



# SABIOTEK Sustainability Report



MARMARA  
UNIVERSITY



YILDIZ TECHNICAL  
UNIVERSITY



İSTANBUL  
ÜNİVERSİTESİ  
CERRAHPAŞA

December, 2024

# Report Outline

About Us

Vision & Mission

History of the Sabiotek

Our Activities

Sabiotek Stakeholder Ecosystem

Sabiotek Sustainability Strategies

Sabiotek Business Model

Our Researchers

Sabiotek Laboratories

Central Laboratories Device Infrastructure

Sabiotek in Numbers

Sabiotek Projects

International Work Group Memberships

1004 - Development of Test Kits

Collaborations

Sabiotek- Publications

Summary of 2022

Summary of 2023

## Administrative Board



- Prof. Dr. Emine Elif GÜZEL MEYDANLI  
President
- Prof. Dr. Cem Bülent ÜSTÜNDAĞ
- Prof. Dr. Bülent MERTOĞLU
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- Assoc. Prof. Dr. Hüseyin ÜVET
- Assoc. Prof. Dr. Selcan KARAKUŞ
- Asst. Prof. MERVE ERGİNER HASKÖYLÜ

## About Us

Biotechnology is an interdisciplinary, innovative research field that uses living organisms, biological systems, or derivatives to change or develop products, services, and processes, directly impacting human life and living environments, particularly in health. The concept of biotechnology has a comprehensive and critical role in solving key challenges related to the sustainable supply of products and services that enhance health and quality of life, as well as environmental protection. This is across various sectors such as conservation, diagnosis and treatment, genomics, chemical production, medical fields, and robotics.

In light of this information, and in alignment with the collaborative approach mentioned in Turkey's 2023 Industry and Technology Strategy, Yıldız Technical University, Marmara University, and Istanbul University-Cerrahpaşa signed an Academic Cooperation Protocol on April 28, 2021, to create a clustering environment and establish a center of excellence for research and practical application in the field of biotechnology, one of the focal technologies of Turkey's national industry and technology strategy.





# Vision & Mission

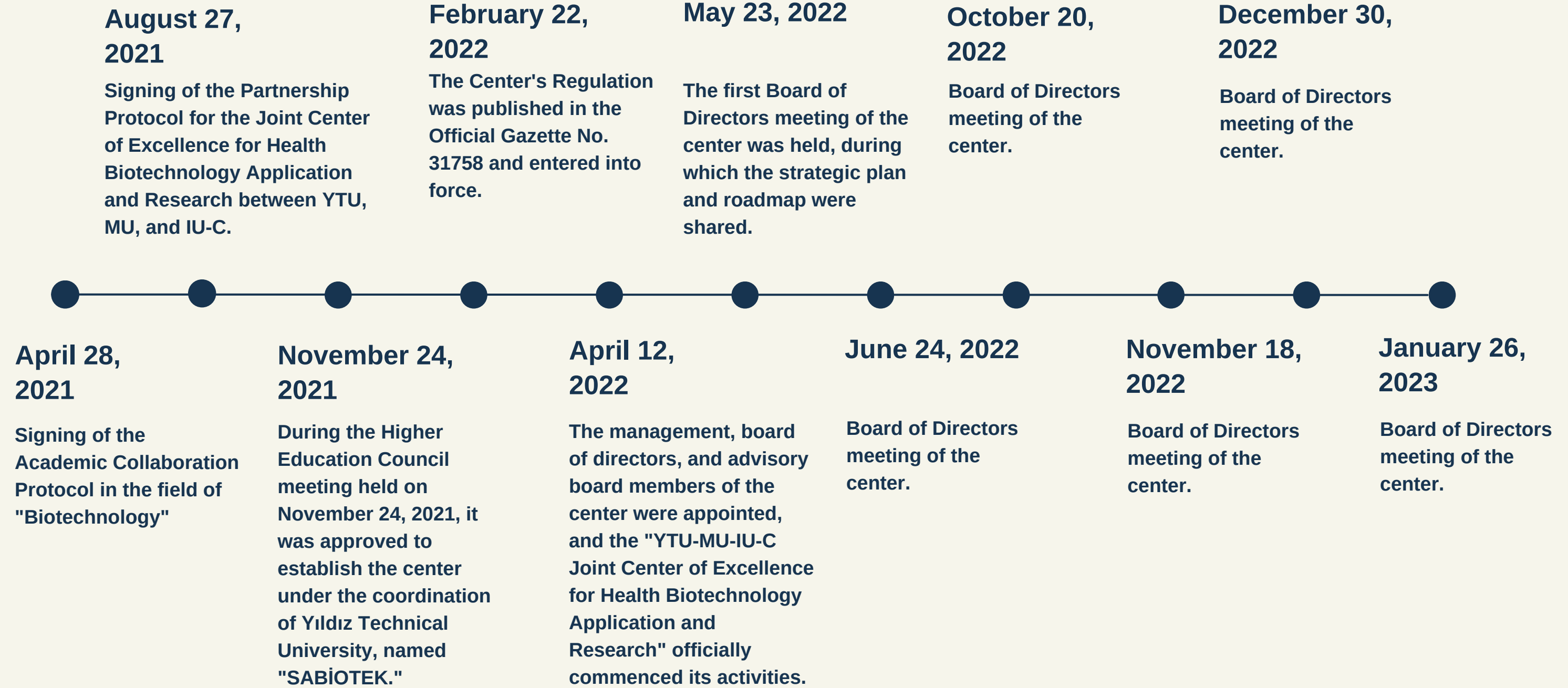
## **Vision:**

- **To enhance the quality of life both nationally and globally through research, product development, and applications in the field of Health Biotechnology.**

