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Investigating neurodegenerative diseases by computational biophysical chemistry

Protein aggregation of amyloids is associated with numerous incurable diseases, including amyloid β (Aβ) in Alzheimer's disease (AD) and α-synuclein in Parkinson's disease (PD). Clinical studies have shown that patients with AD can develop PD and vis-á-versa. Experimental evidence led to the hypothesis that cross-amyloid interactions (e.g., interactions between Aβ and α-synuclein) also play a critical role in protein aggregation. Structure-based characterization of the interactions between two types of amyloids is fundamental to understanding the self-assembly mechanism that exists between them and may pave the way to elucidate the link between two diseases (e.g. PD and AD). Computational biophysical chemistry tools are critical techniques to investigate the molecular mechanisms of these proteins. The Nobel prize in Chemistry 2013 was awarded jointly to Martin Karplus, Michael Levitt and Arieh Warshel for the development of these techniques to investigate the chemistry behind the biological systems. The lecture will demonstrate how these computational tools assist us to investigate neurodegenerative diseases.

Biography

Yifat Miller has completed her PhD in Chemistry from the Hebrew University of Jerusalem (Israel) in 2007. She did her Postdoc in the National Institute of Health (MD, USA) and was awarded the prestigious HFSP and NIH grants. She has published more than 60 papers in several journals, among which are Nature Comm., JACS, PNAS, Angew. Chem. Int. Ed., Chem. Comm. She is serving as an editor in Scientific Report of Nature publishing. She was awarded prizes such as Toronto prize for excellence of young faculty member. She is currently an Associate Professor in the Chemistry Department at BGU.

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