PLATFORM FOR BASIC AND APPLIED CELL TECHNOLOGIES

EQUIPMENT LOCATED AT SOFIA UNIVERSITY

FACULTY OF BIOLOGY

Specific equipment at Sofia University includes specialized laboratories for molecular and cell biology at the Faculty of Biology, incl. (Drosophila m.), cell manipulations and functional and morphological analyzes of 2D and 3D cultures (transfection, TER, 3D cultivation, immunofluorescence staining, cell culture, cell culture and cell line maintenance, histological and embryonic collection, etc.), biochemical studies (protein extraction and analysis, purification, biotinylation, immunoprecipitation, Western blotting, ELISA and others), microscopic studies (phase contour, fluorescence, TEM and SEM, cytotoxicity assay cm (MTT, MTS, comet assay, AnexinV / PI, Cytodeath etc.) and cell cycle.

The Department of Cytology, Histology and Embryology hosts its own bank of cell lines of various biological species, cell culture safety cabinets, sterile disposable cell culture consumables, centrifuges, direct and indirect fluorescence staining and Western blotting antibodies, ECL development system, specialized software for data acquisition and analysis.

- **Laminar safety cabinets - class II**

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- **CO2 incubators**

• **Multimodal analysis system** for spectrophotometric analysis

- **Mini two-dimensional electrophoretic unit**

- **Combined Epoch Quantitative Analysis Unit**

• Spectrofluorimeters

• Biostep Comet assay system

• Rotary microtome "Yidi Medical Appliance"

• Distiller "Desa 0075" 10l

• various class centrifuges

Other routine equipment

FACULTY OF CHEMISTRY AND PHARMACY

Scanning Electron Microscope (JEOL JSM 5510)

The Jeol Scanning Electron Microscope (JSM 5510) operates at voltages up to 30kV, and has an Oxford Instruments Energy Dispersive X-Ray Spectroscopy detector attachment for elemental analysis.

The scanning electron microscope (SEM) images the sample surface by scanning it with a high-energy beam of electrons in a raster scan pattern.

SEM. The beam of electrons strikes the surface of the specimen and interacts with the sample at or near its surface, producing signals that contain information about the sample. The types of signals generated by an SEM include secondary electrons, back scattered electrons, characteristic x-rays and light. Electronic devices are used to detect and amplify the secondary electrons and display them as an image which is digitally captured and displayed on a computer monitor. The SEM can produce very high-resolution images of a sample surface, revealing details less than 5 nm in size. SEM micrographs have a very large depth of focus yielding a characteristic three-dimensional appearance useful for understanding the surface structure of a sample.

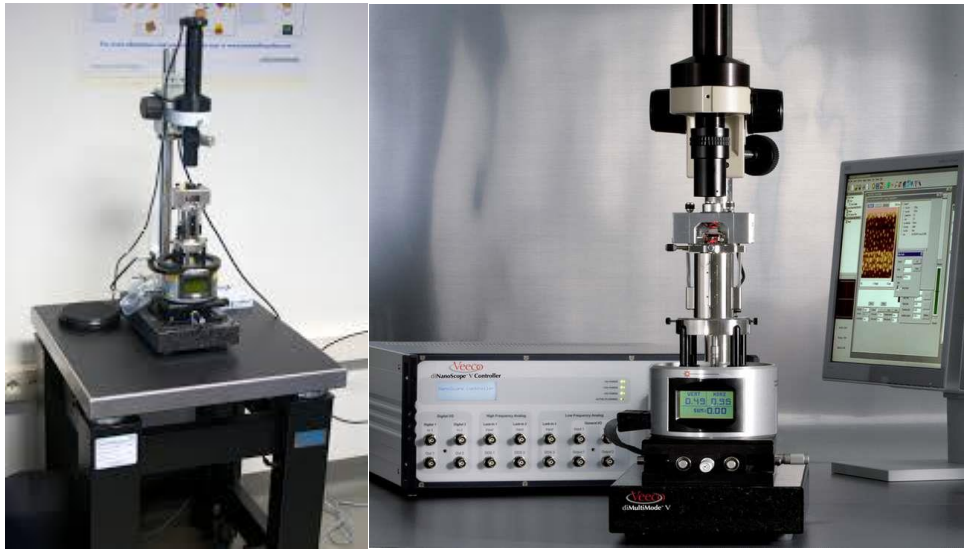
Transmission Electron Microscope (JEOL JEM 2100 (200 kV))

