Abstract No.35

Aromatic Substitution on the Pyrimidine-Fused Heterocycle Molecules Significantly Enhances Their Inhibitory Properties Against Alpha-Glucosidase

Zahra Toubaei[1], Mohammad Hosein Mehraban[1], Reza Yousefi[1], Farhad Panahi[2], Ali Khalafi-Nezhad[2], Fatemeh Mokhtari[2], Mohammad-Mehdi Papari[2]*

1. Protein Chemistry Laboratory(PLC), College of Sciences, Department of Biology, Shiraz University, Shiraz, IR
2. Department of Chemistry, Colleges of Sciences, Shiraz University, Shiraz, IR
(E-mail: zzztoobaei@gmail.com)

Inhibition of intestinal alpha-glucosidase (EC 3.2.1.20) plays a major role in preventing rise in postprandial hyperglycemia in diabetic patients. Consequently development of the alpha-glucosidase inhibitors provides a new approach in the management of this metabolic disorder. Since fused-pyrimidine heterocyclic compounds display various biological activities, in this study different synthetic poly-hydroxy functionalized pyrimidine-fused heterocyclic molecules having either aliphatic or aromatic side chains were used in order to assess their inhibitory activity against both yeast and mouse alpha glucosidases. The assay performed spectroscopically, using p-nitrophenyl α-D- glucoside as the enzyme substrate. The results revealed that aromatic substitutions on fused-pyrimidine heterocyclic scaffold were highly effective against both yeast and mammalian alpha-glucosidases, while the aliphatic substituted compounds were not exhibit significant inhibitory properties. Overall, this finding proves that aromatic substitutions on the pyrimidine-fused heterocycle compounds enhance the inhibition of alpha-glucosidase and can be exploited for using in developing of novel anti-diabetic drugs.

Keywords: Alpha-glucosidase, Inhibition, Diabetes, Pyrimidine-fused Heterocycle Compounds.

Abstract No.36

Effect of Increasing Temperature on Cooperativity of Interaction of Histone H1 And Anticancer Drug Mitoxantrone

Naser Jafargholizadeh, Seyed Jalal Zargar, Shahrokh Safarian, Mehran Habibi-Rezaei*

Department of Cell and Molecular Biology, School of Biology, College of Science, University of Tehran, IR
(E-mail: naser.jafargholizadeh@khayam.ut.ac.ir)

Using ultraviolet spectroscopy technique, we have investigated the interaction of anticancer drug, mitoxantrone with calf thymus histone H1 chromosomal protein in 100 mM phosphate buffer, pH 7.0, at temperatures 300 and 310 K. Scatchard plots show a positive cooperation at both 300 and 310 K. By increasing the temperature from 300 to 310 K, the positive cooperation of interaction of protein and the drug decreases. It seems that rising the temperature induces structural changes in binding sites that subsequently decreases the affinity of the protein to the drug. Furthermore, molar Gibss free energy at 300 K has more negative values than those of 310 K. So at 310 K less molecules of mitoxantrone bind to H1, there is a less positive cooperation between mitoxantrone and H1, and the reaction tendency for spontaneous progression decreases.

Keywords: Ultraviolet Spectroscopy, Mitoxantrone, Histone H1, Cooperation.

Abstract No.37

Binding Study on Serotonin-Serum Albumin Interaction Using Chemometric Analysis of Three-Way Spectrofluoremetric Data

Somaieh Sedaghat, Hadi Parastar, Abdol-khalegh Bordbar*

Department of Chemistry, University of Isfahan, Isfahan, IR
(E-mail: ssssedaghat@gmail.com)

Serum albumin is the principal transporter of fatty acids that are otherwise insoluble in circulating plasma. Bovine serum albumin (BSA) has been given little attention in respect to its role in the functional properties of whey protein concentrates, and makes up only about 5 % of the protein in whey protein concentrates. Its primary biological function has been associated with its lipid binding properties, but the mechanism of this role has not been clearly elucidated. Serotonin or 5-hydroxytryptamine (5-HT) is a monoamine neurotransmitter. Biochemically derived from tryptophan, serotonin is primarily found in the gastrointestinal (GI) tract, platelets, and in the central nervous system (CNS) of animals including humans. These include the regulation of mood, appetite, and sleep. Serotonin also has some cognitive functions, including memory and learning. Modulation of serotonin at synapses is thought to be a major action of several classes of pharmacological antidepressants. In the present study, the interaction of 5-HT with BSA were studied by using fluorescence