

Cellular Physiology

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Mitophagy is a process that selectively degrades mitochondria via autophagy. In mammalian cell culture and yeast, it has been revealed that mitophagy contributes to the maintenance or recovery of mitochondrial function by eliminating damaged or excess mitochondria. However, it is currently unclear whether mitophagy plays a role in maintaining and restoring mitochondrial function also at the whole-body level because of the difficulty in observing mitophagy in the animal body and in generating mitophagy-deficient animal models. We attempt to demonstrate that mitophagy prevents mitochondrial dysfunctioning at the whole-body level during aging. Furthermore, we aim to establish method(s) to suppress the age-dependent hypofunction of the whole body by artificially controlling mitophagy and thus contribute to develop the strategy of prevention or treatment for the age-dependent diseases.



Research interests

1. Physiological role of mitochondrial autophagy.
2. Molecular mechanism of mitochondrial autophagy.
3. Aging and mitochondrial quality control.

Materials and methods for collaborations

1. Observation of mitophagy in culture cells, mice and yeast.

Links to additional info

1. Furukawa K, et al. The PP2A-like Protein Phosphatase Ppg1 and the Far Complex Cooperatively Counteract CK2-Mediated Phosphorylation of Atg32 to Inhibit Mitophagy. *Cell Rep.* 23(12):3579-3590, 2018
<https://www.sciencedirect.com/science/article/pii/S2211124718308283?via%3Dihub>
2. Yamashita SI, et al. Mitochondrial division occurs concurrently with autophagosome formation but independently of Drp1 during mitophagy. *J Cell Biol.* 215(5):649-665, 2016.
<https://rupress.org/jcb/article-lookup/doi/10.1083/jcb.201605093>
3. Kanki T, et al. Casein kinase 2 is essential for mitophagy. *EMBO Rep.* 14(9):788-794, 2013.
<https://www.embopress.org/doi/full/10.1038/embor.2013.114>
4. Lab HP (Japanese only). <https://www.med.niigata-u.ac.jp/mit/>