Abstract No.239

Analysis of the Binding Interaction of Curcumin with Lysozyme

*Afshin Mahmoudian**, *Fakhrossadat Mohammadi*

Department of Chemistry, Institute for Advanced Studies in Basic Sciences (IASBS), Gava Zang, Zanjan, IR
(E-mail: fmohammadi@iasbs.ac.ir)

Curcumin [1,7-bis-(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione] is a polyphenol compound extracted from the herb Curcuma longa Linn. Modern scientific community discovers that curcumin exhibits an enormous variety of pharmacological and biological activities including anti-oxidant, anti-tumor, anti-inflammatory, anti-bacterial, and anti-protozoal activity. Further, curcumin has the possibility to slow down the progress of Alzheimer's diseases by reducing b-amyloid formation. Lysozyme is an antimicrobial proteinase that has ability to lyse the cell walls of bacteria by hydrolyzing the bond between N-acetylglucasamine and N-acetylmuramic acid of the peptidoglycan. Lysozyme consists of a single chain polypeptide containing 129 amino acid residues which is crosslinked with 4 disulfide bridges. The investigation of interactions between small molecules and lysozyme has an important meaning on realizing the transport and metabolism process of the small molecules and the relation of structure and function of lysozyme. With respect to the different physiological and pharmaceutical functions of lysozyme and its widely distribution in various biological fluids and tissues including avian egg, animal secretions, human milk, and tears, we decided to study the interaction of curcumin with chicken egg white lysozyme. This study was carried out using different techniques including steady sate fluorescence, synchronous fluorescence, three-dimensional fluorescence, UV-vis absorption, fluorescence resonance energy transfer, and molecular docking. The fluorescence experiments revealed that addition of curcumin effectively quenched the intrinsic fluorescence of lysozyme by formation of a non-fluorescent complex (static quenching). The number of substantive binding sites and the binding constant were calculated by relevant fluorescence quenching data. Based on the Förster's theory of non-radiative energy transfer, distance between the donor (lysozyme) and acceptor (curcumin) as well as the critical energy transfer distance has also been calculated. The molecular docking studies revealed that specific interactions were observed with the Trp-62 and Trp-63 residues. The calculated thermodynamic parameters showed that H-bonds and van der Waals interactions played a major role in stabilizing the curcumin–lysozyme complex.

Keywords: Lysozyme, Curcumin, Fluorescence Spectroscopy, Molecular Docking.

Abstract No.240

Structural and Functional Study of Lysozyme from Rutilus Frisii Kutum

*Faezeh Moradi**, *Mahmoud Reza Aghamaali*, *Reyhaneh Sariri*

Department of Biology, Faculty of Science, University of Guilan, Rasht, IR
(E-mail: faezehmoradi200@yahoo.com)

Lysozyme is an antibacterial protein, has been implicated in innate immunity in invertebrates, but its activity in shrimp and some other marine animals, remained to be determined. We are going to clone the white Rutiluslysozyme cDNA using a PCR strategy following to designing sutable primers according to the nearest spesiec to Rutilus, and detected its activity in haemocytes using a lytic-zone assay against Micrococcus luteus, The deduced amino acid sequence resulted in 150 amino acid with 46% identity to hen egg white lysozyme. RT-PCR was used to detect lysozyme mRNA in haemocytes. Analysis of the amino acid sequence of the lysozyme may be showed that it belongs to the C-type family of lysozymes. Furthermore, the lysozyme amino acid sequence contained extra residues at its C-terminus, which are characteristic of marine invertebrates. This information will be useful in future studies on the molecular mechanisms of immunity in marine invertebrates.

Keywords: Lysozyme, Shrimp, Prawn, Purification, Haemocyte, PCR-cloning, EST.

Abstract No.241

The Effect of di- and Polyamines on 2',3'-cyclic Cytidine Monophosphate: a Spectroscopic Study

Mona Amuri, *Seyede Zahra Moosavi-Nejad**

Department of Biology, Faculty of basic Sciences, Alzahra University, Tehran, IR
(E-mail: mona.amuri@yahoo.com)

The nucleotide 2',3'-cyclic cytidine monophosphate is produced during hydrolysis process of RNA by RNAse A, although this compound is an intermediate and hydrolyzed in the next step. A large number of