

**Research Services in the Research Center for Functional Genomics, Biomedicine and Translational Medicine,
"Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania**

Service Name	Service Description
Sample processing and biobanking	<p>Our laboratory is able to process different types of biological specimen in standardized conditions.</p> <p>The blood samples are processed in order to obtain serum, plasma and the leukocyte pellet. First, for serum, the samples have to be collected in tubes with no anticoagulant, while for plasma and leukocyte pellet, the samples are collected in EDTA tubes. The leukocyte pellet is transferred in TriReagent solution and kept at -80°C until it is processed for nucleic acid extraction. Serum and plasma samples are aliquot in 500 µl and stored at -80°C.</p> <p>Samples can be stored in ultra-freezer and liquid nitrogen tank for different time periods (months - years).</p>
Tissue processing and examination	<p>Fresh frozen tissue is stored in liquid nitrogen until used for nucleic acid extraction.</p> <p>Paraffin embedded tissues are processed using a fully automated rotary microtome from Leica, and their imagistic examination is possible using a clinical microscope from Olympus, which dispose of a high reproducibility LED source increasing the clarity of the obtained images.</p>
Nucleic acid extraction	<p>The extraction of nucleic acids can be performed form a variety of biological samples, like fresh or frozen tissue, FFPE tissue, cell cultures, whole blood or leukocyte pellet, even serum/plasma or other biological fluids.</p> <p>For the nucleic acid extraction, we can employ either the traditional chloroform /isopropanol method or use specific kits.</p> <p>The extraction of nucleic acids is performed with one of the available methods considering the type of analysis the nucleic acid sample will be used for, and the type of biological specimen and the type of method used for specific marker evaluation.</p>
Quality control for nucleic acids and proteins by NanotropND-2000 and Agilent 2100 bioanalyzer	<p>The NanoDrop 2000c can be used for quantification of nucleic acid and proteins. For nucleic acids is evaluated the A260/A280 ratio and A260/A230, two important parameters related the protein and organics solvents contamination. It also permits the assessment of toxicology assays, colorimetric protein assays, optical density measurements and gold nanoparticle quantification.</p> <p>The Agilent 2100 Bioanalyzer is the standard for RNA sample QC and has replaced labor-intensive gel electrophoresis for this application. At the same time, this platform can be used for DNA fragmentation, protein quantification or flow cytometry. The Agilent 2100 bioanalyzer helps to optimize PCR reactions for gene expression, sequencing, cloning and typing, provides higher sensitivity, improved sizing accuracy and automated, reproducible quantitation, compared with regular gel electrophoresis, which is crucial for all the genomics and transcriptomics studies. It is also rapidly replacing gel electrophoresis for DNA fragment analysis and SDS-PAGE analysis of protein samples. A unique feature of the Agilent 2100 bioanalyzer is that it can be used for both electrophoretic separation and flow cytometric analysis of cell fluorescence parameters using Annexin-Cy5/PI staining. There are some advantages, including improved data precision and</p>

	reproducibility, short analysis times, minimal sample consumption, improved automation and integration of complex workflows.
Isolation of specific cell population using Laser Capture Microdissection	<p>The Laser capture microdissection system is the ultimate laser microdissection tool of researchers who effortlessly wanted to isolate groups of cells, single cells and cell components for analysis across a wide range of applications. It is used for the separation of a pure cell population for molecular profiling studies. Single cells or other relevant cytological entities can be identified, cut, and isolated.</p> <p>Other applications are: matching the isolated cell and the remaining sample in documenting the precision and the efficiency of the isolation; Locate and cleanly microdissect structures smaller than single cells; Isolating specific pluripotent cells from the surrounding fibroblasts. This system allows the microdissection of the cells of interest without any potential damage.</p>
Performing cell cultures experiments	<p>Equipped with type II biosafety cabinets, fume hoods and incubators connected to CO₂ gas line, the lab offers the possibility of culturing of all cell types (normal, tumor or stem). This implies having the entire specific reactive such as mediums or supplements to growth the cells.</p> <p>We can perform a wide range conventional cell culture experiments for adherent and suspension cell lines in normal or hypoxic condition.</p>
Evaluation of cell morphology using bright field microscopy	Light microscopy is used for common laboratory applications that include the visualization of cellular morphology, the estimation confluence and wound assays
Evaluation of fluorescence markers	<p>Fluorescent microscopy represents an important tool, complementary to other molecular biology techniques and can be used to specifically label a selected structure in a cell or in a tissue fragment and can be evaluate using Inverted Fluorescence Microscope</p> <p>Applications: Cell viability Assays, Apoptosis Assays, Cell migration and invasion Assays.</p> <p><i>The Olympus Fluoview 1200 Confocal laser scanning microscope</i> allows the imaging of fixed live cells with high levels of sensitivity, using reduced laser power. Using this technique subsequent to Immunocytochemistry (ICC), we can confirm the expression and location of specific proteins or antigens and run semiquantitative assays based on the fluorescence intensity. Other applications include cellular morphology changes induced <i>in vitro</i> by certain compounds. Moreover, this technique is ideal for the visualization of live cells, tissues and 3D cell culture systems like organoids and spheroids.</p>
Evaluation of cell proliferation or cell viability and clonogenic capacity as effect of different	<p>Assays to measure cellular proliferation, cell viability, and cytotoxicity are commonly used to monitor the effect of different treatment scenarios. The proper choice of an assay method depends on the number and type of cells used as well as the expected outcome. Assays for cell proliferation may monitor the number of cells over time, the number of cellular divisions, metabolic activity, or DNA synthesis.</p> <p><i>Cell counting</i> using vital dyes such as trypan blue or Calcein-AM can provide both the rate of proliferation as well as the</p>

