



NEW RESEARCH PROJECTS FUNDED IN 2013 ROUND TO BEGIN IN 2014

SCIENTIFIC RESEARCH PROJECTS

Professor Jose Vazquez-Boland
University of Edinburgh

Assessment of a pili-based Rhodococcus equi vaccine in foals

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Rhodococcus equi is a pathogenic bacterium that causes a life-threatening respiratory illness in foals (pneumonia). Rhodococcal pneumonia has a major economic impact in the Thoroughbred industry and remains an unresolved problem due to the lack of an effective vaccine to control the infection in regularly affected studs. To gain a better understanding of the infection mechanisms and identify novel vaccine targets, the HBLB previously funded the group to decipher the composition of R. equi genome (the catalogue of genes that defines the organism). It was found that R. equi produces specific appendages termed "pili" that assist in attachment to host cells. It was also discovered that these pili are essential for lung colonisation and work as fully protective vaccine in mice. This project aims to test the protective efficacy of this novel pili vaccine in foals. If the trial is successful, the R. equi pili will form the basis of a commercial vaccine to control rhodococcal infection in stud farms.

Professor Massimo Palmarini
University of Glasgow

Development of synthetic vaccines for African Horse Sickness

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

The aim of this study is to develop a universal vaccine platform for African horse sickness virus (AHSV), the causative agent of one of the most devastating diseases of horses. There are 9 distinct serotypes (a certain strain of microorganism) of AHSV and currently there is no registered vaccine for its control in Europe. AHSV is highly related to bluetongue virus (BTV).

Both viruses are transmitted by Culicoides biting midges (a particular genus of biting midge in the family Ceratopogonidae). The recent outbreaks of BTV and Schmallenberg virus (which causes congenital malformations and stillbirths) in Europe have proven that exotic diseases transmitted by Culicoides have the potential to enter, and moreover become endemic, in the United Kingdom. The aim of this project is to make full use of and benefit from synthetic biology, as well as established molecular methods, for the development of a rapid “off-the-shelf” vaccine platform that can be rapidly deployed against any AHSV serotype, including potentially new emerging (or previously uncharacterised) strains.

Dr Kristien Verheyen
Royal Veterinary College

Nature versus nurture: modelling environmental and genetic contributions to risk of racecourse injury in UK Thoroughbreds

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

Racecourse injuries are of concern to horse welfare, cause economic losses and damage the public perception of racing. This project will establish the causes of injury and death in British flat racing and identify risk factors for these injuries, using all available data from the past 13 years (2000 -2012). Trends in injury rates over time will be evaluated. In addition, genetic contributions to racecourse injury occurrence will be investigated by measuring heritability of injury susceptibility and the correlation between performance and susceptibility to injury. Results from the study can be used by policy makers to inform strategies aimed at reducing injury occurrence on British racecourses. Information on injury heritability and the association between predisposition to injury and performance can inform breeding practices to enhance performance whilst minimising injury risk.

Dr Thilo Pfau
Royal Veterinary College

Early detection of musculoskeletal injury in the Thoroughbred through monitoring of movement symmetry

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

Combining state-of-the art mobile gait analysis with computerised decision making, this study aims to identify gait parameters that maximise the likelihood of identifying developing injuries at the earliest possible stage. This is an essential step towards minimizing injuries and maximising welfare and performance, allowing, in future, quantification of horse, track and training related parameters in relation to the risk of injury.

Dr Xavier Donadeu

University of Edinburgh

Exploring new sources of MSCs in horses

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

This study aims to identify new stem cell sources for therapeutic and investigative purposes.

Dr Jo Ireland

Animal Health Trust

Randomised controlled trial of Clostridium botulinum type C vaccination for prevention of Equine Grass Sickness

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Equine grass sickness (EGS) is a predominantly fatal disease affecting grazing horses, ponies and donkeys and Britain has the highest incidence worldwide. It is hypothesised that EGS is a toxico-infection involving Clostridium botulinum type C, with several studies demonstrating a protective effect of natural immunity to Clostridium botulinum type C. Other equine clostridial diseases are successfully prevented by vaccination, implying that it should be possible to prevent EGS by vaccination. This project aims to determine the efficacy of Clostridium botulinum type C vaccination in preventing EGS by performing a nationwide randomised controlled field trial, comparing EGS incidence between groups of horses receiving vaccination or a placebo. The trial will recruit 1100 horses for a two year period from premises previously affected with a high incidence of EGS. Demonstration of reduced disease incidence in vaccinated horses would provide a major breakthrough in the prevention of EGS, benefiting equine health and welfare.

Dr Frances Henson

Cambridge University

New roles for osteocyte in the aetiopathogenesis of stress fractures

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

This pilot study is designed to investigate mechanisms underlying targeted remodelling of the distal third metacarpal bone (MCIII) in response to stress fractures (SF). Long bone fractures have significant welfare/economic implications to the horseracing industry. These fractures are either one off overload incidents or due to repetitive microdamage from high intensity exercise (SF). The key to fracture prevention is a clear understanding of their aetiopathogenesis. Bone is constantly remodeled to adapt to the demands placed upon it, including repair damage ('targeted remodeling (TM)'). SFs are a failure of TM during high intensity exercise, when bone resorption exceeds bone formation.

SMALL RESEARCH PROJECTS

Dr Colin Barker

Animal Health Trust

Technical transfer and validation of an EHV-1 and EHV-4 ELISA

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Ms Carlyne Tranquille

Animal Health Trust

Pilot investigation into the involvement of a low oxygen environment in the pathogenesis of lateral condylar fracture in Thoroughbred racehorses

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

Dr Paul Pryor

University of York

*Identifying virulence factors in the horse pathogen *Rhodococcus equi* that allows intracellular pathogen survival*

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Dr Kate Allen

University of Bristol

Development of a novel technique for assessing and improving respiratory performance in racehorses.

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Ms Helen Morrell

Harper Adams University

Effect of shortwave ultrasound to tendon-like constructs cultured from adipose derived mesenchymal stem cells in vitro on tissue strength and elasticity

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

Dr Sandra Wilsher

The Paul Mellon Laboratory

Roles of light and temperature on delayed ovulation in maiden and barren, and anovulation in foaling, Thoroughbred mares

Research priority: Improved male and female reproductive efficiency.

Ms Emily Haggett

Rossdales Equine Hospital

Serial investigation of seroprevalence and faecal shedding of Lawsonia intracellularis in Thoroughbred foals in the first year of life.

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Dr John Marshall

University of Glasgow

Validation and development of an inertial-sensor method of gait analysis in the Thoroughbred racehorse.

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.

Dr Pablo Murcia

University of Glasgow

An equine-specific in vitro assay to study equine influenza pathogenesis

Research priority: Improved prevention of current and emerging infectious diseases by the development of more effective vaccines, diagnostic tools, biosecurity and management strategies.

Dr Renate Weller

Royal Veterinary College

How best to support collapsed heels? – the effect of farriery intervention on hoof deformation

Research priority: Improved methods of identification, management and prevention of musculoskeletal disease and injury in racehorses.
