal disease preparedness and response (for example, avian influenza, bluetongue and equine infectious anaemia).

CVERA staff work closely with national policy-makers, both in government and industry. In collaboration with staff from Herd and Veterinary Public Health within the UCD School of Agriculture, Food Science and Veterinary Medicine, CVERA staff also contribute on a weekly basis to on-farm animal health investigations throughout Ireland. A broad range of expertise is represented within the Centre, including agriculture and animal sciences, database development and management, geographic information systems, statistics, veterinary medicine and epidemiology. The Centre is staffed by employees of University College Dublin and of DAFF.

## TB DIAGNOSTICS AND IMMUNOLOGY RESEARCH CENTRE

The interferon-gamma (IFN- $\gamma$ ) assay is used as a tool to assist in the eradication of bovine tuberculosis from the national cattle herd. All of the testing is carried out in the laboratory based at UCD. During 2006-2007, over 25,000 blood samples were submitted to the laboratory for testing. This represents a 60% increase in submissions compared with the previous two years. The majority of samples originate from reactor re-test herds where the test is used to identify infected animals that were missed by the skin test. Other strategic uses of the test are targeted at inconclusive reactor re-tests. The constraint of carrying out preliminary procedures on the blood within 8-12 hours of sampling remains, and this first stage of the test is now being carried out in a regional laboratory serving the west and north-west of the country. This has facilitated a significant increase in the numbers of samples submitted for testing from that region. It is hoped to extend the introduction of this service to additional regional laboratories.

## THE BADGER VACCINE PROJECT

The Badger Vaccine Project is a comprehensive programme of research that seeks to develop a vaccine to control tuberculosis in badgers and to break the link of infection to cattle. We have recently demonstrated that oral vaccination of badgers with the BCG vaccine generates high levels of protective immunity against challenge with *Mycobacterium bovis*. The key to the success of the vaccine lies in the encapsulation of the vaccine in a specific lipid formulation that protects it from degradation as it passes through the stomach. The encapsulation technology designed for this purpose has been developed by collaborators at the University of Otago, New Zealand. We have also shown that the commercially available BCG-Danish strain is as effective a vaccine as the well-characterised BCG-Pasteur laboratory strain. We are continuing to carry out studies with our captive population of badgers to refine the vaccine and address issues relating to the eventual registration of the vaccine as a veterinary medicine. We are also developing and evaluating diagnostic tests with colleagues at VLA (Weybridge, UK). The results of our studies to date have increased our understanding of the progression of the disease following infection and have improved our ability to accurately diagnose *M. bovis* infection in badgers. The work programme has reached a stage where it is necessary to test the vaccine under conditions of natural transmission of infection. A field trial will commence in 2008 to test the efficacy of the vaccine in a large number of badgers over a wide geographic area. Success in the field trial will lead to implementation of a vaccination strategy as part of the national control programme.



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