Practical Structure-Based Drug Design Studies Based on *In Silico* Drug Discovery Techniques

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Structure-based drug design is a rapidly growing research field in which many successes have reported in recent years. The progresses of genomics and proteomics and the rapid accumulation of structural information have provide hundreds of new targets and opportunities for further drug discovery. It is important to consider that structure-based drug design directs the discovery of a drug lead, which is not a drug product but, specifically, a compound with at least micromolar affinity for a target. The time devoted to the structure-based drug design process may represent only a fraction of the total time toward developing a marketable drug product, but structure-based drug design is essential and most powerful when it is a part of an entire drug lead discovery process. This lecture summarizes the practical process of structure-based drug design and includes, primarily, lead generations, computational ligand docking, scoring of docked ligand poses, calculations of binding affinities of ligands, isosteric molecular transformations, and lead optimizations. Key points in this field will be illustrated through two case studies that explore rational drug designs for the chitinase inhibitors which are useful for the design of antifungals and pesticides and the transcription factor activator protein-1 (AP-1) inhibitors which are potential for the treatment of immunoinflammatory diseases, such as rheumatoid arthritis.