



Talks by rising stars of neuroscience

**Metabolic spikes: from rogue electrons to Parkinson's
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Conventionally, neurons are thought to be cellular units that process synaptic inputs into synaptic spikes. However, it is well known that neurons can also spike spontaneously and display a rich repertoire of firing properties with no apparent functional relevance e.g. in in vitro cortical slice preparations. In this talk, I will propose a hypothesis according to which intrinsic excitability in neurons may be a survival mechanism to minimize toxic byproducts of the cell's energy metabolism. In neurons, this toxicity can arise when mitochondrial ATP production stalls due to limited ADP. Under these conditions, electrons deviate from the electron transport chain to produce reactive oxygen species, disrupting many cellular processes and challenging cell survival. To mitigate this, neurons may engage in ADP-producing metabolic spikes. I will explore the validity of this hypothesis using computational models that illustrate the implications of synaptic and metabolic spiking, especially in the context of substantia nigra pars compacta dopaminergic neurons and their degeneration in Parkinson's disease.

Event link:

<https://www.crowdcast.io/e/wwneurise/>