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Immunosensing of parathion using functionalized graphene immobilized screen printed carbon electrode

Jyotsana Mehta, Priya Vinayak, Neha, Sanjeev Kumar, Ashok K. Paul and **Akash Deep**
CSIR-Central Scientific Instruments Organization, India

Pesticides such as organochlorides, organophosphates, carbamates are extensively used to increase crop production. On a flip side, the massive use of the pesticides has left the environment polluted with their concentration above permissible limits. Organophosphates are the most toxic among all the pesticides and affect nervous system by inactivating acetylcholinesterase (AChE) through irreversible binding. Various significant health threats posed by these chemicals foster the need for the development of portable, fast, selective, sensitive and cost effective methods for their sensing. The present work reports the electrochemical impedance spectroscopy (EIS) based ultrasensitive immunosensing of parathion using an antibody immobilized screen printed carbon electrode (SPCE). The experimental procedure involves the annealing of carboxylated graphene sheets on SPCE followed by the electrochemical deposition of amino-benzyl amine (ABA) resulting into the formation of an amine functionalized substrate which is subsequently used for achieving the oriented immobilization of parathion specific antibodies. The configured micro-device was used for qualitative and quantitative detection of parathion. FTIR and impedance measurements were performed to characterize the involved processes of functionalization, immobilization and sensing. The values of charge transfer resistance (RCT) were determined at each step. The data revealed the detection limit of the sensor=0.1 pg/mL. The proposed detection platform can be utilized for determining concentration of pesticides in water and food samples with high sensitivity and selectivity.

jyotsanamehta1@gmail.com, dr.akashdeep@gmail.com

Network based analysis of SNPs associated with age-related disorders

Pooja Khurana, Isha Srivastava and **Yasha Hasija**
Delhi Technological University, India

Age-Related Disorders (ARDs) are the complex disorders associated with the process of ageing. Understanding the biology of ageing and identification of genetic markers associated with ARDs is one of the most important fields of biomedical research. Genome-wide association studies (GWAS) have found several genetic markers (SNPs) associated with ageing and age-related diseases. However, the number of markers in which the evidence for association exceeds the genome-wide significance threshold is very small and markers that do not exceed this threshold are generally neglected. We hypothesize that certain combinations of genes flagged by these markers can be identified if they belong to a common biological pathway. Here, we propose an integrated network and pathway-oriented analysis approach that take into account all SNPs with nominal evidence of association ($P<0.05$) with age-related diseases with the hope of finding the markers shared in different age-related diseases and uncovering the biochemical pathways that can solve the mystery of ageing and associated diseases.

yashahasija@gmail.com