

Animal Cell Culture Facility (BSL-2)

The Animal Cell Culture facility at the Department of Life Science is a state-of-the-art BSL-2 facility equipped to maintain, propagate, and experiment on primary and established cell lines under sterile and controlled conditions. The facility is spread in approximately 800 sq. ft. with a separate donning room, doffing room, media preparation lab, main cell culture lab, autoclave area, and washing area with restricted access. It serves as a vital hub for biomedical research that supports investigation across cell biology, virology, pharmacology, cancer biology, host-pathogen interaction, and vaccine development, following standard institutional biosafety guidelines and NIH/WHO BSL-2 protocols. The facility is equipped with biosafety cabinets, CO₂ incubator, inverted microscopes, refrigerated centrifuges, liquid nitrogen tank, refrigerator, and incubator, which operate under rigorous sterile conditions to safeguard experimental integrity and prevent contamination. The facility also plays an important educational role, training the next generation of scientists in fundamental techniques such as cell passaging, cryopreservation, and viability assays. With adherence to ethical guidelines and biosafety protocols, the Animal Cell Culture Laboratory serves as a cornerstone of modern life science research within the university.

Instruments in this facility

- Class II A2 Biosafety Cabinet
- Forma Steri-Cycle CO₂ Incubator
- Magnus INVI Phase Contrast Inverted Microscope
- Refrigerated Centrifuge
- Equitron SLEFA automatic Autoclave
- LN₂ Cryostorage_Locator Plus Cryo Vessels Systems

ANIMAL CELL CULTURE FACILITY (BSL - 2)**Class II A2 Biosafety Cabinet**

A Class II Type A2 Biological Safety Cabinet is the most widely used BSC in biological research laboratories. It provides simultaneous protection for the user, the sample/product, and the environment through a system of HEPA-filtered airflow. Unlike Type A1 cabinets, the A2 recirculates 70% of cabinet air through a HEPA filter while exhausting 30% to the environment (also HEPA-filtered), and operates under negative pressure plenum conditions, making it safer for work with volatile chemicals at minute quantities.



Key Technical Specifications

Parameter	Specifications
Exterior dimensions W x H x D	1300 x 1568 x 800 mm
Interior dimensions W x H x D	1200 x 780 x 630 mm
Working height of front window	250 mm
Maximum opening height of front window	535 mm
Energy consumption	200W/70W(set-back mode)
Emission filter	520 ± 15, 558 ± 12, 586 ± 10, 623 ± 14, 682 ± 14, 711 ± 12 nm
Average illumination	900 Lx
Exhaust/inflow air volume	585 m ³ /h
Display	7-inch touchscreen
Filter specification	H14 HEPA EN 1822, 99.995% @ MPPS, 99.999% at @ 0.3 µm
Safety Alarms	Audible and visual alarms for abnormal parameters and the operator is at risk of exposure to biohazardous materials
Health Status monitoring	Status of the unit (1) the total accumulated operating hours of the unit, (2) the total UV work hours and the UV bulb install date, and (3) the filter running time, estimated residual lifetime of the HEPA filter, and the filter install date
Display	Interactive touch screen

Signature Features

- **Dual blower system:** Enables a higher degree of personal and product protection compared to the traditional, single blower biological safety cabinet design
- **Thermo Scientific™ SmartFlow™ Plus technology:** Automates airflow compensation
- **Digital Airflow Verification (DAVe™ Plus):** Alerts user to out-of-tolerance airflows that could compromise product and operator protection
- **H14 HEPA filters:** Remove airborne contaminants
- **Tactile window mechanism:** Provides positive confirmation that the correct working height is selected for the sash window
- **Programmable UV light:** Enables timed disinfection cycle run
- **Spacious work area with comfortable armrests**

Key Research Application

- **Microbiological and Cell Culture Work**

The A2 BSC is the gold standard for handling cell lines, primary cultures, and microbial cultures. Researchers rely on it to maintain sterility during passaging, transfection, and media preparation, preventing both sample contamination and operator exposure to biohazardous aerosols.

- **Biosafety Level 1 and 2 (BSL-1 & BSL-2) Agent Handling**

The cabinet is certified for work with Risk Group 1 and 2 agents — including common bacterial pathogens (*E. coli*, *Staphylococcus*, *Salmonella*), viruses (influenza, HIV at BSL-2), fungi, and parasites.

- **Molecular Biology and Genomics**

In PCR setup, RNA extraction, and nucleic acid work, HEPA-filtered laminar airflow prevents environmental and cross-sample nuclease contamination, preserving the integrity of sensitive assays.

- **Pharmaceutical and Biopharmaceutical Research**

A2 cabinets are used extensively in vaccine development, recombinant protein production, and sterility testing, where both product protection and personnel safety are paramount.

- **Oncology and Stem Cell Research**

A2 cabinet is used for handling tumor-derived cell lines, induced pluripotent stem cells (iPSCs), and co-culture systems where aseptic conditions are non-negotiable.

- **Diagnostic and Clinical Laboratories**

A2 BSC is for processing patient-derived specimens such as blood, sputum, urine, and tissue samples that may carry unknown infectious agents.

- **Veterinary and Agricultural Research**

Work involving zoonotic agents, animal cell cultures, and animal pathogens classified at BSL-2 is routinely conducted within A2 cabinet.

ANIMAL CELL CULTURE FACILITY (BSL - 2)**Forma Steri-Cycle CO₂ Incubator**

The Forma™ Steri-Cycle™ CO₂ Incubator is a premium cell culture incubator manufactured by Thermo Fisher Scientific, engineered specifically to meet the demanding requirements of modern biomedical, pharmaceutical, and life sciences research. It combines advanced contamination-control technologies with precise environmental regulation to provide an optimal, stable, and sterile environment for long-term cell and tissue culture work.



Key Technical Specifications

Parameter	Specifications
Exterior dimensions L x W x H	635 x 668 x 1003 mm
Interior dimensions D x W x H	508 x 541 x 681 mm
Capacity	184L, 6.5 cu. ft.
Relative Humidity	<90% at 37 °C
Energy consumption	1200W
Temperature Range	Ambient +5° to 50°C
CO₂ Concentration Range	0 to 20%
CO₂ Sensor Technology	TC Sensor
Display	LED
Filter specification	HEPA
Safety Alarms	Audio/visual alarms with silence button
Health Status monitoring	Alphanumeric messaging center clearly displays temperature, CO ₂ and (optional) RH parameters

Signature Features

▪ HEPA Filtration and Air Circulation

A 100%-efficiency HEPA filter (ULPA-class) is integrated into the recirculating airflow system. The fan recycles the entire cabinet atmosphere through the filter every 60 seconds, ensuring that airborne particulates, fungal spores, and other bioaerosols are continuously removed from the culture environment without the need to open the chamber.

▪ SterilCycle™ High-Heat Decontamination:

The 180 °C dry-heat decontamination programme (SterilCycle™) eliminates microbial contamination — including heat-resistant bacterial endospores — from all internal surfaces. The cycle completes in approximately 6–7 hours, after which the incubator returns to set-point conditions automatically. This eliminates the requirement for chemical decontaminants, reducing chemical hazard and personnel exposure.

▪ Microprocessor Control:

- Alphanumeric messaging center clearly displays temperature, CO₂ and (optional) RH parameters
- Audio/visual alarms with silence button
- Set points for temperature, over temperature, CO₂

- Configurable audible ON/OFF, access code, HEPA filter change reminder, remote alarm contacts, tracking low temp and high and low CO₂ alarms

Key Research Application

- **Cell and Tissue Culture:**

The primary application of the CO₂ Incubator is in mammalian cell and tissue culture. The incubator maintains precise physiological conditions — temperature (37 °C), CO₂ concentration (5%), and humidity (~95% RH) — that replicate the in vivo environment, supporting:

- Continuous culture of primary cells, cell lines, and stem cells
- Long-term proliferation studies requiring stable environmental conditions
- Culture of anchorage-dependent and suspension cells
- 3D cell culture models and organoid development

- **Stem Cell Research:**

The tight environmental control and contamination-prevention features make the Steri-Cycle incubator particularly well-suited to stem cell biology, where even minor fluctuations in CO₂, temperature, or contamination can alter pluripotency or differentiation outcomes:

- Human and mouse embryonic stem cell (ESC) maintenance
- Induced pluripotent stem cell (iPSC) reprogramming and expansion
- Directed differentiation protocols requiring stable multi-week culture
- Neural, cardiac, and hepatic organoid culture

- **Reproductive Biology and Assisted Reproductive Technology (ART):**

The incubator's precision and contamination resistance render it suitable for reproductive medicine applications, including:

- *In vitro* fertilization (IVF) and embryo culture
- Gamete and blastocyst development studies
- Cryopreservation protocol development
- Embryotoxicity and developmental toxicology assays

- **Cancer Biology and Oncology Research:**

Cancer research demands robust, contamination-free incubation across multiple simultaneous experiments. Key oncological applications include:

- Tumour cell line maintenance and passage
- Drug sensitivity and cytotoxicity assays (IC₅₀ determinations)
- Colony-forming unit (CFU) assays and clonogenic survival studies
- Co-culture systems modelling the tumour microenvironment
- Spheroid and patient-derived organoid (PDO) culture

- **Microbiology and Infectious Disease Research:**

For research involving host–pathogen interactions, the incubator supports:

- Co-culture of pathogenic organisms with mammalian host cells
- Viral infection studies and plaque assays
- Intracellular parasite propagation (e.g., Plasmodium, Leishmania)
- Biosafety Level 2 (BSL-2) compatible containment workflows when used within appropriate cabinets

- **Pharmaceutical and Biopharmaceutical Development:**

In drug discovery and biologics production, the Steri-Cycle incubator supports GMP-adjacent workflows:

- Recombinant protein and monoclonal antibody production in CHO and HEK293 cells
- Cell-based assay development for high-throughput screening (HTS)
- Toxicology and ADME (absorption, distribution, metabolism, excretion) studies
- Bioreactor seed-train culture and scale-up preparation

- **Regenerative Medicine and Tissue Engineering:**

The incubator's large 184 L capacity and uniform environment make it a key asset in regenerative medicine research:

- Scaffold-based and scaffold-free tissue engineering
- Mesenchymal stem cell (MSC) expansion for cell therapy applications
- Extracellular matrix (ECM) deposition studies
- Bioprinting substrate preparation and post-print cell culture
- **Genetic and Molecular Biology Research**
- Transient and stable transfection culture post-electroporation
- CRISPR-Cas9 genome editing cell recovery and selection
- Viral vector production (lentiviral, adenoviral, AAV) in producer cell lines
- Reporter gene assay incubation

ANIMAL CELL CULTURE FACILITY (BSL - 2)

Magnus INVI Phase Contrast Inverted Microscope

The Magnus INVI Inverted Microscope, equipped with a 10-megapixel digital camera and integrated image processor software constitutes a comprehensive imaging workstation capable of high-resolution documentation, time-lapse recording, and quantitative morphometric measurements. Unlike conventional upright microscopes, the inverted design places the objectives beneath the specimen stage, making it ideally suited for observing cells in culture vessels such as flasks, multi-well plates, Petri dishes, and chambered slides — all without disturbing the sample. From routine quality control of cell lines and viability assessment, drug screening, and stem cell research, the Magnus INVI addresses the full breadth of imaging needs in a modern animal cell culture laboratory.



Key Technical Specifications

Parameter	Specifications
Optical System	Infinity plan optics with phase contrast capability.
Observation Head	Trinocular head inclined at 30 degree, Interpupillary distance 48mm - 75mm
Eyepieces	High-point, Extra wide-field eyepiece EW10x/22
Objectives	LWD Plan Infinite 4X, LWD Plan Infinite Phase PH10X, PH20X, PH40X
Illumination	Built-in illumination base with pre-centered 6V 30W LED source coupled with an efficient collector lens system
Mechanical Stage	Plane stage 160mm x 250mm with Stage Glass insert & Auxiliary stage 70mm x 180mm
Focusing system	Co-axial coarse and fine controls with a focus adjustment and fine adjustment knobs. Coarse stroke 37.7 mm per rotation and fine stroke 0.2mm per rotation
MagCam digital camera	10MP

Signature Features

- **Inverted Optical Design:** Placing the objectives below the stage allows direct observation of cells and specimens in culture flasks, dishes, or multi-well plates without disturbing the sample.
- **Trinocular Viewing Head:** Inclined trinocular head lets users view through eyepieces while also attaching a camera for imaging, documentation, and analysis.

