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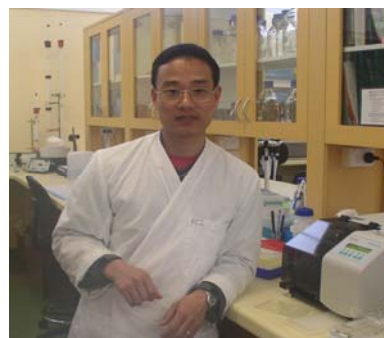
## MASTERS OF VETERINARY SCIENCE RESEARCH STUDENTS

2004

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### **A comparative study of the sensitivity of antigen capture ELISA and PCR to detect epizootic haematopoietic necrosis virus in spiked tissue homogenates of rainbow trout**

Mr Tho Nguyen Dang  
Research support: University of Sydney International  
Postgraduate Research Scholarship.  
Supervisors: Dr RJ Dixon, Professor RJ Whittington



Epizootic haematopoietic necrosis virus (EHNV) can cause high mortality (100%) in redfin perch and mild morbidity and mortality in rainbow trout. The Fish Diseases Commission of the Office International des Epizooties (OIE) has recommended that an antigen capture ELISA be the standard diagnostic test for EHNV infection. As PCR is routine in many diagnostic laboratories, this study was initiated to determine whether PCR would be more sensitive than the ELISA, subsequently reducing false negative results in virus testing. The results showed that the PCR had increased sensitivity compared to the ELISA in detecting EHNV. The practical implications of these results were addressed. Additional data were obtained through transmission experiments in redfin perch on the host-pathogen relationship. Pre-existing antibody mediated immunity was demonstrated in redfin perch that were refractory to infection with an isolate of EHNV shown previously to be highly virulent for this species.

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### **A National Survey of Bovine Infectious Bovine Keratoconjunctivitis and characterization of virulence attributes.**

Mr Craig McConnell  
Research Support: Schering Plough Animal Health  
Supervisor: Associate Professor JK House



Infectious bovine keratoconjunctivitis (IBK) is considered the most common ocular disease of cattle throughout the world. Despite the susceptibility of the causative bacterium, *Moraxella bovis*, to a large number of antimicrobial compounds the treatment of affected cattle has many disadvantages and the prevention of IBK is therefore preferable. IBK pathogenesis is linked to two *M bovis* virulence factors; namely, surface-associated pili and a haemolytic exotoxin (cytolysin) with corneotoxic properties. Pili have been shown to be antigenic and immunogenic and have been recommended as either cellular or acellular vaccine components. Efficacious application of pili based IBK vaccines requires production of a polyvalent vaccine targeting specific regional isolates. Cytotoxicity is mediated by the *M bovis* calcium-dependent cytolysin which is a  $\beta$ -haemolytic, leukotoxic pore-forming protein (MbxA protein) that belongs to the repeats in the structural toxin (RTX) family of pore-forming toxins and is encoded by the gene *mbxA*. The objective of this project is to evaluate pili serologic cross-reactivity, assess for the presence of RTX operons, and to measure antimicrobial susceptibility of *Moraxella* strains isolated from Australian IBK outbreaks.

### **Efficacy of DNA Adenine Methylase Salmonella Vaccines Against Heterologous Challenge in Holstein-Friesian Bull Calves**

Ms Virginia (Jennie) Mohler

Research Support: United States Department of Agriculture

Supervisors: Associate Professor John House, Dr. Keith Walker, and

Dr. Michael Hornitzky



This is a Bachelor of Science (Veterinary)/PhD project. Salmonella are important pathogens of livestock and humans. Increasing antibiotic resistance in food producing species; concerns about antibiotic residues; stock losses; and residual poor growth rates indicate that vaccination would be more economically effective. Traditional salmonella vaccines elicit protection against a single strain of Salmonella. In intensive animal agriculture multiple Salmonella serovars are endemic. A major challenge in the development of a commercial Salmonella vaccine is to find a product that provides sustained cross-protective immunity.

Salmonella *Typhimurium* containing a deletion of the gene required for DNA adenine methylation (DAM) are avirulent yet confer protective immunity as modified live vaccines in murine, avian and bovine models of salmonellosis. *DAM* controls several important and diverse biological processes including DNA replication, methyl-directed mismatch repair, transposition, and the expression of pili required for colonization of host tissues. Experiments conducted in mice and poultry have demonstrated the capacity of *DAM* attenuated *S. typhimurium* to induce protection against heterologous salmonella challenge. Results from current research in calves indicates that protective efficacy of DAM vaccines against subacute heterologous infection with Salmonella *Dublin*.

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### **Dietary and management impacts on the prevalence of environmental mastitis pathogens.**

Ms Lucy Shum

Research Support: Pfizer Animal Health

Supervisor: Associate Professor JK House



There has been a significant decline in the incidence of contagious mastitis due to improvements in milking management in the dairy industry. Intra-mammary infections are now caused predominantly by environmental pathogens, particularly environmental *Streptococci spp.*, coliforms, and environmental *Staphylococci spp.* Australian mastitis surveys conducted on pasture based dairies in Victoria report *Streptococcus uberis* to be the most common environmental mastitis pathogen with few cases of coliform mastitis. In contrast coliform mastitis is reported to be common in Europe and North America. According to the results of mastitis cultures conducted at the UVCC coliform mastitis is more frequent in this region than reports from Victoria. The dairy industry in NSW reflects a diversity of management systems ranging from pasture based to intensive freestall production systems. The objective of this study is to determine the prevalence of mastitis pathogens in NSW dairy farms and to investigate the interactions between diet and environment on the incidence of environmental mastitis pathogens.