Proposal for collaborative research using unique genetically modified non-human primates

Shiga University of Medical Science (SUMS) is recruiting new research collaboration using genetically modified non-human primates (NHP) from around the world. We are highly expecting collaborative research between Stanford and SUMS, and are introducing facility and researchers.

About RCALS

SUMS have Research Center for Animal Life Science (RCALS) which is the joint-use facility for animal experimentation performed in accordance with international regulations. RCALS is mainly focused on generating and using NHP as model animal for human diseases. There are about 700 cynomolgus monkeys (*Macaca fascicularis*) in RCALS which is the largest NHS facility in Japan.

RCALS has two unique techniques for artificial breeding and genetic transformation to generate *M. fascicularis*. RCALS have generated *M. fascicularis* such as:

1. *M. fascicularis* with homozygous Major Histocompatibility Complex (MHC) haplotype which is useful in the research field of regenerative medicine using iPS cell.
2. *M. fascicularis* model of some diseases including dementia and some unpublished diseases.

RCALS is now the satellite of the Institute for Advanced Synthesis of Human Biology (ASHBi), Kyoto University which is funding from the MEXT provided under its FY2018 World Premier International Research Center Initiative (WPI) program.

Moreover, SUMS has a plan to propose RCALS as “International Joint Usage / Research Center” certified by MEXT. SUMS is now contacting to MEXT and they are proactive in strengthening preclinical research using NHP. If RCALS is the MEXT-certified research center, MEXT will financially support to RCALS and SUMS can use some of them for improving international collaboration. It is our great pleasure if SUMS is able to starts collaborative research with Stanford Univ. on this occasion. As you may know, exporting gene modified *M. fascicularis* to US is very hard by the Convention on Biological Diversity (CBD), Access to genetic resources and Benefit Sharing (ABS), etc. So it is better for researchers of Stanford Univ. to visit to SUMS to carry out collaborative research.

Contact

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Researchers in Medical Research using Cynomolgus Monkeys

Kazumasa Ogasawara (Professor, Div. Pathology and Disease Regulation, Director of Academic Affairs and Research and Vice President of SUMS)

Research Interest:

He is interested in establishment of disease models of cynomolgus monkeys for preclinical studies. Mice are used as disease models, but all mice disease models do not reproduced human disease. Thus, he focuses on establishment of disease models in none but cynomolgus monkeys. In addition, he is interested in transplantation using cynomolgus monkeys, which are identified for major histocompatibility complex (MHC). Indeed, the MHC-identified cynomolgus monkeys were used in the transplantation experiments of differentiated iPS cells, such as neurons, retinal pigment epithelial cells and cardiomyocytes.

Articles:
Yasushi Itoh (Associate professor, Div. Pathology and Disease Regulation)

Research Interest:

He has been developed two disease models using cynomolgus monkeys: influenza and premature aging. Various influenza viruses including seasonal and highly pathogenic avian influenza viruses cause clinical signs of diseases in macaques as seen in humans. The premature aging model of genome-edited macaques is expected to show age-related metabolic disorders and tumors. Since macaques’ immunity and metabolism are similar to humans', the macaque model is suitable to evaluate the efficacy of vaccines and drugs as preclinical studies.

Articles:


Masatsugu Ema (Professor, Dept. Stem Cells and Human Disease Models, Director of RCALS)

Research Interest:

Nonhuman primates (NHPs) are considered one of the most valuable animal models, because NHPs are closer to humans in organ size and anatomical structure. So far, he has established techniques to create transgenic and genome editing cynomolgus monkeys. By using these techniques, he has explored an intractable human disease, Autosomal dominant polycystic kidney disease (ADPKD) with CRISPR/Cas9 technique, and demonstrated that targeted disruption of PKD1, a causative gene for ADPKD can recapitulate the human ADPKD pathology. He believes that disease modeling with genetically modified-cynomolgus monkey will open the way for the elucidation of molecular mechanism of human diseases and new therapeutic approaches.

Articles:
Ikuo Tooyama (Professor, Dept. Diagnostics and Therapeutics for Brain Diseases, Director of Molecular Neuroscience Research Center (MNRC))

Research Interest:

He is interested in Alzheimer’s disease (AD) and related disorders. His research team have developed several novel ligands for amyloid imaging or tau-imaging using 19F-MRI, such as Shiga-X and Shiga-Y. Using these chemicals he has succeeded in amyloid and tau imaging in the brain of transgenic mouse models such as Tg2576, APP/PS1 and rTg4510. Some of them have therapeutic potentials in transgenic mouse models of AD. However, it is well known that these rodent models do not show the same neuropathology as human Alzheimer’s disease. Thus, he has collaborated with Professor Ema in RCALS and developed monkey models over-expressing mutant APP gene. These monkey models should provide us valuable tools to evaluate diagnostic and/or therapeutic effects as well as toxicity of chemicals targeting AD.

Articles: