James McNamara, J Cancer Sci Ther 2017, 9:10 (Suppl)
DOI: 10.4172/1948-5956-C1-114

Bacterial nucleases as signal-amplifying biomarkers for infectious disease diagnostics

James McNamara
University of Iowa, USA

Rapid and sensitive methods are currently needed for the detection of many important bacterial pathogens. The diversity of nucleases and their presence in all living organisms make them an attractive class of biomarkers for such applications. Moreover, in contrast to most biomarkers, the enzymatic activity of nucleases can be used for signal amplification in assays that detect them. An important advantage of this approach is that it is not subject to the background that results from the non-specific adherence of exogenous enzymes (e.g., HRP-coupled antibodies binding to ELISA plates). We have developed various rapid and ultrasensitive assays that detect target bacterial species with quenched fluorescent oligonucleotide substrates that are selectively digested (and thereby activated) by their nucleases. The author will discuss applications that have been developed with this platform, including rapid culture-independent detection of 1) urinary tract infections via detection of endonuclease I (of *E. coli*) and 2) *S. aureus* bacteremia via detection of micrococcal nuclease.

Biography

James McNamara had studied Chemical Engineering at the University of Virginia (BS in 1992), Neurobiology at Duke University (PhD in 2003) and then completed a Post-doc at Duke University where he developed RNA based therapeutic approaches for cancer. He joined the Department of Internal Medicine at the University of Iowa in 2007. His research is focused on developing rapid clinical diagnostic assays for bacterial infectious diseases based on selective detection of pathogen-derived nuclease activities.

james-mcnamara@uiowa.edu

Notes: