Chronic Wasting Disease

CLINICAL SIGNS

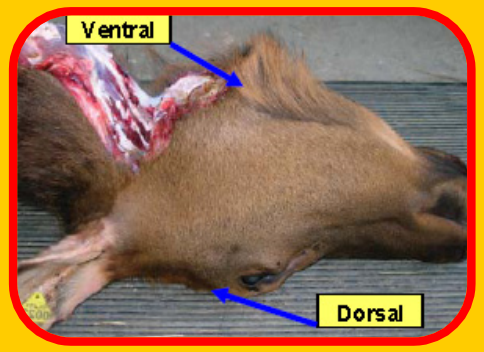
SUSPECT ANIMALS IDENTIFIED

Possible clinical signs of infected animals may include (but are not limited to):

- No observable signs
- Weight loss
- Stumbling
- Depression
- Excessive salivation
- Loss of appetite
- Listlessness
- Abnormal head posture
- Drooping ears

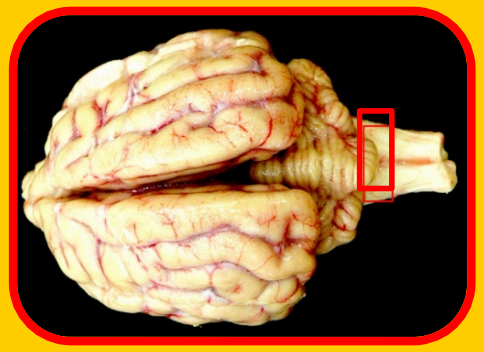
****these signs are not specific to CWD & can occur with other diseases**

SAMPLE COLLECTION



DEAD ANIMALS

Lymph nodes and the brain stem (red box below) are located and removed for testing



LIVE ANIMALS

Blood samples are quick and easy to obtain from live animals with a needle & syringe

DIAGNOSTIC TESTING

ANTIGEN CAPTURE ELISA

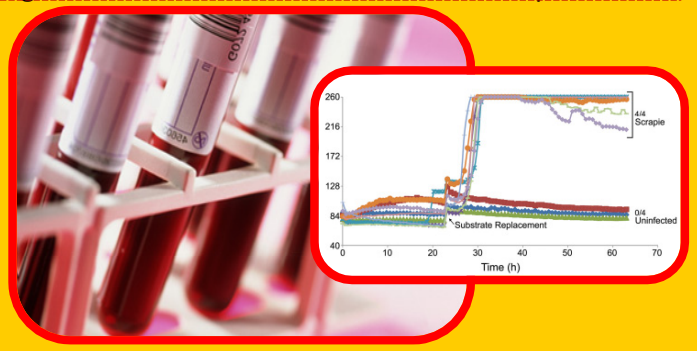
This test allows for more rapid testing of larger numbers of samples (most commonly used)

HISTOPATHOLOGY & IMMUNOHISTOCHEMISTRY

Pathologists can visualize the lesions & causative agent within brain tissue under a microscope

Current ↑

Future ↓



RT QuIC ASSAY

New **experimental** tests may allow infectious agent to be detected in blood from live animals in the early stages

Prion Disease Blood Test Using Immunoprecipitation and Improved Quaking-Induced Conversion

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ABSTRACT **A key challenge in managing transmissible spongiform encephalopathies (TSEs) or prion diseases in medicine, agriculture, and wildlife biology is the development of practical tests for prions that are at or below infectious levels. Of particular interest are tests capable of detecting prions in blood components such as plasma, but blood typically has extremely low prion concentrations and contains inhibitors of the most sensitive prion tests. One of the latter tests is quaking-induced conversion (QuIC), which can be as sensitive as *in vivo* bioassays, but much more rapid, higher throughput, and less expensive. Now we have integrated antibody 15B3-based immunoprecipitation with QuIC reactions to increase sensitivity and isolate prions from inhibitors such as those in plasma samples. Coupling of immunoprecipitation and an improved real-time QuIC reaction dramatically enhanced detection of variant Creutzfeldt-Jakob disease (vCJD) brain tissue diluted into human plasma. Dilutions of 10^{14}-fold, containing ~2 attogram (ag) per ml of proteinase K-resistant prion protein, were readily detected, indicating ~10,000-fold greater sensitivity for vCJD brain than has previously been reported. We also discriminated between plasma and serum samples from scrapie-infected and uninfected hamsters, even in early preclinical stages. This combined assay, which we call "enhanced QuIC" (eQuIC), markedly improves prospects for routine detection of low levels of prions in tissues, fluids, or environmental samples.**

IMPORTANCE **Transmissible spongiform encephalopathies (TSEs) are largely untreatable and are difficult to diagnose definitively prior to irreversible clinical decline or death. The transmissibility of TSEs within and between species highlights the need for practical tests for even the smallest amounts of infectivity. A few sufficiently sensitive *in vitro* methods have been reported, but most have major limitations that would preclude their use in routine diagnostic or screening applications. Our new assay improves the outlook for such critical applications. We focused initially on blood plasma because a practical blood test for prions would be especially valuable for TSE diagnostics and risk reduction. Variant Creutzfeldt-Jakob disease (vCJD) in particular has been transmitted between humans via blood transfusions. Enhanced real-time quaking-induced conversion (eQuIC) provides by far the most sensitive detection of vCJD to date. The 15B3 antibody binds prions of multiple species, suggesting that our assay may be useful for clinical and fundamental studies of a variety of TSEs of humans and animals.**

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