

## **Electrostatic charging of lipid membranes by neuromodulators**

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Neurotransmitters and neuromodulators typically function by binding to specialized receptors in neuronal membranes. In this work, we study two different neurotransmitters that also function as neuromodulators, namely dopamine (DA) [1] and adenosine triphosphate (ATP). Dopamine is best known as the feel-pleasure hormone while ATP is best known for being the source of energy in the cell. Using a combination of scattering and spectroscopic methods, we show that both DA and ATP have an affinity to lipid membranes lacking specialized receptors and have a preferential interaction with lipid headgroups. As a consequence, the membrane surface potential is modified as measured by Dynamic Light Scattering. Our experimental results suggest that 2D diffusion along the membrane could play a role in signaling events involving dopamine and ATP.

[1] Shafieenezhad, A. et al., *Biophys. J.* 122, 1118-1129, 2023.