

Bacterial biosensors for low-cost, point-of-care diagnostics

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There is a global demand for low-cost diagnostic tools that can generate results at the point of use in resource-limited environments. Biosensors that harness the native sensing machinery of bacteria to detect molecules indicative of disease have the potential to meet this demand. These bacterial biosensors can exist in two formats: whole-cell and cell-free. Whole-cell sensors, which use living cells, allow for the development of robust detection tools with readily interpretable results. However, cell-free sensors, which use a bacterial cell extract, are a more field-friendly alternative. In this talk, I will discuss the development of both types of bacterial biosensors, with particular emphasis on the detection of micronutrient deficiency. Additionally, I will describe my study of two poorly characterized factors (plasmid crosstalk and sonication energy input) in cell-free expression systems that significantly affect biosensor design and can be leveraged to make better, more robust cell-free detection platforms.