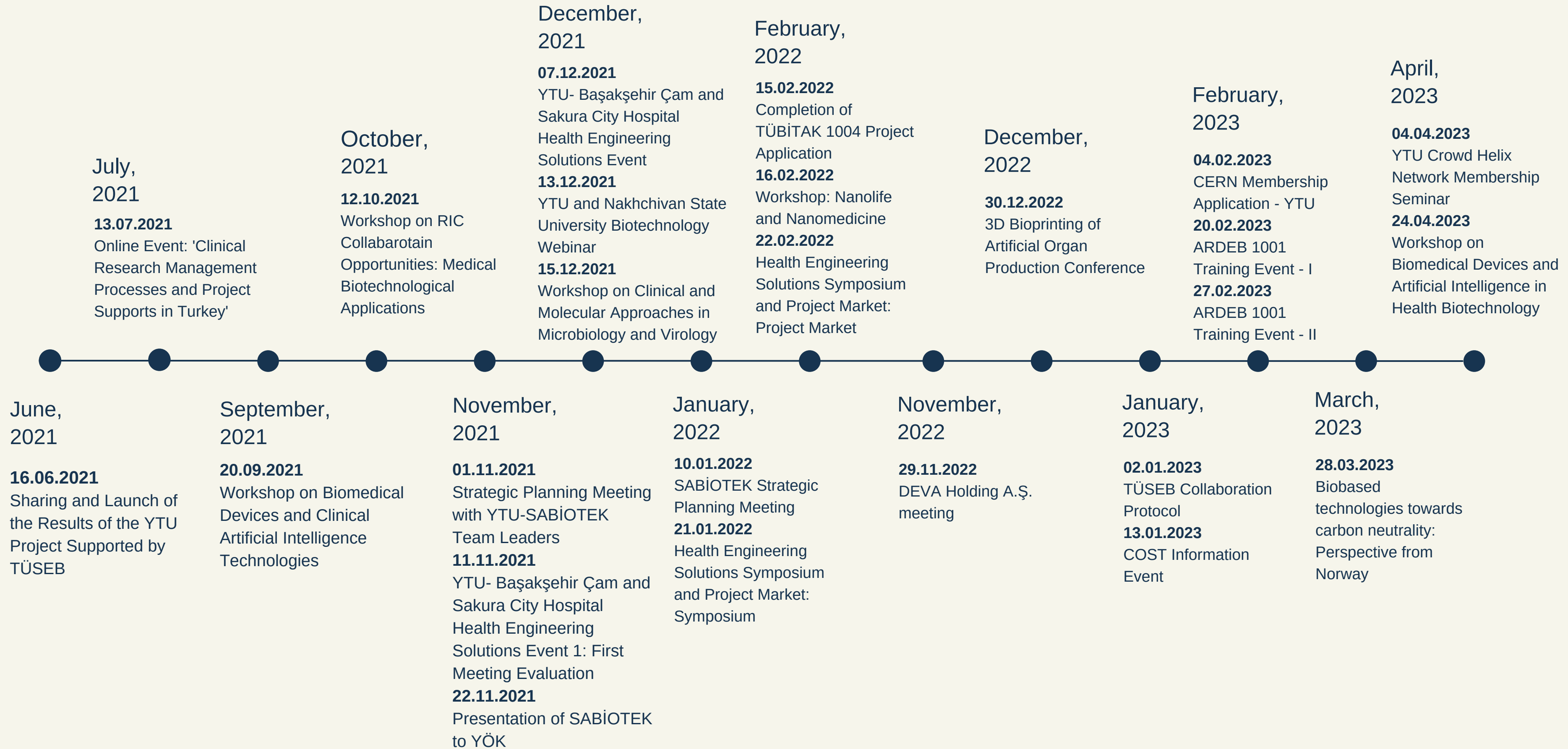
## **Mission:**

- **To become a leading center of excellence in Health Biotechnology by:**
  - **Contributing to national and international academic and industrial progress through biotechnological applications,**
  - **Conducting interdisciplinary/multidisciplinary R&D and innovation studies,**
  - **Establishing collaborations in both the private and public sectors in alignment with our country's Development Plan,**
  - **Bringing together diverse disciplines to develop strategic products and services while fostering continuous innovation,**
  - **Supporting the training of researchers with the capability to conduct solution- and product-oriented, rational, and innovative research.**

# HISTORY OF THE JOINT CENTER OF EXCELLENCE FOR HEALTH BIOTECHNOLOGY APPLICATION AND RESEARCH BY YILDIZ TECHNICAL UNIVERSITY, MARMARA UNIVERSITY, AND ISTANBUL UNIVERSITY-CERRAHPAŞA



# OUR ACTIVITIES



# OUR ACTIVITIES





# SABIOTEK National and International Stakeholder Ecosystem

**Strategic  
Stakeholders**

**Academic  
Stakeholders**

**Industrial  
Stakeholders**

**Research  
Stakeholders  
(Project)**

**Service  
Stakeholders**



# SABIOTEK Sustainability Strategies

## RESEARCH

- U/UA R&D and Industrial Projects

## NATIONAL AND INTERNATIONAL COLLABORATIONS

- Public Sector
- Private Sector

## FINANCIAL BUSINESS MODEL

- Project Titles
- Solution Partnership
- Service Partnership
- Infrastructure Provision

## PREPARATION AND DEVELOPMENT OF PHYSICAL INFRASTRUCTURE

- T.C. Presidency of Strategy and Budget Projects
- BAPK-ADEP
- U/UA Projects

## HUMAN RESOURCES

- Personnel
- Administrative
- Technical

## EDUCATION

- Joint Master's and Doctoral Programs
- Joint Courses

## PROMOTION

- Website
- Social Media Networks

# SABIOTEK BUSINESS MODEL

## Industry Collaboration Projects

- DEVA Holding A.Ş.
- Abdi Ibrahim Pharmaceuticals
- Nobel İlaç
- Sanofi
- Turgut İlaçları
- Santa Farma Pharmaceuticals
- Bilim İlaç
- World Medicine Turkey
- Sanovel İlaç
- Atabay Pharmaceuticals and Fine Chemicals Inc.
- Hayat Kimya

## General Infrastructure Usage

- Analysis Services
- Lab Services
- Device-Specific Usage
- Equipment/Lab Rental for Companies
- Contracted Research

## Education

- Device Trainings
- Lab Trainings
- Certification Trainings
- Summer/Winter Schools

## Promotion – Events

- Website Design
- Project Market with Industrial Partners
- U/UA Seminars, Panels, Conferences, and Symposia
- U/UA Researcher Exchange/Invitations
- TEKNOFEST and other events
- Promotion on Social Media

**U/UA  
Research  
Projects**

**Spin-off / Start-  
up Company  
Establishments**

**Business  
Development  
with Companies**

**Identification of Center  
Researchers and  
Development of  
Incentive Models**

**Consulting  
Services**

# Our Researchers

Thematic Area	Istanbul Cerrahpasa University	Marmara University	Yildiz Technical University	Total
Diagnosis, Treatment, and Translational Medicine	77	61	40	178
Virology, Microbiology, and Immunology	28	17	16	61
Functional Nano and Biomaterials	63	47	86	196
Bioinformatics, Molecular Biology, and Genetics	51	50	24	125
Tissue Engineering	24	18	33	75
Biomedical Devices and Artificial Intelligence Technologies	79	37	45	161

## Researcher Infrastructure by Universities:

- **Istanbul University-Cerrahpaşa: 182**
- **Marmara University: 126**
- **Yıldız Technical University: 130**

**TOTAL: 438**



## SABIOTEK Laboratories

The SABIOTEK Central Laboratory is located at Yıldız Technical University (YTU) Teknopark and provides services in the following areas:

- Office Area: 106.10 m<sup>2</sup>
- Laboratory Area: 461 m<sup>2</sup>

The laboratory's infrastructure includes the following:

- Storage Area: Suitable spaces for storing materials necessary for research and projects.
- Equipment Infrastructure: Facilities equipped with various devices for biotechnology and health-related research.
- Consumables: Supplies and equipment used in laboratory work.

This infrastructure is designed to support a wide range of projects in the fields of biotechnology and health sciences.

