NANYANG TECHNOLOGICAL UNIVERSITY

School of Biological Sciences

Seminar Announcement

Real-Time Folding of Proteins Emerging From the Ribosome

Date: 1 February 2017 Wednesday

Time: 10:00am to 11:00am

Venue: SBS Classroom 3(SBS-01n-23)

Host: Associate Professor Gao Yonggui



Speaker: Professor Marina V. Rodnina
Max Planck Institute for Biophysical Chemistry

Abstract

Protein domains start to fold co-translationally, while they are being synthesized on the ribosome. Co-translational folding is vectorial; it starts in the confined space of the polypeptide exit tunnel of the ribosome and is modulated by the speed of translation. Defects in protein folding cause many human diseases; thus, understanding the co-translational folding is of eminent importance. We investigated co-translational folding of a small five-helix domain in real-time as the protein is being synthesized by the ribosome. We showed that folding of the nascent protein proceeds through a compact, non-native conformation that forms within the peptide tunnel of the ribosome before exiting from the ribosome. The compact state rearranges into a native-like structure immediately after the full domain sequence has emerged from the ribosome. Both folding transitions are rate-limited by translation, allowing for quasi-equilibrium sampling of the conformational space restricted by the ribosome. The rate of translation defines the accuracy of folding. These results may represent a paradigm for the co-translational folding of rapidly folding protein domains.