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【954】A Novel Platform for the Investigation of Mitochondrial Membrane Potential Dynamics

Membrane potential is a ubiquitous cellular feature, fundamental for intercellular signaling of excitable cells, and also critical for intracellular communication. The mitochondrial membrane potential in particular offers a readout of organelle function. Interestingly, mitochondria can form electrically coupled networks, undergoing spontaneous and synchronous transitions in membrane potential. However, such rapid fluctuations have been reported as instantaneous.
To elucidate this , we use a closed-loop, all-optical microscopy platform to simultaneously perturb membrane potential homeostasis via optogenetics and measure potential fluctuations via voltage-imaging. Thanks to the integration with optogenetic control, this work aims to enhance the causal investigation of intracellular signaling and their modulation during activity, as happened for neuronal circuitry.

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