WHAT IS CLAIMED IS:

1. A method for detecting a pathogenic bacteria in real time comprising:

contacting a biological sample in vitro with a fluorogenic substrate for a beta-lactamase of the pathogenic bacteria; wherein the fluorogenic substrate is ~~CNIR5,~~ CNIR5-QSY22, CNIR7, CNIR7-TAT, CNIR9, or CNIR10;

imaging the sample for a product from beta-lactamase activity on the substrate; and

acquiring signals at a wavelength emitted by the beta-lactamase product; thereby detecting the pathogenic bacteria in real time.

~~2. The method of claim 1, further comprising diagnosing in real time a pathophysiological condition associated with the pathogenic bacteria based on an emitted signal intensity greater than a measured control signal, wherein the pathophysiological condition is tuberculosis.~~

~~3.~~2. The method of claim 1, wherein the pathogenic bacteria comprise a bacterial species of Bacteroides, Clostridium, Streptococcus, Staphylococcus, Pseudomonas, Haemophilus, Legionella, Mycobacterium, Escherichia, Salmonella, Shigella, or Listeria.

~~4.~~3. The method of claim 1, wherein the imaging wavelength is from about 300 nm to about 900 nm.

~~5.~~4. The method of claim 1, wherein a wavelength of the emitted signals is about 300 nm to about 900 nm.

~~6.~~5. A method for imaging a pathogenic bacteria, comprising:

contacting a pathogenic bacteria in an in vitro biological sample with a fluorogenic substrate for a beta-lactamase enzyme thereof;

delivering to the pathogenic bacteria an excitation wavelength for a product of beta-lactamase activity on the substrate; wherein the fluorogenic substrate is ~~CNIR5,~~ CNIR5-QSY22, CNIR7, CNIR7-TAT, CNIR9, or CNIR10;

acquiring fluorescent signals emitted from the product; and

producing a 3D reconstruction of the acquired signals, thereby imaging the pathogenic bacteria.

~~7.~~6. The method of claim ~~6~~5, wherein the pathogenic bacteria comprise a bacterial species of Bacteroides, Clostridium, Streptococcus, Staphylococcus, Pseudomonas, Haemophilus, Legionella, Mycobacterium, Escherichia, Salmonella, Shigella, or Listeria.

~~8.~~7. The method of claim ~~6~~5, wherein the excitation wavelength is from about 540 nm to about 730 nm.

~~9.~~8. The method of claim ~~6~~5, wherein a wavelength of the emitted signals is about 650 nm to about 800 nm.

~~10.~~9. A method for detecting a pathogenic *Mycobacteria*, comprising:

contacting a first biological sample *in vitro* with a fluorogenic substrate for a beta-lactamase of the pathogenic *Mycobacteria*; wherein said fluorogenic substrate is ~~CNIR5,~~ CNIR5-QSY22, CNIR7, CNIR7-TAT, CNIR9, or CNIR10;

imaging the biological sample for a product of beta-lactamase activity on the substrate;

imaging a control sample containing the fluorogenic substrate;

measuring in real time intensity of a fluorescent signal acquired at a wavelength emitted by the product of beta-lactamase activity on the fluorogenic substrate in the biological sample and in the control sample; and comparing the measured signal intensities, wherein an increase in the fluorescent signal intensity compared to the measured control signal correlates to a presence of the pathogenic *Mycobacteria* in the biological sample, thereby detecting the pathogenic *Mycobacteria* in the sample.

~~11.~~10. The method of claim ~~10~~9, further comprising:

contacting a second biological sample *in vitro* with a therapeutic compound;

contacting the second biological sample *in vitro* with said fluorogenic substrate;

imaging the second biological sample to monitor efficacy of the therapeutic compound; wherein a decrease in measured emitted signal intensity after contact compared to the measured emitted signal intensity at detection indicates a therapeutic effect against the pathogenic *Mycobacteria*.

~~12.~~11. The method of claim ~~10~~9, wherein the pathogenic *Mycobacteria* is associated with tuberculosis.

~~13.~~12. The method of claim ~~10~~9, wherein the imaging wavelength is about 540 nm to about 730 nm.

~~14.~~13. The method of claim ~~10~~9, wherein a wavelength of the emitted signals is about 650 nm to about 800 nm.