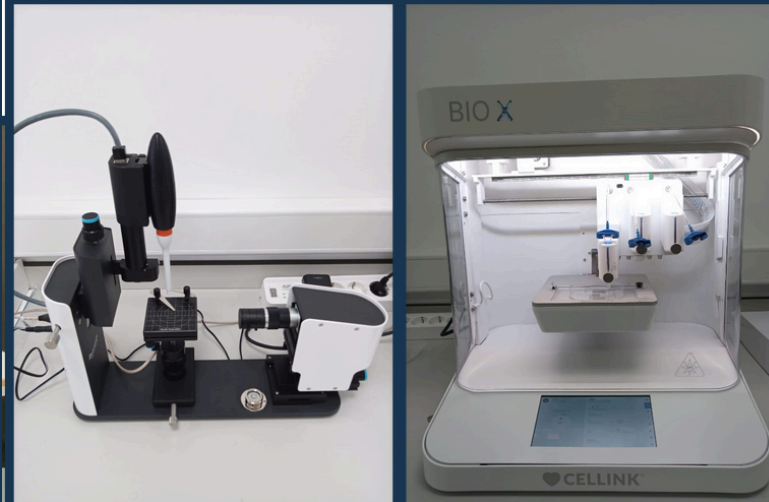
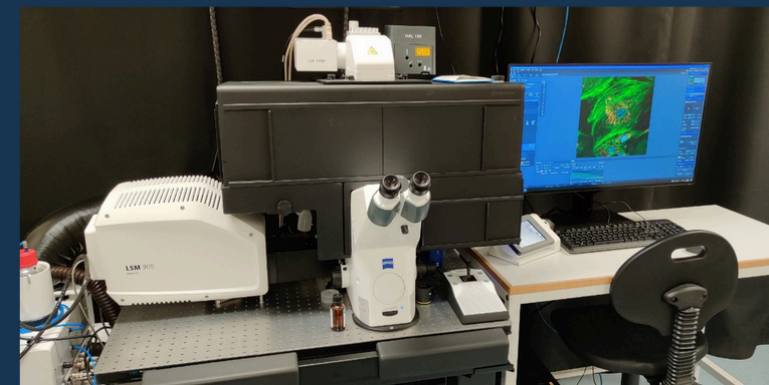


# CENTRAL LABORATORIES DEVICE INFRASTRUCTURE

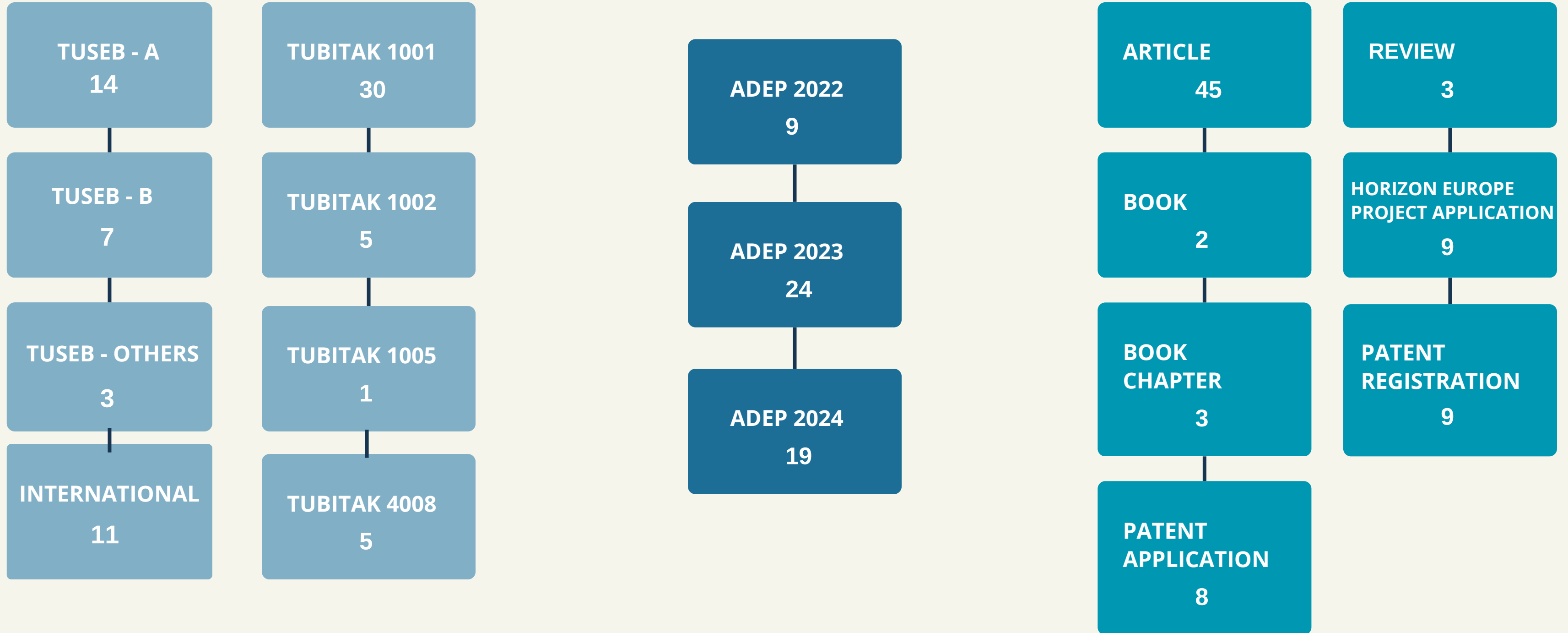
The SABIOTEK Central Laboratories are equipped with state-of-the-art equipment to support a variety of advanced research and development activities. Below is a list of key devices used in the lab:

- Synergy Multi-mode Reader
- Confocal Microscope
- ELISA Reader
- Bio-Rad ChemiDoc Imaging System
- Bio-Rad Western Blot Workflow Package
- Gene Pulser Xcell Total System
- T100 Thermal Cycler
- C1000 Touch Thermal Cycler
- Protein Purification System
- 3D Bioprinter
- Contact Angle Measurement Device
- Biosafety Cabinet
- Refrigerator
- T Cooling Centrifuge
- Autoclave
- Water Bath
- Pipette Gun
- Incubator
- Heated Magnetic Stirrer
- Shaker
- Microcentrifuge
- pH Meter
- Vortex
- Balance
- Analytical Balance
- Pure Water System
- Laminar Flow Hood
- Centrifuge

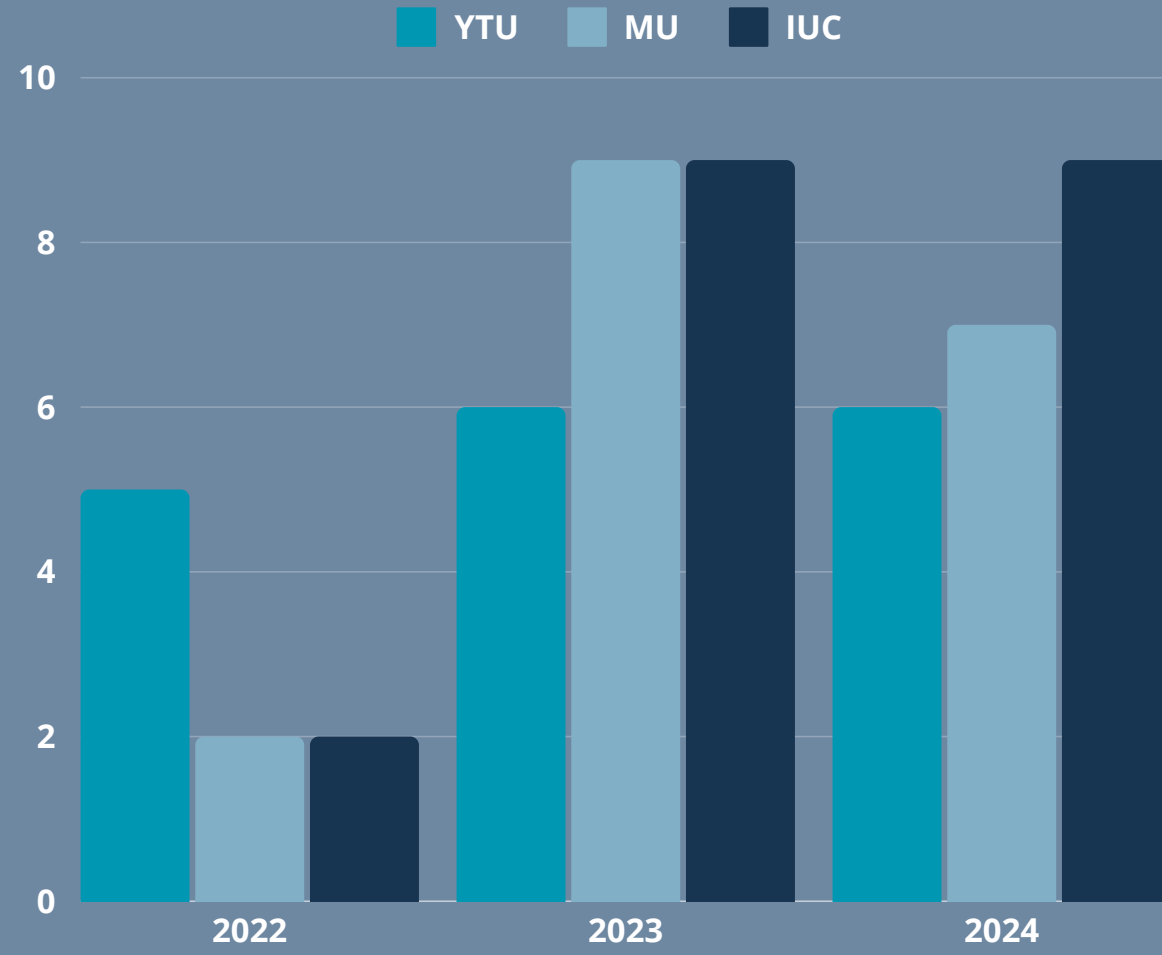
These tools and equipment form the backbone of SABIOTEK's research and development infrastructure, enabling high-level scientific inquiry and supporting groundbreaking work in biotechnology, molecular biology, and medical sciences.



