7th International Conference on **Proteomics & Bioinformatics** October 24-26, 2016 Rome, Italy

Moonlighting microtubule-associated proteins: Regulatory functions by day and pathological functions at night

Judit Ovádi Hungarian Academy of Sciences, Hungary

The sensing, integrating and coordinating features of the eukaryotic cells are achieved by the complex ultrastructural arrays and multifarious functions of the cytoskeletal network which comprises fibrous protein networks of microtubules, actin and intermediate filaments. These filamentous polymer structures are highly dynamic and undergo constant and rapid reorganization during cellular processes. The microtubule system plays a crucial role in the brain, as it is involved in an enormous number of cellular events including cell differentiation and pathological inclusion formation. These multifarious functions of microtubules can be achieved by their decoration with proteins/enzymes that exert specific effects on the dynamics and organization of the cytoskeleton and mediate distinct functions due to their moonlighting features. Our studies focus on two aspects of the microtubule cytoskeleton: i) the hetero-association of tubulin/microtubules with metabolic enzymes, which in addition to their catalytic activities stabilize microtubule structures via their cross-linking functions and posttranslational modifications; ii) the recently discovered Tubulin Polymerization Promoting Protein (TPPP/p25), prototype of the *Neomorphic Moonlighting Proteins* (NMP) which displays distinct physiological or pathological functions. The expression of this disordered *Microtubule Associated Protein* is finely controlled in the human brain; it is indispensable for the development of projections of oligodendrocytes that are responsible for the ensheathment of axons; its non-physiological level leads to distinct CNS diseases such as Parkinson's disease. A new therapeutic strategy based upon the specific targeting of the interface of its pathological complexes but not the physiological ones have been suggested for the innovation of the Parkinson research.

Biography

Judit Ovádi has her expertise in Biochemistry, Molecular Biology and System Biology. She defined the metabolic channeling at microscopic and macroscopic levels as a powerful mechanism to control and direct metabolisms at crossroads. Her research team demonstrated the sensing characteristic of the microtubule pathway at system level. Her research team discovered a unique brain-specific protein denoted Tubulin Polymerization Promoting Protein (TPPP/p25) that displays two exciting characteristics: Intrinsically unstructured and enriched in brain inclusions of Parkinson's disease. The structural and functional feature of this protein has been characterized at different level of organizations as well as at physiological and pathological conditions. Recently, she proposed an innovative strategy for drug development when protein of multiple functions is targeted. She has been the Supervisor of several PhD and DSc dissertations, Visiting Professor in Spain, Italy and USA, Invited Speaker at international meetings recently in Tokyo, Jerusalem, San Francisco, Orleans. She has 156 publications, 480 impact factor, 4300 citation and Hirsch index 37.

ovadi.judit@ttk.mta.hu

Notes: