



UNIVERSITY
OF WARSAW

CeNT CENTRE
OF NEW
TECHNOLOGIES

invites to a seminar by

Prof. Marek Tchórzewski

Maria Curie-Skłodowska University in Lublin

“The ribosomal GTPase-associated center as regulatory element modulating ribosomal modus operandi”

October 18th, 2018 at 12 p.m.

Venue: Centre of New Technologies, Banacha 2C, room 00.142

Host: Prof. dr hab. Agnieszka Chacińska

Abstract:

The eukaryotic protein synthesis machinery appears as a paragon of biological complexity expansion, shaping the quantity and quality of the cellular proteome. In principle, the machinery evolved to fulfill a basic role, allowing ribosome to synthesize proteins efficiently. However, in eukaryotes, transcription and translation are uncoupled in time and space, and translational response does not match the transcriptional response precisely. Eukaryotes have developed systems of regulation of gene expression at the post-genomic-translational level, usually as fast-response to stress conditions. In principle, the ribosome is responsible for two fundamental reactions in the translational process – decoding and peptide bond formation. Considering these basic activities, two active centers are recognized on the ribosome: Decoding Center (DC) – situated on the small subunit, responsible for reading the genetic information and Peptidyl-Transferase-Center (PTC) – residing on large subunit, where peptide-bond-formation takes place. The third active center, GTPase Associated Center (GAC), being part of a large ribosomal subunit stimulates GTP hydrolysis by translational GTPases (trGTPases) at all major steps of protein synthesis. The GAC represents the landing platform for trGTPases, where together they convert chemical energy stored in the GTP into the ‘mechanical’ force that allows the ribosome to traverse through the mRNA, assuring at the same time speed and accuracy of translation. The GAC interplay with trGTPases is critical for both the translational accuracy and the efficiency of peptide bond formation, indicating its supportive role in two elementary ribosomal activities. The DC and PTC represents invariant, rRNA based, ribosomal centers, being conserved in all domains of life. In contrast, the GAC corresponds to the variable ribosomal structure, subjected to numerous modifications, making it a perfect regulatory hub potentially influencing the major aspects of protein synthesis.