Novel Biomarker Panel for the Early Diagnosis of Lyme Disease

Tech ID: 29175 / UC Case 2015-177-0

INVENTION NOVELTY

This diagnostic technology uses a panel of 20 biomarkers to diagnose Lyme disease with much higher sensitivity and accuracy than other currently existing methods. Lyme disease can be detected in peripheral blood samples from patients even at early hard-to-diagnose stages. These aspects of the invention make it indispensable for speeding up recovery and prevention of complications associated with this debilitating illness such as carditis, arthritis, neurological illness and even death.

VALUE PROPOSITION

Lyme disease – a systemic tick-borne bacterial infection, is the most common vector-borne disease in the United States and Europe. Disease prevalence estimates remain inaccurate primarily due to the lack of sensitive diagnostic tests. Current diagnostic tools for detecting nucleic acid or antibody responses from *Borrelia burgdorferi* infection have low assay sensitivity. The inability to detect the early acute phase of infection delays treatment and complete recovery for many patients. This diagnostic technology uses a novel gene expression classifier that allows for early detection of Lyme disease with high sensitivity, specificity and accuracy.

TECHNOLOGY DESCRIPTION

UCSF scientists used whole transcriptome data from 41 clinically diagnosed Lyme disease samples compared with 12 samples from other infections and 19 healthy controls, followed by iterative targeted RNA resequencing in conjunction with machine learning algorithms on a total of 220 unique samples. They identified a panel of 20 genes that accurately discriminated Lyme patients from healthy controls and patients with viral and other bacterial infections. This Lyme disease diagnostic exhibits 82% sensitivity in disease detection and is able to discriminate from other viral or bacterial infections with 91% specificity and 87% accuracy. Transcriptome profiling by next-generation sequencing is a promising approach to identify diagnostic host biomarkers in response to infection and the improved performance of this method makes it particularly suitable for clinical diagnosis of acute Lyme disease.

STAGE OF DEVELOPMENT

Diagnostic validated in 259 patient samples.

CONTACT

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Lyme disease diagnostics, Transcriptome profiling, Biomarker

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Disease: Infectious Diseases

RELATED CASES

2015-177-0

LOOKING FOR PARTNERS

To develop & commercialize the technology as a diagnostic tool for Lyme disease.

DATA AVAILABILITY

Under CDA / NDA

RELATED MATERIALS

- Longitudinal Transcriptome Analysis Reveals a Sustained Differential Gene Expression Signature in Patients Treated for Acute Lyme Disease. MBio. 2016 Feb 12;7(1):e00100-16. Bouquet J, Soloski MJ, Swei A, Cheadle C, Federman S, Billaud JN, Rebman AW, Kabre B, Halpert R, Boorgula M, Aucott JN, Chiu CY.

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- A Gene Expression Panel For Diagnosis Of Ebola Virus Infection

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