

Novel Diagnostic Assay (based on glucose meter) for Bovine Infectious Diseases – TreAssure assay

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The Canadian dairy industry, with an annual income of \$14.7 billion only in 2012, is of major importance for Canada's economy (www.dairyinfo.gc.ca). Infectious diseases are compromising the entire industry's economic worth by causing a reduction in productivity and animal welfare, by increasing health-associated costs and by affecting product quality. Thus, it becomes of vital importance to develop and implement disease control strategies to prevent introduction and spread of infection disease and efficient and accessible diagnostics play a critical role in this approach. Current diagnostic methods are expensive and rely on labs and trained personnel, which negatively impacts the implementation these strategies.

Here we are describing a novel diagnostic test for detection of various analytes/ markers of exposure to infectious diseases (antibodies) or infectious pathogens themselves based on the use of a common glucometer. The diagnostic assay is based on recombinant proteins that are able to recognize the analytes and a report their presence through the production of glucose in a single step protocol that takes only one hour. Glucose increase is then measured by a glucometer.

We applied this diagnostic assay to efficiently detect antibodies raised against antigens coming from the human influenza virus and antibodies against HIV present in non-purified serum. We also applied a modified version of this assay to detect directly infectious pathogens like *Staphylococcus aureus*, a causing agent of mastitis. Furthermore, this assay to detect neurodegenerative processes characteristic for the prion diseases like bovine spongiform encephalopathy (BSI). Finally we showed that this assay retains its activity even in undiluted clinical samples like milk or blood.

Implications: The resulting diagnostic assay will facilitate the innovation of an inexpensive, one-step Point-Of-Care test to be used directly in the field (farms), on different types of samples. This technology will not require trained personnel nor diagnostic laboratories and it will be easily adopted for detection of different infection diseases. Most importantly, this technology will facilitate the implementation of disease control programs currently being planned or conducted in Alberta (Johne's disease and BLV). This technology also has the potential to become adopted in routine diagnostic laboratory settings as an inexpensive detection system.