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Method for improved pathogen detection

Researchers at Stanford have developed a method of using intact genetically modified pathogens for more sensitive and accurate diagnosis of pathogenic infection. Clinical diagnosis of pathogen infection requires direct detection of the pathogen or detection of pathogen specific antibodies. Antibody detection is often the more reliable method of diagnostic testing. Current methods for detecting pathogen specific antibodies have significant limitations which can lead to inaccurate diagnostic results. Thus, new, more sensitive and specific methods are needed to diagnose pathogenic infection. To help meet this need the inventors have developed this technology to diagnose pathogenic infection and analyze immune response to infection. For this method, they have developed diagnostic pathogens-intact pathogens that have been genetically altered to express a fluorophore and to eliminate expression of conserved proteins and epitopes that are shared by many pathogens. The diagnostic pathogen is exposed to the patient sample and then analyzed for pathogen specific antibodies and the isotype distribution of the antibodies. This method enables more sensitive and specific diagnosis of pathogens, analysis of the immune response to such pathogens, and informed, targeted treatment of the infection.

Stage of research

Using only a small drop of blood, the inventors have shown this method can detect *Borrelia Burgdorferi* (the pathogen that causes Lyme disease) infection in live mice within the first week of infection. This method also identified critical ratios between different types of antibodies that are informative for the state of the immune response.

Applications

- Diagnostic for:

- Infectious disease, including Lyme disease
- Allergies
- Vaccine design

Advantages

- Diagnostic pathogen designed to allow rapid identification of live, intact, active pathogens
- High sensitivity
- High specificity
- Method maintains proteins in their native conformation for maximal antibody epitope recognition
- Simultaneous resolution of multiple pathogen specific antibody isotypes
- Unlike existing technologies, can measure all antibody subtypes not just IgG and IgM
- Enables more precise determination of the immune response
- Enables more informed, targeted treatment of infection

Patents

- Published Application: [WO2020072534](#)

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