Hamid Mobasheri, J Biosens Bioelectron 2014, 5:3
http://dx.doi.org/10.4172/2155-6210.S1.022

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Biosensors & Bioelectronics
August 11-13, 2014 Hilton San Antonio Airport, San Antonio, USA

Bio-nanoelectronic nature of biological macromolecules acting as high frequency signal generator and sensors

Hamid Mobasheri
University of Tehran, Iran

Biological molecules are polyelectrolytes formed from strands of neutral, positive and negatively charged amino acids with certain sequence that fold several times reaching a functional conformation where a unique distribution of charges is arranged in water in the presence of different ions at certain temperatures. Continuous high speed motion of groups, at picosecond range, due to thermal agitation changes the arrangements and distances between different groups causing changes in local electrical filed at high frequency. The fast motion and small relaxation time of dipolar water molecules and involved ions form transient short life dielectrics in the vicinity of macromolecules in closely interacting manner. Consequently, the macromolecules act as oscillators whose frequency and field strength is controlled by available ions, ligands, temperature, pH, electric, magnetic and electromagnetic fields set in their nano-environment. The bioelectronics profile of each macromolecule can be defined based on its conformation and affecting chemical and physical means, so that theoretically, one should be able to sense and measure it. On the other hand the defined status of macromolecules is deviated by minor changes in their nano-environment. This is why they can be considered as nano-sensors capable of recognition of various chemical and physical changes in their neighbourhood and reporting it by means of changes in their bioelectronics profile, electron conductivity of adjacent water molecules files and oscillating ionic, electrical, magnetical and electromagnetical fields formed accordingly. In this talk, the bioelectrical activity of single ion channel that acts as an oscillating bio- transistor is discussed based on the experimental data obtained at molecular level in real time and its application as a biosensor capable to translate the physical and chemical changes into electrical current is evaluated.

h.mobasheri@ibb.ut.ac.ir