Immuno-PCR Based Approach Enables Early and Objective Diagnosis of Lyme Disease

Researchers at the University of Central Florida (UCF) have developed a multiplex immuno-PCR (iPCR) based diagnostic test which improves upon currently available approaches for Lyme disease detection. Lyme disease is caused by the bacteria Borrelia burgdorferi (B. burgdorferi) and is transmitted to humans and animals through the bite of infected ticks. The Centers for Disease Control and Prevention's recommended protocol for diagnosing Lyme disease involves testing blood sera using a subjective two-tiered system which often leads to misdiagnoses. The method also lacks sensitivity in the early stages of the infection. UCF's approach combines the sensitivity of PCR with the specificity and the versatility of immunoassays in a simplified and objective diagnostic test.

Technical Details

The UCF invention uses specialized magnetic beads that complex with antibodies produced by individuals infected with B. burgdorferi. Additionally, the test makes use of specialized oligonucleotide reporters that are amplified by qPCR if antibodies from infected individuals are detected. The qPCR step offers a more objective readout of B. burgdorferi infection than the immune-blot analysis commonly used in Lyme disease testing. Compared with the current assays for Lyme disease diagnosis, the diagnostic test developed at UCF enables earlier and objective detection of infection (in mouse models) and a more simplified single-tiered approach for diagnosis (in serum samples from Lyme disease patients).

Stage of Development

Assay developed and tested with patient serum samples.

Partnering opportunity

The research team is looking for partners to further develop the technology for therapeutic use and commercialization.

Benefits

- Reduces the cost and complexity of current methods for diagnosing Lyme disease
- Objective readout for Lyme disease
- Increased sensitivity for earlier detection
- Standardized reagents
- Can be developed for high throughput automation

Applications

- Lyme disease diagnostics

Publications

- Enhanced detection of host response antibodies to Borrelia burgdorferi using immuno-PCR, Clinical and Vaccine Immunology, 2013 Mar;20(3):350-7

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• Simple objective detection of human lyme disease infection using immuno-PCR and a single recombinant hybrid antigen. Clinical and Vaccine Immunology, 2014 Aug;21(8):1094-105

Technology #33429
• US Patent 10,294,531

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