treatment scenarios	<p>percentage of viable cells.</p> <p>Cell proliferation or cell viability:</p> <ul style="list-style-type: none"> • MTT/MTS Cell Proliferation Assay Kit is a colorimetric method for sensitive quantification of viable cells in proliferation and cytotoxicity assay. • Cell Counting Kit-8 is sensitive colorimetric assays for the determination of the number of viable cells in cell proliferation and cytotoxicity assays at different time points from same experiment. • The AlamarBlue Cell Viability Assay Reagent is used to quantify cellular metabolic activity and in turn determine the concentration of viable cells in a given sample. In AlamarBlue Reagent assay, the growing cells cause a chemical reduction of the AlamarBlue dye from non-fluorescent blue to fluorescent red. The continued growth of viable cells maintains a reducing environment (fluorescent, red) and inhibition of growth maintains an oxidized environment (non-fluorescent, blue), which can be detected using a fluorescence or absorbance detector at different time points. <p>These assays can be used for the measurement of cell proliferation in response to growth factors, cytokines, mitogens, and nutrients, etc. It can also be used for the analysis of cytotoxic compounds like anticancer drugs and many other toxic agents and pharmaceutical compounds. We are able to calculate the response to different treatment scenarios and if are used multiple doses we can calculate the standard toxicological parameter IC₅₀.</p> <p><i>Clonogenic assay or colony formation</i> assay is an <i>in vitro</i> cell survival assay based on the ability of a single cell to grow into a colony. The colony is defined to consist of at least 50 cells. The assay essentially tests every cell in the population for its ability to undergo "unlimited" division. Clonogenic assay is the method of choice to determine cell reproductive death after treatment with ionizing radiation, but can also be used to determine the effectiveness of other cytotoxic agents. Only a fraction of seeded cells retains the capacity to produce colonies. Before or after treatment, cells are seeded out in appropriate dilutions to form colonies in 1-3 weeks. Colonies are fixed with glutaraldehyde (6.0% v/v)/methanol (80% v/v) and stained with crystal violet/Trypan Blue and counted and presented as graphical representation to see comparative the colony number for treated cells versus control cells.</p>
Functional test for assessment of invasion and migration capacity	<p>The scratch assay is an easy, low-cost and well-developed method to measure cell migration <i>in vitro</i>. The basic steps involve creating a "scratch" in a cell monolayer, capturing the images at the beginning and at regular intervals during cell migration to close the scratch, and comparing the images to quantify the migration rate of the cells. Compared to other methods, the <i>in vitro</i> scratch assay is particularly suitable for studies on the effects of cell–matrix and cell–cell interactions on cell migration, mimic cell migration during wound healing <i>in vivo</i> and is compatible with imaging of live cells during migration to monitor intracellular events if desired.</p> <p>The transwell migration and invasion assays may be used to analyze the ability of single cells to directionally respond to various chemo-attractants whether they are chemokines, growth factors, lipids, or nucleotides. Thus, transwell cell migration assay measures the chemotactic capability of cells toward a chemo-attractant. Meanwhile, transwell cell</p>

