PLATFORM BASIC AND APPLIED "OMICS"-TECHNOLOGIES

FACILITIES

EQUIPMENT AVAILABLE IN THE JOINT GENOMIC CENTER

Joint Genoment Center Ltd. at Sofia University "St. Kl. Ohridski "is an innovative structure with opportunities for training, research and providing high-tech solutions and services for academia and business in the field of biotechnology focusing on quality of health and food. In the field of genomics: - Analysis of the presence of genetically modified organisms (GMOs); • Identification of DNA based on sequencing of short specific sections; • Specialized DNA identification analyzes for origin and purity testing; • Diagnosis and assessment of genetic status, etc. In the field of metabolism: • Target analysis of metabolites - Quantitative determination of specific metabolites; • Metabolic profile • Qualitative and quantitative determination of a group of related compounds or compounds from a specific metabolic pathway • Qualitative and quantitative determination of all metabolites; • Fingerprint • Classification of samples by rapid and general analysis without detailed identification of the compounds.

- **Capilary electrophoresis equipment (sequencer) Genetic Analyzer 3100**

The device allows separation of DNA fragments differing in length by one nucleotide. It can be used for Sanger sequencing or microsatellite analysis.

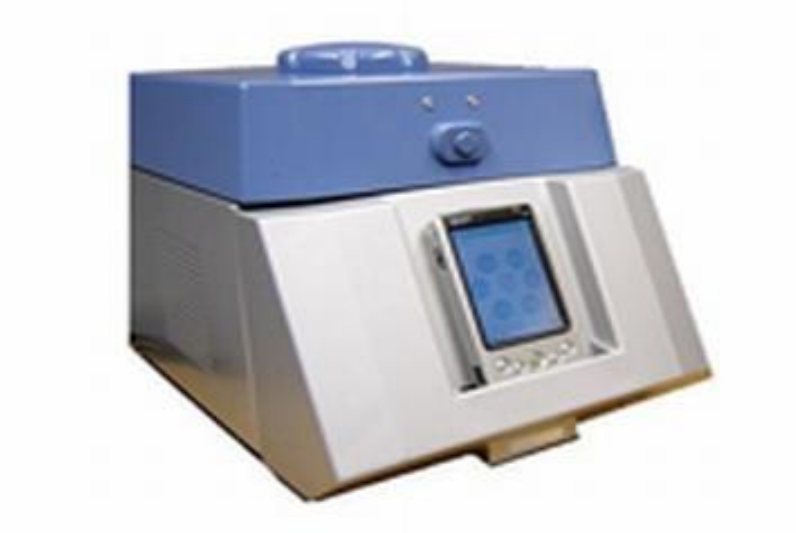
- **Pyrosequencer Qiagen Pyromark Q96**

The apparatus is used for mass parallel sequencing of individual loci.

- **GC-MS chromatograph Agilent**

One of the successful models with application in metabolomic analysis. Allows separation and identification of organic compounds in complex samples.

- 5 **gradient PCR devices (96x0.2ml) – one server**



- **4 satellite blocks**

The available devices allow simultaneous analysis of 480 samples.

- **Spectrophotometer NanoDrop 8000**

The spectrophotometer allows determination of the DNA / RNA / protein concentration in a volume of 1-2 μl, as well as the removal of the UV absorption spectrum and the visible area

- **Gel scanning and documentation equipment**
  Allows imaging in UV and visible spectra.

- **Horizontal DNA electrophoresis systems**
- **Vertical protein electrophoresis systems**

- **Robotic systems for DNA / RNA / protein extraction**
- **ELISA reader Anthos (with filters)**
- **Equipment for working with bacterial and tissue cultures**
- **Controlled environment chambers**
- **General laboratory equipment**

It is possible to equip four workplaces simultaneously.

A Technology Transfer Office, which provides consultations in the field of bio-economy, strategies of academia-business relationships in the process of globalization, protection of intellectual law; attracting investment; creating startup companies, functions from 2011 in JSC.

The technology base and existing expertise in the Joint Genomic Center will be used for specialized training and will serve as a reference center for genetic diagnostics and genomic analysis at NI KTB.

EQUIPMENT IN MEDICAL CENTER "REPROBIOMED"

The Laboratory of the **Technology Transfer Office in the Field of Molecular Genetics and Diagnostics** at the Medical Center "ReproBioMed" has modern equipment for genetic and immunological research and a young and ambitious team, which makes it an important diagnostic and research structure.

