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We use this collection and it's working

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Abstract

Cellular processes including lysosomal and mitochondrial dysfunction are implicated in the development of many diseases. Quantitative visualization of mitochondria and lysosomes is crucial to understand how these organelles are dysregulated during disease. To address a gap in live-imaging tools, we developed GEM-SCOPE (Genetically Encoded and Modular SubCellular Organelle Probes), a modular toolbox of fluorescent markers designed to inform on localization, distribution, turnover, and oxidative stress of specific organelles. We expressed GEM-SCOPE in differentiated astrocytes and neurons from a human pluripotent stem cell *PRKN*-knockout model of Parkinson's disease and identified disease-associated changes in proliferation, lysosomal distribution, mitochondrial transport and turnover, and reactive oxygen species. We demonstrate GEM-SCOPE is a powerful panel that provide critical insight into the subcellular mechanisms underlying Parkinson's disease in human cells. GEM-SCOPE can be expanded upon and applied to a diversity of cellular models to glean an understanding of the mechanisms that promote disease onset and progression.

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