

Division of Biosciences

Department of Integrated Biosciences

Laboratory	Faculty	Introduction of research activities and laboratory	Key words	Projects or activities summer program students can participate
Molecular Recognition Laboratory	Assoc.Prof. Shinji NAGATA	My research interest is to find out endocrine control in feeding behavior. Among hormones related to feeding-motivation, the peptidyl ligands are mostly recognized by receptors, eventually precise biological processes. We are using insects as a model animal to address a ligand-sharing system in which several ligands can be recognized by a receptor. To understand the comprehensive ligand-receptor interaction in the body is to address the mechanisms of endocrine control in the feeding motivation as well as those in the normal processes of the growth and development.	<ol style="list-style-type: none"> 1) Insect 2) Peptides 3) Hormone 4) Behavior 5) Feeding 	To know the ligand recognition in receptors, the summer program students firstly perform calcium imaging or equivalent techniques to reveal the intracellular responses against stimulation of ligands, which you will chemically synthesize peptides. The students will also experience MALDI-TOF MS, RT-PCR, qRT-PCR, HPLC, measurement of the biological activities in insects (analyses of locomotor activities, nutrient-selective behaviors, blood sugar and lipid levels, and so on). Further, the program students can experience RNA interference targeting on those receptor genes using crickets to impair their transcripts and functions to address its function related to feeding behavior and metabolic processes.
Nakayama Laboratory	Assoc. Prof. Kazuhiro NAKAYAMA	Our project focused on role of genetic adaptation for local environments in shaping the ethnic variety of diseases susceptibilities in East Asians. We recently reported evidence for positive natural selection events in Mongolians, one of the representative nomadic group in East Asia, using high density genome wide single nucleotide polymorphism (SNP) data (Nakayama K et al. Mol Biol Evol 2017 34:1936-46.). SNP that showed signature of selection in Mongolians would contribute to evolution of metabolic traits in Mongolians. We also identified the TRIB2 as a gene influencing visceral fat	<ol style="list-style-type: none"> 1) Human 2) Genome variation 3) Evolution 4) Adaptation 	We are planning to assess functional and phenotypic consequences of the variants under selection using medical genetic approaches, including in silico functional prediction, in vitro functional assays, and the association analysis with health checkup cohorts. The student can learn about DNA extraction and genotyping of focal SNPs in human DNA samples. Additionally, the student may learn about the principal of evolutionary genetic analyses using focal and genome-wide SNP genotype data.

	<p>accumulation in modern East Asians and moreover, discovered signatures of positive natural selection related with adaptation to cold environments in ancestors of East Asians during the last glacial maximum (Nakayama K et al. Hum Genet 2013 132:201-17; Nakayama K and Iwamoto S J Physiol Anthropol 2017 36:16.).</p>		
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