	invasion assay measures both cell chemotaxis and the invasion of cells through extracellular matrix, a process that is commonly found in cancer metastasis or embryonic development
Cell toxicology, invasion and migration evaluation by xCELLigence System (ACEA Biosciences)	The xCELLigence System from ACEA Biosciences is a microelectronic biosensor system for cell-based assays, providing dynamic, real-time, label-free cellular analyses for a variety of research applications in drug development, toxicology, cellular invasion and migration, or co-culture application. This pioneering technology allows researchers to increase productivity and exceed the limits of endpoint analysis by capturing data throughout the entire time course of an experiment and obtaining more physiologically relevant data. In a flexible format, it accommodates up to three 16 well plates (E-Plates or CIM-Plates), running the experiment simultaneously or independently for a wide range of toxicological and invasion and migration applications.
Cell separation of a wide range of cellular populations with AutoMACS™ Pro Separator (Miltenyi)	Magnetic-activated cell sorting (MACS) is a column-based separation technique where labeled cells are passed through a magnetic column. It allows the isolation of a certain cell type based on a particular experimental design focused to isolate a pure cellular population, or to eliminate particular subpopulations. SEP system provides a column-free cell separation technique in which a tube of labeled cells is placed inside a magnetic field. This technology has the advantage of obtaining high purity cellular population for a wide range of translational research applications.
UV-VIS, fluorescence and luminescence determination using a BioTek Microplate Reader	The Microplate Reader is an instrument used to detect biological, chemical or physical events of samples in microtiter plates. They are widely used in research, drug discovery, bioassay validation, quality control. Sample reactions can be assayed in 6-96 well format microtiter plates. The Microplate Reader can be used for protein determination, enzyme kinetics, cell toxicology tests (MTT test, release of LDH activity), reactive oxygen species (dichlorofluorescein assay) and the quantification of a wide range of metabolic products based on immunoenzymatic assays.
Characterization of cell populations by flow cytometry using BD FACS Canto II	Flow cytometry (using BD FACSCantoII) is a technology that simultaneously measures and analyzes multiple physical characteristics of single particles, usually cells, as they flow in a fluid stream through a beam of light. Flow cytometry provides rapid analysis of multiple characteristics of single cells. Flow cytometry permit a wide range of clinic applications: <i>in hematology</i> (erythrocyte analysis, leukocyte analysis, platelet analysis, leukemia and lymphoma phenotyping (leukocyte surface antigens), identification of <i>prognostic markers in important subgroups</i> (TdT, MPO), hematopoietic progenitor cell enumeration (CD34), diagnosis of systemic mastocytosis (CD25, CD69), anti-platelet antibodies (IgG, IgM), anti-neutrophil antibodies (IgG), immune complexes (Complement, IgG), <i>in immunology</i> (histocompatibility cross-matching (IgG, IgM), transplantation rejection (CD3, circulating OKT3), HLA-B27 detection (HLA-B27), immunodeficiency studies (CD4, CD8), <i>in oncology</i> (DNA content and S phase of tumors (DNA), measurement of proliferation markers (Ki-67, PCNA), <i>in genetic disorders</i> (PNH (CD55, CD59), leukocyte adhesion deficiency (CD11/CD18 complex). Functional test for evaluation of: <ul style="list-style-type: none"> • apoptosis (using Annexin V/ propidium iodide)

	<ul style="list-style-type: none"> • cell cycle (using propidium iodide DNA staining) • stem cells characterization
Nanoparticles characterization	<p>The NanoSight NS300 uses the technology of Nanoparticle Tracking Analysis (NTA) to characterize nanoparticles from 10nm - 2000 nm in solution. This technology utilizes the properties of both light scattering and Brownian motion in order to obtain the size distribution and concentration measurement of particles in liquid suspension. A laser beam is passed through the sample chamber, and the particles in suspension pass in the path of this beam scatter light in such a manner that they can be easily visualized via 20x magnification microscope onto which a camera is mounted. The camera operates at 30 frames per second (fps), capturing a video file of the particles moving under Brownian motion. The software tracks many particles individually and using the Stokes-Einstein equation calculates their hydrodynamic diameters. The measurement is controlled via Standard Operating Procedures which are set with a user-friendly software interface permitting the acquisition of the data and different format visualization.</p>
Microarray application in biomedical research	<p>Microarray lab is fully equipped with all the instruments to carry out microarray analysis with the latest version of Agilent technology (SureScan Microarray Scanner/G4900DA from Agilent Technologies- built-in ozone protection to minimize signal degradation and continuous slide loading capability) and provides a full service, including:</p> <ul style="list-style-type: none"> • Technical guidance in experimental design for biological specimens and cell culture-based studies • RNA extraction protocols (for gene expression protocols is recommended miRNeasy kits from QIAGEN for purification, around 200ng of total RNA; for miRNA microarray 100 ng of total RNA it is required, and the recommended kits are those that recover total RNA or special column-based kits for recovery of miRNA fraction; additionally 3-4 µl of RNA is required for quality control) • Quality control of nucleic acids with NanodropND200 (A260/A280ratio value >1.8 and A260/A230 ratio>1.5) and Bionalyzer 2010 (RNA integrity higher than 7) • Sample labeling and array hybridization (Agilent technology) • Raw data extraction and QC of the raw data (Features Extraction) • Data analysis (Gene Spring for the case of mRNA and miRNA, gene ontology and target genes using specialized programs) and data validation by qRT-PCR or Nanostring <p>Microarray services include:</p> <ul style="list-style-type: none"> • mRNA expression: provide commercially human microarrays or different animal models, as well as custom design arrays (Agilent technologies) form different biological specimen (tissues, cell culture) • miRNA expression services using Agilent microarray based on commercially available or custom made for different species from different biological specimens (tissue, biological fluids like serum/plasma, urine or saliva) • CGH or different variants of Custom CGH+SNP Microarray

