

## Physiology and Cell Biology

### 1. Staffs and Students (April 2010)

Professor	Noboru MIZUSHIMA	
Junior Associate Professor	Naotada ISHIHARA (~March)	
Assistant Professor	Akiko KUMA,	Taki NISHIMURA
Tokunin Assistant Professor	Takahiro SASAKI (~June),	Chieko KISHI
Postdoctoral Fellow	Eisuke ITAKURA,	Ikuko HONDA
Graduate Students	Anoop Kumar Gopi VELIKKAKATH, Mayurbhai Himatbhai SAHANI, Hideaki MORISHITA, Quy PHAM NGUYEN, Takako NAITO, 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. Riley, B.E., Kaiser, S.E., Shaler, T.A., Ng, A.C., Hara, T., Hipp, M.S., Lage, K., Xavier, R.J., Ryu, K.Y., Taguchi, K., Yamamoto, M., Tanaka, K., Mizushima, N., Komatsu, M., Kopito, R.R. Ubiquitin accumulation in autophagy-deficient mice is dependent on the Nrf2-mediated stress response pathway: a potential role for protein aggregation in autophagic substrate selection. *J. Cell Biol.* 191: 537-552 (2010)
2. Itakura, E., Mizushima, N. Characterization of autophagosome formation site by a hierarchical analysis of mammalian Atg proteins. *Autophagy* 6: 764-76 (2010)
3. Taneike, M., Yamaguchi, O., Nakai, A., Hikoso, S., Takeda, T., Mizote, I., Oka, T., Tamai, T., Oyabu, J., Murakawa, T., Nishida, K., Shimizu, T., Hori, M., Komuro, I., Shirasawa, T., Mizushima, N., Otsu, K. Inhibition of autophagy in the heart induces age-related cardiomyopathy. *Autophagy* 6: 600-606 (2010)
4. Kaizuka, T., Hara, T., Oshiro, N., Kikkawa, U., Yonezawa, K., Takehana, K., Iemura, S., Natsume, T., Mizushima, N. Ttl1 and Tel2 are critical factors in mammalian target of rapamycin complex assembly. *J. Biol. Chem.* 285: 20109-20116 (2010)
5. Hartleben, B., Gödel, M., Meyer-Schwesinger, C., Liu, S., Ulrich, T., Köbler, S., Wiech, T., Grahammer, F., Arnold, S.J., Lindenmeyer, M.T., Cohen, C.D., Pavenstädt, H., Kerjaschki, D., Mizushima, N., Shaw, A.S., Walz, G., Huber, T.B. Autophagy controls glomerular disease susceptibility, and maintains podocyte homeostasis in aging mice. *J. Clin. Invest.* 120:1084-1096 (2010)

#### Review Article

1. Mizushima, N. Noboru Mizushima: All about autophagy. Interview by Caitlin Sedwick. *J. Cell Biol.* 190: 946-947 (2010).
2. Mizushima, N., Levine, B. Autophagy in mammalian development and differentiation. *Nat. Cell Biol.* 12: 823-830 (2010)
3. Mizushima, N., Yoshimori, T. and Levine, B. Methods in mammalian autophagy research. *Cell* 140: 313-326 (2010)
4. Mizushima, N. The role of the Atg1/ULK1 complex in autophagy regulation. *Curr Opin Cell Biol.*, 22: 132-139 (2010)

5. Klionsky, D.J., Codogno, P., Cuervo, A.M., Deretic, V., Elazar, Z., Fueyo-Margareto, J., Gewirtz, D.A., Kroemer, G., Levine, B., Mizushima, N., Rubinsztein, D.C., Thumm, M., Tooze, S.A. A comprehensive glossary of autophagy-related molecules and processes. *Autophagy*. 2010 May 6;6(4). [Epub ahead of print]
6. Kuma, A., Mizushima, N. Physiological role of autophagy as an intracellular recycling system: With an emphasis on nutrient metabolism. *Semin. Cell Dev. Biol.* 21: 683-90, (2010)
7. Mizushima, N. Autophagy. *FEBS Lett.* 584:1279 (2010)

#### Award

1. Noboru Mizushima: Kakiuchi Saburo Memorial Award (October, 2010)

#### Conference Chair / Organization

1. Gordon Research Conference "Autophagy in stress, development and disease" Barga, Italy 2010.4.25-30