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Structural characteristics of conserved C-terminal segment of eukaryotic acidic ribosomal P2 proteins: Functional implications

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Ribosome structure has been solved by X-ray crystallography several years ago, but to date, very little is known about the ribosomal stalk, which in the ribosome is a supramolecular assembly of proteins. During protein synthesis, the stalk is known to adopt different conformations at different steps of the elongation cycle. Eukaryotic stalk is much more complex than prokaryotic stalk. It consists of acidic proteins known as P proteins (P0, P1, P2), which are organized as a complex assembly, $P0(P1\text{-}P2)_2$. However, the individual proteins are known to self-associate under physiological conditions. The P2 protein is quite conserved across several eukaryotic species, particularly, its C-terminal domain. Within the C-terminal domain also, the last 11 residues are even more conserved. It has been argued that multiple copies of this C-terminal sequence protrude outwards from the ribosome to the cytoplasm, function to fetch the elongation factors and draw them into GTPase-associated center. In order to understand structure function relationships of this domain, we have carried out investigations on several constructs of the domain (5kDa) from different eukaryotic species (human, *P. falciparum* and *T. gondii*). MALDI indicated that the protein is a monomer and Circular Dichroism (CD) and NMR studies showed that this domain is intrinsically disordered. Fluorescence spectroscopy revealed that this domain interacts with GTP and elongation factor (eEF2). It also interacts with the TCS (trichosanthin) ribosome inactivating protein, which has been characterized by NMR. The binding site on P2 has been mapped by chemical shift perturbation. Binding is seen to be conserved throughout the species. Further, it seems that TCS occupies the same site as eEF2 and this may be responsible for translational inhibition. The C terminal domain also seems to show phosphorylation as post translation modification. Further investigations are in process to unravel more details.

Biography

Pushpa Mishra (born, 1985, in Faridabad) received BSc degree in Chemistry from Delhi University in 2007, and MSc degree in Chemistry from Indian Institute of Technology, Delhi in 2009.Currently, she is a graduate student with Prof. Ramakrishna V. Hosur at TIFR. Her research focuses on structure function relationships of eukaryotic ribosomal P proteins.

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