UCLA College | Physical Sciences Chemistry & Biochemistry

PHYSICAL CHEMISTRY SEMINAR

Prof. Shu-ou Shan

Division of Chemistry and Chemical Engineering

California Institute of Technology

Monday, April 18, 2022
4:00 PM
Young Hall 2033

"Nascent Protein Selection and Triage At the Ribosome"

Abstract: Proper protein biogenesis is a pre-requisite for the generation and maintenance of a functional proteome. Accumulating data show that this process begins early, when nascent proteins begin to emerge from the ribosome. Indeed, the ribosome exit site is a crowded environment where a variety of ribosome-associated protein biogenesis factors (RPBs) jostle for access to the nascent polypeptide (Fig. 1). Within seconds, the nascent polypeptide must engage the correct set of factors and commit to the proper biogenesis pathway. These early decisions profoundly influence the folding, assembly, localization, maturation, and quality control of nascent proteins. This raises the question: How do these factors, which bind the ribosome at overlapping sites and prefers similar sequence features on the nascent polypeptide, compete or collaborate with one another to enable the efficient and accurate selection of nascent proteins into the proper biogenesis pathway? In this talk, I will describe recent works that highlight how the spatiotemporal coordination between RPBs at the ribosome exit site contributes to the fidelity of individual protein biogenesis pathways, and begin to illustrate the molecular principles for this regulation. Resolution of this problem will also provide insights to understand how fidelity is generated from noisy and degenerate molecular signals, and how it occurs in the crowded cellular environment.

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