Abstract

Background: The fragment-to-fragment approach for the estimation of the biological affinity of the pharmacophores with biologically active molecules has been proposed. It is the next step in the elaboration of molecular docking and using the quantum-chemical methods for the complex modeling of pharmacophores with biomolecule fragments.

Methods: The parameter 0 was used to estimate the contribution of -electron interactions in bio-logical affinity. It is directly related to the position of the frontier levels and reflects the donor-accep-tor properties of the pharmacophores and stabilization energy of the [Pharm·BioM] complex.

Results: By using quantum-chemical calculations, it was found that the stacking interaction of oxa-zoles with phenylalanine is 7-11 kcal/mol, while the energy of hydrogen bonding of oxazoles with the amino group of lysine is 5-9 kcal/mol. The fragment-to-fragment approach can be applied for the investigation of the dependence of biological affinity on the electronic structure of pharmacophores.

Conclusion: The founded quantum-chemical regularities are confirmed with the structure-activity relationships of substituted oxazoles.

Keywords: Biological affinity 0, 1, 3-oxazoles, fragment-to-fragment approach, [Pharm·BioM] complex, -stacking interaction, hydrogen bonds.