ChemE MIT Chemical Engineering

Seminar Series
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CRISPR-based Diagnostics: Gross Errors, Useful Specificity, and Microfluidic Assays

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3pm
66-110

Molecular diagnostics based on CRISPR enzyme systems have recently been the subject of intense research, development, and investment. CRISPR-associated (Cas) enzyme assays are easily reconfigurable, highly specific, and compatible with lyophilization, simple kits, and microfluidic components. We are conducting studies of the basic kinetics of CRISPR enzymes. In 2020, we discovered that the great majority of all CRISPR enzyme kinetics studies showed data that are inconsistent and grossly violate basic rules of mass conservation and rate laws. We are also evaluating and applying CRISPR's specificity and developing microfluidic assays. We performed a study of CRISPR specificity to small mutations, including single-nucleotide polymorphisms. We will also briefly present an overview of microfluidic CRISPR assays and report on novel CRISPR assays using on-chip electric field control with a method called isotachophoresis (ITP).

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