UC RIVERSIDE

BCH 252 Seminar Series

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Seminar Title: "Single Molecule Dynamics of Eukaryotic Translation Initiation"

Abstract: Translation initiation involves highly coordinated dynamics that play a vital role in mediating regulated gene expression. One of the first translation initiation factors that encounters a eukaryotic mRNA is a trimeric complex called eIF4F. eIF4F is composed of eIF4E, which recognizes and binds the mRNA 5' cap, eIF4G, a multifunctional, multi-domain scaffolding protein, and eIF4A, an RNA helicase. These factors in concert enable mRNA recognition for recruitment to the ribosome, but how they coordinate dynamically to define mRNA-specific cap-binding efficiencies on the initiation timescale remains elusive. Furthermore, the ribosome in complex with other key initiation factors interacts with the eIF4F bound mRNA and moves along the 5' untranslated region (UTR) to locate the start codon; this movement is termed scanning and is thought to proceed linearly with significantly processive 5'-to-3' directionality. Although the scanning model was proposed many decades ago, the exact molecular mechanism of the motion, and how it may vary between different mRNAs under various cellular conditions remain unclear due to the highly dynamic nature of the process. To address these questions, we used single-molecule fluorescence approach to understand how eIF4F dynamically interacts to contribute to cap-recognition efficiency and observe the dynamics of the ribosome complex scanning along various cellular mRNAs. Our study provides insights into these vital processes in translational control and uncover dynamic interplay of key eukaryotic translation initiation factors.

Location: Genomics Auditorium 1102A

Tuesday, May 10th, 2022
12:00 p.m. - 12:50 p.m.

Host: Dr. Li Fan