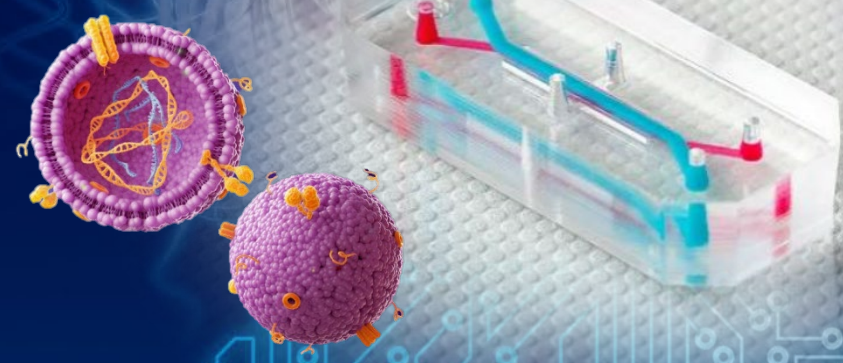
한림대학교

제 115회
ORGAN ON A CHIP
기술교류회



2025.04.03 목 오후 4시 30분

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1. Education

박사: Univ. of Chicago, Dept. of Chemistry (2004)
석사: 고려대학교 화학과 (1997)
학사: 고려대학교 화학과 (1995)

2. Experience

2009 ~ 현재 동국대학교 의생명공학과, 교수
2007 ~ 2009 삼성종합기술원, Senior Engineer
2004 ~ 2007 Lawrence Livermore Nat'l Lab., USA, Post-doc

세포 기반 센서 구축과 그 응용
Genetically encoded biosensors and their applications

Intein-mediated protein engineering has been widely utilized for various biological applications, including biosensing and bioimaging. In this presentation, we will discuss several examples of intein-mediated protein engineering, with a focus on the development of genetically encoded biosensors. Live cell-based biosensors have become valuable tools in biotechnology and chemical biology. Here, we have designed genetically encoded sensor cells that report the presence of biologically active molecules through fluorescence translocation, utilizing split intein-mediated conditional protein trans-splicing (PTS) and conditional protein trans-cleavage (PTC) reactions. Our approach leverages the bond-forming and bond-breaking capabilities of intein-mediated reactions in sensor construction, effectively eliminating false-positive signals caused by the simple binding of fragmented reporters. These live cell-based sensors can detect biologically active signaling molecules and their agonists, while also distinguishing structural analogs, making them highly effective for screening biologically active compounds. Additionally, the sensor cells have been used for non-invasive, real-time monitoring of cell differentiation at single-cell resolution. This innovative platform holds great potential for applications such as drug screening and cell-based therapies.

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