

Engineering intelligent *Escherichia coli* to sense and remove heavy metals

Sambandam Ravikumar, 유익근, 홍순호*
울산대학교
(shhong@mail.ulsan.ac.kr*)

Synthesis of intelligent genetic network in bacteria is one of the great applications of synthetic biology. Here we show the assembly of an intelligent system that can trigger bacteria to sense and respond to the removal of heavy metals such as zinc and copper by engineering of two component systems. This bacterial system can sense zinc and copper using OmpR and NtrC family of two component sensor system and remove metals contaminants through cell surface display system. The genetic circuit of HydHG and CusSR were fused to cell surface display system for the expression of chimeric protein namely OmpC with heavy metal binding peptide. Our Intelligent bacterial system targets the specific heavy metal and triggers a cell surface display system in response to the heavy metal added to the bacterial population which is potentially used in the field of biosensor and bioremediation.

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