**Development of on-farm test for Bovine herpesvirus-1**

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Production efficiency in healthy animals is higher than in diseased livestock with the World Organisation for Animal Health (OIE) estimating that approximately 20% of animal production is lost due to unhealthy animals. Infectious Bovine Rhinotracheitis (IBR), caused by Bovine Herpesvirus-1 (BoHV-1) is a respiratory disease of bovines which can result in high levels of morbidity and related productivity losses on farm. Infection of pregnant cows with BoHV-1 can also result in abortion in mid to late gestation. Studies have highlighted that bovine respiratory (of which IBR is a central component) costs the US cattle industry $3billon per year. On-farm losses due to IBR are more difficult to ascertain as the majority of production losses are sub-clinical and therefore unobserved by the farmer. However, statistical models suggest that BoHV-1-seropositive dairy cows and herds produce 150-250Kg less milk per cow per year. Early identification of IBR is essential to achieving effective control, in that, intervention with vaccines can reduce clinical signs and reduce the number of carrier animals present within a herd. Application of a rapid, on-farm biosensor-based diagnostic has the potential, for the first time, to enable pre-clinical vaccination for IBR by rapidly identifying BoHV-1 exposure which is critical to the prevention of whole herd infection. The objective of the proposed project is to develop a biosensor-based pen-side test i.e. on-farm diagnostic device (IBR-Nano), for detection of BoHV-1 seropositive individuals. Efforts will also be made to source BoHV-1 strain-specific monoclonal antibodies that will allow identification of differing viral sub-types which will be of critical importance to future epidemiological studies. Initially, BoHV-1antibody-antigen pairings will be identified and sourced. Label-free assays will then be developed using SPR technology and transferred to nanowire chip sensors. Serum samples of known disease status will be used to initially interrogate the response. The use of additional non-invasive sample matrices such as milk and saliva will also be investigated.

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