

# List of Instruments in Laboratory of Molecular and Biochemical Research

As of 2021.1.19

	Instrument	Manufacturer	Model	Purpose and Application
<b>Measuring Instruments</b>	Real-time PCR	Thermo Fisher Scientific	QuantStudio 3	To quantify mRNA expression level e.g. gene expression analysis, SNP typing (gene polymorphism analysis), and HRM analysis (gene mutation detection)
	Real-time PCR (3)	Thermo Fisher Scientific	7500 Fast	
	DNA sequencer	Thermo Fisher Scientific	3500 Genetic Analyzer	To determine the order of the four bases; G (guanine), C (cytosine), A (adenine) and T (thymine). e.g. DNA sequence analysis (re-sequence, mutation analysis), and DNA fragment analysis (microsatellite analysis, SNP analysis, methylation analysis)
	DNA sequencer	Thermo Fisher Scientific	3730 Genetic Analyzer	
	Microarray analysis system	Thermo Fisher Scientific	GeneChip system	To measure the expression levels of large numbers of genes simultaneously
	Microelectrode array (MEA) system	Bio Research Center	MEA2100	To record spontaneous activity such as action potential in neuronal or cardiac cultures, or brain or cardiac slices
	Spectrophotometer	Thermo Fisher Scientific	Nano Drop	To quantify nucleic acids and proteins in very small samples (1-2 $\mu$ L)
	Luminometer	Molecular Devices	SpectraMaxL	To measure luminescence (for 96-well plates) e.g. Luciferase assay
	Luminometer	Berthold Technologies	Lumat LB 9507	To measure luminescence (for single tubes) e.g. Luciferase assay
	Microplate Reader	Molecular Devices	Spectramax 340 PC384	To measure absorbance. Wavelength range: 340-850 nm e.g. ELISA, cytotoxicity assay, protein quantification
	Automated gel electrophoresis system	Agilent Technologies	TapeStation4150	To analyze the quantity and quality of samples (RNA and DNA)
	High Performance Liquid Chromatography	Thermo Fisher Scientific	UltiMate 3000 UHPLC	To separate and detect compounds in a liquid, including body fluid, by using electrochemical detector
	Gel imaging system	ATTO	Printgraph 2M	To observe or photograph EtBr-stained DNA with a UV transilluminator, or CBB-stained protein with a LED illuminator
	Thermal cycler (2)	Bio-Rad	T-100	
	Thermal cycler	Thermo Fisher Scientific	Veriti	To facilitate temperature-sensitive reactions such as PCR amplification and reverse transcription
Ca <sup>2+</sup> imaging system	Hamamatsu Photonics	AquaCosmos imaging system	To measure intracellular Ca <sup>2+</sup> concentration on single cells with fluorescent Ca <sup>2+</sup> indicator dyes	

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<b>Instruments for Cell Culture</b>	Electroporator	NEPAGENE	NEPA Porator system 2	To transfer DNA, RNA and protein into cells by electroporation
	Electroporator	Thermo Fisher Scientific	Neon	
	Electroporator	Lonza	Nucleofector II b	
	All-in-one fluorescence microscope	KEYENCE	BZ-X800	To observe and photograph fluorescence-labeled living cells without a darkroom
	Inverted microscope (phase contrast)	Zeiss	Axiovert40C	To observe living cells in bright field
	Inverted microscope (phase contrast)	Zeiss	Primovert	
	Inverted microscope (phase contrast)	Nikon	TMS	
	Biological safety cabinet	Panasonic	MHE-S901A2-PJ	To protect the laboratory worker from pathogens
	Biological safety cabinet	Thermo Fisher Scientific	1345	
	Clean bench	Juji Field	NS-10B	To perform various operations required for cell culture in a clean environment without contamination of dusts and pathogens
	Clean bench	Panasonic	MCV-13BSF	
	Clean bench	Showa Science	S-1301PRV	Also known as a tissue culture hood or laminar flow cabinet
	Clean bench	Showa Science	S-1000SRV	
	CO <sub>2</sub> incubator (5)	Thermo Fisher Scientific	F370	To grow and maintain cells
	CO <sub>2</sub> incubator	Thermo Fisher Scientific	Model3110	
	CO <sub>2</sub> incubator	PHC	MCO-170AICUVD-PJ	
	CO <sub>2</sub> incubator (tabletop)	WakenBtech	WKN-MC35	
	CO <sub>2</sub> incubator (tabletop)	WakenBtech	MODEL9100 Ex	
CO <sub>2</sub> incubator (tabletop) (2)	WakenBtech	MODEL9200 Ex		
CO <sub>2</sub> incubator (tabletop)	WakenBtech	WKN-MC35	To grow and maintain cells. Capable of culturing under low oxygen (i.e. hypoxia) conditions	

	Instrument	Manufacturer	Model	Purpose and Application
Instruments for microorganism Culture	Shaker	TAITEC	BR-43FL	To mix, blend, or agitate samples (temperature setting: 4 to 70 °C, shaking speed: 20 to 300 rpm/min) e.g. culture of microorganisms such as E. coli
	Shaker	TAITEC	BR-300LF	To mix, blend, or agitate samples (temperature setting: 4 to 70 °C, shaking speed: 25 to 160 rpm/min) e.g. culture of microorganisms such as E. coli
	Shaker	TAITEC	BR-40LF	To mix, blend, or agitate samples (temperature setting: 4 to 70 °C, shaking speed: 20 to 200 rpm/min) e.g. culture of microorganisms such as E. coli
	Heating incubator	Thermo Fisher Scientific	F370	To warm samples at 37 °C e.g. culture of microorganisms such as E. coli, enzyme reaction such as DNA digestion
	Heating incubator	EYELA	SLI-220	To warm samples at 30 °C e.g. culture of microorganisms such as E.coli and yeast, enzyme reaction
	Incubator shaker (4)	TAITEC	PERSONAL-11	To incubate and shake in a water bath for short time (shaking speed: 20 to 160 rpm/min, temperature setting: room temperature + 5 °C to 100 °C) e.g. warming the culture medium
General Instruments	Biological safety cabinet	ESCO	AC2-3N7	To protect the laboratory worker and the sample from pathogens e.g. handling BLS2 sample such as human blood
	All-in-one fluorescence microscope (2)	KEYENCE	BZ-X700	To observe and photograph fluorescence-labeled fixed cells without a darkroom
	High speed refrigerated micro centrifuge	TOMY	MDX-310	To centrifuge samples (Max speed; 15,000 rpm, Max RCF; 20,380 g, Max capacity; 24 microtubes (1.5 mL)) (Max speed; 15,000 rpm, Max RCF; 18,120 g, Max capacity; 8-Strip PCR Tube × 8)
	High speed refrigerated micro centrifuge	TOMY	MX-301	To centrifuge samples (Max speed; 15,000 rpm, Max RCF; 20,380 g, Max capacity; 24 microtubes (1.5 mL)) (Max speed; 15,000 rpm, Max RCF; 20,130 g, Max capacity; 5 mL tube x 12) (Max speed; 4,400- 10,100 rpm, Max RCF; 1,750 -9,240 g, Max capacity; 15 mL tube x 4, 50 mL tube x 4)
	High speed refrigerated micro centrifuge (3)	TOMY	KITMAN-24	To centrifuge samples (Max speed; 13,500 rpm, Max RCF; 17,730 g, Max capacity; 24 microtubes (1.5 mL))
	High speed refrigerated micro centrifuge	TOMY	MX-100	To centrifuge samples (Max speed; 15,000 rpm, Max RCF; 17,610 g, Max capacity; 18 microtubes (1.5 mL))
	High speed refrigerated micro centrifuge	TOMY	MX-160	To centrifuge samples (Max speed; 15,000 rpm, Max RCF; 20,630 g, Max capacity; 36 microtubes (1.5 mL))
	High speed benchtop micro centrifuge(2)	TOMY	MC-150	To centrifuge samples (Max speed; 15,000 rpm, Max RCF; 16,350 g, Max capacity; 12 microtubes (1.5 mL))
	Refrigerated centrifuge	HITACHI	CR16RX II	To centrifuge samples T5SS31 rotor (Max speed; 4,800 rpm, Max RCF; 4,170 g, Max capacity; 15 mL tube x 16, 50 mL tube x 4) T4SS31 rotor (Max speed; 4,000 rpm, Max RCF; 2,900 g, Max capacity; 15 mL tube x 24, 50 mL tube x 8)
	Versatile high capacity refrigerated centrifuge	HITACHI	Himac CF8DL	To centrifuge samples (Max speed; 3,000 rpm, Max RCF; 2,150 g, Max capacity; 15 mL tube x 80) (Max speed; 3,000 rpm, Max RCF; 2,100 g, Max capacity; 50 mL tube x 24) (Max speed; 2,000 rpm, Max RCF; 850 g, Max capacity; 4 micro-plates)