TEM JEM-2100. Incorporates an integrated PC system for various functions with excellent cost performance, supports research and development in wide scientific fields, for biology to materials researches.
Multipurpose 200 kV TEM with simple and ease-of-use operability and excellent expandability

Atomic Force Microscopy (AFM) Nanoscope V-Multimode (Brucker, Germany)

MultiMode 8-HR AFM is equally well suited for imaging in both air and fluid

Heating to 250°C, cooling to -35°C with temperature control accessories
A large variety of standard operating modes and many unique capabilities enable the MultiMode 8-HR AFM system to characterize everything from mechanical to electrical properties



NMR Spectrometer – Bruker Avance III 500MHz

ASCEND superconducting magnet system, 54mm bore, operation field at 11.7 T.
Avance III HD console (IPSO) with four radio frequency and four linear amplifier (BLAXH2H300/100/150; BLAX500).
HPPR Preamplifier.
Bruker Topspin 3.2 Software.
Bruker LINUX workstation HP z420.
ϕ 5 mm Triple resonance broadband probe (TBI) for 1H, 13C observe as well as 31P – 15N performance. Including actively shielded z-gradient. Temperature range -150 to +150°C.
ϕ 5 mm Broadband probe (SMART), observe all the nuclei from 31P to 15N, as well as 1H and 19F performance, 1H and 19F decoupling. Including actively shielded z-gradient. Temperature range -150 to +150°C.
2.5 mm CP/MAS Cross-polarization probe head with double resonance 1H/X for Solid State.

EQUIPMENT LOCATED AT INSTITUTE OF BIOLOGY AND IMMUNOLOGY OF REPRODUCTION – BULGARIAN ACADEMY OF SCIENCES

- Laser scanning microscope Leica TCS SPE, Visualization and 3D reconstruction of specimens of thick tissue sections; multicellular structures; biofilms and cell cultures grown on the surface or in the bulk of new materials; colony assays for antigens;
- Cell In Vitro Technology Workstation: Leica DMI 3000B-1 Invert Microscope, ICSI / IMSI and Eppendorf Microsession - 1 pc. and computer configuration
- In vitro Cell Technology Workstation: Nikon-1 Research Invert Microscope and Computer Configuration
- Olympus Straight Fluorescence Microscope (with built-in halogen lighting, wide-angle eyepieces, condenser with movable upper lens, lenses, 2 personal computer with specialized software)
- Computer Assisted Sperm Analysis - CASA (semen analysis system, Leica DMI 3000B inverter microscope, adapters, special table, lenses, digital camera)
- Flow cytometer, BD FASCalibur with argon laser and a red diode laser - 2 morphological channels and 4 fluorescence channels.
- Third-generation nanoparticle sequencer incl. workstation and mini-computer for real-time data analysis.

- qPCR real-time qPCR real-time response device (qPCR)
- PCR instruments (96x0.2ml)
- Universal analytical apparatus operating in 96-well format, working as a spectrophotometer, fluorescence, and luminescent reagent. The spectrophotometer allows determination of DNA / RNA / protein concentration in a volume of 1-2 µl as well as removal of the absorption spectrum in Fluorescence / Luminescence and the visible area.
- WATERS Chromatographic System. (gradient pump, manual injector, UV / Vision Detector, fraction collector, computer configuration and software, columns and consumables)
- 2D proteomic analysis system (isoelectric focusing system - IEF, 2D electrophoretic analysis system, high-sensitivity visualization scanner, Analytical software for 1-dimensional analysis, computer configuration)
- Apparatus for vertical protein electrophoresis.
- Apparatus for horizontal DNA electrophoresis
- DNA, RNA and protein concentration analysis system working with fluorescent dye
- Equipment – laminar safety cabinets for working with bacterial and tissue cultures
- General Laboratory equipment

Laboratory for in vitro fertilization and embryo transfer equipped with:

Laminar boxes with built-in stereomicroscopes

Micromanipulation system (*purchased under the ReProForce project*)

• **CO2 incubators (**purchased under the ReProForce project)

• Cell technology workstation (purchased under the ReProForce project)

Cell technology workstation

Leica DMI 3000B-1, Invert Microscope, ICSI / IMSI and Eppendorf microdissection - 1 pc. and computer configuration

• **Cryostat with microtome**

Freezers -80/-150oC *(purchased under the ReProForce project***)**

- **Flow cytometer** (*purchased under the "Development of Scientific Infrastructure" project*)