<p>Evaluation of mutational and transcriptomic pattern using next generation sequencing</p>	<p>Next Generation Sequencing Laboratory is equipped with an Ion Torrent Personal Genome Machine and an Illumina NextSeq 550 sequencer that can be used for different types of NGS experiments like:</p> <ul style="list-style-type: none"> • Targeted DNA sequencing using either commercially available panels or custom panel • Targeted RNA sequencing using either commercially available panels or custom panels • MiRNA sequencing • Whole exome sequencing • Whole transcriptome sequencing <p>The targeted sequencing and miRNA sequencing applications are done on the Ion Torrent Personal Genome Machine sequencer and The Whole exome and whole transcriptome experiments are done on the Illumina NexSeq 550. The NGS laboratory has the main instruments necessary for a complete experiment starting from the biological sample and finishing with data analysis. Here we can offer a full service as follows:</p> <ul style="list-style-type: none"> • Technical guidance for experimental design • DNA, RNA and miARN extractions using specific commercially available kits • Quality control assessments using NanoDrop ND2000, Qubit 2.0 and Agilent Bioanalyzer • Sequencing Library preparation, template synthesis and sequencing • Data analysis using the Varian caller and Ion Reporter software • Variance validation either using Sanger sequencing or real time PCR technology
<p>Molecular profiling and data validation using Nanostring nCounter</p>	<p>The nCounter system from Nanostring Technologies is a fully automated system to profile hundreds of mRNAs, microRNAs, or DNA targets simultaneously with high sensitivity and precision, not only for molecular profiling studies but also for the validation of experimental data (particularly those generated by microarray and NGS experiments). NanoString nCounter technology uses color-coded molecular barcodes that can hybridize directly to different types of target molecules. This system has several advantages like: it used low amounts of material (100 ng of total RNA/sample)/600 ng DNA; ability to analyze RNA samples of poor quality; can assess over 800 transcripts per sample simultaneously; no enzymatic reactions involved, in a high dynamic range, sensitivity and reproducibility. The main applications are:</p> <ul style="list-style-type: none"> • mRNA Profiling (gene expression analysis, single cell gene expression analysis, plex2TM expression analysis, lncRNA expression analysis, leukemia fusion gene analysis) • miRNA Profiling (miRNA expression analysis, miRGETM expression analysis) • analysis of DNA (Copy Number Variation Analysis-CNV, Chip-String expression analysis).
<p>PCR amplification Veriti Thermal Cycler</p>	<p>The polymerase chain reaction (PCR) is a technology in molecular biology used to amplify a single copy or a few copies of a DNA fragment across several orders of magnitude, generating thousands to millions of copies of a particular DNA</p>

