AI-Driven RNA Gene Host Response Panel and Biomarker Platform for Differential Diagnosis of Lyme Disease and Tickborne Infections

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TECHNOLOGY DESCRIPTION

Tickborne infections, especially Lyme disease, are rising in incidence and remain challenging to diagnose due to overlapping symptoms with acute febrile illnesses, while current diagnostic tools remain inadequate. UCSF inventors have developed innovative technology that leverages differential diagnostics and multinomial classification across three categories to address this growing need. This platform uses RNA gene biomarkers and advanced AI techniques, including generative adversarial networks (GANS), to achieve ~90% diagnostic accuracy for Lyme disease, babesiosis, and anaplasmosis. Samples from 438 individuals representing these infections and “look-alike” acute febrile illnesses (e.g., viral infections, bacterial sepsis, hyperinflammatory syndromes such as MIS-C) were included to generate the models. Early validation highlights its potential for blood-based diagnostic assays, asymptomatic infection screening, and identifying therapeutic or vaccine targets, with scalable designs for portable platforms such as qRT-PCR.

LOOKING FOR PARTNERS

Unique insights include the successful application of GANS to enhance biomarker detection for anaplasmosis despite a limited sample size. With a scalable design for portable platforms like qRT-PCR, this technology addresses the growing need for improved differential diagnostics for tickborne infections, offering opportunities for partnerships in clinical validation and commercialization.

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OTHER INFORMATION

KEYWORDS

AI-powered diagnostic technology for infectious diseases, RNA gene biomarkers for tickborne disease diagnosis, Scalable qRT-PCR diagnostic solutions, Generative adversarial networks (GANs) in diagnostics, Innovative biomarker-based diagnostic tools, Portable qRT-PCR technology for infectious diseases

CATEGORIZED AS

- **Biotechnology**
  - Bioinformatics
  - Genomics
- **Medical**

- Diagnostics
- Disease: Infectious Diseases
- **Research Tools**
- Bioinformatics
- Nucleic Acids/DNA/RNA
- Screening Assays

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