

# Institut de Biotecnologia i Biomedicina

*Expertise portfolio*

## ABOUT THE INSTITUTE

The Institut de Biotecnologia i de Biomedicina (IBB) was created in 1970 as a research institute of the Universitat Autònoma de Barcelona (UAB). Although the institute was originally devoted to promoting fundamental biological research, we have been focusing in the Biotechnology and Biomedicine fields for the last 20 years.

At the IBB we conduct top-level scientific research with the aim of advancing scientific findings into translational results, to revert our knowledge to society. Our researchers participate in high competitive calls, both national and internationally, aimed at funding basic and translational research.

Among the 150 researchers currently working at the IBB, there are lecturers and professors from the UAB, ICREA and other senior researchers, postdoctoral fellows, and PhD and Master students. The IBB hosts 18 research groups organised into 3 programmes covering different areas of scientific expertise that include bioinformatics, cellular and structural biology, genomics, immunology, microbiology and proteomics.

Our multidisciplinary character, one of the most relevant characteristics of the IBB, allows for a broad approach to biological problems, both basic and applied. The IBB researchers have expertise in several topics within the biomedicine and the biotechnology field.

At the IBB we are compromised with doing research to tackle current problems in Health and Biotechnology, for the well-being of society



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# Biomedicine

## Drug design, discovery and validation

- Protein-ligand interactions: bioinformatics, proteomics, structure resolution, molecular docking, interactomics
- Design and optimization of inhibitors & drugs
- Software and algorithms to analyse the structure and function of proteins to develop new therapeutics
- Target discovery and target-based virtual screening for antimicrobial-drug development
- Validation of antimicrobial and antitumor compounds: in vitro, in vivo, animal models (mice, zebrafish, etc.)

## Genomics, big data & AI

- Functional analysis of different classes of genomic variants and association studies in complex diseases
- Bioinformatics analysis of patterns of genome variation
- Analysis and visualization of genome big data
- Virulence/no virulence studies, epidemiology
- Diagnosis and Prognosis of brain tumours by magnetic resonance spectroscopy with AI

## Diagnostics & therapeutics

- Lateral flow-based diagnostic devices
- New tools for Parkinson diagnostics
- Enhancing protein solubility for protein therapeutics
- Protein-based therapeutics for Oncology, Parkinson and other degenerative diseases
- Targeted drug delivery and drug carrier formulation for therapeutics and theragnostics in oncology, degenerative diseases and rare diseases
- Design of new therapies based on genetically modified bacteria for the treatment of cancer

## Immunology

- Antigen discovery and prophylactic modulation of immune system (vaccines & adjuvants)
- Regulation of immune response; oxidative stress and inflammation process leading to pathologies
- Processing, antigenic presentation, and cellular response in tolerance, autoimmunity, and cancer

## Reproduction

- Genome integrity analysis
- Bio banking
- Spermiogenesis and sperm physiology
- Fertility analysis & diagnostics
- Stable cell lines from tissue, immortalisation
- Oxidative stress and inflammation regarding fertility-related pathologies

# Industrial Biotechnology

## Protein & biomass production

- Lab-scale protein production in several organisms (E. coli, yeast, mammalian cells, insect cells-BVs)
- Design of novel yeast promoters and stress-tolerant strains for protein production and fermentation processes

## Enzymology & other applications

- Design/modify industrial enzymes to increase productivity with synthetic processes
- Use of amyloid fibers for enzymatic or energetic activity

# Animal Biotechnology

## Reproduction & conservation

- Biotech developments for bio banking and species conservation
- Therapies for infertility treatments & diagnostics
- Genome integrity analysis
- Stable cell lines from tissue, cell immortalization

## Drug design & discovery

- Identify therapeutic targets for vaccine & diagnostic kits
- Protease inhibitors as drugs
- Genomics & interactomics  
(see *Biomedicine portfolio*)

## Immunology

- Zebrafish models
- Host-pathogen interactions
- Vaccines/NP for immunization
- Biosensors to monitor fish health

Expertise portfolio 2024

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