Synthetic Biology in Asia

Meet the Authors

Friday, 13th Nov 2020

02.00 - 03.30PM (GMT+8, CST)

Register at:
www.qrs.ly/eic0f7i

MODERATOR

Adison Wong
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Artificial functional membraneless compartments in *Escherichia coli*

Membraneless organelles, a new type of cellular compartments, are formed by liquid-liquid phase separation of proteins and/or nucleic acids in eukaryotes. These organelles play crucial roles in cell physiology and pathology, and thus give rise to a fundamental mechanism for organizing the intracellular milieu. However, such cellular compartments have yet to be discovered or created synthetically in prokaryotes. In this talk, I will introduce the formation of liquid protein condensates within the living cells of prokaryotic *Escherichia coli* upon heterologous overexpression of intrinsically disordered proteins such as spider silk and resilin. Functionalization of these condensates was achieved via fusion and targeted colocalization of fluorescent or catalytic cargo proteins to the compartments. The ability to form and functionalize membraneless compartments may serve as a versatile tool in engineering prokaryotes. The research work delivered may also inspire the exploration of natural membraneless compartments in *E. coli* and other prokaryotes.
www.nature.com/articles/s41589-020-0579-9

Jeong Wook Lee
Assistant Professor
POTSTECH

Sensitive fluorescence detection of RNA via one-pot isothermal ligation and transcription

The control of viral outbreaks requires nucleic acid diagnostic tests that are sensitive, simple and fast. Here, we report a highly sensitive and specific one-pot assay for the fluorescence-based detection of RNA from pathogens. The assay, which can be performed within 30–50 min of incubation time and can reach a limit of detection of 0.1-attomolar RNA concentration, relies on a sustained isothermal reaction cascade producing an RNA aptamer that binds to a fluorogenic dye. The RNA aptamer is transcribed by the T7 RNA polymerase from the ligation product of a promoter DNA probe and a reporter DNA probe that hybridize with the target single-stranded RNA sequence via the SplintR ligase (a Chlorella virus DNA ligase). In 40 nasopharyngeal SARS-CoV-2 samples, the assay reached positive and negative predictive values of 95 and 100%, respectively. We also show that the assay can rapidly detect a range of viral and bacterial RNAs.
www.nature.com/articles/s41551-020-00617-5

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