



Thursday, February 1, 2018, 12:30 pm
Seaver Science Library, Room 150

SSC Auditorium next to the library

Professor Eric Kool

Department of Chemistry
Stanford University

Probing DNA Repair Pathways with Designer Nucleotides

Abstract:

Fluorescent designer nucleobases have proven widely useful for decades as tools for biophysical measurement of nucleic acids, and have been employed commonly as probes of nucleic acid geometry and protein-DNA binding. Here I describe a different application of fluorescent DNA bases: as sensors of enzymes and biological pathways. We have found that a wide variety of fluorescent nucleobases can be combined with fluorescence quenching groups in short oligomers to yield dark sensor molecules that respond to bond-cleaving enzymes with light-up signals. Examples include DNA-based sensors of esterases, proteases, and nucleases, all of which selectively report on enzyme activities in cells and biological media. I describe recent efforts in the development of reporters of several DNA repair pathways. These probes are useful in vitro to screen for small-molecule inhibitors of these pathways, and as cellular sensors to report on the repair activity in living systems. I will describe our efforts, in collaboration with pharmaceutical companies and clinical oncologists, to use these probes in the study of the role of specific repair pathways in solid tumors.

Hosted by Professor Charles McKenna

The scientific community is invited