

Cell and Molecular Biology Facility

Facility Equipment

Balances

- **Mettler Toledo Balance AE240:** Offers dual range for 40 grams and 200 grams. Readability 0.01 / 0.1 mg, Repeatability (sd) 0.02 / 0.1 mg, Linearity \pm 0.03 / 0.2 mg. Features internal calibration.
- **Mettler Toledo Balance MS204S/03:** Located in DV3092B. Specifications are as follows: Limit values: maximum capacity 220 g, readability 0.1 mg, repeatability (at nominal load) 0.1 mg, linearity deviation 0.2 mg, sensitivity temperature drift 1.5 ppm/°C. Typical values: repeatability (at nominal load) 0.08 mg, linearity deviation 0.06 mg, minimum sample weight (acc. to USP) 0.16 g, minimum sample weight (U=1 %, k=2) 0.016 g, minimum sample weight OIML 0.01 g.
- **Sartorius Balance BCE4202I-1SPM:** Located in DV3092B. Maximum weighing capacity 4200g, minimum load 500mg, optimum minimum initial weighing 8.2g, weighing pan size 182x182mm without sample chamber.

Bio-Molecule Analysis

- **Bioanalyzer Agilent 2100:** Located in DV3092E priming station and IKA vortex mixer are available. It is an automated electrophoresis tool for the sample quality control of bio- molecules, the digital data delivers objective assessment of sizing, quantitation, integrity and purity from DNA, RNA, and proteins. Together with the 2100 Expert Software and Bioanalyzer assays, the instrument provides highly precise sample analytical evaluation in many workflows, including next generation sequencing (NGS), gene expression, biopharmaceutical and gene editing research.
- **Denovix DS11+ FX:** Located in DV3092E. It is a micro-volume spectrophotometer/ Fluorometer, sample volume is low as 0.5-1.0ul. Cuvette option is available. Key applications: nucleic acid concentration, protein and peptide concentration, OD600, colorimetric assay and kinetics. Micro-volume detection range for dsDNA at 0.75ng/uL- 37500ng/uL, protein at 0.04mg/mL - 1125 mg/mL BSA, RNA detection can go as low as 0.6ng/ul. Key Features for FX Fluorometer module: 4 channels at excitation/emission 442-497 /514-567nm, 490-558 /565-650, 613-662/664-740 nm, UV361-389/435-485 nm; using 0.5ml thin wall PCR tubes. Fluorescence dsDNA assay kits are available from Denovix, other commercially available assay kits from other brands can also be used on the module including those designed for Qubit® and Quantus™ platforms.
- **Promega Maxwell RSC System:** Located in DV3092E. The Instrument is a compact,

automated nucleic acid purification platform that processes up to 16 samples simultaneously using prefilled cartridges and preprogrammed methods. It offers consistent, reliable DNA or RNA extraction in 25–60 minutes with minimal steps and less hands-on time, the integrated Quantus™ Fluorometer lets you collect purification and quantification data in one report.

- **Qubit 3.0 Fluorometer:** Located in DV3092E, portable. It can be used for the quantitation of DNA, RNA, microRNA, and protein using fluorescence-based Qubit quantitation assays. Applications also include ion sphere assay and fluorometer mode. The advantage of its accuracy and sensitivity makes the Qubit 3.0 ideal for quantitation of precious samples or the samples for delicate applications. To use Qubit 3.0, a Qubit Assay Kit appropriate for quantifying your samples and 0.5ml assay tubes (can be 0.5ml clear-wall PCR tube) are needed. Order information for the assay kits can be found at www.lifetechnologies.com.

