presumably through interactions with Aβ. In this study we have investigated about this promotive effect of AChE and BChE on amyloid aggregation in vitro. Our preliminary results showed that both enzymes could significantly increase Aβ42 thioflavine T (ThT) fluorescence intensity, considered as a quantitive index of amyloid aggregation, when they were incubated with Aβ. In the continuation of these studies we will examine the synergistic effects of these two enzymes (if any) and the effects of their inhibitors of Aβ aggregation, with the use of techniques such as circular dichroism (CD) and atomic force microscopy (AFM) in addition to thioflavine T fluorescence spectroscopy.

Keywords: Beta Amyloid (Aβ), Fibril Formation, Acetylcholinesterase (AChE), Butyrylcholinesterase (BChE).

Abstract No.91

The Effects of Addictive Drugs on Zebrafish Behavior and its Correlation with Brain Metabolites Changes

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Drug addiction is a worldwide problem and is considered as a chronic brain disease and government spend huge resource to eradicate this problem. However, eradication could only be possible if we understand the behavior and molecular mechanism of addiction. Currently, numbers of animal models including zebrafish were used to understand the behavior and molecular mechanism of drugs addiction and withdrawal symptoms. We use zebrafish as model organism to understand how alcohol and nicotine separately or in combination affect known zebrafish behavior and brain metabolite. Our findings suggest that addictive drugs disrupt shoaling behavior and reduce frightening behavior in adult zebrafish but induce in larvae zebrafish. The effect, however, was less prone to highly active young adult fish but more prone to energy starved adult fish (such as hungry and old age or full-term egg bearing female fish). Drugs also produced progressively decreased feeding pattern with time compared to control except in case of nicotine where no significant feeding was observed. Feeding pattern however, recovered during drug withdrawal period except the fish group co-treated with alcohol and nicotine (co-abuse). This finding clearly suggests that addictive drugs can manipulate appetite. Drugs also found to influence learning and memory example, nicotine produced improve understanding of stimulating environment whereas alcohol causes decreases in this activity. In contrast, fish group co-abuse with drugs, the memory seemed to be largely compromise by the anxiolytic as well as anxiogenic effect. Further, sleeping pattern and duration during night was significantly disrupted in the fish co-abuse with drugs. Our zebrafish brain metabolites analysis also indicates that the addictive drugs manipulate the concentration of the metabolite critical in memory formation such as N-acetyl L-aspartate (excitatory activator) and taurine (excitatory inhibitor).

Keywords: Behavioral Study, Addictive Drugs, Addiction, Alcohol, Nicotine, Brain Metabolite.

Abstract No.92

Employment of Phage Display Technology To Construct GFP-Bearing Phage Nanoparticles with Peptide-Ligands Targeting Into Intestinal Epithelial Cells

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Gene and drug targeting is a promising strategy to treat various diseases. Over the recent years, phages thanks to attractive features such as lack of intrinsic tropism for mammalian cells, the presence of a capside structure surrounding DNA and the background of safe use have fostered various attempts to develop novel gene and drug carriers as attractive alternatives to existing viral and non-viral vehicles used for gene and drug delivery. To circumvent the problem of low efficiency of phage vehicles, one great technological achievement called phage display is exploited in order to express targeting ligands on the surface of phage thereby developing a platform for specific and targeted gene and drug delivery into cells. Here, our aim was to construct bacteriophage nanoparticles with the capability of targeted delivery into intestinal cells. To this end, XL1-Blue MRF′ bacterial cells were infected with M13 phages thereby amplifying phage particles. Following titering of phage particles by preparing serial dilutions of phage suspension, M13 plaques were obtained on solid medium. These plaques were employed for extracting double-stranded DNA of M13. GFP gene cassette was cloned in M13 bacteriophage genome as a reporter gene. Making use of phage display, two oligonucleotide

sequences encoding peptide ligands were then cloned into geneIII of M13 bacteriophage as fusion. These sequences were previously reported to elicit tranmucosal transport (TMT). The investigation of capacity of these phages for targeting into intestinal cells is under study. The phage platform generated in our work has the capability to be used in targeting a variety of genes and drugs into intestinal cells.

Keywords: Bacteriophage M13, Phage Display, Phagemid, GFP, Intestinal Cells.

Abstract No.93

Investigation of Mechano-Chemical Properties of Lambda Phage Genome Using Optical Tweezers

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In recent years, we have experienced a dramatic innovation in biochemical and structural biological methodologies, origins of which goes back to the introduction of a new field known as single molecule biochemistry and biophysics. One of the methods of single molecule studying is optical tweezers that has made possible important advances in obtaining detailed information about processes such as replication, transcription, and translation. Investigations on physical properties such as elasticity of macromolecules such as DNA in high forces, is one of its exceptional capabilities. In this paper, the physical properties of genomic Lambda phage DNA, is studied with the use of an optical tweezer instrumentation. First, λ-DNA (48000 bp and about 16 μm in length) was labeled with biotin at one end and with Digoxigenin (DIG) at the other end. Then, the labeled DNA was linked to streptavidin- and anti-DIG-coated polystyrene beads. Finally, the elastic property of the DNA was investigated by exerting physical force onto it with the use of optical tweezers. Our preliminary results show that DNA could be stretched up to exertion of 65pN.

Keywords: Single Molecule Study, Optical Tweezers, DNA Labeling Using Biotin And Digoxigenin, Physical Analysis Of Lambda Genome.

Abstract No.94

The Paradigm of Uncertain Role of Surface Hydrophobicity in Chaperone Activity of Alpha-Crytallins

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As a prominent member of small heat shock protein (sHsp) family and major structural protein of eye lens, alpha crystallin is a large polydisperse oligomer of αA and αB-subunits. This chaperone suppresses the aggregation of unfolded proteins which is critical for the maintenance of lens transparency. Although the mechanism of chaperone activity of alpha-crystallin is not fully understood, entropically driven hydrophobic contacts between their accessible hydrophobic surfaces and newly exposed hydrophobic sites of unfolding substrates is known as one of the major forces implicated in the mechanistic action of this chaperone. As reported before, quantity of exposed hydrophobic surface plays a critical function in performing strong chaperone ability by chaperones. However in the case of alpha-crystallin as shown before, chaperone ability and the extent of hydrophobic surface sometimes run in opposite directions. The relation between surface hydrophobicity of alpha-crystallin and its chaperone activity has not been fully explained in literatures so far. In the current study, alpha-crystallin was purified from bovine lens, using gel filtration chromatography and the protein was subjected to long term non-enzymatic glycation, under sterile condition. Both glycated and non-glycated samples were used for determining the relationship between chaperone activity and surface hydrophobicity using different spectroscopic instruments. According to the results of this study, we believe that surface hydrophobicity may play a dual function. Increase in hydrophobicity results in elevated chaperone activity until reaching a threshold quantity, favoring stronger interactions between alpha-crsytallin and partially unfolded target protein. Further increase in the surface hydrophobicity may affect the subunit exchange process and oligomerization state of alpha-crystallin subunits, leading to the significant reduction in its chaperone activity.

Keywords: Alpha-crystallin, Hydrophobicity, Chaperone activity, Dual function.
