# Public call for collaborative research and research meeting for FY 2022
# The Medical Institute of Bioregulation, Kyushu University,
# (Start of the public call: December 2021)

Having been recognized as a Joint Usage/Research Center for the Multi-Stratified Host Defense System since April 1, 2010, the Medical Institute of Bioregulation（MIB）, Kyushu University has been promoting collaborative research with researchers involved in host-defense studies.

We publicly call for research proposals for fiscal year 2022.

## 1. Research Categories for which a Call for Proposals is Organized

A. Collaborative research

(1) Instrument usage type project:

Research project using the multi-stratified levels of research facility infrastructure and the technology of this institute. Research expenses are distributed to cover the instrument usage fee, travel expenses and so on.

(2) Collaborative research type project:

Research project aiming at clarifying the host-defense system using the knowledge about host defense accumulated in this institute. Only travel and accommodation expenses are granted.

B. Research meetings

Meetings focusing on information exchange and presentation of research results among researchers involved in host-defense studies, or meetings for planning collaborative research among such researchers.

## 2. Research Field

We call for collaborative research proposals on the following four research fields. The available facilities and research support service for each field are listed (Attachment). For information on facilitators, please see the following link (Laboratory List):

https://www.bioreg.kyushu-u.ac.jp/mib/labo_list_e.html

(1) Genomics, Epigenomics and Transcriptomics

Genomics:

We provide services of massive detection of genomic variations. We accept collaborative researches such as large-scale genome sequencing using NovaSeq or HiSeq. We also accept mid-to-small scale researches such as exome sequencing of disease pedigrees and Amlicon-seq of biomes using MiSeq.

Epigenomics:

We plan to perform collaborative research on epigenetic modifications, such as DNA methylation and histone modifications, which are important for the maintenance of function and homeostasis of living tissues. For example, using our cutting-edge technology applicable to a limited amount of DNA, we are able to reveal the genome-wide distribution pattern of DNA methylation at single-

base resolution. Such studies will provide a comprehensive understanding of epigenetics and contribute to the progress of biosciences related to health and diseases.

Transcriptomics:

We accept proposals for collaborative studies on understanding cell homeostasis and its deficiency appearing as abnormal development, tumorigenesis, and ageing using transcriptome quantification and/or epigenome regulation. Single Cell transcriptomics has enabled elucidation of the phenotype of an individual not only by identifying the cells responsible for the phenotype but also by understanding the cell dynamics reconstructed from capturing cell population. Applicants are encouraged to apply these comprehensive analyses for humans or other model/non-model organisms with appropriate statistical analyses.

(2) Proteomics and Metabolomics

Proteomics is a comprehensive analytical method for proteins that employs mass spectrometry. Proteomics approach makes it possible to obtain information on expression levels, post-translational modifications, and even interactions between many general proteins. By adopting this kind of comprehensive analytical method, it is possible to gain a deeper understanding of life processes and promote researches more efficiently than conventional techniques allow.

Metabolomics, exhaustive analysis of metabolites, has been applied in various fields as precise phenotypic characterization by means multi-component profiling. However, since the targeted metabolites are widely ranging from low- to high-molecular weight, technology used for simultaneous multi-component analysis has become critical concern. Selection of suitable technology is essential to effectively conduct metabolome analysis. Our laboratory has strong knowledge background and is equipped with numerous sophisticated technologies for high-resolution metabolomics research.

(3) Structural Biology

We plan to conduct collaborative research on the technical development of structural biology using a high-performance cryoelectron microscope, and on the elucidation of the mechanism of molecular functions of proteins using structural biology technologies, such as nuclear magnetic resonance and X-ray crystallography.

Conventionally, functional analysis is performed first and protein structure is determined last, however currently there are an increasing number of cases where protein structure is determined first and its function is inferred from the structure. The necessity of determination of biomacromolecule structures is now widely recognized, based on the fact that "it is often possible to describe their functions in ways similar to macro machines, even though they are nano-scale molecules."

(4) Embryonic and Genetic Engineering

We plan to conduct collaborative research on the elucidation of host-defense mechanism at an

individual level by developmental engineering methods using mice, and the development of new therapies for diseases caused by the breakdown of the host-defense mechanism. Genetical modification includes the production of knockout, knock-in, and transgenic mice from fertilized eggs and ES cells. We also actively introduce genome editing technology based on the CRISPR / Cas 9 system.

### 3. Eligibility for Applicants

Researchers belong to universities, national or public institutions, or equivalent institutions

### 4. Period of Research

From April 1, 2022 to March 31, 2023

### 5. How to Apply

Please fill out the application form and send it to the address (see 11. Contact below) by post or e-mail. You MUST discuss the details of the collaboration with the facilitator of the MIB, before sending your completed application form.

The application form is downloadable at: https://www.bioreg.kyushu-u.ac.jp/mib/activities_collabo_e.html

Required Documents:

A. Collaborative research：application form 1
B. Research meeting：application form 2

Application deadline:

February 18, 2022

* Each research group is not allowed to apply two or more collaborative research projects per year, and the same application title must not be used more than 2 years.

*We may accept your application even after the application deadline. Please contact the facilitator of the MIB or the contact person (see “11. Contact” below) in advance. In case that we stop accepting applications, we will notify in the MIB HP.

### 6. Screening Results

Once the review committee has made a decision to either accept or reject the application, applicants will be informed of the result as soon as possible.

### 7. Report of the Research Results

Please submit a report describing the progress and results of the research once the study has been completed. If you are going to publish a paper based on the results of the study, please acknowledge the facilities of our institute that you have used. The sentence is as follows:

> *"This work was partly performed in the Cooperative Research Project Program of the Medical Institute of Bioregulation, Kyushu University."*

In addition, please submit a copy of the reprint of the paper.

## 8. Research Expenses

Research expenses are allocated on the basis of screening results.

A. Collaborative research

A maximum budget of 500,000 yen, as travel and accommodation expenses, is provided. Travel expenses can be provided to research collaborators as well within the budget. In the case of instrument usage type project, research expenses are distributed as well. However, they can only cover the service fees of the institute, and cannot be allocated to personal consumable supplies and materials.

B. Research meetings

The meeting, travel, and accommodation expenses are granted.

International academic meetings: up to 1,500,000 yen

The other meetings: up to 500,000 yen

## 9. Handling of Intellectual Properties

Intellectual properties are handled in accordance with the Intellectual Property Handling Rules of Kyushu University.

## 10. Others

(1) MIB is not responsible for any injuries or accidents during collaborative research / research meeting.

(2) By laws and ordinances, you MUST receive an appropriate education and training or an ethical approval from either internal or external committee to meet the required ethical standards, for researches that contain genetic modifications and animal experiments, ethical issues such as human genomic information and materials, or other restricted activities.

## 11. Contact

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