Cell Disruption and Homogenization

- **Sonic Dismembrator FB120:** Located in DV3092K, suitable for liquid sample processing including biological cell disruption, homogenization, dispersion, fine mixing and degassing. Three probes available:
 - 1) 1/4" (6mm) tip for 10-50ml sample process
 - 2) 1/8" (3mm) micro-tip for 0.5-15ml sample process
 - 3) 1.5" cup horn for indirect process in an ultrasonic water bath, ideal for sterile samples or samples too small for probe-style horns.
- **FastPrep96:** Located in DV3092B. The instrument is a high-speed, benchtop homogenizer for efficient disruption of cell membranes. It lyses any tissues and cells thoroughly and quickly, thus allows easy and reproducible isolation of stable RNA, active proteins and full-length genomic DNA. Three interchangeable sample holders are available: 2x 96 well plates, 2ml/24 places and 15ml/6 places. Cooling box using dry ice is available on sample holders of 2ml and 15ml tubes. Official training from core facility training is mandatory for new users.
- **Microfluidizer LM20:** Located in DV3092B. It is a processor converting high fluid pressure into shear force at a constant rate which ensures that 100% of your material undergoes exactly the same treatment yielding consistently reliable results. Recommended applications are emulsions, dispersions, liposomes, cell disruption and fine Particle deagglomeration. With a 300ml sample reservoir, it is ideal for large sample processing, minimum sample volume is 14ml. Official training is mandatory for new users.
- **Precellys 24 Dual:** Located in DV3092E. The homogenizer is equipped with cooling system of Cryolys and HITACHI Air Compressor, and the temperature display device HANNA HI147-00. Cooling reagent for Cryolys can be liquid nitrogen or dry ice, cold air (-50°C) is sprayed around each tube so the temperature during homogenization remains at around 4°C. Two types of sample adapters are available: 2ml with 12 places and 7ml with 6 places at maximum. Manufacturer specified tubes are required.





- **Qiagen Tissue Lyser II: Located** in DV3092E. The instrument is a flexible bead mill designed for rapid and efficient disruption of up to 48 or 192 samples at the same time. A wide variety of biological samples can be processed including human, animal and plant tissues as well as yeasts and bacteria. Two types of adapters are available: a pair of 2ml /24 places holder and a pair of 96 well plate. No cooling system.

Centrifuge



- **Beckman Ultracentrifuge Model L8-70MR:** Two units are installed in DV3092K. Model L8M is a microprocessor –controlled preparative ultracentrifuge, it can be used with any Beckman’s family of ultracentrifuge rotors (except the type 15 rotor type 35 and type 42.1 rotors with serial numbers 1299 or lower). Set speed 1000-70000 rpm depending on the rotors being used (Important note: Currently, the centrifuge speed can only be set up to 90% of a rotor’s maximum speed due to rotor’s aging); set temperature 1-45°C; set time up to 99h59min. Available rotors at the core facility: 70Ti, 70.1Ti, 42.1with serial number 1433, 42.2Ti, 45Ti, 50.2Ti, SW32Ti, SW40Ti and SW50.1.




| Rotor Type | Serial Number | Manufacturer Max Speed /Max Speed to Be Used at Core Facility (10% less) | Sample Size (Number of Tubes x Nominal Capacity of Largest Tube) |
|------------|---------------|--|--|
| 70Ti | 941 | 70,000 rpm/ 63,000rpm | 8 x 39 ml |
| 70.1Ti | 962 | 70,000rpm/ 63,000 rpm | 12 x 13.5 ml |
| 42.2 Ti | 08U 827 | 42.000rpm/ 37, 800 rpm | 72 x 230 ul |
| 42.1 | 1433 | 42,000 rpm/ 37,800 rpm | 8x 38.5ml |
| 45T1 | 1475 | 45000rpm/40500rpm | 6 x 94 ml |
| 50.2Ti | 06U 3803 | 50,000rpm/45,000rpm | 12x39ml |
| SW32Ti | 08U2087 | 32,000 rpm/ 28,800 rpm | 3 x 38.5 ml |
| SW40Ti | 2980 | 40,000rpm/ 36,000 rpm | 6 x 14 ml |
| SW50.1 | 3494 | 50, 000 rpm/ 45,000 rpm | 6 x 5ml |

