

Molecular Pharmacology

1. Staffs and Students

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	Kumiko Tomita	
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2. Purpose of Education

Osteoporosis is one of the serious diseases in aging societies in the world. Osteoporosis increases risk of fracture that results in loss of quality of life and threatens life of aged people. Therefore, it is crucial to understand how bone mass is regulated by specific factors to establish the therapy and prevention for osteoporosis. Graduate students will study bone metabolism through journal presentation and investigate bone metabolism using mice and tissue culture system by advanced molecular and cellular biological approaches.

3. Research Subjects

- 1) Molecular mechanisms of osteoblast and chondrocyte differentiation.
- 2) Mechanism of regulation of bone mass by nervous system.
- 3) Regulation of bone metabolism by mechanical stress.
- 4) Regulation of gene expression by hormones.
- 5) Molecular biology of function and formation of osteoclasts.

4. Publications

Original articles

1. Kamolratanakul P, Hayata T, Ezura Y, Kawamata A, Hayashi C, Yamamoto Y, Hemmi H, Nagao M, Hanyu R, Notomi T, Nakamoto T, Amagasa T, Akiyoshi K, Noda M. Nanogel-based scaffold delivery of prostaglandin E(2) receptor (EP4) specific agonist in combination with low dosage of growth factor heals critical size bone defect. *Arthritis Rheum* (2011 in press).
2. Hanyu R, Hayata T, Nagao M, Saita Y, Hemmi H, Notomi T, Nakamoto T, Schipani E, Kronenberg H, Kaneko K, Kurosawa H, Ezura Y, Noda M. Per-1 is a specific clock gene regulated by parathyroid hormone (PTH) signaling in osteoblasts and is functional for the transcriptional events induced by PTH. *J Cell Biochem* 112:433-8, 2011.
3. Nagao M, Saita Y, Hanyu R, Hemmi H, Notomi T, Hayata T, Nakamoto T, Nakashima K, Kaneko K, Kurosawa H, Ishii S, Ezura Y, Noda M. Schnurri-2 deficiency counteracts against bone loss induced by ovariectomy. *J Cell Physiol* 226:573-8, 2011.
4. Shimizu S, Okuda N, Kato N, Rittling SR, Okawa A, Shinomiya K, Muneta T, Denhardt DT, Noda M, Tsuji K, Asou Y. Osteopontin deficiency impairs wear debris-induced osteolysis via regulation of cytokine secretion from murine macrophages. *Arthritis Rheum* 62:1329-37, 2010.
5. Nifuji A, Ideno H, Ohyama Y, Takanabe R, Araki R, Abe M, Noda M, Shibuya H. Nemo-like kinase (NLK) expression in osteoblastic cells and suppression of osteoblastic differentiation. *Exp Cell Res* 316:1127-36, 2010.
6. Mizoguchi F, Izu Y, Hayata T, Hemmi H, Nakashima K, Nakamura T, Kato S, Miyasaka N, Ezura Y, Noda M. Osteoclast-specific Dicer gene deficiency suppresses osteoclastic bone resorption. *J Cell Biochem* 109:866-75, 2010.