- **Long Working Distance Objectives:** Specially designed objectives provide sufficient space between the lens and specimen, making it easier to focus through thick culture vessel bottoms.
- **Phase Contrast Capability:** Enhances visibility of transparent, unstained live cells by improving contrast, which is especially useful in cell culture and morphology studies.
- **Wide-Field Eyepieces:** High-quality wide-field eyepieces offer a larger field of view, allowing easier scanning and observation of specimens.
- **Integrated Illumination:** Built-in halogen or LED light source delivers bright, evenly distributed illumination with adjustable intensity for clear imaging.
- **Smooth Mechanical Stage:** Stable and precise X–Y mechanical stage movements allow easy positioning and scanning of culture dishes and samples.
- **Co-axial Focus Controls:** Co-located coarse and fine focus knobs provide smooth, accurate focusing for detailed observation at different magnifications.
- **ELWD Condenser:** Extra-long working distance condenser ensures proper illuminated contrast when viewing through culture vessel walls.
- **Accessory Compatibility:** Supports additional accessories like dish holders, Terasaki holders, warm plates, and digital cameras to extend functionality for diverse applications.

Key Research Applications

▪ Routine Cell Culture Monitoring & Quality Control

The primary day-to-day function of the Magnus INVI in cell culture laboratory is routine monitoring of adherent and suspension cell lines. Cells are grown directly in standard T-flasks (T-25, T-75, T-150), multi-well plates, or Petri dishes, which are placed on the inverted stage without any preparation. The LWD objectives allow imaging through the base of culture vessels with adequate working clearance.

- **Morphology Assessment:** Regular observation of CHO, HEK-293, Vero, HeLa, NIH 3T3, and primary cells for cytoplasmic granularity, nuclear clarity, and shape integrity.
- **Confluence Estimation:** Visual estimation and, with software tools, automated percentage confluence measurement to time subculture accurately.
- **Contamination Detection:** Early detection of bacterial, yeast, or fungal contamination through phase contrast visualization of round bodies or mycelial structures in the medium.
- **Cell Health Indicators:** Identification of stressed, apoptotic, or necrotic cells based on morphological criteria — membrane blebbing, shrinkage, vacuolation.
- **Cell Viability & Counting:**

Coupled with trypan blue exclusion staining in a hemocytometer or disposable counting chamber, the Magnus INVI provides bright-field and phase contrast imaging for manual and semi-automated cell viability assessment. The 10 MP camera captures high-resolution images that are imported into the image processor for automated counting routines.

- **Live/Dead Cell Discrimination:** Blue-stained (dead) vs. unstained (live) cells clearly distinguished at 10× magnification with high contrast.

- **Total Cell Count and Viability Percentage:** Software ROI counting across hemocytometer grids with automatic tally.
- **Colony Forming Unit (CFU) Assay:** Enumeration of individual colonies in clonogenic assays; area and diameter measured per colony.
- **Cytotoxicity & Drug Screening Assays:**

High-content screening (HCS) of compound libraries or dose-response studies on 96/384-well plates is facilitated by the motorized stage option and mosaic tiling function. The software automatically acquires, stitches, and analyses multi-well plate images.

- **IC₅₀ Determination:** Cell viability images at multiple drug concentrations allow software-derived dose-response curve fitting.
- **Morphological Cytotoxicity Profiling:** Cell size, shape descriptors (circularity, elongation), and texture analysis to classify cell death mode.
- **Stem Cell & Primary Cell Research**

Animal stem cell culture — including iPSCs, embryonic stem cells, and adult progenitor cells — demands careful optical observation of colony morphology. The Magnus INVI's phase contrast system provides the gentle, label-free contrast needed for undifferentiated colony characterization.

- **ESC/iPSC Colony Monitoring:** Assessment of compact colony borders, high nucleus-to-cytoplasm ratio, and absence of spontaneous differentiation.
- **Differentiation Tracking:** Time-lapse documentation of morphological transitions during directed differentiation protocols (neuronal, cardiomyocyte, hepatocyte lineages).
- **Embryoid Body (EB) Formation:** 3D aggregate imaging in non-adherent or hanging drop cultures using long working distance objectives.
- **Microbiology & Virology Support Applications**

Where animal cell lines are used as host systems for viral propagation or co-culture models, the Magnus INVI provides cytopathic effect (CPE) monitoring and plaque assay imaging.

- **CPE Detection:** Observation of virus-induced rounding, syncytia formation, or cell lysis in Vero, MDCK, or BHK-21 cells.
- **Plaque Assay Imaging:** 4× or 10× mosaic tiling of agar overlay plates; software auto-counts plaques and measures plaque diameter.

Co-Culture Models: Multi-cell type culture observation for host-pathogen interaction studies

ANIMAL CELL CULTURE FACILITY (BSL - 2)**Refrigerated Centrifuge**

The Thermo Scientific Sorvall ST 4 Plus Centrifuge, equipped with the TX-750 swinging-bucket rotor and its comprehensive adaptor ecosystem, provides animal cell culture laboratories with a single, versatile benchtop platform capable of handling the full range of centrifugation requirements — from routine cell pelleting and media exchange through density gradient separations, viral vector clarification, and high-throughput microplate processing.



Key Specifications

Parameter	Specifications
Instrument Type	Refrigerated Benchtop Centrifuge, CFC-Free
Maximum Speed	~5000g Up to ~26000 g (rotor dependent)
Temperature Range	-10°C to +40°C, $\pm 2^{\circ}\text{C}$
Speed Control	Digital programmable control
Speed Accuracy	+/- 20 rpm
Rotor Compatibility	Swinging bucket and fixed-angle rotors
Rotor Detection	Automatic Rotor Identification (ARID)
Capacity	4X7 50mL; 4X14 15mL; 4X48 2mL; 4X750mL microplate/culture flask
Acceleration/Deceleration	Choices of 9 Accel/10 Decel Rates
Display	Digital control panel
Safety Features	Lid lock and imbalance detection
Run Time	Up to 9 hr. 59 min
Program Storage	Up to 6 Programs via LCD User Interface buttons
Standards	ISO 14971, ISO 13485, ISO 9001

Signature Features

- **Temperature-Controlled Centrifugation:** A Sorvall™ ST Plus Series Centrifuge maintains low operating temperatures during high-speed runs, preventing denaturation or degradation of heat-sensitive biomolecules such as enzymes, DNA, RNA, and proteins. This is particularly important in molecular biology, clinical diagnostics, and biochemical research.
- **Programmable Operation:** A Sorvall™ ST Plus Series Centrifuges allow precise control over speed (RPM/RCF), time, temperature, and acceleration/deceleration rates. This ensures reproducible experimental conditions for applications such as cell pelleting, plasma separation, and subcellular fractionation.
- **High Sample Capacity:** The Sorvall™ ST Plus Series Centrifuge supports multiple tubes or microplates in a single run, enabling simultaneous processing of numerous samples. This enhances laboratory throughput and efficiency, especially in clinical and research laboratories handling large sample volumes.
- **Advanced Safety Mechanisms:** Automatic lid-locking systems of a Sorvall™ ST Plus Series Centrifuge and imbalance detection features prevent accidents during high-speed centrifugation. These safety mechanisms protect both the user and the instrument while ensuring stable and secure operation.
- **Biocontainment:** Biocontainment sealing options provides protection to user and sample and offer glove-friendly, one-handed operation.
- **User-Friendly Interface:** A digital control panel of a Sorvall™ ST Plus Series Centrifuge with programmable settings allows easy setup and real-time monitoring of centrifugation parameters. This simplifies workflow management and reduces the chances of operational errors in routine and advanced laboratory procedures.

Key Research Applications

- **Cell Harvest and Pelleting:** A Sorvall™ ST Plus Series Centrifuge is used to routine harvest of suspension and adherent cells (e.g., CHO, HEK-293, Jurkat, hybridoma, and primary PBMC). It also enables efficient separation of cellular debris from culture media, facilitating downstream biochemical and molecular analyses.
- **Wash Steps and Media Exchange:** Sequential wash steps during sub-culture, transduction, or prior to downstream assays require gentle but complete pelleting to remove residual serum, antibiotics, or non-incorporated reagents. The swinging-bucket geometry of the TX-750 produces compact, easily resuspendable pellets, minimising cell loss during supernatant removal.
- **Density Gradient Separations:** Ficoll-Paque, Percoll, and OptiPrep density gradient centrifugation for isolation of primary mononuclear cells (PBMCs, splenocytes, bone marrow-derived cells) from whole blood or dissociated animal tissue are readily performed using the TX-750 rotor. The swinging-bucket design is specifically required for these protocols to maintain a sharp interface between gradient layers.
- **Conditioned Media Collection and Cytokine Harvest:** Collection of conditioned media from secreting cell lines (hybridomas for monoclonal antibody production, stromal cells for

paracrine factor harvest) requires low-speed clarification to remove cell debris while preserving secreted proteins.

- **Viral Vector Production:** In lentiviral and adeno-associated virus (AAV) production workflows, the ST 4 Plus with biocontainment lid supports:
 - Producer cell pelleting prior to lysate preparation (for AAV2/5/8/9 intracellular vectors)
 - Supernatant clarification of VSV-G pseudotyped lentiviral particles at 500-1,000 x g
 - Iodixanol or sucrose cushion preparation for concentration
- **Viral Vector Production:** High-throughput drug screening, toxicity assays, and multi-well ELISA preparation benefit from microplate centrifugation to:
 - Eliminate air bubbles and condense liquid to well bottoms before plate reading
 - Pellet cells for supernatant collection in 96-well assay plates
 - Enhance cell attachment to well surface after seeding (brief 100-200 x g spin)
 - Process cell-based reporter assays requiring rapid and uniform pelleting
- **Cryopreservation Workflows:** During cell banking and recovery, the ST 4 Plus supports: pelleting cells for resuspension in cryoprotective medium (DMSO-containing), post-thaw washing to remove DMSO rapidly, and preparation of cell count samples in pellet resuspensions. Temperature control in the ST 4 Plus R (+4°C) is particularly important for post-thaw DMSO removal to limit cryoprotectant toxicity exposure time.

ANIMAL CELL CULTURE FACILITY (BSL - 2)**Equitron SLEFA automatic Autoclave**

The Equitron 7431 SLEFA Autoclave (53 L) is a well-engineered, fully automated sterilization solution that comprehensively addresses the demands of an animal cell culture research laboratory. Its programmable microprocessor control, multi-layer safety interlocks, CE and ASME certification, and practical 53-litre chamber capacity combine to make it a reliable and regulatory-ready instrument for media sterilization, glassware processing, biohazardous waste decontamination, and instrument sterilization. Its fully automatic operation supports both the operational efficiency and the rigorous reproducibility that modern cell biology and biomedical research require.



Key Technical Specifications

Parameter	Specifications
Chamber Capacity	53 Litres
Working Chamber Dimensions	350 mm × 550 mm
Loading Type	Top Loading
Carrier Dimensions	300 × 500 mm (with separator)
Standard Sterilization Temperature	121°C
Maximum Operating Temperature	134°C
Maximum Operating Pressure	30 psi (~1.035 bar)
Control System	Microprocessor / LCD-based; user-programmable time and temperature
Lid Locking Mechanism	Single ergonomic lever; single-hand operation
Over-Temperature Protection	Independent alarm and automatic cut-off
Low Water Protection	Automatic low water level cut-off
Pressure Safety Valve	Spring-loaded; activates on over-pressure, Pressure interlock on door
Chamber Construction	Stainless steel; designed and tested per ASME guidelines
External Construction	Epoxy-coated steel (standard); SS 304 external panels available (suffix -SS)
Cycle Automation	Fully automatic: air purging → sterilization hold → pressure exhaust

Signature Features

▪ Reproducibility and Batch Consistency

The microprocessor-based controller executes each sterilization cycle — air purging, sterilization hold, and terminal pressure exhaust — identically and automatically, without operator intervention. This reproducibility is essential in GLP-compliant cell culture operations where batch-to-batch consistency in media and reagent sterility is both a scientific and regulatory requirement.

▪ Multi-Layer Safety Architecture

The 7431 SLEFA incorporates redundant safety systems critical for laboratories handling animal-derived biological materials:

- The lid safety interlock prevents cycle initiation until the lid is fully secured and prevents lid opening while the chamber is pressurized, protecting operators from steam-related injury.
- An independent over-temperature alarm with automatic cut-off guards against thermal damage to culture materials or equipment.
- The spring-loaded pressure safety valve provides passive overpressure protection independent of the electronic control system.
- The low water cut-off prevents element damage and chamber overheating during unattended operation.
- **Operational Efficiency**

The 53-litre chamber capacity enables high-volume batch sterilization in a single run, minimizing turnaround time and supporting continuous cell culture workflows. The ergonomic single-lever mechanism allows rapid, one-handed lid operation. Full automation frees research staff from attendance duties during the sterilization cycle, enabling concurrent laboratory activities.

- **Flexibility Across Sterilization Modes**

The 7431 SLEFA supports standard gravity-displacement sterilization at 121°C for routine media and glassware processing, and an optional high-speed operating mode at 134°C for applications requiring more aggressive or rapid sterilization. This eliminates the need for multiple instruments across diverse sterilization requirements in a single laboratory.

Key Research Applications

- **Sterilization of Culture Media and Reagents**

Animal cell culture depends on chemically defined or complex media such as DMEM, RPMI-1640, and MEM, along with supplements including phosphate-buffered saline (PBS), distilled water, and salt solutions. While heat-sensitive components of media like serum require filter sterilization, but base media preparations and aqueous solutions require moist-heat sterilization at 121°C. The 7431 SLEFA achieves and maintains this temperature through its programmable hold cycle, ensuring complete destruction of bacteria, fungi, viruses, and mycoplasma — persistent threats to mammalian cell cultures.

- **Sterilization of Glassware, Surgical Instruments and Plasticware**

Active cell culture laboratories generate large volumes of glassware and autoclavable plasticware including Erlenmeyer flasks, beakers, measuring cylinders, glass pipettes, centrifuge tubes, pipette tip boxes, reagent bottles scalpels, scissors, forceps, and spatulas. The 7431 SLEFA's 53-litre chamber accommodates substantial batch loads, enabling efficient high-throughput decontamination to support continuous cell culture workflows.

- **Decontamination of Biohazardous Waste**

In accordance with biosafety regulations governing animal-derived biological materials, all laboratory waste — including spent media, contaminated plasticware, sharps containers, and animal tissue remnants — must be rendered biologically safe before disposal. The automatic cycle of the 7431 SLEFA ensures consistent, validated inactivation of all biological agents, supporting compliance with

Institutional Biosafety Committee (IBSC) requirements and national biosafety frameworks such as those issued by India's DBT/RCGM or equivalent international bodies.

- **Preparation of Microbiological Substrates**

Cell culture research frequently intersects with microbiology, especially when developing feeder-cell layers, preparing bacteria-conditioned media, or conducting co-culture experiments. The 7431 SLEFA is suitable for sterilizing agar plates, broth media, and culture substrates used in microbiome-related assays and co-culture systems, broadening its application beyond core mammalian cell culture.

- **Sterilization of Process Water**

High-purity autoclaved water is required for reconstituting lyophilized media components, preparing buffer solutions, and rinsing laboratory glassware. The autoclave neutralizes residual microbial contamination and pyrogens in water supplies, reducing the risk of introducing endotoxins into sensitive animal cell culture systems.

ANIMAL CELL CULTURE FACILITY (BSL - 2)

LN2 Cryostorage Locator Plus Cryo Vessels Systems

The Thermo Scientific Locator Plus Rack and Box System is a portable, vacuum-insulated vessel used for long-term preservation of biological specimens in liquid nitrogen (vapour or liquid phase) between -130 °C to -180 °C. It combines a rugged aluminium rack framework with colour-coded polycarbonate cryogenic boxes, providing laboratories with an organised, scalable, and efficient system for managing large inventories of cryopreserved animal cells, tissues, and biological samples.



