



Unraveling mysteries of autophagy

Cell Biology Center

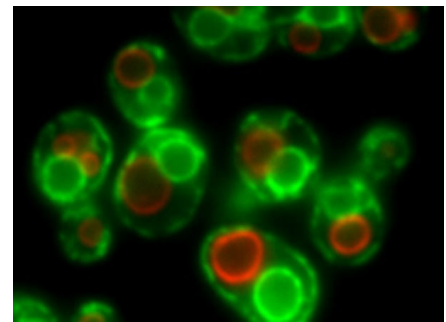
<http://www.nakatogawa-lab.bio.titech.ac.jp/>

- Understanding molecular mechanisms of autophagy
- Elucidating physiological roles of autophagy

Autophagy is a major degradation system within cells constituting our bodies. Cells sequester a wide variety of cells' own components within lipid membrane sacs called "autophagosomes" and transport them into intracellular compartments called lysosomes or vacuoles, which contain different hydrolases, for degradation.

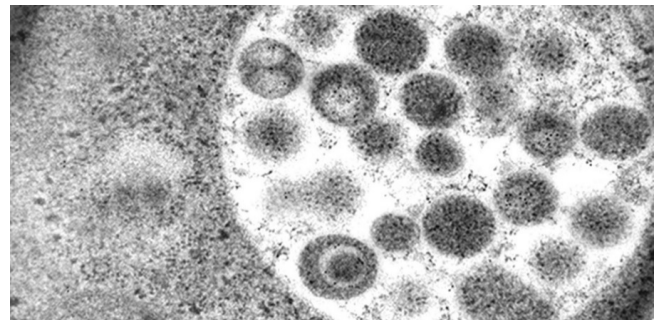
- How cells generate autophagosomes?
- How cells target specific components for degradation via autophagy? What is the purpose of the degradation?

We are studying the molecular mechanism and physiological significance of autophagy using budding yeast, an excellent model organism, and various experimental techniques.



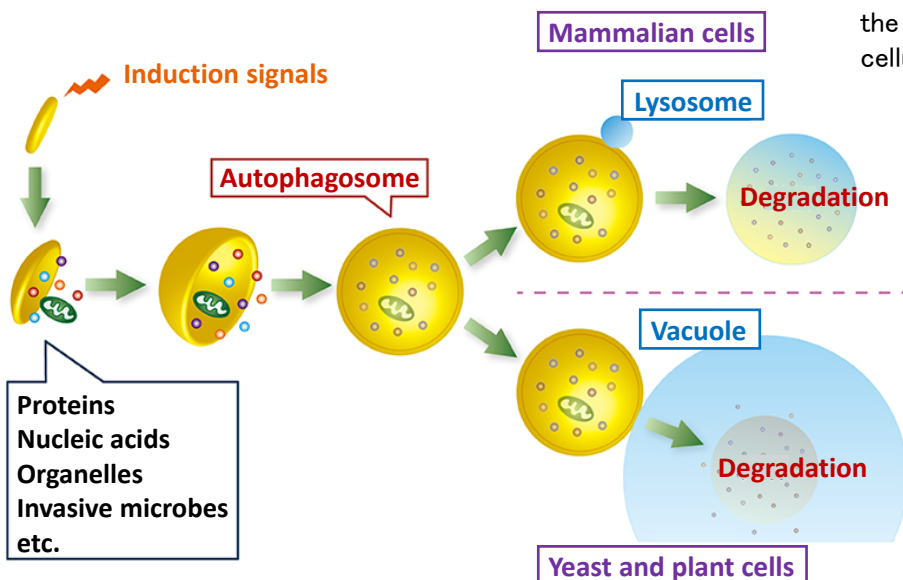
Fluorescence microscopy of yeast cells

- The endoplasmic reticulum/nuclear envelope and vacuolar membranes in yeast cells are visualized using green and red fluorescent proteins, respectively.



Electron microscopy of yeast cells

- A white circular area in the right side represents the vacuole, within which darker circular areas show cellular material imported via autophagy.



Process of autophagy

- Autophagy is induced by various extra- or intracellular environmental changes.
- Upon autophagy induction, a membrane cisterna forms, expands while curving, and closes to complete the autophagosome. During this process, cellular material to be degraded are sequestered within the autophagosome.
- The autophagosome then fuses with the lysosome/vacuole for degradation of the sequestered material.