Health & Medicine

New Chemical Illuminates Brain Activity

Spring 2010



David Sulzer in his Columbia laboratory.

Brain researchers are now observing synaptic activity in live tissue with a new degree of precision, using a fluorescent chemical invented at Columbia.

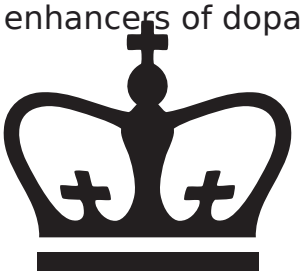
The laboratories of Dalibor Sames, a chemistry professor, and David Sulzer, a neurobiology professor, recently developed a type of fluorescent false neurotransmitter (FFN), a glowing substance that can be monitored as it travels within tissue observed under a microscope. The new chemical, which Sames and

Sulzer have dubbed FFN511, mimics and moves alongside of dopamine, a neurotransmitter that helps regulate emotion and learning. The chemical glows green so that researchers will see whenever the brain releases dopamine. FFN511 represents an innovation over existing imaging compounds because it is bright enough to be observed as it is picked up and released by individual brain synapses even when used at low concentrations, meaning that it doesn't disrupt normal brain activity.

"This is the first method of looking at individual synaptic activity," says Sulzer.

The chemical is designed to be used in research on memory, learning, and decision making, as well as illnesses that include Parkinson's disease, attention deficit hyperactivity disorder, and schizophrenia. The international biochemical company Ascent Scientific recently inked a licensing deal with Columbia University to be the first commercial supplier.

"We believe that FFN511 has the potential to become an essential research tool for neuroscientists studying the synaptic transmission of dopamine," says Sulzer, "as well as for drug discovery efforts seeking to identify improved blockers and enhancers of dopamine transporter activity."



Guide to school abbreviations

All categories >