



## Chronic Wasting Disease (CWD): Field Animal-Side Testing and Improving Laboratory Diagnostic Sensitivity

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Developing an inexpensive, easy to use, and accurate ‘animal side’ test for hunters to use to identify animals who are potentially infected with CWD would be a significant advancement in the fight against CWD. Existing CWD testing is expensive, and time and labor intensive. There are currently two CWD tests. One is ‘ELISA’, which stands for **Enzyme-Linked ImmunoSorbent Assay** that detects denatured prions in tissues. The other is ‘IHC’, shorthand for **ImmunoHistoChemistry** that visualizes the presence of prion deposits in tissues. ELISA is more commonly used because it’s faster and less expensive. Unfortunately, the test isn’t ‘definitive’, meaning that it occasionally makes mistakes. IHC is ‘definitive’ and used to confirm positive ELISAs, but the process is substantially more complicated and time-consuming.

Recently, a third method, abbreviated ‘RT-QuIC’, for **Real-Time Quaking-Induced Conversion**, has emerged. Like IHC, RT-QuIC is ‘definitive’. And, RT-QuIC has the advantages of being faster and even more sensitive. Unfortunately, like most emerging technologies, RT QuIC is still experimental. Test components are expensive, quality is variable, and formal standards for interpretation of test results don’t exist.

Most wildlife disease experts believe that soon, RT-QuIC will become the preferred test alternative and most agree that it’s the necessary first step in creating the ‘technological foundation’ for the development of a practical animal-side test. For this reason, Sri Sreevatsan and colleagues in the College of Veterinary Medicine at Michigan State University and wildlife health experts at the Michigan Department of Natural Resources received funding support from Public Act 207 of 2018 to do just that.

The researchers aim to develop a rapid, portable, field-friendly screening test that could be used to identify potentially infected animals for subsequent RT-QuIC confirmation.

Testing for signs of prion disease is easier than testing for prions themselves, Dr. Sreevatsan’s team is targeting non-prion biomarker proteins of neurologic disease. Specifically, they are focusing on “leaky” proteins that accumulate in the blood due to prion induced disease. Identification of neurological damage by assessing these established markers would be sufficient to select a relatively smaller number of animal tissues for expensive confirmatory diagnostics.

At present, the research team is working to increase the reliability and practicality of RT-QuIC for detection of CWD prions. To accomplish this, they’ve acquired more than 500 brain and lymph node samples for analysis. The scientists are working closely with other experts at Rocky Mountain Laboratories in Colorado who developed the RT-QuIC. The MSU/DNR team has been able to replicate Rocky Mountain lab results and now is in a position to use RT-QuIC to evaluate brain homogenates obtained from CWD positive Michigan deer.

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In parallel with refining RT-QuIC, the Michigan team is developing ELISA-based protein biomarker tests. They obtained blood serum samples from deer before and one year after experimental infection from researchers at the Iowa State University and National Animal Disease Center.

In spite of the challenges posed by the pandemic, the Michigan team is well on it's way towards developing the first animal side test for CWD screening followed by confirmatory testing of a few suspect samples. Provided that testing goes as planned, a new and extremely sensitive rapid test soon may be available, reducing costs and processing time. Ultimately, it's now within the realm of possibility that a convenient and inexpensive test will become available for hunters in the foreseeable future.

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