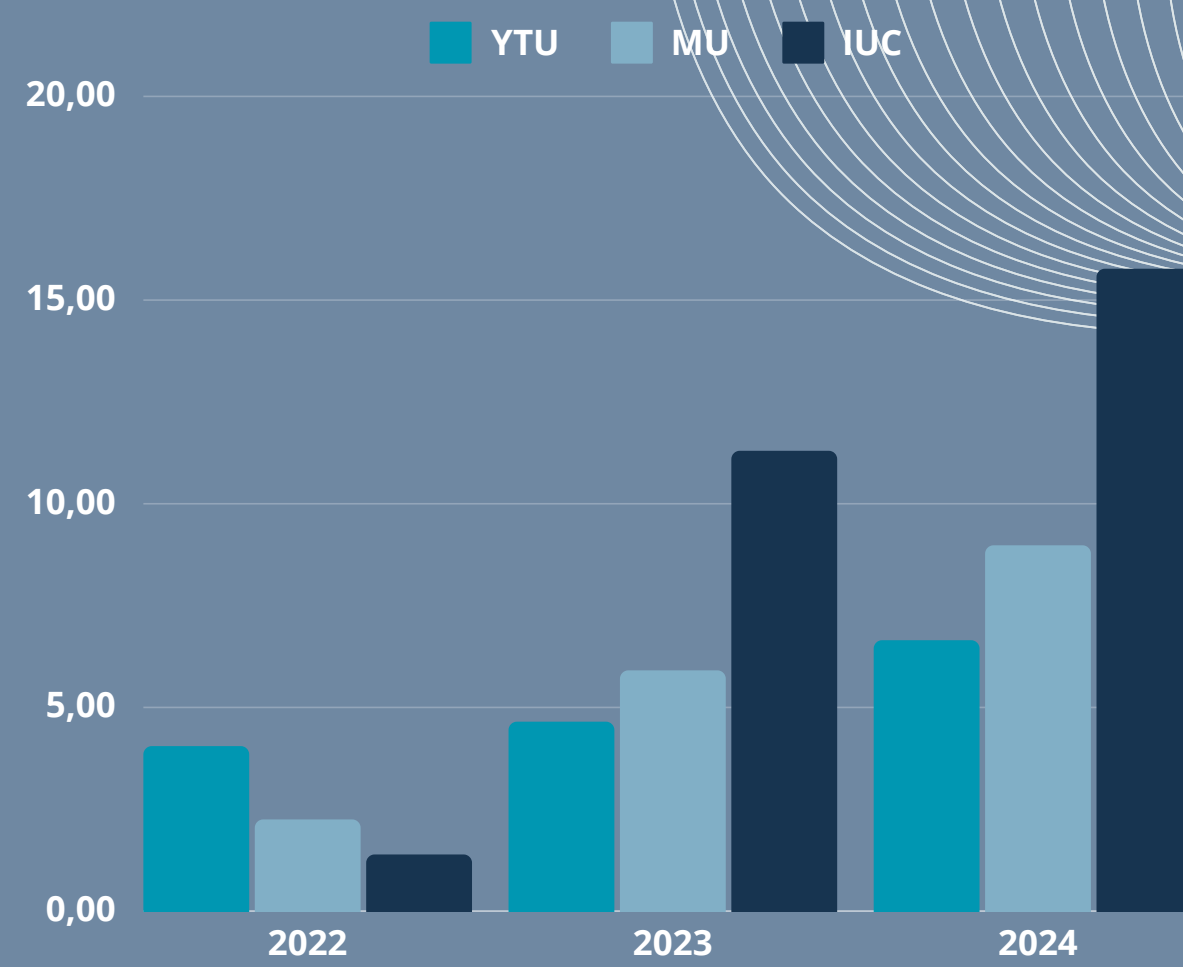
# SABIOTEK IN NUMBERS



# SABIOTEK IN NUMBERS - ADEP

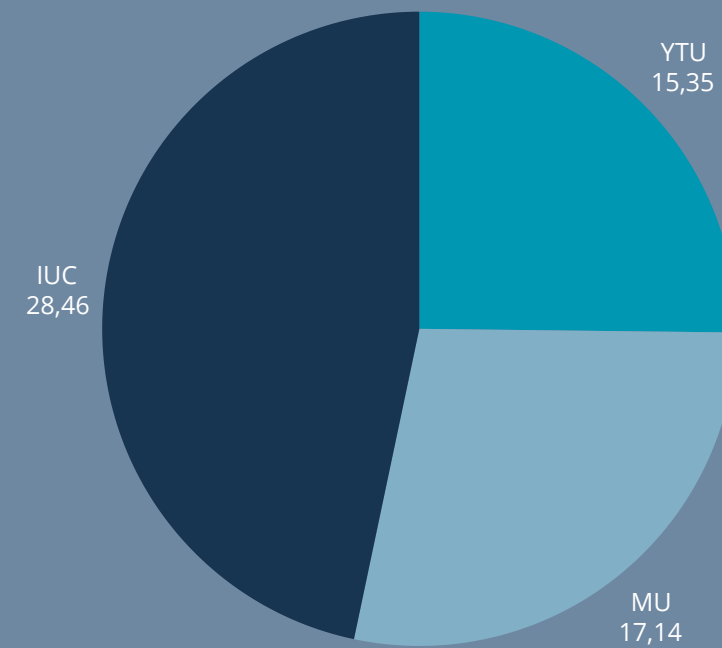
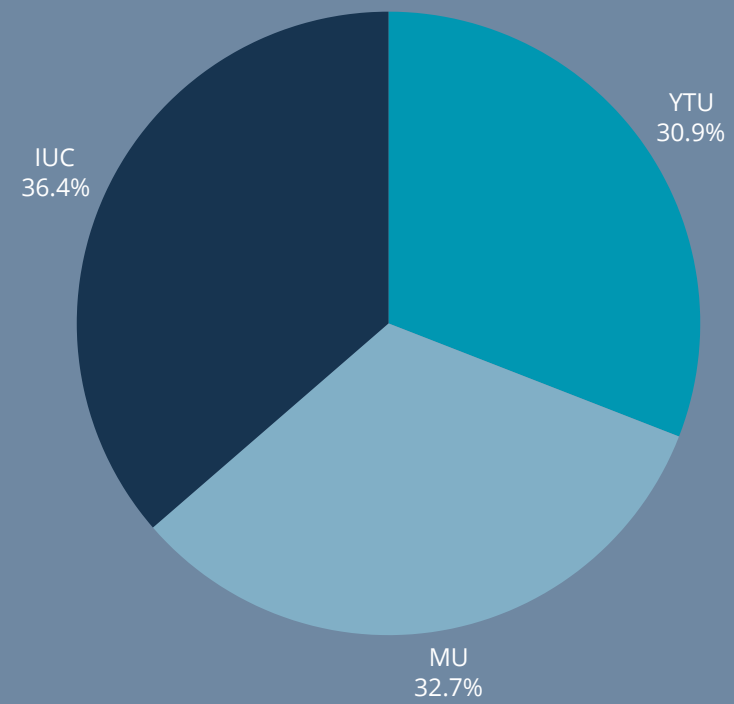


Number of Supported ADEP Projects



Support Amount (Million TL)

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# SABIOTEK - Projects (2022 ADEP)

University	ADEP Project Name	Budget
Yildiz Technical University	Design and Fabrication of Biomimetic-Biofunctional Nasal Cartilage Tissue Scaffold	1.450.000,00 TRY
Yildiz Technical University	Production of Anti-SARS-CoV-2 IgY Antibodies, Development of Prophylactic Formulations, and Investigation of Their Efficacy	700.000,00 TRY
Yildiz Technical University	Design of a Microfluidic Lab-on-a-Chip Myocardial Infarction Platform and In Vitro Modeling of Heart Attacks	500.000,00 TRY
Yildiz Technical University	Production of Wound Dressing Materials Reinforced with Nanofibers Loaded with Extracts of Microalgae Isolated from the Arctic and Antarctic	700.000,00 TRY
Yildiz Technical University	Hybrid BODIPY-Phthalocyanine Compounds: Investigation of Photodynamic Anticancer Therapy and Photodynamic Antibacterial Drug Properties	700.000,00 TRY
		<b>TOTAL = 4.050.000,00 TRY</b>
Istanbul Cerrahpaşa University	Recombinant Alpha-Synuclein Production, Purification, and Validation for Use in Scientific Research	950.085,14 TRY
Istanbul Cerrahpaşa University	Investigation of the Effects of Extracellular Vesicles Isolated from Seminal Plasma and Female Reproductive Organs on Gamete Cryopreservation and In Vitro Embryo Development	1.299.961,88 TRY
		<b>TOTAL = 2.250.047,00 TRY</b>
Marmara University	Creation of a 3D Tumor Microenvironment for Personalized Glioblastoma Treatment and Testing of Molecules Targeting the Proteasomal System Identified through Transcriptome Analysis in This Model	694.345,00 TRY
Marmara University	Unveiling the Impact of Microbiome in Obesity Treatment and Development of Innovative Probiotic Supplement	700.000,00 TRY
		<b>TOTAL = 1.394.345,00 TRY</b>

**TOTAL = 7.700.392,02 TRY**



# SABIOTEK - Projects (2023 ADEP)



ADEP Project Name	Budget
Isolation of Novel Exopolysaccharide (EPS) Producing Lactic Acid Bacteria, Characterization of the EPS they Produce, and Determination of Their Technofunctional Properties for Potential Health Applications	799.882,36 TRY
Investigation of Anticancer Activity and Apoptosis Mechanism of Arctic and Antarctic Microalgae Extract-loaded Nanocarriers on Different Cancer Cell Lines	800.000,00 TRY
Development of an Exosomal Antiviral Agent Specific to Feline Coronavirus (FCoV), the Causative Agent of Feline Infectious Peritonitis (FIP)	649.996,44 TRY
Development of a Natural Polymer-Based Electrospun Scaffold for the Regeneration of Tympanic Membrane Perforations	599.882,90 TRY
Development of a Plasmonic Biosensor and Optical Reader Device Prototype for Diabetes Diagnosis and Monitoring	999.343,68 TRY
Development of a Biomechanical and Optical Virtual Twin of the Eye	799.989,60 TRY

**TOTAL = 4.649.094,98 TRY**

# SABIOTEK - Projects (2024 ADEP)



ADEP Project Name	Budget
Artificial Intelligence Supported Sensor-Based Biomechanical Movement Analysis for Evaluating Athletic Performance in Archery	1.177.691,66 TRY
Multilayered Biofunctional Tissue Scaffold: An Integrated Approach for Innovative and Effective Treatment of Diabetic Wounds	1.177.691,66 TRY
Production of Nanoformulations of Metabolites Produced by Bacteria from the Turkish Soil Microbiome for Cancer Treatment: In Vitro Evaluation of Efficacy and Safety	1.135.631,24 TRY
Isolation of Actinobacteria with Antimicrobial and Neuroprotective Activities from Galanthus L. Species Found in Turkey and Genomic Analysis of Biosynthetic Gene Clusters	1.177.691,66 TRY
Evaluation of In Vitro Anticancer Activity of Bacterial Mini-Cell Loaded Microneedles for Melanoma Treatment	984.000,00 TRY
Development of Recycling Process for NiCr Alloy Waste Used in Biomedical Applications for Sustainable Additive Manufacturing	515.197,00 TRY