- **Beckman Ultracentrifuge Model Optima L-80 XP:** Located in DV3092E. The operation of the Optima™ L-XP is controlled through the touchscreen interface display. Set speed 1 000 to 80 000 rpm in 100-rpm increments. Set temperature 0-40°C. Set time to 999 hours 59 minute, hold for continuous runs. It shares all the rotors with ultra- centrifuge L8-70MR.
- **Beckman High Speed Centrifuge Avanti JXN-26:** Located in DV3092E. It is a refrigerated, general- purpose laboratory centrifuge. Speed range depends on rotors in use; set time up to 99 hr 59 min or continuous; temperature control -10 to +40°C. Available rotors and related information:

| Rotor Type | Description | Max RPM | Max RCF (xg) | Max Capacity | Available Centrifuge Bottles in Core Facility | | | |
|--|--|---------|--------------|--|---|---|----------------------|----------|
| | | | | | Type | Description | Beckman order number | Quantity |
| JA -14  | Fixed angle 25°, 6 places for 250ml bottles | 14,000 | 30,070 | 6x250ml | 250 ml | Polypropylene wide mouth bottle with screw on cap, 62x120mm | 356011 | 6 |
| | | | | | 250 ml | Polycarbonate wide mouth bottle with cap assemblies, 62x120mm | 356013 | 6 |
| JA25.50  | Fixed angle 34°, 8 places for 50ml tubes | 25,000 | 75,600 | 8x50ml | 50ml | Polycarbonate bottle with cap assemblies, 29x104mm | 361693 | 24 |
| JLA8.1000  | Fixed angle 20°, 6 places for 1L bottles | 8000 | 15,970 | 6x1L | 1L | Polypropylene bottle with cap assemblies, 96x191mm | C31597 | 6 |
| JS5.3  | Swing bucket, 4 places for standard plates and 15ml and 50m conical tubes with 4 plate carriers, 15ml tube adaptor set of 4 and 50ml tube adaptor set of 4 | 5300 | 6,870 | 1.plate: 24xmicro plates or 8 deep-well plates or 4 square well plate 2. Tube: 28x50ml Or 72x15ml | n/a | n/a | n/a | n/a |

- Beckman Centrifuge Allegra X-15R:** Located in DV3092B. It is the bench top centrifuge with refrigerator. Operating temperature -10°C to +40°C. SX4750A swing bucket rotor with different adapters for 15ml, 50ml and 250ml tubes, and multi-well plates. Maximum speed 4750rpm for tubes and bottles, maximum speed 4450 rpm for plate (maximum 3 plates/holder).
- Beckman Centrifuge Allegra 25R:** Located in DV3092B. It is the bench top centrifuge with refrigerator. Set temperature -20°C to +40°C; set time is 9 hours 59 min or continuous; actual working speed depends on the rotor in use. Available rotor information:

| Rotor Selection Number (Code) | Rotor | Manufacturer Maximum Speed | Core Facility Allowed Maximum Speed | Available Adaptor | Special Beckman Tube requirement | Tube Filling Guideline |
|--------------------------------|--|--|-------------------------------------|--|----------------------------------|------------------------|
| S-57 | S5700: Two place Swing Bucket rotor for microplates  | 5700 rpm (6130 RCF) | N/A | Standard microplates up to five stacked plates per bucket | None | |
| S-5.1 BUC5 PLA | TS-5.1-500: Four place swing bucket rotor  | 5100rpm (swing buckets) (5530 RCF) | N/A | 15ml and 50ml tubes | None | |

| | | | | | | |
|--------------------|--|-------------------------------|---|-------------|--|---|
| <p>A-10</p> | <p>TA-10-250: Six place fixed angle rotor for 250ml bottles</p>  | <p>10000 rpm (15300 RCF)</p> | <p>10% Less than Manufacturer maxi speed:</p> <p>9000rpm (13770 RCF)</p> | <p>None</p> | <p>1.Beckman #356011: Polypropylene 250ml</p>  <p>2.Beckman #356013 Polycarbonate 250ml</p>  | <p>Polypropylene tubes at least half full</p> |
|--------------------|--|-------------------------------|---|-------------|--|---|

- **Eppendorf Centrifuge 5810R:** Located in DV3092K. It is the bench top centrifuge with refrigerator. Operating temperature range -9°C to 40°C; 4x750ml swing bucket rotor along with different adapters for 15ml, 50 ml, 250ml tubes and multi-well plates. Maximum speed 3900 rpm (3214 x g). Rotor A-2-DWP for deep well plates is compatible with this model (not available in core facility).
- **Eppendorf Micro-Centrifuge 5415R:** Located in Dv3092K. Maximum capacity of 24 x 1.5/2.0 ml tubes. Adjustable speed from 800 to 13,200 rpm (in 200 rpm increments) and a maximum rcf of 16,100 x g. Temperature range from 0 to 40°C.
- **Eppendorf Micro-Centrifuge 5424:** Located in DV3092E. Standard micro-centrifuge for 24x1.5-2ml tubes without refrigerator. Speed 100 – 15,000 rpm (50rpm steps).
- **Micro-Centrifuge HERMLE Z233MK:** Located in room DV3092K, with refrigerator, for 1.5-2ml Eppendorf tubes, 44 sample spaces, maximum speed 15000rpm, 21380 xg.

Electroporation System

- **Biorad Gene Pulser Xcell:** Located in DV3092B. This is complete electroporation system including both the CE module, and the PC module for transfections of both eukaryotic and prokaryotic cells; delivering square and exponential waves. It has flexible transfecting cell types from primary, suspension, and difficult-to-transfect mammalian cells including T- cells, to bacteria and fungi. Preset-ready-to-use protocols can save time. It also enables incremental voltage steps to optimize protocols.

Freeze Drying and Concentrating

- **Christ Freeze Dryer: Model Epsilon 2-6LSC plus**, located in DV3092K. The freeze dryer is a general purpose, high-performance laboratory and pilot unit for drying solid or liquid products in vials, ampoules, tubes and other glass containers. The applications include the drying of plans, tissues, antibodies and vaccines, etc. It is not used for drying highly corrosive substances such as hydrogen chloride (HCl), flammables and explosives. Official training from core facility technician is mandatory for new users.
- **Eppendorf Vacufuge Plus**: One unit is installed in room DV3092B. Second unit is installed in the fume hood in DV3092E. They are designed for the evaporation of liquid from wet samples in 1.5 or 2ml micro-tubes, 48 tube places at maximum. It can be used as concentrator, desiccator and centrifuge; speed1400rpm; optional temperature at 30/45/60°C or room temperature. Not for the use of aggressive chemicals including strong and weak alkalis, strong acids, solutions with mercury, copper and other heavy metal ions, halogenated hydrocarbons, concentrated saline and phenol.

Gel Imaging and Running Apparatus

- **Bio-Rad Gel Doc XR+**: Located in DV3092K, with Image Lab software. Applications include nucleic acid gels with stains of Ethidium bromide, SYBR gold, SYBR green, SYBR safe, Fast blue, Gel green and Gel red; protein gels with staining of Coomassie blue, Coomassie fluor orange, Copper stain, Flamingo fluorescent gel stain, Krypton, Oriole fluorescent gel stain, Silver stain, SYPRO ruby and Zinc stain; blots with stains of Colorimetric reagent. Note: not for chemiluminescence blot. A digital monochrome thermal printer P-95DW is attached to get printed images.
- **IBright Imaging System FL1500**: Located in room DV3092E. Applications include chemiluminescent Western blots, fluorescent Western blots with multiple dyes, protein gels with visual stained dyes or fluorescence proteins and DNA/RNA gels stained with fluorescent nucleic acid stains. 5 fluorescence channels are available at excitation/emission wavelengths of 455-485nm/508-557nm, 515-545nm/568-617nm, 608-632nm/675-720nm, 610-660nm/710-730nm and 745-765nm/800-850nm. The instrument can be run directly from touchscreen, photos can be transferred through USB drive or internet based ThermoFisher Cloud account. It also provides on board and desktop versions of IBright Image Analysis Software for image analysis.
- **ThermoFisher OWL A2 Large Gel System**: Portable, can be borrowed to individual labs upon request. It has a large gel running chamber and an external casting tray for detailed DNA and RNA agarose gel electrophoresis. The system comes with a VWR power source 300V, one comb of 24 wells and three combs of 36 wells.
- **ThermoFisher Power Supply EC3000XL**: Portable, can be borrowed to individual labs upon request. It is designed to provide constant voltage, current, power, or temperature in both manual and programmed modes of operation commonly used in electrophoresis applications. DC output power 20-3000VDC, 400W max; 1-400mA, 400W max.

Incubator and Incubator Shaker

- **Incubator Shaker DiaMed VS-8480S:** Located in room DV3092B/D. Temperature range ambient to 60°C, shaking speed 10-350rpm. Capacity 2x1000ml at maximum.
- **Incubator Shaker Mandel SI300:** Located in room DV3092B/D., temperature range 5°C above ambient to 60°C, speed 10-300rpm, optional reciprocating motion. Maximum operating time is 99 hours; capacity is 4L. It can be used for bacterial culture.
- **Incubator Shaker Lab-Line 3525:** Located in room DV3092B. Temperature range 5°C above ambient to 60°C; shaking speed (orbits/min): 40-400 rpm, maximum safe speed with load is less than 400 rpm; timer count down from 60 Min; chamber dimensions (W x H x D) 34 x 14.5 x 22 in.
- **Incubator Shaker Thermo Scientific MaxQ 6000:** Located in room DV3092B. 6L capacity. Temperature range 10°C above ambient to 60°C. Speed 15 to 300 rpm \pm 1 (stacked); 15 to 500 rpm \pm 1 (unstacked). 2L, 1L and 500ml flask holders and 15ml tuber holders are available.
- **Incubator Shaker Thermo Scientific MaxQ 6000-7:** Located in room DV3092B. 6L capacity with refrigerator. Temperature range 15°C below ambient to 60°C. Speed 15 to 300 rpm \pm 1 (stacked); 15 to 500 rpm \pm 1 (unstacked). Sticky matts are installed to accommodate different flask size.
- **Lab-Line Junior Orbital Shaker Model 3520:** Located in DV3092B. It is a bench top shaker at room temperature without sample incubation chamber. Orbital motion with speed range 40-400 rpm.
- **Lab-Line Maxi Rotator Model 4631: Located in DV3092B.** It is a bench top compact unit ideal for procedures which require a smooth and consistent mixing action. The mixing motion is a horizontal and vertical orbital rotation through a 6° angle at speeds from 0 to 25 rpm. Working temperature 15-40°C.
- **Incubator Fisher Scientific Isotemp 1601D (Catalogue 11-690-637D):** Located in DV3092B. Interior chamber volume 3.75 cubic feet, temperature range 30- 75°C.
- **Precision mechanic convection incubator:** Located in DV3092k, temperature range up to 70 °C.

Laminar Flow Hood

- **Microzone Horizontal Laminar Flow Hood H4-MW-99 C35:** Located in room DV3092B. The Hood provides clean workstations by preventing extraneous air-borne particulates from entering the work area to protect samples from contamination. They are not used for toxic and biohazard materials.
- **Laminar Flow Hood AirClean System:** Located in room DV3092E. A clean work station suitable for PCR preparation and other appropriate work requiring clean air environment.

Multichannel Pipettes

- **Rainin E4XLS Electronic Multi-Channel Pipette:** Portable, can be loaned to individual labs upon request. 0.5-10ul capacity, 12 channels, Rainin tips with part number 17002930 (in removable –cover racks), 17002928 (in removable –cover racks, filter tip) and 17001128 (in bulk) can be used, other models of Rainin 10ul tips can be used as well (tip information is available on the Mettler –Toledo Inc. website).
- **Rainin 20-300ul Multichannel Pipette:** Portable, can be loaned to individual labs upon request. Rainin tips are required.
- **Rainin 100-1200ul Multichannel Pipette:** Portable, can be loaned to individual labs upon request. Rainin tips are required.

PCR and Real Time PCR

- **Arktik Thermal Cycler:** Located in DV3092K. Temperature range 4 to 99°C, 96 well plate format or individual tube. The integrated USB port enables protocol transfer.
- **Bio-Rad Thermal Cycler S1000 Dual 48/48 well:** Located in DV3092E. It comes with a gradient-enabled dual 48/48 -well fast reaction module that allows 2 independently controlled protocols to be run side by side in a single bay. Recommended reaction volume is 10- 50ul/well
- **GeneAmp PCR System 9700:** Manufactured by Applied Biosystem, located in DV3092E. It is equipped with uniform heating and cooling system to efficiently produce high quality results. Additionally, there are several build-in diagnostic and validation tools available. It can be used in the formats of 96 well PCR plate, 8-strip PCR tubes or individual PCR tubes. Reaction volume can be 5-100ul.
- **Bio-Rad Real Time PCR System:** Located in DV3092K. The system consists of one CFX96 touch, one CFX384 touch and a desktop computer. It can be used in the format of 96 well plate or high-throughput 384 well plate forma separately or simultaneously. Single tube or tube strip can be used as well. CFX 96 excitation/emission wavelength is 450-730nm, CFX384 has the range of excitation/emission wavelength 450-690nm. With operating software CFX Maestro you can do data collection, analysis and graphing.

Plate Reader

- **BioTek Synergy HTX: Located in DV3092E.** Available detections: Absorbance, fluorescence and luminescence. Two filter sets for fluorescence reading, Set1: Ex-360/40 nm, Em-460/40nm, Set2: Ex-485/20nm, Em-528/20nm. Absorbance detection allows both UV and visible light absorbance measurement, wavelength selection is from 200-999nm at 1-nm increment. Plate format: 6, 12, 24, 48, 96 and 384 well microplates with standard 128x86 mm geometry, as well as Take3 trio micro-volume plate. Reusable Take3 Trio metal plate available to measure 48 samples at a time with low sample volume 2ul for high throughput nucleic acid quantifications and protein A280 assays. It is also equipped with Dual Injector System to support automated dual-reagent dispensing.

Refrigerator and Freezer

- **GE Refrigerator:** Located in DV3092K
- **Half Sized Refrigerator:** Located in DV3092B
- **Kenmore -20°C chest freezer:** Located in DV3092B, manual defrost.

Others

- **Digital Dry Bath AccuBlock:** Located in DV3092E. Temperature range up to 150°C, capacity 20x 1.5ml tubes.
- **Heat and Stir from VWR:** Located in DV3092B.
- **Hybridization Oven SHEL LAB 1012:** Located in room DV3092E. Temperature range: Amb. +5 to 65°C. Temperature uniformity: +/- 0.25°C. Rotational speed control: manually adjustable control maintains carousel speed from 0 to 15 RPM.
- **Microwave Oven:** Located in room DV3092B.
- **Ultrasonic Cleaner Branson 1510:** Located in room DV3092E, for cleaning materials and instrument part. Tank capacity 1.91L.
- **Ultraviolet Crosslinker CL-1000:** Located in DV3092K. Applications include: Crosslinking of DNA or RNA to nitrocellulose, nylon or reinforced nitrocellulose; PCR sample contamination control; photo-linking of DNA; testing RecA function; Rapid site mapping; UV sterilization and sanitization; UV curing.
- **Vortexer from VWR :** Located in DV3092E.
- **Water Bath Thermo Scientific Precision:** Located in DV3092B.