

**CELL-PERMEABLE ORGANIC FLUORESCENT PROBES FOR LIVE-CELL
LONG-TERM SUPER-RESOLUTION IMAGING REVEAL LYSOSOME-
MITOCHONDRION INTERACTIONS**

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ABSTRACT

Characterizing the long-term nanometer-scale interactions between lysosomes and mitochondria in live cells is essential for understanding their functions but remains challenging due to limitations of the existing fluorescent probes. Here, we develop cell-permeable organic fluorescent probes for lysosomes with excellent specificity and high photostability. We also use an existing Atto 647N dye with high brightness and excellent photostability to achieve specific labeling of mitochondria in live cells. Using these probes, we obtain dual-color structured illumination microscopy (SIM) images of dynamic physical lysosome-mitochondrion interactions in live cells at an ~90-nm resolution over a long time course of ~13 min. We successfully record the consecutive dynamic processes of lysosomal fusion and fission, as well as four types of physical lysosome-mitochondrion interactions by super-resolution imaging. Our probes provide an avenue for understanding the functions and the dynamic interplay of lysosomes and mitochondria in live cells.

REFERENCE

[1] Y. Han, M. Li, F. Qiu, M. Zhang, and Y-H. Zhang, "Cell-permeable organic fluorescent probes for live-cell long-term super-resolution imaging reveal lysosome-mitochondrion interactions," *Nat. Commun.*, **8**, 1307 (2017).