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# Neurotransmitter sensing by high temporal and spatial resolution

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Neurotransmitters mediate communication between neurons and non-neuronal cells. Changings in neurotransmitter levels in the synaptic area can cause or aggravate central nervous system (CNS) disorders. In the past, detecting directly of these levels has been limited in its temporal and spatial resolution because of their nature of chemical signaling and their structures. Minimally invasive techniques for monitoring brain chemistry in vivo provided better understanding of neuropharmacology of CNS disorders. For monitoring and sampling brain chemistry; voltammetric electrodes, micro dialysis and related analytical techniques had been used. Micro dialysis, compared to voltammetry, offers lower temporal and spatial resolution. Glutamate is a principle neurotransmitter. But it also has neurotoxic effects. In our studies we used voltammetric electrodes for detecting glutamate activities in synaptic area. Different brain areas were chosen with stereotaxy three dimensionally for each experimental disease models. We used different glutamate transporter activator or inhibitor drugs to change glutamate levels in synaptic area in different animal models. To better understand the role of glutamate in neurodegenerative disease models, we used enzyme-based microelectrodes that were selective for glutamate and measures with fast temporal and high spatial resolution. Also our understanding on drugs and their action mechanisms are increasing by this method.

## Biography

Ahmet Hacimuftuoglu graduated from medical faculty of Istanbul (Capa) University in 1999. He has completed his PhD from Ataturk University and postdoctoral studies from Ohio State University School of Medicine. He has set up an "*In vivo* voltammetry laboratory" in Ataturk University, in 2008. He is the head of the department of Medical Pharmacology in Ataturk University. He has published more than 50 papers in SCI *Journals* and also has 4 patents, and serving as an Editorial Board Member of *Turkish Journal of Biology* and also serving as an executive committee member of TUBITAK Biotechnology in Turkey. He mainly works on glutamate and psychoneuropharmacology.

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