A Method for Rapid Differential Diagnosis of Infection

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Technology description

A rapid differential diagnosis of infection using fluid chromatographic separation of biomarkers such as quorum sensing molecules (QSMs) that can be used to identify infection agents.
This method is capable of identifying specific molecules associated with bacterial infections or fungal pathogens and direct therapy to appropriate antibiotics. Pathogenic Gram-negative and Gram-positive bacteria and fungi secrete small QSMs that regulate microbial populations via communication between species. This can provide qualitative and quantitative information about the stage of infectious disease and the involvement of microbial biofilms in the infectious pathogenesis.

Background

Many bacteria and fungi can form organized communities in the form of a surface dwelling microbial biofilm that may be involved in a wound infection or as medical device contamination. In clinical settings, early detection of pathogenic microbiological organisms is critical. Rapid identification of the infectious organism and organism type can help direct the application of the most effective therapy at an early stage. Most current microbiological diagnostic tests require prior culture of the infectious organism, which is a process that can often take 24-48 hours or more. This delay in detection and identification puts already vulnerable patients at risk and increases potential for mortality. There is a need for a rapid diagnostic test that can identify specific infections/pathogens in order to prescribe appropriate therapies/medication.

Technology Description

Researchers at the University of New Mexico have developed a rapid differential diagnosis of infection using fluid chromatographic separation of biomarkers such as quorum sensing molecules (QSMs) that can be used to identify infection agents. This method is capable of identifying specific molecules associated with bacterial infections or fungal pathogens and direct therapy to appropriate antibiotics. Pathogenic Gram-negative and Gram-positive bacteria and fungi secrete small QSMs that regulate microbial populations via communication between species. This can provide qualitative and quantitative information about the stage of infectious disease and the involvement of microbial biofilms in the infectious pathogenesis.

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Application area

A rapid, culture-free method of diagnosing infections in clinical specimens.
Capable of detecting and identifying dangerous gram positive and gram negative bacteria and pathogenic fungi in a matter of hours rather days
Valuable addition to culture-based testing
Enables rapid detection followed by targeted treatment of the infection/pathogen
Provides information about the stage of the infection and the involvement of microbial biofilms in the infection
May be used on a variety of specimens including sputum, blood, and urine
May be tuned for identification a wide range of infectious agents by altering mass spectrometer operating parameters to improve peak separation and by using co-solvents
Broad applications include diagnosis in clinical settings and direct targeted treatment of infection

Institution

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