INTEGRATION OF STRUCTURE-BASED AND LIGAND-BASED APPROACHES IN MEDICINAL CHEMISTRY AND DRUG DESIGN

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Drug discovery is a highly complex and costly process, which demands integrated efforts in several relevant aspects involving innovation, knowledge, information, technologies, expertise, R&D investments and management skills. The shift from traditional to genomics- and proteomics-based drug research has fundamentally transformed key R&D strategies in the pharmaceutical industry addressed to the design of new chemical entities as drug candidates against a variety of biological targets. The very foundations of drug discovery are being rapidly transformed by high throughput systems, automated assays, robotics and advanced computational applications in medicinal chemistry. Nowadays, Structure-based and ligand-based approaches bring together the most powerful concepts in modern chemistry and biology, linking medicinal chemistry with genomics and proteomics. Drug discovery has moved toward more rational strategies based on our increasing understanding of the fundamental principles of protein-ligand interactions. The combination of available knowledge of several 3D protein structures with hundreds of thousands of small-molecules has attracted the attention of scientists from all over the world for the application of structure-based and ligand-based drug design techniques. The definition and assessment of both chemical and biological space have revitalized the importance of exploring the intrinsic complementary nature of experimental and computational medicinal chemistry methods in drug design. This talk provides a perspective of the utility of structure-based and ligand-based approaches in drug design, highlighting the present challenges, limitations, and future perspectives in medicinal chemistry.