

Overview of Kibo experiment candidates for around 2012

1. Experiment Title

Effect of microgravity on osteoclasts and the analysis of the gravity sensing system in medaka

2. Principal Investigator

Akira Kudo

Department of Biological Information, Tokyo Institute of Technology

3. Outline of Experiment

During the space flight, bone mineral density is decreased by the influence of osteoclast activation, which molecular mechanism is expectantly investigated. In the study of medaka bone development, we investigated the system of vertebra formation, and firstly identified the presence of osteoclasts in medaka. Moreover, osteoclast resorbing activity was affected by hypergravity, indicating the possibility that we can investigate the effect of microgravity on osteoclasts in space. To find this effect, we examine the alteration of osteoclast activity under microgravity with the histological analysis or the expression analysis by RNA in-situ hybridization. Furthermore, since we have succeeded the establishment of the medaka osteoclast-specific transgenic lines, we perform the in-vivo imaging analyses for gene expression and cell mobility. Finally, to examine the gravity sensing system, we employ tooth and bone as the high density organs, which are highly sensitive to gravity, and perform the histological analysis and the gene expression analysis of such gravity-sensitive tissues at surrounding pharyngeal teeth and supporting bone.