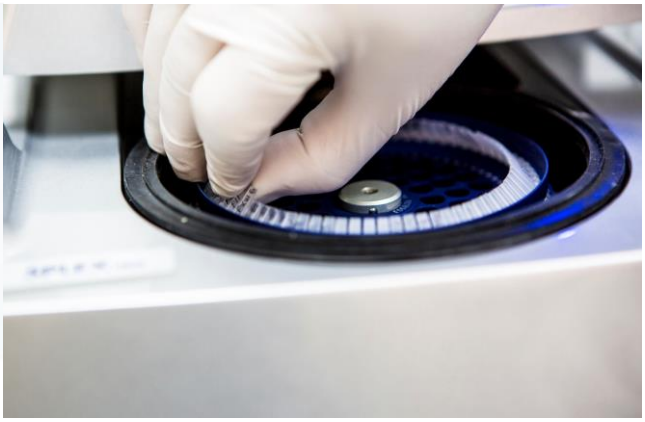
The basic molecular techniques to be applied are Polymerase Chain Reaction (PCR), Real Time PCR, Microarrays, New Generation Sequencing (NGS), and ELISA.

- **Rotor-Gene Q 2plex HRM Platform**

- with two detecting fluorescent channels and HRM

- with two rotors for work with various volumes

Polymer chain reaction in real-time is an ultra-sensitive technology that works by fluorescence detection of signals. Through this method qualitative and quantitative analyzes can be made as well as the activity of a gene. It can be used to diagnose genetic diseases and predisposition, as well as for the presence of bacterial or viral infections. In some cases, it may also be used for pre-implantation genetic diagnosis. (For working with the apparatus are authorized biologists in the field of molecular genetics and diagnostics)



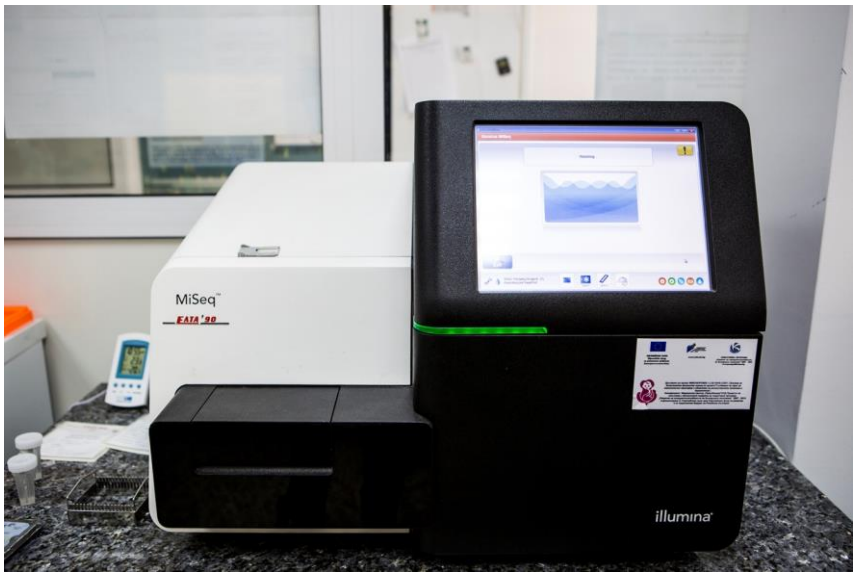
- **MiSeq Illumina next generation sequencing**

Applications:

- Preimplantation genetic diagnostics

- Whole genome sequencing

Next Generation Sequencing (NGS) is the most advanced and powerful method for DNA research. The possibilities of this technology extend from the simultaneous investigation of a number of genes and their mutations associated with a certain group of pathologies to the reading of the entire coding DNA in the human genome. This method is used for pre-implantation, prenatal and postnatal diagnosis



(Authorized specialists, biologists in the field of molecular genetics and diagnostics, as well as a clinician with specialty in medical genetics, are working with the system)

EQUIPMENT IN THE INSTITUTE OF BIOLOGY AND IMMUNOLOGY OF REPRODUCTION – BAS

- LABORATORY FOR CELL CULTURE, PHYSICAL AND CHEMICAL ANALYSIS:
- **Real-time RT_PCR Agilent** (Grant *"Research Infrastructure Development"*

- **HPLC Chromatography System** (*purchased under the "Research Infrastructure Development" project*)

(equipped with gradient pump, manual injector, UV visible detector, fraction collector, computer configuration and software, columns and consumables)

- **Invert microscope** *(purchased under the "Research Infrastructure Development")*