BD FACS Calibur

Immunophenotypic assay of cell suspensions;
evaluation of cell proliferation and apoptosis;
vitality tests

• Classic automatic sperm analyzer (purchased under the "Development of Scientific Infrastructure" project)

• COMPUTING ASSISTED SPERM ANALYSER

Assessment of morphological indicators and sperm vitality of different species. (semen analysis system, Leica DMI 3000B inverter microscope, adapters, special table, lenses, digital camera)

EQUIPMENT AT "Invito AG MTC Dimitrov"

"Inviro AG MTC Dimitrov" Ltd. is a clinical unit for assisted reproduction with experience in the isolation, storage and characterization of hematopoietic and mesenchymal stem cells. The team has expertise in setting up SOPs for isolating, processing and delivering human cells and tissues. In-Vitro AG Center Dimitrov Ltd. has modern equipment for the application of the basic procedures for cell cultures, cryopreservation of stem cells and maintenance of samples of human reproductive and stem cells under fully controlled conditions. An embryological laboratory equipped with advanced equipment and complying with a European standard for operation and micromanipulation with cells in performing Assisted Reproductive Technologies (ART) - gametes processing, intrauterine insemination (IUI), in vitro fertilization - IVF / ICSI, cultivation and selection of embryos and embryo transfer. "In-Vitro AG Center Dimitrov EOOD" has an accredited cryobank under the control of the Transplantation Implementation Agency, for the isolation, processing and storage of hematopoietic and mesenchymal stem cells from various sources. There are regular specialized trainings, demonstration courses open to specialized medical colleges, donor campaigns.

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Most relevant equipment under terms of regulatory access:

 Program Biofreezer ("Consarctic") - 2006 - with different cryopreservation regimens (gradual and controlled temperature reduction);
 Freezers for storage of frozen samples (-1500C) - 2 pcs. (Sanyo) - for the long-term storage of human samples;
Dewar tanks (for liquid nitrogen) - tanks for long-term storage of samples in liquid nitrogen - 20 pieces, different volumes;
 Freezing freezers have the so-called " Backup System, which ensures a continuous supply of liquid nitrogen when the power supply is interrupted;
 The clinic has a spare power unit for permanent supply of electricity;
 Inviro AG MTC Dimitrov Ltd. has 24-hour security and video surveillance ensuring the complete safety of the stored samples
 CO2 incubators (5 - 2 Panasonic, 1 Sanyo, 1 FormaScientific, 1 ShellLab);
 Laminar boxes (equipped with heating panels and microscopes) - 3 pcs. "BioBase Laminar Flow Cabinet", 1 "Telstar AH-100", 1 pc. "OrigioScanLab Equipment" + "Fortuna 1200E IVF CleanAir");
- Centrifuges ("Nuve NF 200" - 2007, "MLW-T 52,2", "MLW-T 32D");
 Eppendorf Micropiner;
 Inverted microscopes (3pcs) + 5-6 ordinary microscopes (2 "Olympus", "Nikon SNZ10", "CarlZeissJena", "Optics", "Lomo");

EQUIPMENT at Medical Center ReProBiomed

MC ReproBioMed is equipped with high technology level facilities covering wide range of clinical and research activities: - ultrasound equipment (Medison Sonoace X6 and Medison Accuvix) with the possibility of 2D, 3D and 4D visualization modes , and color Doppler probes (abdominal , vaginal and abdominal volume 4D- ultrasound and fetal morphology) with the ability to record analog images (on thermal paper or color laser printer) , static on the hard drive, optical drive, or USB flash drive and real-time (video clip on the hard drive, optical drive, or USB flash drive) ; possibility for networking of data transfer through LAN / DICOM connection ., • Analyzers for biochemical , immunological and haematological tests.

MC ReproBioMed is equipped with first class facilities for in-vitro fertilization and cell micromanipulation.

The staff includes Ob&Gyn clinicians, academicians, certified embryologists, immunologists, biologists. Special training is provided to MSc in Cell Biology and Developmental Biology, PhD students and post-docs.

The Laboratory for assisted reproduction hosts all necessary equipment for routine culture work like laminar safety cabinets , centrifuges , stereo -, and inverted microscope , inverted microscope (Nikon) with a micromanipulator for gametes (Integra Ti-Research Instruments), laser (Hamilton Thorne), CO 2 - incubators, Computer assisted semen analysis (CASA) and others. The Cryo bank is equipped with Dewar tanks (AirLiquid, Taylor Wharton) for storage of gametes, embryos and tissue specimens; system software freezing and others.