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Intersection of proteomics and bioinformatics in deciphering novel functions of proteins

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Abstract

Proteins seldom work by themselves; they almost always interact with other biomolecules to accomplish their functions. Webs of such biomolecular interactions constitute the basis for life, and those occurring between proteins play exceptionally important roles.

We have recently analyzed the web of protein interaction during hormone action and the consequences of such interactions. I will discuss interactions of hormone receptors with interacting protein and the structural elements involved in this association. I will also illustrate how these interactions cause exacerberation of hormone driven signals. A deep understanding of receptor-protein association as well as analyzing interacting partner expression could be the pivotal point in devising better therapies for managing events associated with them.

Taking this approach further, I will discuss how interactome analysis can identify novel partners especially in relation to spatial compartmentation in the cell. I will exemplify how classical cytosolic proteins are identified to be a component of nuclear interactome. I will explain how a combined bioinformatics & proteomics approach can be used to predict their nuclear function. In addition, an integrative approach with bioinformatics and site-directed mutagenesis confirms the basis of these interactions. Finally, I will illustrate using in-vivo experiments how these interactions can be proven and their functional significance.

Biography

Malini Laloraya is a PhD in Life Sciences (Devi Ahilya University, Indore). She was a Rockefeller Visiting Fellow at Population Council's Center for Biomedical Research, Rockefeller University, USA and a visiting faculty at University of Virginia and University of Florida, USA. She was a Raine Visiting Professorship at The University of Western Australia (April 2006 & 2008) sponsored by Raine Medical Research Foundation. She is currently a Scientist F (Professor equiv.) at Rajiv Gandhi Centre for Biotechnology, Trivandrum.