(Thermo Scientific)	Fisher	sequence. PCR allows isolation of DNA fragments from genomic DNA by selective amplification of a specific region of DNA using particular primers, used for downstream molecular applications or directly assessed by Bioanalyzer 2100.
Real-time evaluations using LightCycler480 RT-PCR (Roche), RT-PCR (Applied Biosystems)	PCR using ViiA-7 system	Real-time PCR allows monitoring of the desired product at any point in the amplification process by measuring fluorescence. It monitors the amplification of a targeted DNA molecule during the PCR, i.e. in real-time. Real-time PCR is used for sensitive, specific detection and quantification of nucleic acid targets. It includes a wide range of applications starting with gene or noncoding RNA (ncRNA, miRNA) expression, Genetic Variation Analysis (SNP Genotyping, Drug Metabolism Enzyme Genotyping, Copy Number Variation Analysis) and Gene Methylation status. It can be used either with TaqMan or SybrGreen reagents.
Protein evaluation by Western Blot		Western Blot is used for evaluation of proteins from cell/tissue lysate using SDS-polyacrylamide gels followed by transfer to nitrocellulose membrane. The membrane is marked with primary and secondary antibodies and the proteins are identified either by chemiluminescent or visible detection. This technique can be applied in different types of projects, like validation of RT-PCR data at protein level or identification of specific proteins. For this service we use the Mini-PROTEAN tetra cell system and the membranes are visualized using Azure Gel Imaging System.
Protein determination by ELISA		ELISA is a popular format of "wet-lab" type analytic biochemistry assay that uses a solid-phase enzyme immunoassay (EIA) to detect the presence of a substance, usually an antigen, in a liquid sample or wet sample. This technique is used often in the identification of proteins both quantitatively and qualitatively, and also in validation of transcriptome data at the protein level. We can perform kit based ELISA, indirect or sandwich ELISA. The ELISA plates are read on the Spectral Max 19 or BioTek spectrophotometers.
Protein determination using AB SCIEX Triple Quad 4500 System		The TripleQuadruple 4500 system is a robust and reliable instrument and has enhanced performance across all critical parameters: sensitivity, dynamic range, linear Ion trap performance, scan speed and footprint. There are some advantages such as improved MRM sensitivity by 10X vs competitive triple quads in the same class, optimized integration with UHPLC strategies with scan speeds of up to 12,000 Da/sec, and more data points acquired for a given UHPLC peak, improved multi-day batch assay reproducibility with solid 0.1 Da mass stability over 24 hours, 5 orders of dynamic range, more compounds screened with ultra-fast MRM cycle times with 1 millisecond dwell times. This reliable system allows a wide range of applications for thousands of compounds after purification using isoelectric focusing separation or other specific methods. Different applications of proteomics include discovery of protein biomarkers to identify potential disease biomarkers in molecular diagnostics and prognostic.
Microbiological determination	CFU	Colony formatting units (CFU) is a method used in microbiology for the assessment of the contamination level of a biological sample or other types of samples where such determinations are required. This analysis is a type of quality control method with multiple applications, such as quality control of pharmaceutical products in accordance with international regulatory standards, where the level of microorganisms in a drug batch is required to be determined for the safety of patients.

Custom made gene expression vectors	Our laboratory is able to design and produce plasmid vectors and lentiviral vectors (2nd and 3rd generation) for constitutive and regulated transgene expression in cell line and animal models. Vectors with genome editing capabilities using CRISPR/Cas9 can also be provided for boosting research in biomedical fundamental research.
Stable cell clones	The service offers monoclonal cell lines stable that express transgenes of interest, such as reporter genes, or other genes on demand.

**Research Equipments in the Research Center for Functional Genomics, Biomedicine and Translational Medicine,
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Equipment Name	Equipment Description
Mini-PROTEAN Electrophoresis system	Mini-PROTEAN Tetra cell is ideal for vertical mini gel electrophoresis. It can be used with either precast or handmade gels and the electrophoresis cell accommodates 1-4 10.0x8 gels. The Mini-PROTEAN electrophoresis system is composed of: power supply, tank with lid, combs, gel releasers, spacer plates, short plates, sample loading guide, casting frame and casting stand. The modules of these electrophoresis systems are interchangeable and by changing the electrophoresis module with the Mini-Trans Blot module, one can perform western blotting.
ROTEAN® i12™ IEF System	The PROTEAN i12 IEF system is used for isoelectric focusing (IEF) on immobilized pH gradient (IPG) strips for the first dimension of two-dimensional electrophoretic protein analysis. The PROTEAN i12 IEF cell can run 1–12IPG strips in 7, 11, 13, 17, 18, and 24 cm focusing trays. Each channel in the i12™ focusing tray is powered by its own power supply, enabling precise control over each IPG strip. This makes it possible to run different sample types, different gradients, and multiple protocols all at the same time. The i12 focusing trays and electrode assemblies accommodate all possible gel configurations. The cell is fully programmable from the user interface; connection to an external computer is not required.
Bio-Dot Microfiltration Apparatus	The 96 well Bio-Dot microfiltration unit provides easy, reproducible methods for binding proteins or nucleic acids in solution onto membranes. Many experimental protocols can be accommodated by using interchangeable templates. The unit is available as a complete system composed of Bio-Dot apparatus, Bio-Dot gasket, stopcock and tubing. The system has the following features: resistance to 100% ethanol, strong acids and NaOH; autoclavability; patented sealing gasket to eliminate lateral leakage; easy sample application with microplate-based spacing; flow valve (3way) for adjustable vacuum.
SpectraMax 190 Microplate Reader	The patented multichannel optical design of the SpectraMax 190 Absorbance Microplate Reader mimics a dual beam spectrophotometer, measures each sample in the plate directly, and eliminates measurement errors caused by variations in light output between optical fibers on other instruments for more reliable data reporting. The SpectraMax 190 Microplate Reader supports a multitude of absorbance assay categories including: Cell viability, proliferation, and cytotoxicity; ELISAs and immunoassays; Endotoxin detection; Enzyme assays; Microbial growth; Micro volume applications; Nucleic acid (DNA) quantitation; Phosphatases/kinases; Protein quantification.
QUBIT 2.0Fluorometer	The Qubit® 2.0 Fluorometer is a benchtop fluorometer for the quantitation of DNA, RNA, and protein, using the highly sensitive and accurate fluorescence-based Qubit™ quantitation assays. Use of the state-of-the-art dyes selective for dsDNA, RNA, and protein minimizes the effects of contaminants that affect the quantitation.

