

BIOTECHNOLOGICAL DRUG RESEARCH AND DEVELOPMENT LABORATORY

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1. LABORATORY OVERVIEW

Our laboratory was established to conduct advanced scientific research, strengthen university-industry collaborations, and develop innovative solutions for societal benefit. Operating within the university, our facility offers high-quality analytical services across multiple disciplines with an interdisciplinary approach.

2. OUR MISSION AND VISION

Mission: Our laboratory's primary mission is to generate reliable data based on scientific accuracy and ethical principles while contributing to sustainable research efforts.

Vision: To become a leading laboratory recognized for excellence in scientific research, innovation, and analytical services — contributing to the advancement of knowledge, supporting sustainable development, and shaping the future through ethical and high-quality laboratory practices.

2. SCOPE OF SERVICES

Our laboratory provides analysis, testing, and R&D support across various fields, including biotechnology, molecular biology, environmental sciences, pharmaceuticals, food, and materials science.

Our main services include; Chemical and physical analyses, Project-based research support and Technical consultancy

3. QUALITY MANAGEMENT AND ACCREDITATIONS

The laboratory is structured in accordance with Good Laboratory Practice (GLP) principles. A robust quality management system is implemented throughout all analysis processes, ensuring traceability of records and reproducibility of results.

Additionally, our laboratory complies with national and international quality standards as defined by authorized institutions such as ISO and TÜRKAK.

4. TECHNOLOGICAL INFRASTRUCTURE AND EQUIPMENT

Our infrastructure is equipped with advanced analytical instruments and modern laboratory technologies.

Key instruments include:

- Capillary Electrophoresis
- Nanodrop
- LC-MS/MS (Liquid Chromatography–Mass Spectrometry)
- Circular Dicroism Spectroscopy
- Real-Time PCR
- ICP-MS (Inductively Coupled Plasma Mass Spectrometry) etc.

These high-precision devices enable us to perform analyses in line with international scientific standards.

OUR INVENTORY

Capillary Electrophoresis	1
Biomolecular Affinity Measurement Detection System	2
Nanodrop	2
Tangential Flow Filtration	2
Liquid Chromatography Mass Spectrometry (LC/MS)	3
Circular Dichroism Spectroscopy	4
High Performance Liquid Chromatography (Hplc)	4
Sequencing	5
Polymerase Change Reaction (PCR)	5
Cell Analyzer	5
Cell Counter	5
Mammalian Cell Culture.....	6
Fast Performance Liquid Chromatography (FPLC).....	7
Microplate Reader	8
Microplate Shaker.....	8
Gel Imaging System.....	8
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Surface Plasmon Resonance (SPR).....	9
Dynamic Light Scattering (DLS).....	10
Bacterial Fermentation.....	11
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CAPILLARY ELECTROPHORESIS

Beckman Coulter PA 800 Plus

Capillary Zone Electrophoresis (CZE)

Enables rapid and efficient separation of biomolecules such as proteins, peptides, and nucleic acids in small volumes based on their molecular size and electrical properties.

Capillary Isoelectric Focusing (cIEF)

Provides more sensitive detection of protein isoelectric points compared to the CZE method, enabling the identification of both acidic and basic variants.

Capillary Electrophoresis -SDS MW Analysis (CE-SDS)

Enables the separation of biomolecules by molecular weight within a gel matrix under high-voltage conditions, supporting the analysis of weight variants and protein modifications.

Capillary Electrophoresis -SDS MW Analysis (CE-SDS)

Detects the purity of purified biomolecules with high precision and reliability.



BIOMOLECULAR AFFINITY MEASUREMENT DETECTION SYSTEM

Iris Kinetics Multiplexed Affinity
MX-100



NANODROP

Thermo Scientific Nanodrop 2000
UV-Vis Spectrophotometer



Protein and Nucleic Acid Concentration Determination

Enables spectrophotometric analysis with minimal sample volumes and is used for the quantification of protein concentrations as well as nucleic acid samples (DNA/RNA). Additionally, it provides preliminary insights into sample quality and purity through spectral analysis.

TANGENTIAL FLOW FILTRATION

GE Healthcare Bo-Sciences AB
ÄKTA™ flux s



Buffer Solution Change and Concentration

It is used to pass proteins and drugs into the formulation buffer.

LIQUID CHROMATOGRAPHY MASS SPECTROMETRY



Waters SYNAPT G2-S

Intact Mass Analysis

It is the analysis of the total molecular weight of a protein by mass spectrometry (MS) fragmenting the relevant molecule.

Reduced Mass Analysis

Allows the analysis of the light and heavy chains of a protein, especially monoclon antibodies, by reducing them separately.

Native Mass Analysis

Enables the study of intact protein, non-covalent protein-protein and protein-ligand complexes in their biological state.

Peptide Mapping Analysis

Proteins can be degraded enzymatically to confirm their amino acid sequence and characterize their post-translational modifications (PTMs).

Disulfide Bond Analysis

Characterization of disulfide bonds, which are critical for maintaining the stability and function of the protein, is performed.

Hydrogen/Deuterium Exchange Mass Spectrometry (HDX-MS)

Protein-protein or *protein-ligand* interaction sites are used to obtain information about conformational changes and structure induced by allosteric effects and post-translational modifications (PTMs).

Ion Mobility Mass Spectrometry (IM-MS)

Separates and identify ionized molecules in the gas phase based on their mobility in a carrier buffer gas.



