Attachment

Available Facilities

1.Nucleic Acid Omics (Genomics, Epigenomics, Transcriptomics, Infomatics Analysis, Spatial Omics)

1) DNA sequencing analysis using next generation sequencers.

Fig.1 Next Generation Sequencers

The Medical Research Center for High Depth Omics possesses short-read-type next generation sequencers, mainly Illumina instruments, including Illumina NovaSeq6000, HiSeq2500, HiSeq1500, and MiSeq, which are beneficial for super parallel analysis in single cell transcriptomics or epigenomics (ATACSeq, ChILSeq) adding to regular genome/transcriptome analysis. We are flexible to accept proposals of various other studies that require the use of NGS upon request.

2) DNA sequencing Analysis with Third-Generation Sequencers

Fig.2 Third-Generation Sequencer

The Medical Research Center Initiative for High Depth Omics has introduced the PacBio Sequel IIe. This sequencer is capable of reading much longer sequences (14kb to 18kb) with high precision compared to next-generation sequencers (Long Read-Seq). It can be used for determining structural polymorphisms in model organisms such as humans and mice, enhancing genomic sequence determination in non-model organisms, sequencing metagenomes, and IsoSeq analysis.

3） Infrastructure System Usage for Information Analysis of 1) and 2)

The analysis of information from next-generation and third-generation sequencers requires the use of various bioinformatics tools. Our institute has established an information analysis system that can be utilized for the analysis of sequence-centered information obtained from 1) and 2)

4） Spatial Omics Analysis

The Medical Research Center Initiative for High Depth Omics is equipped with a microscopy system necessary for implementing Photoisolation chemistry (PIC) methods, sequential immunostaining, and sequential RNA/DNA-FISH methods.

○Inquiries about available instruments and technology

*Please add “kyushu-u.ac.jp” to each email address.

Division	Facilitator	E-mail Address	Remarks
Genomics	Hiroki Shibata (Associate Professor)	hshibata@gen.	Whole Genome Seq, Exome-Seq, Amplicon-Seq
Transcriptomics	Yasuyuki Ohkawa (Professor)	yohkawa@bioreg.	ChIP/ChILSeq, scRNA/ATAC-Seq
Biomedical Information Analysis	Masao Nagasaki (professor)	nagasaki@bioreg.	Utilization of Information Analysis Infrastructure, Informatic analysis
Gene Expression Dynamics	Hiroshi Ochiai (Professor)	ochiai@bioreg	Sequential RNA/DNA -FISH

2. Proteomics and Metabolomics

○Facilities for proteome analysis (Proteomics)

1) Preparation of Samples for Proteomics

In order to perform identification of proteins using mass spectrometry, it is necessary to perform pre-processing of protein samples by protease digestion.

Depending on the type of sample and the purpose of the experiment, sample preparation is performed by in-solution digestion or in-gel digestion.

2) Mass Spectrometers

There is one mass spectrometers available.

【Quadrupole-Orbitrap Mass Spectrometer】

・Orbitrap Exploris 240 (Thermo Fisher)

The Orbitrap, an ion trap mass spectrometer, provides high-resolution accurate mass data. A FAIMS Pro interface is also available for on-line gas-phase fractionation based on differential ion mobility.

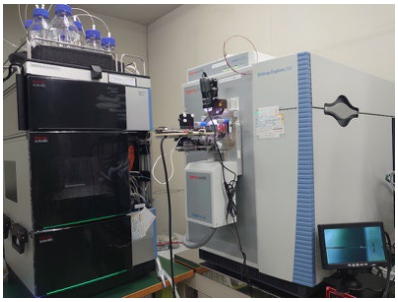

Fig. 1 Orbitrap Exploris 240

3) Database Search Engines

- Proteome Discoverer 3.0(Thermo Fisher)

○Facilities for metabolome analysis (Metabolomics)

1) Sample preparation for metabolomics

Metabolomics research requires proper sample preparation system to obtain high quality metabolome data.

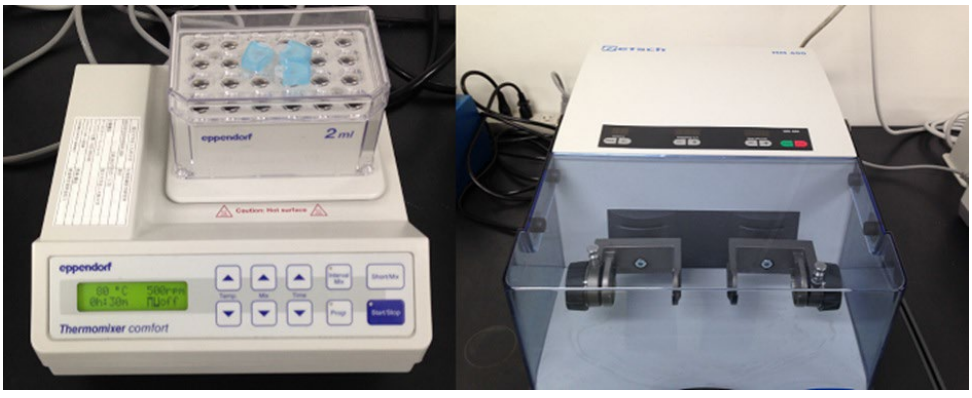

Fig. 2　Sample preparation system for metabolome analysis

2) Mass spectrometers

Different mass spectrometers are required according to research purposes and target metabolites.

