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Caged Serotonin for Visible-Light Photodelivery

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Caged compounds of a molecule to be photoreleased are important tools for neurophysiology and other areas of biological research. The possibility to deliver precise amounts of biomolecules, in this case, neurotransmitters, by means of a focused light spot in a small area of living tissue allows the researcher to substitute the invasive current injection or picosyringe-based techniques.

Since late 2008, we selected the biomolecule Serotonin (5HT) for the synthesis of a caged compound. The complex synthesized is Ru(bpy)₂PMe₃Serotonin, a ruthenium atom coordinating two bipyridines (bpy), a tuning ligand (PMe₃), and Serotonin. The product obtained was characterized by RMN and UV-Vis spectrometry.

Electrophysiological experiments were conducted in leech ganglia to confirm at the biological level the performance of the photoreleased serotonin. The records obtained are consistent with those of direct stimulation with free serotonin in solution by more traditional methods.