

Studying conformational changes on GDP and GTP binding with a novel visualization platform

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In many biological processes, proteins have important interactions with various molecules such as proteins, ions or ligands. Many proteins undergo conformational changes upon these interactions, where regions with large conformational changes are critical to the interactions. Several important proteins, such as the universal translation initiation factor (IF2/eIF5B), have been observed having large conformational changes on GDP and GTP binding. This work uses a novel platform, CCProf, to analyze conformational changes of entire proteins. This study analyzes protein conformational change with 9 biological features, including potential binding target site, secondary structure, conservation, disorder propensity, hydrophathy propensity, sequence domain, structural domain, phosphorylation site and catalytic site. All this information is integrated into a well-aligned view so that researchers can capture important relevance between different biological features visually. This analysis help researchers to study potential causes of conformational changes. The results of this work show two flexible regions with disorder-to-order transitions. The large conformational changes of these regions help to recognize multiple binding targets.

Biography

Darby Tien-Hao Chang received his BS, MS and PhD in Computer Science and Information Engineering from National Taiwan University. Currently, he is working as a Professor of the Department of Electrical Engineering, National Cheng Kung University. He focuses mainly on machine learning and systems biology and has developed many analytical algorithms for protein/DNA sequences, structures, binding sites and interactions. He has co-worked with researchers in various fields such as computer science, life science, pharmacy and medicine and executed many cross-filed researches. Recently, he has expanded his interest and started to collaborate with specialists of industrial design, business, finance, data science and social science.

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