**TOTAL = 6.167.903,22 TRY**

# SABIOTEK - Projects (2023 ADEP)

ADEP Project Name	Budget
Development of Colorimetric and Fluorometric Sensors for the Detection of Nitric Oxide Radical and its Derived Nitrite Ion in Cell Cultures and Environmental Samples, and Investigation of its Potential for Conversion into a Medical Diagnostic Kit	886.147,94 TRY
Development of Nanoantibodies for Protection and Treatment of Canine Parvovirus Infections	1.551.467,07 TRY
Development of New Anti-Cancer Nanoformulations with Enhanced Bioavailability of Oleandrin Compound Extracted from Nerium oleander L. and Evaluation of Their Bioactivities Using In Vitro Methods	1.535.740,73 TRY
Investigation of the Role of Conditioned Media Derived from Infrapatellar Fat Pad-Derived Telocytes in Chondrogenic Differentiation of Cells	2.852.504,30 TRY
Development of a New and Domestic Test Method Based on NIR Fluorescence for Hydrazine Detection	703.994,26 TRY
Optimization of Synthesis of Metal-Organic Framework (MOF) Structures and Investigation of Their Potential Use as Drug Delivery Systems	552.441,79 TRY
Preparation of Innovative Formulations Loaded with Nucleic Acids and Comparison of Their Efficacy and Toxicity for CRISPR and Other Gene Therapy Applications	1.792.199,29 TRY
Identification of the Blood Microbiota Profile in Familial Mediterranean Fever Patients During Remission and Fever Phases and Investigation of Its Similarity with Gut Microbiota Profile	723.399,00 TRY
Optimization of Nano Lipid Carrier (NLT) Synthesis, Characterization, and In Vitro Studies as a Drug Delivery System in Brain Cancer Treatment	699.955,46 TRY

**TOTAL = 11.297.849,84 TRY**



# SABIOTEK - Projects (2024 ADEP)

ADEP Project Name	Budget
Development of a New Test for Rapid and Accurate Analysis of Methanol Using a Colorimetric Dipstick Method	581.854,25 TRY
Evaluation of the In Vitro Antidiabetic, Anticholinesterase, Antioxidant, Antimicrobial, and Genotoxic Activities of Extracts and Oils Obtained from Different Parts of Angelica purpurascens AvLall Gilli Plant by Various Methods, Along with Its Anatomical and Morphological Properties	626.644,80 TRY
Prevascularized Oral Mucosa Equivalent Products Produced by 3D Bioprinting	895.624,89 TRY
In Vitro Investigation of the Effect of Temozolomide-Loaded Nanoparticles with Targeting Ligand Conjugations on Human Glioblastoma Cells Using a Multidisciplinary Approach	1.791.799,50 TRY
Determination of Genetic Biomarkers Associated with Dystonia Disease and Development of Therapeutic Molecules	1.887.196,29 TRY
Development of a Patient-Specific New Total Talus Implant Design for Treatment of Ankle Talus Avascular Necrosis and Stability Analyses	2.112.176,99 TRY
Development of VHH Nanobody and Recombinant IgY Antibodies Against Newcastle Disease Virus in Chickens	2.329.673,88 TRY
Predicting Archers' Performance Using an Artificial Intelligence Model Enhanced with Heart Rate, Archer's Heart Rhythm, and Exercise Data	2.614.791,00 TRY
Comparison of Drug-Free and IGF1 LR3 Controlled Drug-Release Sulfated Alginate GelMA Nerve Conduits with Autologous Nerve Grafts and Standard Nerve Conduits in Rat Sciatic Nerve Defect Model	2.932.482,89 TRY

**TOTAL = 15.772.244,49 TRY**





# SABIOTEK - Projects (2023 ADEP)



**MARMARA**  
UNIVERSITY

ADEP Project Name	Budget
Monogenic Inflammatory Bowel Diseases: Immunological and Genomic Approach	978.091,50 TRY
Researching the Therapeutic Effects of Traditional Medicinal Plants in Various Disease Models and Developing Products	751.000,00 TRY
Development of Breast Cancer Early Diagnosis and Screening Prototype with Virtual Reality (VR) Technology	449.580,00 TRY
Investigation of the Efficacy of Beneficial Microbiota or MSC-Supported Applications in Crohn's Disease Organoid Models and the Epitelial Barrier Resistance via TEER Analysis	723.008,34 TRY
Use of Drug-Loaded GelgpoliNIPAA Hydrogel-Based Microneedles and Drug-Loaded Silk Fibroin SilkMa-Based Injectable Hydrogels for Controlled Drug Release in Resistant Epilepsy Treatment	719.684,97 TRY
Designing Next-Generation Antisense Oligonucleotide-Based Target ABC Transporter Inhibitors with Carbohydrate-Conjugated Systems and Investigating Their Efficacy in Anti-Cancer Drug-Resistant Hepatocellular Carcinoma and Glioblastoma Cell Models	714.999,99 TRY
Development of an Anaerobic/Microaerophilic/Capnophilic Bacteria Culturing System	644.000,00 TRY
Production of Growth Hormone Receptor-Specific Aptamer for Acromegaly Treatment	519.000,00 TRY
Immunological Investigation of Differences in Adaptive and Innate Immunity, and Inflammasome Response Leading to Clinical Heterogeneity and Phenotypic Variations in the Course of Behçet's Disease	413.785,85 TRY

**TOTAL = 5.913.150,65 TRY**



## International Work Group Memberships

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- Prof. Dr. Taylan Yetkin

CA21159 - Understanding interaction light - biological surfaces: possibility for new electronic materials and devices (PhoBioS)

- Assoc. Prof. Dr. Alper Yılmaz

CA21140 - Interception of oral cancer development (INTERCEPTOR)

- Assoc. Prof. Dr. M. Murat Özmen, Asst. Prof. Dr. Görke Gürel Peközer, and Başak Akın

CA21108-European Network for Skin Engineering and Modeling (NETSKINMODELS)

- Assoc. Prof. Dr. Tuđba Özer

CA18225-Taste and Odor in early diagnosis of source and drinking Water Problems

- Assoc. Prof. Dr. Sakıp Önder

CA21145 - European Network for diagnosis and treatment of antibiotic-resistant bacterial infections (EURESTOP)

CA21159-Understanding interaction light - biological surfaces: possibility for new electronic materials and devices

- SELCEN ARI YUKA

CA20110 - RNA communication across kingdoms: new mechanisms and strategies in pathogen control

# 1004 - Development of Test Kits and Early Warning Systems for the Diagnosis, Monitoring, and Treatment of Diseases Associated with Neuron Damage

The comprehensive 1004 application process for neurological disease diagnosis, treatment, and monitoring technologies has been completed in collaboration with 8 research program executing institutions, including Istanbul University-Cerrahpaşa (İÜC), Yıldız Technical University (YTÜ), and Marmara University (MÜ).

The aim is to foster university-to-university and university-to-industry collaborations, facilitate knowledge and technology transfer across various scientific fields or disciplines, identify new research areas, and train and employ scientists.

Through 16 different sub-projects—5 from İstanbul University-Cerrahpaşa (İÜC), 1 from Marmara University (MÜ), and 1 from Yıldız Technical University (YTÜ)—the goal is to develop cost-effective, high-tech products with the potential to strengthen the market by securing a place in international markets.

