FFN511

Fluorescent false neurotransmitter; highly efficient optical tracer of dopamine

**Product Code:** ab120331  
**Purity:** >99%  
**Sizes:** 1mg | 5mg

**Biological Description:**
A novel, fluorescent probe for optical imaging and measurement of synaptic activity in the brain. This Fluorescent False Neurotransmitter (FFN) acts as a substrate for the synaptic vesicle monoamine transporter (VMAT2). It fluoresces sufficiently enough to provide resolution at the individual synaptic level but at concentrations that do not interfere with normal synaptic function. Inhibits 5-HT binding to VMAT2 with an IC₅₀ of 1 µM (comparable to dopamine itself). Compatible with GFP-based tags and other optical probes. To view a demo of the technique on-line, visit our website.

**Useful References:**

**Chemical Information:**
- 9-(2-Aminoethyl)-2,3,6,7-tetrahydro-1H,5H,11H [1]benzopyrano[6,7,8-ij]quinolinizin-11-one  
- Desiccate at +4°C  
- MW 284.36  
- Soluble in ethanol and DMSO to 100mM  
- C₁₇H₂₀N₂O₂  
- 1004548-96-2  
- Purity >99%

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Memory, decision making and learning require activation and modification of synapses in the brain. This synaptic transmission involves the accumulation of neurotransmitters in vesicles within the cytoplasm of the pre-synaptic neuron; neurotransmitters are then released when the vesicle fuses with the plasma membrane of the cell. Previous methods have allowed researchers to measure post-synaptic neuronal activity and to observe the vesicle-membrane fusion process but, until now, it has not been possible to observe actual neurotransmitter release from individual synapses.

Born of the need for a tool that would permit direct visualization of neurotransmitter release and uptake, and measurement of synaptic activity, the laboratories of Dalibor Sames, PhD, an Associate Professor in Columbia's Department of Chemistry, and David Sulzer, PhD, a Professor of Neurobiology at Columbia University Medical Center, collaborated to create several Fluorescent False Neurotransmitters (FFNs), a class of highly efficient optical imaging probes that fluoresce sufficiently enough to provide resolution at the individual synaptic level but at concentrations that do not interfere with normal synaptic function. Steve Roome, General Manager, Abcam Biochemicals, comments, "This groundbreaking tool provides a means for scientists to optically measure important presynaptic processes at the synaptic terminal level of discrete neurons. We are delighted to be the first commercial supplier to bring FFN511 to the life sciences community."

Dr. Sames reports, "In our recent Science publication, we describe a new form of synaptic plasticity, revealed by FFN511, where individual dopaminergic synapses respond differently to stimulus frequency (which emulates brain activity). FFN511 enabled us to acquire optical measurements of presynaptic changes, at a spatial resolution up to one micromolar, that were simply not possible to achieve with existing probes or electrophysiological methods."

"We believe that FFN511 has the potential to become an essential research tool for neuroscientists studying the synaptic transmission of dopamine as well as for drug discovery efforts seeking to identify improved blockers and enhancers of dopamine transporter activity," says Dr. Sulzer. "Blocking of dopamine active transport proteins has been shown to ameliorate symptoms in pre-clinical models of Parkinson’s Disease, and drugs that target dopamine transporters and receptors are used to treat ADHD, bipolar disorder and schizophrenia."

“Broadly, FFNs provide a means of characterizing neurotransmitter release at the level of individual synapses, even on the same neuron. This capability is very important for understanding how the nervous system activates specific pathways and actions, and how it is altered by learning and development,” explains Beth Kauderer of Columbia Technology Ventures, the technology licensing office of Columbia University. “We expect that FFNs will be useful for both fundamental and applied neurobiology research, across a wide range of areas including learning, neurodegeneration and drug addiction.”

Reference: