**Chemical Biology Approaches to Modulating Protein-Protein Interactions**

The majority of drugs on the market today target proteins with defined small-molecule binding sites, including enzymes and receptors. However, some of the most pressing and devastating diseases involve proteins that do not possess these natural binding sites, such as those involved in protein-protein interactions associated with many cancers. Molecules capable of modulating protein-protein interactions are thus valuable research tools to uncover molecular functions of target proteins and further can be potential therapeutic candidates. However, discovering such molecules is challenging mostly due to the fairly large and flat protein interfaces involved in protein-protein interactions. Typical drug-like small molecules may not be suitable to effectively cover such extended protein contact areas. Thus, there is an urgent need for the development of different types of molecules to target protein interfaces. In order to address these fundamental problems, we have made considerable efforts to design and synthesize a novel class of synthetic molecules that can mimic protein surface structure and function. Here I will present recent development of such chemical tools and their biological application.