Sub-project content:

- 6 monitoring
- 7 diagnostics
- 3 treatments



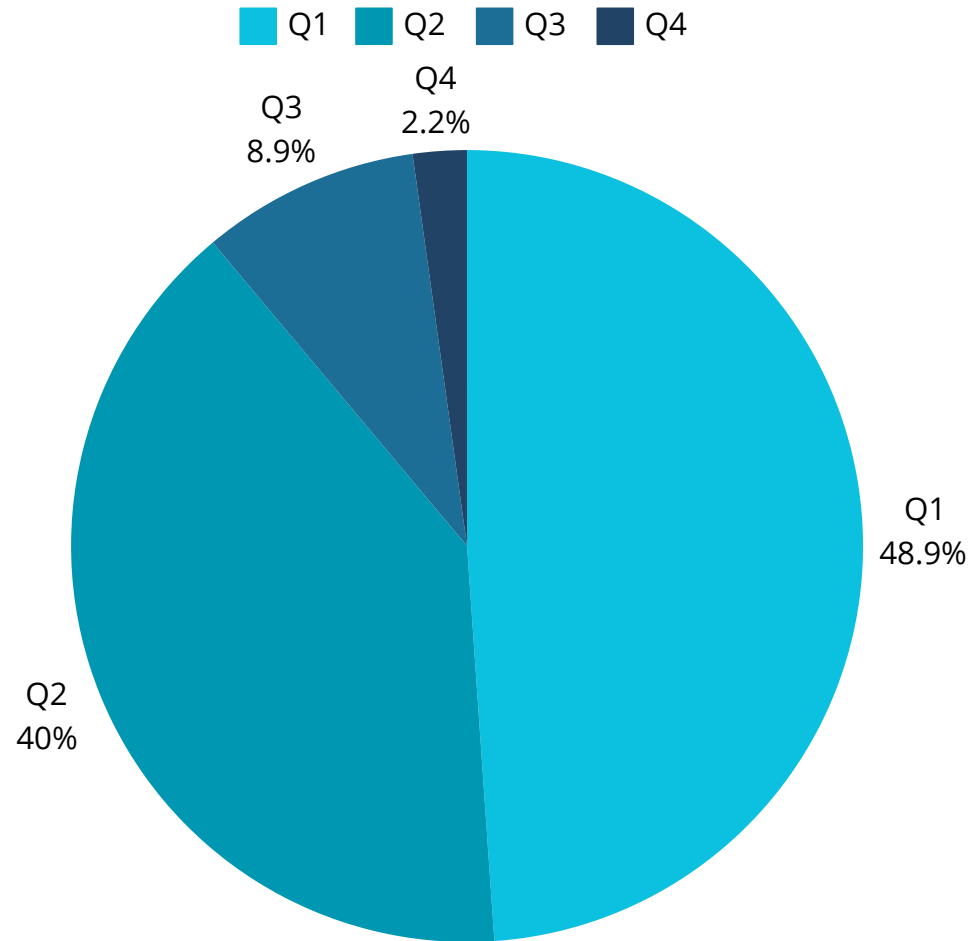
# Collaborations

- University of Medicine and Pharmacy Carol Davila
- Czech University of Life Sciences Prague
- The University of Technology of Compiègne
- Université de Rouen Normandie
- Internationale Hochschule
- The Pennsylvania State University
- Health Institutes of Türkiye (TUSEB)
- Tiga Healthcare Technologies
- Siemens Healthineers
- University of Hradec Králové
- University of Turku
- Lviv Polytechnic National University
- University of Messina
- Lviv Medical University
- University of Bordeaux
- The Universitat Internacional de Catalunya
- University POLITEHNICA of Bucharest
- University of Science and Technology Zewail City



