

Engineering microbes for various medical applications

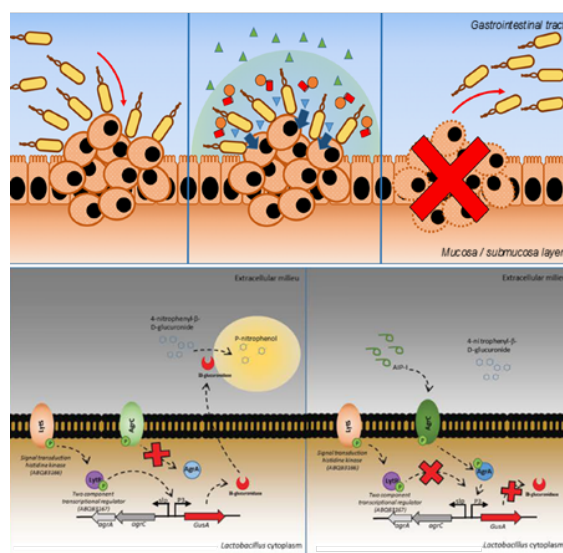
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Abstract: Engineering microbes for various function and applications have been the hallmark of all biochemists and molecular biologists alike. Recently, generating intuitive and autonomous microbes can be considered the holy grail of synthetic biology research. Thus, in this presentation, we will discuss the various approaches used to develop therapies with higher efficacy and specificity; while providing safety for the use on the human host. The various studies that will be discussed leverage heavily on genetic circuit engineering, protein engineering, and optimization of host-cell responses under different environmental stresses. We will be discussing the use of binding proteins and catalytic conversion of dietary-nutrient to elicit anticancer activities while briefly touching on the prospect of developing improved anticancer proteins with improved target specificity and improved efficacy. Additionally, we will discuss the engineering of various bacteriocins with improved target specificity and engineering protein tags that both stabilize and improve the antimicrobial peptide's killing efficacy. We will also briefly discuss the use of microbial-based biosensors for the detection of pathogenic microbes. In summary, it was found that through the careful engineering of microbes using cellular reprogramming, along with engineered protein for improved target identification and catalytic activity, it is possible to generate commensal and probiotic microbes with desirable traits.

Graphical abstract:



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