Selective filtering of excitatory inputs to nucleus accumbens by dopamine and serotonin. Christoffel et al., (2021 PNAS.118(24):e2106648118. PubMed.

Re-interpretation in terms of the IPL mechanism

Dopamine reduces excitatory postsynaptic currents (EPSCs) generated by paraventricular thalamus (PVT) inputs to NAc, when carried out by whole cell recording from medium spiny neurons (MSNs) of NAc (Christoffel et al., 2021). This naturally leads to the question, "What mechanistic explanation can satisfy the inference that dopamine filter excitatory inputs to NAc?" Based on IPL mechanism, formation of IPLs between dendritic spines of MSNs that synapse with excitatory inputs from PVT neurons and dendritic spines of MSNs that synapse with inhibitory inputs from ventral tegmental area (VTA) takes place when dopaminergic inputs from VTA cause expansion of spines of MSNs that synapse with excitatory inputs (Vadakkan, 2019). The net effect will provide results equivalent to filtering of excitatory inputs to NAc by dopamine.

References

Christoffel DJ, Walsh JJ, Hoerbelt P, Heifets BD, Llorach P, Lopez RC, Ramakrishnan C, Deisseroth K, Malenka RC (2021) Selective filtering of excitatory inputs to nucleus accumbens by dopamine and serotonin. Proc Natl Acad Sci U S A.118(24):e2106648118. PubMed

Vadakkan K.I (2019) Internal sensation of pleasure can be explained as a specific conformation of semblance: Inference from electrophysiological findings. Peerj Preprints Article