- **LABORATORY FOR PROTEOME ANALYSIS:**

- **Proteome analytical system** (*purchased under the "Research Infrastructure Development" project)*

- **Vertical polyacrylamide gel electrophoresis system and Differential in Gel Electrophoresis (DIGE) Scanner** with simultaneous detection of more than two fluorescent dyes and DIGE scanning data acquisition software (*Grant ReProForce REGPOT-2009-1, EC*)

2D PROTEOME ANALYSIS SYSTEM

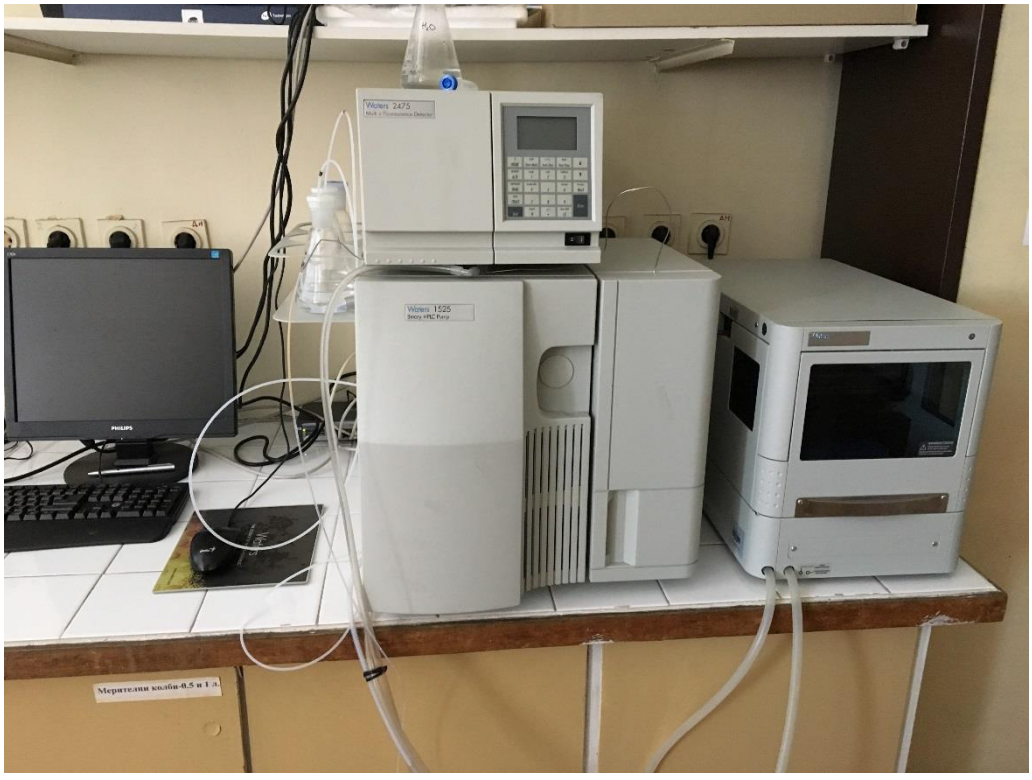
(IEF ANALYSIS system, 2D electrophoretic analysis system, high-sensitivity visualization scanner, 1-dimensional analytical software analysis, computer configuration)

- **Other conventional apparatus for electrophoretic methods**
- **and methods for detection of proteins**

EQUIPMENT IN THE INSTITUTE OF BIOPHYSICS AND BIOMEDICAL ENGINEERING-BULGARIAN ACADEMY OF SCIENCES

A research base for the development of metabolomic analysis is being developed by expanding the available equipment and increasing the possibilities and updating of the technical parameters in particular of the lipidome analysis. An emphasis is placed on performing analyzes of sphingolipid metabolites that have high functional activity in a number of vital cellular processes such as differentiation, proliferation, migration, etc. Sphingolipid metabolites, especially ceramide and sphingosine-1-phosphate, and the balance between them, play a key role in determining cell fate in terms of proliferative potential as well as in the implantation process and endometrial changes.

- **HPLC for lipidome analysis**



Basic equipment for the upgrade of the technology platform for the analysis of sphingolipid metabolism and the possibilities for its modulation.

- **Gas-chromatograph for analysis of fatty acids**

- **Fluorescent spectrophotometer for analysis of cell membrane structure**

The available equipment and highly professional scientific expertise allow the following groups of analyzes to be conducted for scientific research purposes with regulated access

- Lipidome analysis
- Analysis of sphingolipid metabolites
- Analysis of lipid peroxides