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(54) Title: USE OF BACTERIAL BETA-LACTAMASE FOR IN VITRO DIAGNOSTICS AND IN VIVO IMAGING, DIAGNOSTICS AND THERAPEUTICS

(57) Abstract: Provided herein are imaging methods for detecting, diagnosing and imaging pathogenic bacteria or a pathophysiological condition associated therewith using fluorescent, luminescent or colorimetric detection agents, e.g., fluorogenic substrates for bacterial enzymes, caged luciferins and fluorescent proteins, luciferases and enzymes expressed by recombinant bacteria. Signals emitted by the fluorescent, luminescent or colorimetric detection agents in the presence of the bacteria are compared to controls to detect and locate the pathogenic bacteria. Also provided is a method for screening therapeutic agents to treat the pathophysiological conditions by measuring fluorescence or luminescence emitted from the detection agents in the presence and absence of the potential therapeutic agent. In addition, a method for detecting a pathogenic bacteria via PET or SPECT imaging using a positron-emitting or gamma-emitting substrate for a beta-lactamase or other enzyme or protein of the pathogenic bacteria. Further provided are the fluorogenic substrates CNIR-7 or CNIR7-TAT or the radiolabeled substrates.



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