Physiology and Cell Biology

1. Staffs and Students (April 2009)

Professor	Noboru MIZUSHIMA
Junior Associate Professor	Naotada ISHIHARA
Assistant Professor	Akiko KUMA (June~)
Tokunin Assistant Professor	Takahiro SASAKI
Medical Fellow	Chieko KISHI
Postdoctoral Fellow	Eisuke ITAKURA
Graduate Students	Nao HOSOKAWA, Yutaka MIURA, Anoop Kumar Gopi VELIKKAKATH, Mayurbhai Himatbhai SAHANI, Hideaki MORISHITA, Quy PHAM NGUYEN, Takako NAITO (August~), Takeshi KAIZUKA, Yui MATSUNAGA

2. Purpose of Education

Our department is a branch of basic medical science. In the undergraduate course, our department deals with physiology and introductory cell biology. Our main object in the graduate course is to provide a wide range of views to understand human biology using various research techniques such as molecular biology, biochemistry, cell biology and mouse genetics.

3. Research Subjects

1) Molecular mechanism of autophagy, a dynamic degradation system within cells
2) Physiological and pathophysiological roles of autophagy
3) Development of new methods for monitoring autophagy
4) Membrane dynamics of mitochondrial fission and fusion

4. Publications

Original Article

1. Hosokawa, N., Sasaki, T., Iemura, S., Natsume, T., Hara, T., Mizushima, N. Atg101, a novel mammalian autophagy protein interacting with Atg13. ***Autophagy.*** 5:973-979 (2009)
2. Satoo, K., Noda, N.N., Kumeta, H., Fujioka, Y., Mizushima, N., Ohsumi, Y., Inagaki, F. The structure of Atg4B-LC3 complex reveals the mechanism of LC3 processing and delipidation during autophagy. ***EMBO J.*** 28:1341-1350 (2009)
3. Stephenson, L.M., Miller, B.C., Ng, A., Eisenberg, J., Zhao, Z., Cadwell, K., Graham, D.B., Mizushima, N., Xavier, R., Virgin, H.W., Swat, W. Identification of Atg5-dependent transcriptional changes and increases in mitochondrial mass in Atg5-deficient T lymphocytes. ***Autophagy*** 5:625-635 (2009)
4. Hosokawa, N., Hara, T., Kaizuka, T., Kishi, C., Takamura, A., Miura, Y., Iemura, S., Natsume, T., Takehana, K., Yamada, N., Guan, J.L., Oshiro, N., Mizushima, N. Nutrient-dependent mTORC1 association with the ULK1-Atg13-FIP200 complex required for autophagy. ***Mol. Biol. Cell*** 20: 1981-1991 (2009)
5. Ishihara, N., Nomura, M., Jofuku, A., Kato, H., Suzuki, S. O., Masuda, K., Otera, H., Nakanishi, Y., Nonaka, I., Goto, Y-i., Taguchi, N., Morinaga, H., Maeda, M., Takayanagi, R., Yokota, S. and Mihara, K. Mitochondrial fission factor Drp1 is essential for embryonic development and synapse formation in mice. ***Nature Cell Biology*** 11:958-966 (2009)
6. Yasukawa, K., Oshiumi, H., Takeda, M., Ishihara, N., Yanagi, Y., Seya, T., Kawabata, S-i. and Koshiba, T. Mitofusin 2 inhibits mitochondrial antiviral signaling. ***Science Signaling*** 2:ra47 (2009)

Review Article

1. Ishihara, N., Mizushima, N., A receptor for eating mitochondria. ***Dev. Cell*** 17: 1-2 (2009)
2. Nedjic, J., Aichinger, M., Mizushima, N., Klein, L. Macroautophagy, endogenous MHC II loading and T cell selection: the benefits of breaking the rules. ***Curr Opin Immunol.*** 21: 92-97 (2009)
3. Itakura, E., Mizushima, N., Atg14 and UVRAG: Mutually exclusive subunits of mammalian Beclin 1-PI3K complexes. ***Autophagy*** 5: 534-536 (2009)
4. Raben, N., Baum, R., Schreiner, C., Takikita, S., Mizushima, N., Ralston, E., Plotz, P. When more is less: Excess and

deficiency of autophagy coexist in skeletal muscle in Pompe disease. ***Autophagy*** 5: 111-113 (2009)
5. Hara, T., Mizushima, N.. Role of ULK-FIP200 complex in mammalian autophagy: FIP200, a counterpart of yeast Atg17? ***Autophagy*** 5:85-87 (2009)
6. Mizushima N. Methods for monitoring autophagy using GFP-LC3 transgenic mice. ***Methods Enzymol.*** 452:13-23 (2009)

Award

1. Noboru Mizushima: Inoue Prize for Science (February, 2009)