NanoDrop 2000C	The Thermo Scientific NanoDrop 2000c UV-Vis spectrophotometer is able to quantify DNA, RNA and protein with enhanced capabilities, featuring both microvolume pedestal and cuvette measurement options. The cuvette station is ideal for measuring dilute nucleic acid and protein assays, includes heating and micro-stirring capabilities, and allows users to perform kinetics and cell culture readings (600nm). It presents a wide spectral range (190-840nm) for measuring a variety of samples types: Peptides (205nm),DNA and RNA (260nm), Purified protein (280nm),Toxicology assays and industrial dyes (490nm), Gold nanoparticles (520nm), Colorimetric protein assays (BCA 562nm, Bradford 595nm, Modified Lowry 650nm, Pierce 660 660nm), Optical Density measurements (600nm)
Ion Torrent Personal Genome Machine	The Ion Torrent PGM sequencer was first manufactured in 2010 by Life Technologies and is a sequencer that uses the sequencing by synthesis method and the emulsion PCR for template synthesis. For the identification of each nucleotide added during sequencing, it uses the measurements of H ⁺ ions which are released during base incorporation. This sequencer has a fast run of approximate 2 hours, and the reagents are less expensive than for other platforms. This instrument works with 3 types of semiconductor chips (314, 316 and 318) and is mainly used for small genome sequencing and targeted sequencing. The Ion Torrent PGM can also be used for mRNA or miRNA sequencing and ChiP sequencing when using the 318 chips
CASY SYSTEM	The cells suspended in CASYton, an electrolyte buffer, are aspirated through a precision measuring capillary with a defined size. While passing through the measuring capillary, they are scanned with a frequency of 1 million measurements per second in a low voltage field between two platinum electrodes. The resulting electrical signals generated by a cell passing through the measuring capillary are analyzed in terms of amplitude, pulse width, course of time and resulting pulse area. The analyzed pulse areas of cell signals are cumulated and assigned in a calibrated multi-channel analyzer that has 512,000 differentiated size channels
LightCycler 480 II	The system utilizes a novel block technology to allow the rapid heating and cooling required to complete a 40-cycle, 384-well qPCR run in less than 40 minutes. The benchtop instrument is easily customizable to meet changing user requirements, and can be integrated into everyday use as a robotically controlled, automated high-throughput solution. Based on a comprehensive improvement of the Peltier-based technology, using heat-equalizing Thermo-Base Technology incorporated into a silver block, the LightCycler® 480 Instrument provides extraordinary well-to-well temperature homogeneity and maximized inter-well, inter-cycle reproducibility. LightCycler 480 II Roche is used for: analysis of genotyping, gene expression and mutagenesis analysis of gene expression, miRNA and non-coding RNA analysis, SNP genotyping, the identification of key genetic mutations in certain types of cancer, evaluation of the DNA copies number in the studied samples.
NanoString nCounter	The nCounter Dx Analysis System consists of two instruments: the Prep Station and the Digital Analyzer. The Prep Station also includes a pipette tip rack, a liquid waste container, a solid waste container, and silicone grease. The Prep Station is a multi-channel pipetting robot configured specifically for use with NanoString nCounter Test Kits. The