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General Instruments	Versatile high capacity refrigerated centrifuge	HITACHI	Himac CF9RX	To centrifuge samples (Max speed; 3,000 rpm, Max RCF; 2,150 g, Max capacity; 15 mL tube x 48, 50 mL tube x 24) (Max speed; 3,000 rpm, Max RCF; 2,000 g, Max capacity; 4 micro-plates)
	Versatile high capacity refrigerated centrifuge	HITACHI	Himac CF7D2	To centrifuge samples (Max speed; 3,000 rpm, Max RCF; 1,870 g, Max capacity; 15 mL tube x 72, 50 mL tube x 20) (Max speed; 3,000 rpm, Max RCF; 1,650 g, Max capacity; 4 micro-plates)
	Plate centrifuge	KUBOTA	Plate Spin	To centrifuge samples in plates (Max speed; 2,500 rpm, Max RCF; 700 g, Max capacity; 2 micro-plates)
	Plate centrifuge	Bio Medical Science	BSR-M001	To centrifuge samples in plates (Max speed; 2,500 rpm, Max RCF; 500 g, Max capacity; 2 micro-plates, only for DNA sequencer)
	Centrifugal evaporator/concentrator (2)	HITACHI	LTE-12	To concentrate samples by evaporating solvent through centrifugation and decompression (Max capacity; 12 microtubes (1.5 mL))
	In-situ hybridization system	ACD	HybEZ	To provide superior conditions for RNA in situ hybridization. Suitable for RNAscope assay.
	Hybridization oven	TAITEC	HB-100	To shake and heat samples e.g. staining and de-staining of gel, enzyme reaction at high temperature, hybridization
	Thermo shaker for microtubes	Funakoshi	TS-100C	To mix and heat (or cool) samples in 1.5 mL tubes
	Automated western-processing device (2)	Thermo Fisher Scientific	iBind	To automate the process from blocking protein-transferred membrane to washing after secondary antibody reaction
	Bead mill homogenizer	TOMY	MS-100R	To disrupt tissues and cells using a bead mill
	Bead mill homogenizer	TOMY	MS-100	
	Polytron homogenizer	Kinematica	PT3100	To disrupt tissues and cells using a rotating blade
	Polytron homogenizer	Kinematica	Model KR	
	Ultrasonic homogenizer	Branson	SONIFIER 250-Advance	To disrupt tissues and cells through cavitation and ultrasonic waves
	pH meter	Horiba Scientific	LAQUA F-71S	To measure and adjust pH of a sample solution
	Water purification systems	Merck Millipore	Milli-Q Integral MT 10	To produce "pure water (RO water)" that removes impurities through a reverse osmosis (RO) membrane, and "ultra pure water (Milli-Q water)" that removes organic substances from pure water.
	Fume hood (2)	Dalton	DFA10	To protect users from inhalation of toxic gases (One from organic solvents, the other from toxic powders, acids, and bases)
	Ultraviolet crosslinker	Funakoshi	FS-800	To crosslink nucleic acids (DNA or RNA) to nylon or nitrocellulose membranes
	Dissecting microscope	Nikon	SMZ-2B	To observe objects at low magnification e.g. observing tissues during dissection
	Dissecting microscope	OLYMPUS	SZ61-ILST	
	Scale	METTLER	AG135	To measure the weight of powder reagents etc. (for micro weighing, maximum weighing: 101 g)
	Electronic scale	METTLER	PC440	To measure the weight of powder reagents etc. (maximum weighing: 400 g)
	Electronic scale	Shimadzu	UW420H	To measure tissue weight (for tissue weighing, maximum weighing: 420 g)
	Electronic scale	As One	ASP202F	To measure the weight of powder reagents and tissues (maximum weighing: 200 g)
	Animal weighing scale	Shinko Denshi	DH-R610N	To measure the weight of small animals, including mice (maximum weighing: 610 g)
	Inhalation anesthesia system for small laboratory animals	Natsume Seisakusho	NARCOBIT-E(type-2)	To anesthetize small animals such as mice and rats
	Carbon dioxide euthanasia equipment	Natsume Seisakusho	KN-750-2	To euthanize small animals such as mice and rats using carbon dioxide
	Local exhaust ventilation (4)	Dalton	LFK175G	To remove odors during dissection and anesthetics

