UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Veterinary Science

Research project in microbiology available in the Department Veterinary Tropical Diseases

Project title: Rapid, novel, multiplex detection of infectious causes of bovine abortion, using xMAP® technology
Degree: MSc (Veterinary Science)
Study duration: 2 years (starting date: immediately)
Minimum academic requirements: Honour's degree or equivalent in a relevant field. Experience in and knowledge of molecular biology is an advantage.
Funding: Research funds are available, does not include living costs/stipend.

Background: Abortions cause major losses in animal production, due to loss of meat and milk, wasted time in breeding, supplementary feeding for pregnant animals and culling of animals to control infectious causes of abortions. Diagnosis of the cause of abortion is often frustrating. The diagnostic success rate for bovines is relatively low and variable (30%–40%) (Tibary, 2018). Abortions can occur weeks to months after the initial infection occurred, and the infectious agent may no longer be present when the abortion occurs. Diagnosis may also be complicated by autolysis of the abortus, or environmental contamination. In the laboratory, diagnosis often relies on serology or culture/isolation of the organism. Molecular diagnostic assays for some causes of abortions in cattle exist and can be performed rapidly, but at the moment, individual assays need to be performed for each suspected pathogen, which is very costly and the time to perform the assay increases with each test that is performed.

There is a constant need to develop technologies that allow rapid, cost effective, high throughput detection of pathogens of livestock. xMAP® technology (Luminex Corporation, Austin, TX, USA) may provide the answer, as this technology allows for multiplexing of biological tests (assays), reducing time, labour, and costs over traditional methods. Depending on the system, real-time PCR can detect at most a handful of pathogens at the same time, while for xMAP® technology, the number of pathogens that can be detected simultaneously is theoretically an order of magnitude greater. This will allow for testing of many pathogens simultaneously, which can be done rapidly and be offered at a much lower price point than current assays.

Reference: Tibary, A. 2018. Abortion in Cattle, Merck Veterinary Manual, Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Kenilworth, NJ, USA.

Aim of the project: Develop a rapid, multiplex assay for detection of infectious causes of bovine abortions by: (1) Establishing individual, optimised, real-time PCR assays in the laboratory, (2) Covalently binding PCR probes to xMAP microspheres and optimising individual "Target-Specific PCR Sequence Detection with xMAP® microspheres" assays, and (3) Optimising and validating a multiplex xMAP® assay.

- **CONTACT PERSON:** Prof. Melvyn Quan, Department Veterinary Tropical Diseases; E-mail:

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Please send your CV, certified academic records and a motivational letter to the above-mentioned contact person. Two academic reference letters will be an advantage in the selection of the successful candidate

Deadline for submission of applications: 23 February 2021