Institut Ruđer Bošković

XCVIII. Kolokvij Zavoda za organsku kemiju i biokemiju i

Sekcije za organsku kemiju Hrvatskog kemijskog društva

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Using calorimetry to study intra- and intermolecular interactions

Molecular recognition plays an important role in biological systems and can be either intermolecular (ligand binding to macromolecule) or intramolecular (folding of macromolecules).[1] Understanding the relationship between the structure of biological macromolecules and the energetics that dictate stability and binding with others molecules remains one of the most important problems in biochemistry and biotechnology. Such knowledge helps to design proteins with enhanced stability, more stable drug formulations and pharmaceutical ligands.[2,3]

Energetics of biological macromolecules can be explored by two major calorimetry technology platforms that are used by researchers all over the world. Differential scanning calorimetry (DSC) is a powerful technique for studying thermal transitions in biological systems. It allows us to directly determine enthalpy changes and thus characterize the stability of the system. On the other hand, isothermal titration calorimetry (ITC) is the “gold standard” for measuring biomolecular interactions.[4] It helps us to obtain a complete thermodynamic profile of the molecular interaction in a single experiment. That means that ITC goes beyond binding affinities and can elucidate the mechanism of the molecular interaction.

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3. Lah, J., Prislan, I., Krzan, B., Salobir, M., Francky, A. and Vesnaver, G., *Biochemistry*., **44** (2005) 13883–13892.
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