

REVOLUTIONARY DIAGNOSTICS – NONTRADITIONAL APPROACHES FOR DEVELOPING BREAKTHROUGH CAPABILITIES AGAINST EMERGING THREATS

Portable Field-effect Transistor For Serotonin Neurotransmitter Monitoring On-site

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Among the neurotransmitters, serotonin is a stress biomarker, the concentrations change in the body can occur various illnesses, such as psychological and mental. In particular, serotonin is correlated with cortisol by stress, which was affected by chemical, biological, and radiological (CBR) and was changed in the body. Therefore, the detection and monitoring system of serotonin is an important technology. Here, we demonstrated a portable serotonin sensor platform based on the field-effect transistor (FET) using single-layer graphene and serotonin antibody (SAb). The sensing performance of SAb-conjugated graphene micropatterned FET (SAb-GMFET) showed the limit of detection (LOD) of 10 pM within 10 sec, and highly selective detection in the various interference materials, such as epinephrine, dopamine, oxytocin, and tryptamine, owing to specific SAb. The detection range of SAb-GMFET showed 10 pM to 1 μ M, the linear range exhibited 10 pM to 1 nM. A portable device was developed for rapid detection and monitoring on-site, and the performance was evaluated as similar detection ability with SAb-GMFET. Therefore, this SAb-GMFET can be utilized for serotonin monitoring on-site and can be used to the platform fabrication technology for the detection of the other stress biomarkers.

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