	instrument performs liquid transfers, magnetic bead separations, and immobilization of molecular labels on the sample cartridge surface. The Digital Analyzer is a multi-channel epifluorescence scanner configured specifically for use with NanoString's nCounter Test Kit Cartridges
ViiA 7 AB Applied Biosystem	Real-Time PCR ViiA7 System was designed to improve the productivity of researchers that includes changing gene expression in response to pharmacological agents, and how genetic variation influences response to treatments for diseases. With a simplified workflow, intuitive software, touch-screen interface, and one-button protocols for error minimization, the ViiA™ 7 System offers exceptional reproducibility with minimal well-to-well and instrument-to-instrument variation. Full compatibility with any standard or fast-cycling 384 plates and TaqMan® Array Micro Fluidic Cards and Reagents makes high-productivity real-time PCR accessible to any size lab.
Verity 96-Well Thermal Cycler	Verity 96-Well Thermal Cycler is used to amplify specific DNA fragments by PCR. The benefits include optimization of PCR machine - each block can be set to a specific temperature that is ideal for precise control on the optimization of PCR. Eriflex™ Blocks offer 6 independent temperature blocks for precise control over PCR optimization. Unlike traditional gradient blocks, Veriti® thermal cyclers are not bound to a computer algorithm to generate a "gradient" of temperatures. The samples can be incubated at six different temperatures at the same time. Veriti 96-Well Thermal Cycler helps shorten the PCR cycling time with the options to run fast or standard PCR chemistry protocols
Synergy H1 Hybrid Multi-Mode Microplate Reader	Synergy™ H1 is a flexible monochromator-based multi-mode microplate reader that can be turned into a high-performance patented Hybrid system with the addition of a filter-based optical module. The monochromator optics uses a third generation quadruple grating design that allows working at any excitation or emission wavelength with a 1 nm step. This system supports top and bottom fluorescence intensity, UV-visible absorbance and high performance luminescence detection. It is the ideal system for all the standard microplate applications found in life science research laboratories. This module supports advanced detection modes such as Fluorescence Polarization, Time-Resolved Fluorescence & TR-FRET and filtered luminescence. A dual reagent injection system is available to automate inject/read assays such as ion channels assays or flash luminescence assays.
The autoMACS® Pro Separator	The autoMACS® Pro Separator is a benchtop instrument for high-speed magnetic cell sorting of multiple samples. The autoMACS Pro Separator is compatible with more than 250 MACS Cell Separation Reagents for easy and fast isolation of virtually any cell type from any species. The system enables cell sorting directly from whole blood or bone marrow without the need for density-gradient centrifugation or erythrocyte lysis. The compatibility of MACS Technology with flow cytometry allows the use of the autoMACS Pro Separator as an alternative to flow sorting. Alternatively, the autoMACS Pro Separator can be used as a pre-sorter for speeding up flow sorting. The instrument is operated via touchscreen and intuitive screen menus.
2100 Bioanalyzer	Agilent 2100 Bioanalyzer electrophoresis system provides electrophoretic separation, qualitative and quantitative

Instrument	analysis of fragments of DNA/ RNA/ protein and cellular analysis (flow cytometry module). The system offers two types of analyses: electrophoresis and cell analysis on a chip (type 2 color flow cytometry); the system uses reagents kits which complete, ready-to-use; low sample consumption (1-4 ml), easy to use. Digital data are presented in several forms: gel electrophoresis images, electroforegramme, tables etc. It has interchangeable cartridges to avoid contamination. Agilent 2100 Bioanalyzer represents the standard in qualitative assessments of the samples of nucleic acids and protein and successfully replaces gel electrophoresis analysis for DNA / RNA or SDS-PAGE analysis of protein samples
BD FACS Canto II Flow cytometry	Flow cytometry is used for immunophenotyping of a variety of specimens, including whole blood, bone marrow, cerebrospinal fluid, urine and solid tissues. The characteristics that can be measured include cell size, cytoplasmic complexity, DNA or RNA content, and a wide range of intracellular and membrane-bound proteins. Flow cytometry is used in several fields such as immunology, oncology and hematology.
Microarray	The SureScan Microarray Scanner is a laser induced fluorescence scanner designed to read microarrays printed on standard 1 inch x 3 inch glass slides. It simultaneously measures the fluorescence intensity of two dyes from labeled sample nucleic acid bound to microarrays. The microarray platform is the central point of a modern genomics facility, offering cutting edge tools to perform molecular research. The resolution varies from 1 to 10 microns, while the autoloader permits the loading of up to 24 slides at the same time. The SureScan from Agilent performs fast scans of the microarray slides: two-color simultaneous data acquisition in 16 minutes per for 3-micron scans and 24 minutes for 2-micron scans (scan region of 61 mm x 21.6 mm).
Proteomics Qtrap 4500	Proteomics is a new area of medical practices, dealing with research of protein structure and function. This allows to determine the structure and function of proteins in order to identify new biomarkers (microRNA, proteins) for molecular diagnosis in cancer and autoimmune diseases, predicting the development and progression of the illness, the identification of new therapeutic strategies in different conditions - the classification and the choice of treatment for patients with autoimmune and oncological diseases, the establishment of new therapeutic strategies in cancer, identification and quantification of proteins in cells, tissues and fluids in order to identify new diagnostic biomarkers, analysis of changes of protein expression in normal cells compared to pathological cells, study of protein-protein interactions, characterization of post-translational modifications.
xCELLigence RTCA DP Instrument	The xCELLigence RTCA DP instrument analyses cell functions using non-destructive, reagent free impedance measurements where real time monitoring detects short term events. The instrument uses impedance measurements to monitor cell growth or death and morphology changes using 2000 to 60000 cells per well, depending on the cell line. The system is used for cell invasion and migration assays, compound- and cell-mediated cytotoxicity, cell adhesion and cell spreading, cell proliferation and cell differentiation, receptor-mediated signaling, virus-mediated cytopathogenicity, continuous quality control of cells. A wide range of parameters are analyzed, including time