	Instrument	Manufacturer	Model	Purpose and Application
Instruments for Sterilization	Autoclave (4)	TOMY	LSX-500	To sterilize reagents and instruments under high pressure and temperature e.g. disposal of E.coli., sterilization of reagents
	Dry heat sterilizer	Panasonic	MOV-212S	To sterilize glassware, such as pipettes and flasks, at high temperatures (maximum temperature: 200 °C)
	Dry heat sterilizer	Panasonic	MOV-112S	
	Hot air circulating oven	TAITEC	M-16	To dry objects such as tips and flasks after autoclaving
	Hot air circulating oven	ALP	A-120HS	To dry glassware after washing
Softwares	GeneSpring	Agilent Technologies		For gene expression analysis and genome analysis by DNA microarray (for details, see <a href="https://www.agilent.com/cs/library/usermanuals/public/GeneSpring-manual.pdf">https://www.agilent.com/cs/library/usermanuals/public/GeneSpring-manual.pdf</a> )
	Chromosome Analysis Suite	Thermo Fisher Scientific		For analysis of copy number variation (CNV) (for details, see <a href="http://www.affymetrix.com/support/technical/byproduct.affx?product=chas">http://www.affymetrix.com/support/technical/byproduct.affx?product=chas</a> )
	OncoScan Console	Thermo Fisher Scientific		For analysis of OncoScan and CytoScan arrays (for details, see <a href="http://www.affymetrix.com/support/technical/byproduct.affx?product=oncoscan">http://www.affymetrix.com/support/technical/byproduct.affx?product=oncoscan</a> )
	Somatic Mutation Viewer	Thermo Fisher Scientific		For analysis of OncoScan array (for details, see <a href="http://www.affymetrix.com/support/technical/byproduct.affx?product=oncoscan_assay_kits">http://www.affymetrix.com/support/technical/byproduct.affx?product=oncoscan_assay_kits</a> )
	Expression Console	Thermo Fisher Scientific		For analysis of expression array (for details, see <a href="http://www.affymetrix.com/support/technical/byproduct.affx?product=expressionconsole">http://www.affymetrix.com/support/technical/byproduct.affx?product=expressionconsole</a> )
	Genotyping Console	Thermo Fisher Scientific		For analysis of genome array (for details, see <a href="http://www.affymetrix.com/support/technical/byproduct.affx?product=genotypingconsole">http://www.affymetrix.com/support/technical/byproduct.affx?product=genotypingconsole</a> )
	Transcriptome Analysis Console	Thermo Fisher Scientific		For analysis of Clariom array (for details, see <a href="http://www.affymetrix.com/support/technical/byproduct.affx?product=tac">http://www.affymetrix.com/support/technical/byproduct.affx?product=tac</a> )
Instruments in P2 Level Cell Culture Room	Biological safety cabinet	Dalton	NSE-1200 II B2	To protect the laboratory worker from pathogens
	Biological safety cabinet	Panasonic	MHE-130AJ	
	Cell culture incubator (2)	Thermo Fisher Scientific	F370	To grow and maintain cells
	Cell culture incubator (tabletop)	WakenBtech	MODEL9200 E	
	Cell culture incubator (tabletop)	WakenBtech	MODEL9300 E	To grow and maintain cells
	Refrigerated centrifuge to protect from biohazardous contamination	Thermo Fisher Scientific	Sorvall ST 8FR	To centrifuge samples (Max speed; 4,500 rpm, Max RCF; 3,260 g, Max capacity; 15 mL tube x 8, 50 mL tube x 4) (Max speed; 4,400 rpm, Max RCF; 2,576 g, Max capacity; 4 micro-plates)
	Versatile high capacity refrigerated centrifuge	HITACHI	Himac CF7D2	To centrifuge samples (Max speed; 3,000 rpm, Max RCF; 1,870 g, Max capacity; 15 mL tube x 40, 50 mL tube x 20) (Max speed; 3,000 rpm, Max RCF; 1,650 g, Max capacity; 4 micro-plates)
	High speed refrigerated micro centrifuge	HITACHI	Himac CT13R	To centrifuge samples (Max speed; 13,000 rpm, Max RCF; 16,060 g, Max capacity; 24 microtubes (1.5 mL))
	All-in-one fluorescence microscope	KEYENCE	BZ-9000	To observe and photograph fluorescence-labeled living cells without a darkroom
	Inverted microscope (phase contrast)	Nikon	TS100-LED	To observe living cells in bright field
	Thermostatic water bath, with stirrer	Iuchi Seieido	HTS-50N	To incubate and/or shake in a water bath for a short time (shaking speed: 80-1500 rpm)
	Autoclave	TOMY	SX-500	To sterilize biohazardous reagents and objects under high pressure and temperature