Two types of mass spectrometers are now available.

[Triple quadrupole gas chromatography mass spectrometer]

- GC-MS 7000C (Agilent)

For metabolome analysis of low-molecular weight hydrophilic metabolites, including sugars, organic acids and amino acids

Fig. 3 GC-MS system

[Supercritical fluid chromatography triple quadrupole mass spectrometer]

- Nexera UC (Shimadzu)
- LCMS-8060 (Shimadzu)

For targeted lipidomics analysis

Fig. 4 SFC-MS system

○Inquiries about available instruments and technology

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Division	Facilitator	E-mail Address	Remarks
Metabolomics	Takeshi Bamba (Professor)	bamba@bioreg.	

3. Structural Biology

1) Automatic setting-up devices for crystallization screening

- Search under 96 different crystallization conditions using a total of 25 µl protein solution (0.2 µl per drop).

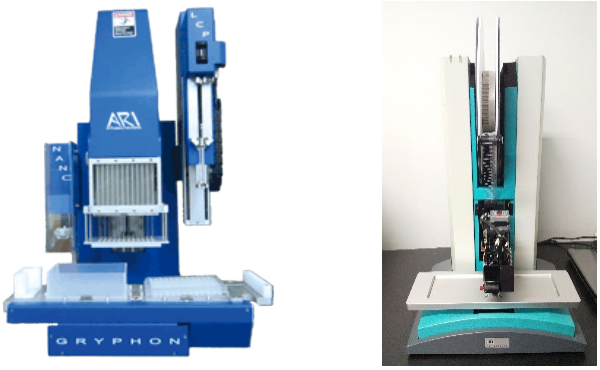

Fig. 1 (left) Crystal Gryphon LCP Setting-up Device (Art Robbins Instruments)
(right)Mosquito (SPT Labtech)

2) Single particle analysis using electron microscopes
- FEI Tecnai G3 Polara (300 kV transmission electron microscope)
  Cryo measurements at liquid nitrogen temperature,
  Tomography including STEM tomography, STEM(HAADF),
  4K x 4K CCD (UltraScan4000, GATAN),
  Energy filter (GIF BioQuantum K3, GATAN with 24 Mega-Pixel CCD)
- FEI Tecnai20 (200 kV transmission electron microscope)
  Tomography, 2K x 2K CCD (Eagle 2k, FEI)

3) Circular Dichroic Polarimeter (CD)
-JASCO J-820

Fig. 2 Cryoelectron microscope (Tecnai Polara)

*1) The conditions or quantities of protein samples required for a successful measurement may vary substantially depending on the type of analysis or research aim. Please inquire of the facilitator in the institute beforehand whether the experiment is feasible or not.

*2) Preliminary studies need not have been performed on the samples (crystallization, determination of lattice constant, electron microscopic observation, etc.). ― However, the preparation of the samples or a preliminary study for the collection of data is desirable.

○Inquiries about available instruments and technology
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Division	Facilitator	E-mail Address	Remarks
Trans-Scale Structural Life Science	Kenji Inaba (Professor)	kenji.inaba@bioreg.	

4. Embryonic and Genetic Engineering

We can provide the following technological support regarding developmental engineering experiments: ES injection into blastocysts, DNA injection (including Crispr/Cas9) into fertilized eggs, in vitro fertilization/preparation of frozen fertilized eggs, etc.

Fig. Electroporator (left) and Micromanipulator System (right)

Attachment

Service	Reception	Comments
ES cell injection	1 to 2 days p.w. (Tue, Wed, Thu, Fri)	Use of C57BL/6J mice
DNA injection	1 to 2 days p.w. (Tue, Thu)	Use of C57BL/6J mice
Preparation of frozen fertilized egg	Arbitrary	Embryo freezing via in vitro fertilization (IVF); cleaning of mice
Bringing in frozen fertilized egg	Arbitrary	Thawing/transplantation of frozen embryo from other institutions; aim of transfer
Carrying out/thawing frozen fertilized egg	Arbitrary	Thawing/transplantation of frozen embryo, transporting frozen embryo
Preparation of frozen sperm	Arbitrary	Preparation and preservation of frozen sperm

○Inquiries about available instruments and technology

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Division	Facilitator	E-mail Address	Remarks
Immunology and Genomic Biology	Yoshihiro Baba (Professor)	babay@bioreg.	