



## **2021 Lecture Series**

## **Professor Ala Tabor**

Animal BioTICKnology Lab, Centre for Animal Science Queensland Alliance for Agriculture & Food Innovation

will present a seminar entitled

## TICKnologies and animal vaccines

Friday 19 September 2021, 11am Institute for Glycomics

Join Zoom Meeting https://us02web.zoom.us/j/84693409508?pwd=bEU1S3cy SWV2KzJnNGxyenJMQ0U0Zz09&from=addon Meeting ID: 846 9340 9508 Passcode: 359870

## Abstract

Reverse vaccinology or immuno-informatics approaches have been applied by many researchers with citations increasing particularly in the last 20 years. The increase in these types of publications coincide with improvements in genome sequencing technologies which has been exponential particularly in the last 20 years. Globally there are approximately ~900+ tick species with approximately 77 tick species causing significant impacts to the health of humans and animals including livestock and pets. When it comes to tick genomics, this is still a developing field due to the repetitive content and the size of the genomes ranging between 70-80% and ~2-7Gb, respectively. A reverse vaccinology pipeline was developed over ~15 years ago based on an expressed sequence tag library for the cattle tick Rhipicephalus microplus species complex which included bioinformatics predictions of T cell and B cell binding epitopes, screening using sera from tick resistant and tick susceptible cattle, in vitro antibody feeding of female adult ticks, and extensive cattle trials testing mixtures and individual tick antigens which has finally selected 2 candidates as a dual vaccine at ~90% efficacy. The Australian paralysis tick is the most toxic species globally and 19 different types of holocyclotoxins (HTs) at 38-99% peptide sequence identities were identified in organs of ticks collected from paralysed pets using Illumina cDNA sequencing. Following screening of HTs using serum produced by local Australian companies known as 'Tick Anti-Serum', we identified the most immunogenic HTs and a cocktail vaccine of 8 HTs was tested in a proof-of-concept trial in dogs showing no symptoms of paralysis in the vaccinated group. The pathways to commercialisation for both vaccines will be discussed.

