24th RAP Seminar

The 24th Seminar on RIKEN Center for Advanced Photonics

Language: Japanese

Date: **June 19(Fri) 16:00 - 17:00, 2015**

Location: **Cooperation Center, 3F, W319, Wako Campus, RIKEN**

(理研 和光キャンパス 研究交流棟3階会議室 W319)

Title: **Molecular Dissection of Autophagy in Yeast**

オートファジーの分子機構 - 細胞内リサイクルシステム -

Speaker: **Prof. Yoshinori OHSUMI**

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Autophagy is a bulk protein degradation system in lysosome/vacuole which is well conserved from yeast to higher eukaryotes. The most critical step in autophagy is unique membrane dynamics for sequestration of degradation target into unique double membrane bound autophagosome. Since discovery of autophagy by electron microscopy, not so much progress in its molecular mechanisms had been made, and genes or specific proteins required for the process had not identified. More than 27 years ago by using light microscope I first found autophagy in the yeast, *S. cerevisiae* induced by nutrient starvations. Taking advantage of the yeast system, we succeeded in isolation of many autophagy-defective mutants. Further studies revealed that 18 *ATG* genes are essential for starvation-induced autophagy. All those Atg proteins encoded were found to function concertedly in the sequestration of cytoplasmic constituents by forming the autophagosome. The Atg proteins consist of six functional units, namely the Atg1 protein kinase and its regulators, the PI3 kinase complex, the Atg2-Atg18 complex, the membrane protein Atg9, and two unique ubiquitin-like conjugation systems. These Atg proteins at least partially localize on the peri-vacuolar structure named the PAS. Further analyses of Atg proteins revealed hierarchical order of recruitment of Atg proteins to the PAS.

Since these *ATG* genes are well conserved from yeast to mammals and plants, recently a vast range of studies in autophagy have been undertaken in various organisms, different cell types and organs. Now it is getting clear that autophagy is relevant to so many physiological events and diseases. Present our knowledge on structures and functions of Atg proteins and recent physiological studies of autophagy in yeast will be discussed.

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