ENGINEERING ENZYMES FOR MICROBIAL CONTROL: CELL-FREE METHODS FOR ENHANCING ANTIMICROBIAL EFFICACY THROUGH DIRECTED EVOLUTION

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Regulatory authorities and retailers are aggressively banning chemicals found in consumer and industrial products. Specifically, these bans are targeting chemicals that bio-accumulate and persist in the environment leading to negative human health outcomes such as the proliferation of superbugs. Regulations enacted over the last few years have directly impacted antimicrobials—such as triclosan and 18 related compounds - banning them from consumer soap and hand sanitizers. Major retailers have followed suit by further banning numerous preservatives and biocides commonly used in consumer products.

Manufacturers have few alternatives to these chemical preservatives, which are readily found in paints, personal care products, and household cleaning products. Using cell-free protein synthesis in combination with chemical and genetic controls, Curie Co has developed a suite of tools to rapidly evolve biocidal enzymes to replace these banned preservatives and biocides. Development of these tools addresses a gap in current methodology by providing a toolbox for the rapid expression and selection of toxic proteins and enzymes that are not readily produced using microbial fermentation. Enzymes are catalytic, evolvable, and biodegradable, which provides a cost effective and environmentally benign replacement for chemical biocides.