	dependent IC50 determination other statistical analyses based on the system software.
Inverted Fluorescence Microscope OLYMPUS IX71	As new fluorochromes are developed and new methods of light excitation and manipulation become more popular for live cell experiments, more and more researchers will require the use of low phototoxicity near-IR wavelengths in addition to the conventional visible spectrum. Olympus has equipped its IX2 series microscopes with the new UIS2 optical system precisely to meet those demands. With its high S/N ratio, its compensation for chromatic aberration over a much wider wavelength range and its flat, high transmittance, this new system sets a new world standard of fluorescence performance — efficiently detecting even faint fluorescence signals without damaging the cell, and optimizing multi-color observation. Delivering unprecedented image quality over a super wide light spectrum, the IX2 inverted system microscope will be the live cell instrument of choice.
Confocal Microscope OLYMPUS FLOVIEW FV1200MPE/FV1200	Imaging of living tissues demands the highest levels of sensitivity which allows for reduced laser power, phototoxicity and photobleaching, and innovative approaches to measurement of fluorescent indicators. The new FV1200 offers increased scan light throughput, cooled high sensitivity detector technology, and capitalizes on the advantages of the recently introduced IX83 automated inverted microscope platform. Enhancements in detector and coating technology allow for up to five simultaneous fluorescent detection channels. The dedicated laser light stimulation scanner (SIM Scanner) achieves simultaneous stimulation and imaging for real-time visualization of rapid cell responses. This coordination of laser stimulation and imaging makes the FV1200 an ideal choice for FRAP, FLIP and photoactivation.
Laser Capture Microdissection System MMI CellCut Plus	MMi CellCut combines several leading-edge technologies in providing extremely fast, precise sections from a wide range of microscopic samples. This is achieved by dissecting the areas of interest with an ultraprecise UV-laser while maintaining its morphology and ensuring the quality of the source material for subsequent downstream analysis without unnecessary induction of physical or chemical forces.
BabyGravimat	The BabyGravimat instrument is meant for making simple or serial dilutions of a biological/pharmaceutical sample for microbiological analysis. It is equipped with a scale for weighting the sample in a specialized bag and a dosing system for the diluent.
BagMixer CC	The BagSystem instrument is used for homogenizing biological/pharmaceutical samples in a specialized bag. It is equipped with a LCD screen and programmable parameters for speed and time of homogenization of the sample.
EasySpiral	The easySpiral instrument is a system for automated plating microbiological samples on Petri dishes. The volume of the inoculated sample can be programmed between 50-200 μ L, also the instrument is able to plate the biological samples in a circular or exponential manner. The instrument is equipped with automated cleaning and disinfecting system.
Scan500	The Scan500 instrument is an automated system for counting bacterial colonies on inoculated Petri dishes. It is equipped with LEDs for visualizing the bacterial colonies. The image is captured with a CCD camera and analysis of

	the image is performed with the included software. The results can be saved as a pdf file for documentation proposes.
Thermostat	The Thermostat is a programmable incubator for temperatures ranging between 20 and 60°C. It is primary used for cultivation of microorganisms at an optimal temperature
MaxQ 416 HP Orbital Shaker	MaxQ 416 HP Orbital Shaker is a programmable instrument for culturing microorganisms under shaking conditions. It is equipped with several accessories for adapting different culturing vessels.
THERMO SCIENTIFIC FORMA 8605, -86 oC ULTRAFREEZER	Upright ultra-low freezers ULF range: - realized in steel epoxy coated outside and stainless steel inside - solid doors realized with the same insulation and material as the structure and security key locking - digital-electronic temperature control.
HERMO SCIENTIFIC BioCane 47/Locator 4/Arctic Express 5	Liquid cryogens can be used to rapidly reduce sample temperatures, maintain samples at very cold conditions, and create an environment to test products. Liquid nitrogen (LN2), for its versatility is one of the most popular cryogenic liquids used in the laboratory. Medical facilities, both research and healthcare, commonly use liquid nitrogen for the storage, handling and shipment of biological samples. Cryogenic nitrogen have advantages over mechanical freezers due to its speed and ability to limit the sharp ice crystals in tissue and cells that can form with other methods.
Illumina NextSeq 550 System	Illumina NextSeq 550 System is a single solution that provides a seamless transition between high-throughput sequencing and array scanning. All in one, Sequencing features and Array Scanning Features are put together to provide the best solution for your projects. The nextSeq 550 enables sequencing of exosomes, whole genomes, and transcriptome and supports TruSeq and Nextera libraries. Real-Time Analysis – is using an integrated analysis software on-instrument data analysis, which includes image analysis and base calling. Moreover, nextSeq 550 allows you to transition between array scanning and high-throughput sequencing on the same instrument, just using the same control software.