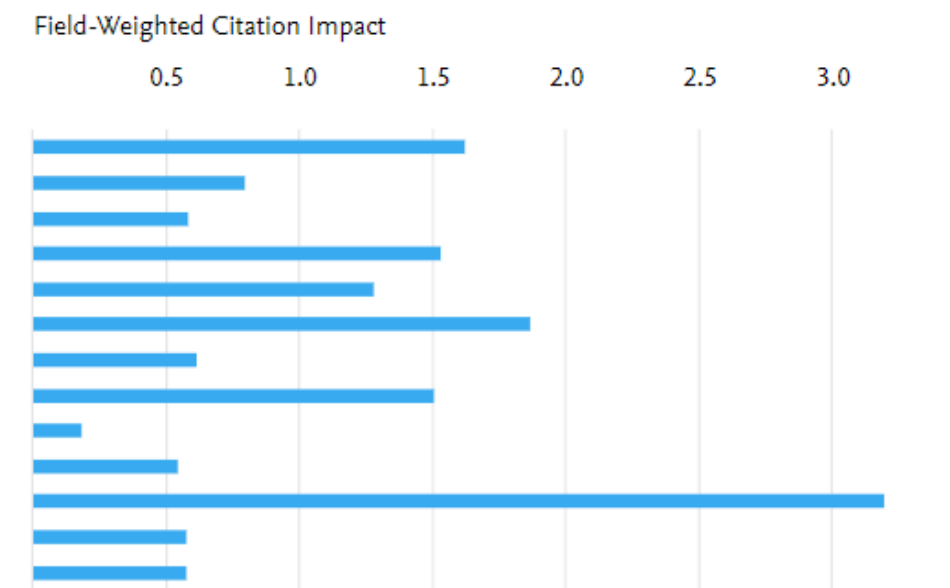
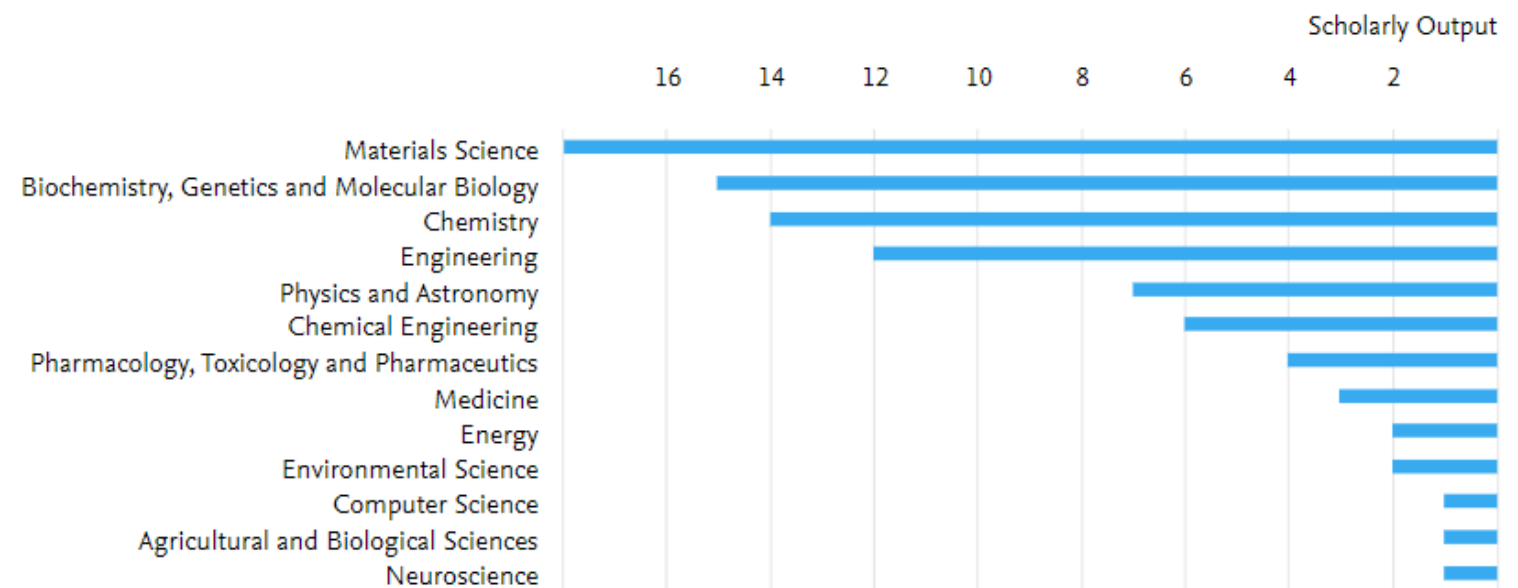
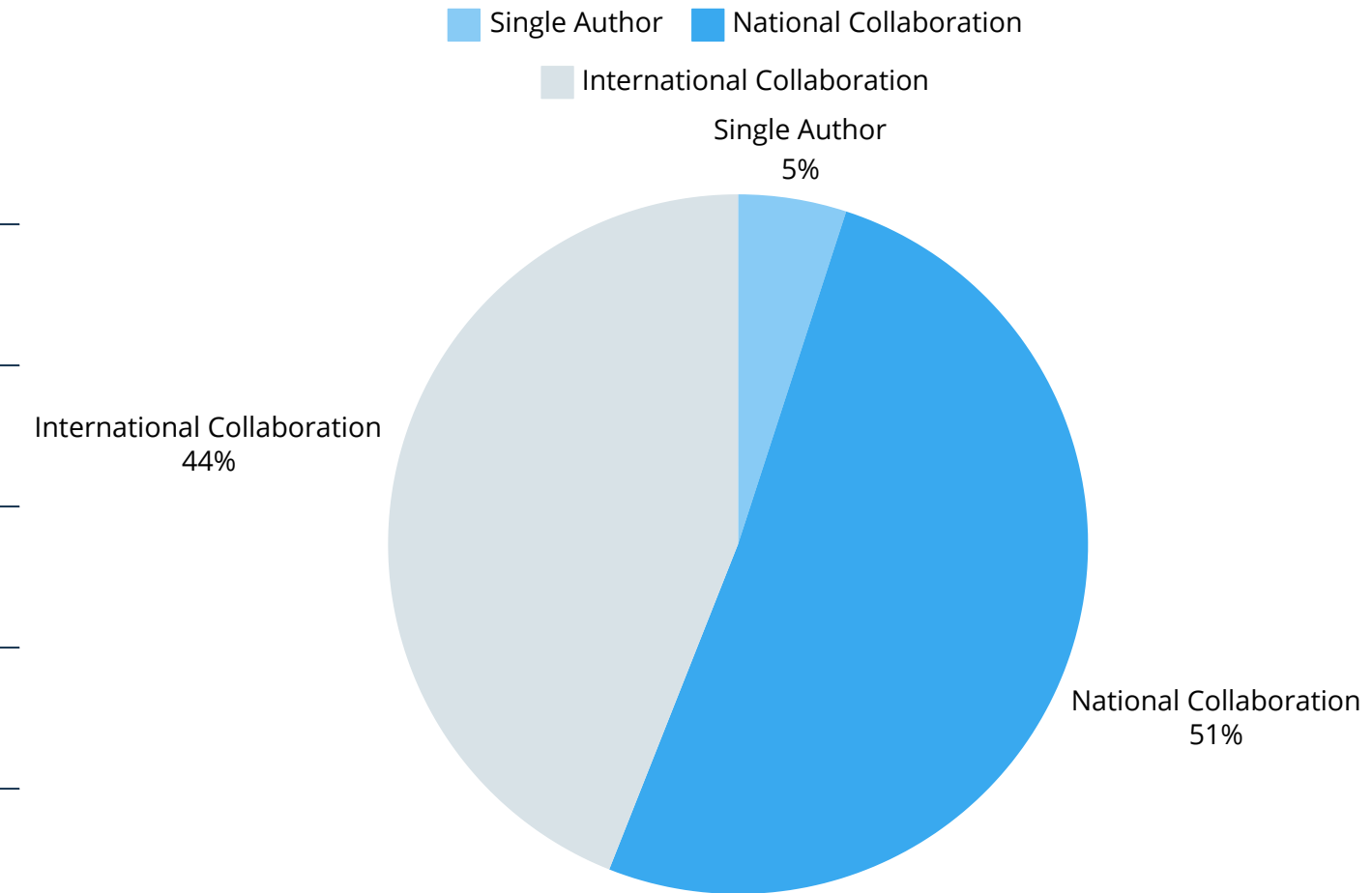


# SABIOTEK - Publications



Quartile	Publication Number	%
Q1	22	48.9
Q2	18	40.0
Q3	4	8.9
Q4	1	2.2

**Total = 45**



# Summary of 2022

## Projects

- 9 ADEP
- 1 TUBITAK- 1004
- 24TUBITAK
- 24 TUSEB
- 8 International
- 2 Others

## Stakeholder Meetings

- Visits to Industry Stakeholders
- Collaboration Protocols with Public Stakeholders

## Events

- Symposium: Engineering Solutions in Healthcare
- Workshop: Marmara University, Nanolife, and Nanomedicine
- Seminar: 3D Printing Technologies (in collaboration with Istanbul University-Cerrahpaşa and Yıldız Technical University)
- Conferences: Various academic and professional gatherings focusing on interdisciplinary research and innovation.

## Infrastructure Development

- Researcher Infrastructure
- Central Infrastructure
- Satellite Infrastructure

## Promotion

- Website
- Social Media Accounts
- Researcher Meetings
- Meetings with Student Organizations

# Summary of 2023

## Projects

- 10 TÜBİTAK ARDEB-1001 Project Acceptances
- 2 TÜSEB C Priority R&D Project Applications
- 9 European Union Project Applications

## Stakeholder Meetings

- Collaboration Protocol with TÜSEB
- Project Development Activities with TIGA BT
- Project Collaboration with Siemens Healthineers
- Koç-Yaşa Partnership

## Events

- Information Days and Training Sessions (3)
- Seminars/Conferences (2)
- Workshops (3)
- Student Collaborative Congresses (3)

## Academic Publications

- 1 National Publication in Collaboration with SABIOTEK
- 1 International Publication in Collaboration with SABIOTEK
- 2 International Books
- 34 Publications with SABIOTEK Institutional Affiliation

## Infrastructure Development

- A Shared Laboratory Space Equipped with Basic Laboratory Instruments
- Advanced Molecular Analysis and Purification Laboratory
- Equipment/Analysis Training Sessions

## Promotion

- Website
- Social Media Accounts
- Researcher Meetings
- Meetings with Student Organizations

## Contact



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