Key Specifications

Parameter	Specifications
Capacity	71L
Vial Capacity:	2,000 2 mL vials
Sample Temp	Below -180 °C
Dimensions	~95.3 cm Height, 66 cm Diameter
Insulation	Vacuum
Material	Stainless Steel
Liquid Nitrogen Usage	0.85L/day

Signature Features

- **Design and storage:** Compact design to minimize space requirements while maximizing storage capacity
- **Suited for both manual and computerized inventory record-keeping methods**
- **Outstanding temperature uniformity:** samples are stored below -180°C , even when less than 2 in. (5cm) of liquid nitrogen remains in the vessel
- **Nitrogen level monitoring:** Audible alarm that sounds when nitrogen level falls below safe range; dry remote alarm contact for remote monitoring
- **Operating costs:** Advanced vacuum insulation to minimize liquid nitrogen evaporation and reduces operating costs
- **Secure locking to prevent unauthorized entry**

Research Applications

- **Cryopreservation of Cell Lines:** The primary application of the Liquid nitrogen drawer is the long-term cryopreservation of established and primary animal cell lines at low temperature in LN₂ vapour/liquid phase. The system's stable ultra-low temperature environment ensures cell viability is maintained over years, preventing genetic drift and phenotypic changes associated with continuous in vitro passaging.

Key uses include:

- Master Cell Banks (MCB) and Working Cell Banks (WCB) for GMP-grade bioproduction
- Long-term archiving of genetically engineered mammalian cells
- Storage of transfected and transduced cell populations
- **Stem Cell and iPSC banking:** Induced pluripotent stem cells (iPSCs) and embryonic stem cell (ESC) lines require meticulous storage conditions due to their sensitivity and high research value. The Locator™ Plus system provides the consistent -196°C environment essential for maintaining pluripotency markers and differentiation potential post-thaw.

Key uses include:

- iPSC master stocks for regenerative medicine research
- Storage of differentiated progenitor cell populations
- Embryonic stem cell repositories for developmental biology studies
- **Primary Cell and Tissue Storage:** Freshly isolated primary cells from animal models (murine, bovine, porcine, primate) are irreplaceable biological resources. The Locator™ Plus system's organised rack-and-box architecture enables researchers to maintain large inventories of patient-derived and animal-derived primary cells with full traceability.

Key uses include:

- Primary hepatocytes, cardiomyocytes, and neural cells
- Peripheral blood mononuclear cells (PBMCs) from rodent and primate models

- Islet cells and pancreatic beta-cells for diabetes research
- **Biologics and Vaccine Development:** In biopharmaceutical research and vaccine manufacturing, preserving virus seed stocks, monoclonal antibody-producing hybridomas, and recombinant protein-expressing cell lines is mission-critical. The Locator™ Plus system's high-density storage and colour-coded indexing support stringent regulatory and traceability requirements.

Key uses include:

- Hybridoma cell line archives for monoclonal antibody production
- Viral vector stocks (AAV, lentiviral, adenoviral) used in gene therapy
- Antigen-presenting cell banks for vaccine immunogenicity studies
- **Genetic and Genomic Resource Banking:** Biorepositories and genomic resource centres employ the Locator™ Plus system to archive cryopreserved cell-based genetic material as part of broader biobanking programmes.

Key uses include:

- Cryopreserved germline cells (oocytes, sperm, embryos) in reproductive biology
- Genetically modified animal-derived cell lines (CRISPR-edited, transgenic)
- Reference cell panels for genetic screening and biomarker validation
- **Toxicology and Drug Screening:** High-throughput drug discovery platforms utilize cryopreserved hepatocytes and target-specific cell lines for compound screening. The system's large storage capacity and rapid-access design support the demands of plate-based and automated screening workflows.

Key uses include:

- Cryopreserved hepatocyte panels for ADME/Tox studies
- Reporter gene cell lines for high-content imaging assays
- Archived dose-response samples for longitudinal toxicological studies