

**Abstract No.40**

**The Study of Hydrogen Bonds Between Lamotrigine and some Parts of**

*Mitra Moosavi\*, Jaber Jahanbin Sardroodi,  
Alireza Rastkar Ebrahimzadeh*

Molecular simulations lab, Azerbaijan university of tarbiat moallem,  
Tabriz, IR  
(E-mail: mitra3954@yahoo.com)

Nowadays, extensive studies has been done on drugs because of their importance in the human life. Many drugs including Anticonvulsant agents such as Lamotrigine (LTG) block sodium channels in a voltage\_dependent manner. LTG blocks the channel in the inactivated open state. We've studied interaction between this drug with some parts of its receptors in human body by the help of Docking method and molecular dynamic simulation . These studies show that LTG binds to the excitatory amino acids such as Glutamate and Glycine in Inactivation gate and in this manner controls epilepsy.The results of this study is useful for medical sciences , pharmacists , chemists and biologists.

**Keywords:** Drug-Protein Interaction, Lamotrigine, Voltage-gated Sodium Channel, Molecular Docking, Molecular Dynamic Simulation.

**Abstract No.41**

**The Effects of Extremely Low Frequency Electromagnetic Fields (ELF-EMFs) on Acetylcholinesterase Activity**

*Ali Afrasyabi, Gholamhossain Riazzi\**

Institute of Biochemistry and Biophysics, University of Tehran, Tehran,  
Iran, IR  
(E-mail: aliafrasyabi60@yahoo.com)

A serine protease Acetylcholinesterase (AChE) enzyme hydrolyzes acetylcholine (ACh) to choline and acetate in the cholinergic synapses in the brain and neuromuscular junctions. Signal transmission between two neurons is a result from neurotransmitters release in the most nervous systems. Ach kind of neurotransmitters in the cholinergic system is synthesized from acetyl-CoA and choline by choline acetyltransferase enzyme. Stimulation of the pre-synaptic nerve causes the release of the ach into the synaptic cleft and bind to its receptors such as nicotinic acetylcholine receptors (nAChR) and muscarinic

acetylcholine receptors (mAChR) on the post-synaptic nerve membrane for transmitting the signal to next nerve.ACh has a role in learning and short-term memory through synaptic plasticity therefore the occurrence of damage in brain cholinergic system induces disruption in memory and cognition mechanism and reduces synaptic plasticity. These effects lead to increase the rate of neurodegenerative diseases such as Alzheimer's disease. In this study we investigated the effects of Extremely Low Frequency Electromagnetic Fields (ELF-EMFs) on the synaptosomal acetylcholinesterase enzyme activity. We prepared the synaptosomes suspension from sheep brain of the left hemisphere with sucrose density gradient centrifugation based on Dodd method and measured the enzyme activity of AChE via Ellman method. The prepared synaptosome suspensions were exposed to 190 Hz and 213 Hz electromagnetic field for 30 min at flux intensity of either 0.1 mT to 1.7 mT that similar to intensity and frequency of mobile phones. Our current research aimed at the effects of ELF-EMFs on Ach concentration in synaptic cleft through AChE enzyme activity to study the Alzheimer's disease inducer parameters.

**Keywords:** Extremely Low Frequency Electromagnetic Fields (ELF-EMFs), Acetylcholinesterase (AChE), Synaptosome.

**Abstract No.42**

**The Effect of Sucrose and Trehalose on the Structure and Dynamics of Luciferase: Molecular Dynamics Simulation Study**

*Masumeh Ali Mohammadi<sup>1</sup>, Faramarz Mehrnejad\*<sup>1</sup>,  
Mahmoud Khadem-Maaref<sup>2</sup>, Nader Chaparzadeh<sup>1</sup>,  
Saman Hosseinkhani<sup>3</sup>*

1. Department of Cellular and Molecular Biology, Faculty of Science, Azarbaijan University of Tarbiat Moallem, Tabriz, IR
2. Department of Physics, Faculty of Science, Azarbaijan University of Tarbiat Moallem, Tabriz, IR
3. Department of Biochemistry, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, IR  
(E-mail: asman.ma@gmail.com)

Firefly luciferase from *Photinus pyralis* is a 62 kDa protein which has large N-terminal domain and small c-terminal. It catalyzes a series of reactions leading to light production from substrate D-luciferin in the presence of MgATP and molecular oxygen.Over the past years, firefly Luciferase has been used in many of biological assays such as gene regulation,protein-protein interactions,cell proliferation,cell migration,chemical biology and drug discovery assays.However, the enzyme is unstable which can effect on sensitivity of those techniques.