NANYANG TECHNOLOGICAL UNIVERSITY

School of Biological Sciences

Seminar Announcement

Ribosome-associated ncRNAs (rancRNAs): An emerging class of translation regulators

Date: 02 September 2016 Friday

Time: 11:00am to 12:00pm

Venue: SBS-01n-22 Classroom 2

Host: A/Prof Gao Yonggui



Speaker: Professor. Norbert Polacek
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Abstract

Small non-protein-coding RNA (ncRNA) molecules represent major contributors to regulatory networks in controlling gene expression in a highly efficient manner. Most of the recently discovered regulatory ncRNAs acting on translation target the mRNA rather than the ribosome (e.g.: miRNAs, siRNAs, antisense RNAs).

Recently, we have performed targeted screens for ribosome-associated ncRNAs (rancRNAs) in various model organisms spanning all three domains of life, including human pathogens. For a subset of rancRNA candidates we have gathered experimental evidence demonstrating ribosome association in a stress-dependent manner. The rancRNAs appear to be involved in the first wave of cellular stress response by fine-tuning the rate of protein biosynthesis (1-3). From a mechanistic point of view different rancRNAs were found to affect the translation initiation or elongation phases by competing with tRNA or mRNA for ribosome binding, respectively. Many of the investigated rancRNAs are processing products of larger functional RNAs, such as mRNAs (1), tRNAs (2,3), or snoRNAs (4). Post-transcriptional cleavage of RNA to generate smaller fragments is a widespread mechanism that enlarges the structural and functional complexity of cellular RNomes.

Our data disclose the ribosome as target for small regulatory RNAs. rancRNAs are found in all domains of life and represent a prevalent but so far largely unexplored class of regulatory molecules (5). Ongoing work in our lab revealed first aspects of rancRNA processing, structure and functioning of this emerging class of translation regulators.