A protease-based biosensor for the detection of schistosoma cercariae

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One of the primary goals of synthetic biology is the application-driven generation of new parts, circuits, and systems to solve problems that, as yet, have not been adequately addressed. The parasitic infection Schistosomiasis affects over 200 million people worldwide. The causative agents are fluke worms of the *Schistosoma* genus, and infection only occurs when the cercarial larvae are able to penetrate the skin. To facilitate this, they secrete an elastase protease that enables the parasite to burrow through elastin in the skin. We have therefore, designed and characterised several whole-cell biosensors that detect *Schistosoma* cercarial elastase activity. Our biosensors were designed to incorporate a cercarial elastase detection system that is based on the specific recognition of its proteolytic activity, and upon detection to produce a biosensor output that is easy to measure. In order to validate our biosensor designs we used several *Schistosoma mansoni*-derived biological samples termed cercarial transformation fluid (SmCTF) that contain soluble cercarial antigens. Here, we report that our elastase biosensor designs successfully detected cercarial elastase activity in SmCTF samples. We also have additional data and exciting progress to report.