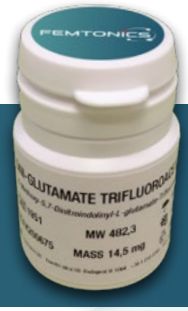
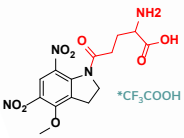
CAGED NEUROTRANSMITTERS



Femtonics Chemistry designs and develops new caged neurotransmitters for frontier neuroscience research. The two main products are a glutamate derivative and a GABA (gamma-amino-butyric acid) derivative. These dinitro-indoline-masked forms of glutamate and GABA release the bioactive forms of the two neurotransmitters more rapidly than other, commercially available versions of these compounds. They were developed to have high-quantum yield, requiring less irradiation for release, so their effective concentrations are lower than that of other caging scaffolds. DNI-Glu and iDMPO-DNI-GABA are compounds developed in-house, only available from Femtonics; in addition, iDMPO-DNI-GABA is the only commercially available caged GABA compound.

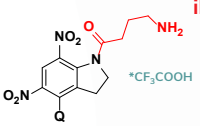


DNI-Glu*TFA

- **Name**: 4-methoxy-5,7-dinitroindolinyl-L-glutamate trifluoroacetate
- **Molecular formula**: $C_{16}H_{17}N_4O_{10}F_3$
- **MW**: 482.32 Da
- **Standard packaging size**: 6 mg
  (custom packaging available 14.5 mg or 20 mg)

DNI-Glu*TFA [1, 2, 3, 4, 5]

- Higher quantum yield (ca. 7 times, than MNI-Glu).
- Lower effective concentration (2-3 times), so less toxicity observed than MNI-Glu.
- Releases Glu more rapidly by the effect of two photon irradiation (720 nm) than MNI-Glu.
- Exists as trifluoroacetic acid salted form, ensuring good solubility, stability and low hygroscopicity of the product.



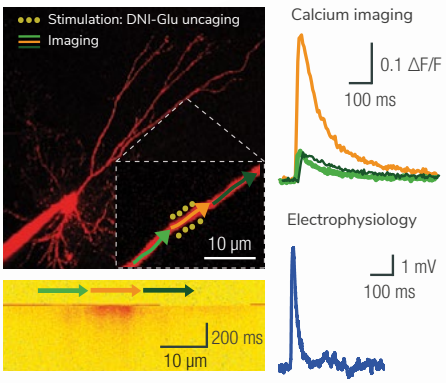
iDMPO-DNI-GABA*TFA

PATENTED

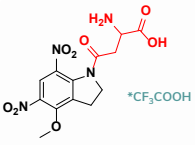
- **Name**: 4-aminoalkyl-5,7-dinitroindolinyl-GABA trifluoroacetate
- **Molecular formula**: $C_{21}H_{27}N_5O_{10}F_6$
- **MW**: 623.50 Da
- **Standard packaging size**: 16 mg
  (custom packaging available 6 mg -20 mg)

iDMPO-DNI-GABA*TFA [6, 7, 8, 9, 10]

- Rapidly and efficiently releases GABA (γ-aminobutyric acid) neurotransmitter, by the effect of one (360 nm) or two photon (720 nm) irradiation.
- GABA is the chief inhibitory neurotransmitter in the mammalian central nervous system. Its principal role is reducing neuronal excitability throughout the nervous system.
- Exists as trifluoroacetic acid salted form, ensuring good solubility, stability and low hygroscopicity of the product.
- Highly resistant to hydrolysis at neutral pH.
- High quantum yield.



DNI-Glu uncaging on a patch-clamped and Alexa-594 filled parvalbumin interneuron: the yellow spots show the locations of stimulation. Imaging was performed along the green, orange and blue lines. The right figures show the Glu-release induced Ca^{2+}-transients along the lines and the excitatory postsynaptic potential.

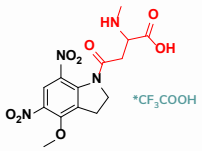


DNI-D-Asp*TFA

- **Name**: 4-methoxy-5,7-dinitroindolinyl-D-aspartate trifluoroacetate
- **Molecular formula**: $C_{16}H_{17}N_4O_{10}F_3$
- **MW**: 482.32 Da
- **Standard packaging size**: 6 mg
  (custom packaging available 14 mg or 20 mg)

DNI-D-Asp*TFA [11]

- Rapidly and efficiently releases D-Asp neurotransmitter, by the effect of one (360 nm) or two photon (720 nm) irradiation.
- Agonist at NMDA receptors and EAAT substrate.
- Exists as trifluoroacetic acid salted form, ensuring good solubility, stability and low hygroscopicity of the product.
- Highly resistant to hydrolysis at neutral pH.
- Higher quantum yield (ca. 7 times, than MNI-D-Asp).
- Releases D-Asp neurotransmitter more rapidly by the effect of two photon irradiation (720 nm) than MNI-D-Asp.

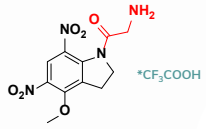


DNI-NMDA*TFA

- **Name**: 4-methoxy-5,7-dinitroindolinyl-N-methyl-D-aspartate trifluoroacetate
- **Molecular formula**: $C_{17}H_{19}N_4O_{10}F_3$
- **MW**: 496.33 Da
- **Standard packaging size**: 6 mg
  (custom packaging available 14 mg or 20 mg)

DNI-NMDA*TFA [12, 13]

- Rapidly and efficiently releases NMDA (N-methyl-D-Asp) neurotransmitter (selective NMDAR agonist), by the effect of one (360 nm) or two photon (720 nm) irradiation.
- Exists as trifluoroacetic acid salted form, ensuring good solubility, stability and low hygroscopicity of the product.
- Highly resistant to hydrolysis at neutral pH.
- Higher quantum yield (ca. 7 times, than MNI-NMDA).
- Releases NMDA neurotransmitter more rapidly by the effect of two photon irradiation (720 nm) than MNI-NMDA.



DNI-Gly*TFA

- **Name**: 2-amino-1-(4-methoxy-5,7-dinitroindolin-1-yl) ethan-1-one trifluoroacetate
- **Molecular formula**: $C_{13}H_{13}N_4O_8F_3$
- **MW**: 410.24 Da
- **Standard packaging size**: 13 mg
  (custom packaging available 6 mg -20 mg)

DNI-Gly*TFA [14]

- Rapidly and efficiently releases Gly (Glycine) neurotransmitter, by the effect of one (360 nm) or two photon (720 nm) irradiation.
- Glycine is an inhibitory neurotransmitter on GlyR in the CNS, especially in the spinal cord, brainstem, and retina, via ionotropic receptors, causing an Inhibitory postsynaptic potential (IPSP).
- Exists as trifluoroacetic acid salted form, ensuring good solubility, stability and low hygroscopicity of the product.
- Highly resistant to hydrolysis at neutral pH.
- High quantum yield.

References:

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THINKING AHEAD
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