

## Fractal Therapeutics, Inc.

### *A Novel Point-of-care Diagnostic for Nosocomial Infections*

This proposal describes a novel point-of-care *in vitro* diagnostic test aimed at the identification of common nosocomial infections (NIs) occurring in a hospital setting. The proposed test would allow healthcare providers to rapidly identify the infectious agent, and evaluate the presence of known antibiotic resistance elements, thus informing both the choice of treatment for the affected patient, and the need for risk mitigation measures to prevent the spread of the infectious agent.

To facilitate development and deployment, the test combines two mature technology platforms: PCR and oligonucleotide microarrays. The novelty lies in the design of the test- its clinical context, the approach to probe and DNA barcode design, and the deliberate use of redundancy to create assay robustness. The test consists of three consecutive steps, performed on purified DNA from patient samples: hybridization of sample DNA to a series of specific probes, a specific PCR reaction to amplify DNA bound to probe and incubation of the probe/sample mix on an oligonucleotide microarray. These steps are anticipated to be completed in 120 minutes or less, and are expected to present a low-to-moderate technical training burden (CLIA-moderate).

The probe panel for the test screens for thirteen common pathogens and 1485 previously described horizontal resistance elements. We have designed the probe panel and tested it in simulation. The designed oligonucleotide array is anticipated to have 9281 probes, each of which is a single-stranded 15-mer. Based on simulation testing, the probe panel was able to identify 98% of all resistance elements and 100% of all pathogens tested. We anticipate that the performance of the actual test in a clinical testing may be lower due to cross-hybridization and bacterial genomic instability.