Researchers quantify thermodynamic interplay during protein co-aggregation
7 June 2021, by Li Yuan

Co-aggregation of multiple pathogenic proteins is common in neurodegenerative diseases. However, the deconvolution of such biochemical process is still challenging.

Recently, a research group led by Prof. Liu Yu from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences developed a dual-color fluorogenic thermal shift assay to simultaneously demonstrate the aggregation of two different proteins and quantitatively study their thermodynamic stability during co-aggregation.

This study was published in Chemical Science.

The researchers developed multi-color fluorogenic protein aggregation sensors to expand spectral coverage. Then they quantified shifts in melting temperatures in a heterozygous model protein system, which revealed that the thermodynamic stability of wild-type proteins was significantly compromised by the mutant ones but not vice versa.

They also examined how small molecule ligands selectively and differentially interfered with such interplay.

"These sensors are suited to visualize how different proteins exert influence on each other upon their co-aggregation in live cells," said Prof. Liu.

In particular, they investigated how amyloidogenic transthyretin proteins interacted with apolipoprotein IV proteins during their co-aggregation process, which indicated that apolipoprotein IV was a pharmacological chaperone.


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