CIRCULAR DICHROISM SPECTROSCOPY



Jasco J-1500-150



Secondary Structure Analysis

It allows rapid characterization of the secondary structures and folding properties of proteins. It can be used for formulation studies. Changes in folding caused by changes in protein structure can be examined.

Thermal Melting Point Analysis

Thermal stability and thermodynamic parameters of the protein can be measured. Mutations applied to the protein and their effects on ligand binding can be examined.



HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

Thermo Scientific UltiMate 3000

Size Exclusion Chromatography (SEC)

An analytical assay designed to detect and quantify aggregate and fragment levels in purified antibody samples.

Ion Exchange Chromatography (IEX)

An analytical technique used to determine the charge profile of purified antibodies.

Reversed Phase Liquid Chromatography (RP)

A highly sensitive method capable of detecting changes as subtle as a single peptide bond cleavage, and identifying the monosaccharide composition of glycoproteins



SEQUENCING

Illumina MiSeq™

- Mutagenesis Analysis
- Genome Sequencing
- Exom Sequencing
- New Generation Sequencing(NGS)



POLYMERASE CHAIN REACTION (PCR)

Bio-Rad T100 Thermal Cycler



CELL ANALYZER

ACEA Biosciences xCELLigence RTCA DP



CELL COUNTER

NanoEntek EVE Automated Cell Counter

- Toxicity Analyzes
- Migration Analysis (HUVEC)
- Proliferation Analysis (HUVEC)

MAMMALIAN CELL CULTURE

BIOSAFETY CABINET

Hedlab X-Bio Class-II

CARBON DIOXIDE (CO₂) INCUBATOR

ESCO CCL-170-B8

CENTRIFUGE

Beckman Coulter Allegra X-30R



FAST PERFORMANCE LIQUID CHROMATOGRAPHY (FPLC)

GE Healthcare Bio-Sciences AB ÄKTA™ avant 25

Affinity Chromatography

Purification is achieved with the help of tags attached to recombinant proteins or molecules that bind directly to a specific region of the protein.

Ion Exchange Chromatography (IEX)

Purification is carried out by taking advantage of the electrical properties of proteins.

Hydrophobic Interaction Chromatography (HIC)

It is a purification technique by taking advantage of hydrophilic or hydrophobic properties.

Size Exclusion Chromatography (SEC)

Purification is carried out depending on the size of the protein.





MICROPLATE READER
BMG LABTECH CLARIOstar



MICROPLATE SHAKER
JEIO TECH VM-96B

ELISA Tests

With these tests, the relative potency of molecules can be determined and the concentration and content of the analyte can be estimated.



GEL IMAGING SYSTEM
Bio-Rad Molecular Imager Gel
Doc XR+ Universal Hood II



SDS-PAGE &
WESTERN BLOTTING

- MW Determination
- Purity Determination
- Western Blotting / Immunoblotting

SURFACE PLASMON RESONANCE (SPR)

Biacore™ X100



Kinetic Analysis

Enables the precise determination of association (k_a) and dissociation (k_d) rate constants, providing a comprehensive understanding of the dynamic interaction between biomolecules over time.

Affinity Measurements (KD)

Accurately quantifies the binding strength between interacting molecules by calculating the equilibrium dissociation constant, allowing for a deeper evaluation of molecular recognition and stability.

Concentration Analysis

Facilitates the detection and quantification of analytes based on their specific interactions with immobilized ligands, offering a highly sensitive and label-free method for biomolecular concentration assessment.

Specificity and Selectivity Studies

Differentiates between specific and non-specific binding events, ensuring high assay reliability and enabling the characterization of molecular interactions with high precision.

Epitope Mapping and Characterization

Identifies and characterizes binding sites for monoclonal antibodies, peptides, or other ligands, providing essential structural and functional insights for therapeutic and diagnostic applications.

DYNAMIC LIGHT SCATTERING (DLS)

Anton Paar Litesizer DLS 101

Particle and Molecular Size Measurement

Determines the hydrodynamic diameter of nanoparticles, proteins, and polymers in solution by analyzing the fluctuations in scattered light intensity caused by Brownian motion.

Zeta Potential Analysis

Measures the surface charge of particles in suspension, allowing the evaluation of colloidal stability and predicting aggregation behavior under different conditions.



Aggregation and Stability Studies

Assesses the stability of colloidal and protein-based formulations by detecting aggregation and changes in particle size over time, helping in formulation development and optimization.

Polydispersity Index (PDI) Evaluation

Determines the uniformity of particle size distribution in a sample, ensuring quality control in pharmaceutical, biotechnological, and material science applications.

Temperature-Dependent Size Analysis

Monitors the impact of temperature on particle size and stability, enabling thermal stability assessments for biomolecules, liposomes, and polymeric materials.

BACTERIAL FERMENTATION

Applikon My-Control Bioreactor System



High-Efficiency Bacterial Growth for Biomolecule Production

The bacterial fermentation system provides precise control over microbial growth conditions, enabling the efficient production of proteins, enzymes, plasmid DNA and metabolites for research and industrial applications. By optimizing temperature, pH, dissolved oxygen, and nutrient supply, this system ensures high cell density cultures with consistent yield and quality.

MAMMALIAN FERMENTATION

Sartorius Bioreactor System

Advanced Cultivation for Recombinant Protein and Biopharmaceutical Production

The mammalian cell fermentation system enables controlled cultivation of cell lines for high-yield production of recombinant proteins, monoclonal antibodies, viral vectors, and therapeutic biomolecules by optimizing growth and expression conditions.

