

## Microbiology and Infectious Diseases

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### DESCRIPTION

The Microbiology and Infectious Diseases group comprises a diverse team including physicians, microbiologists, nurses, technicians, and students. Research focuses on Clinical Microbiology, Kidney Transplant, and Infectious Diseases. In Clinical Microbiology, studies include drug resistance mechanisms, tuberculosis, Leishmaniasis, Chagas, viral infections, and microbiome analysis. Kidney Transplant research examines biomarkers, immune responses to infections like CMV and COVID-19, and the impacts of immunosuppression reduction. Infectious Diseases research covers antibiotic policies, multiresistant microorganisms, infections related to foreign bodies, diabetic foot diseases, and tuberculosis. Cutting-edge techniques like Next Generation Sequencing and bioinformatics are employed.

### MAIN LINES OF RESEARCH

#### Clinical Microbiology

- Detection and characterization of different antimicrobial mechanisms of resistance. (Ferran Navarro).
- Epidemiology of tuberculosis and anti-tuberculosis resistance mechanisms (Montserrat Garrigó).
- Molecular diagnosis in infectious diseases, taxonomy (Ferran Navarro and Elisenda Miró).
- Microbiome description in clinical samples (Ferran Navarro, Elisenda Miró, and Alba Rivera).
- Leishmaniasis: epidemiology, characterization and diagnosis and Chagas: diagnosis and congenital infection (Carmen Muñoz and Teresa Llovet).



### 5.1.5 Translational Medicine Area

- Medical care projects (Ferran Sánchez). Early bloodstream infection detection by NGS of cfDNA (Alba Rivera).

#### Infectious Diseases

- Restricted-use policies for antimicrobial agents and suitable use of antimicrobial agents.
- Study of antimicrobial multiresistant microorganism infections requiring patient isolation.
- Study of foreign body infections such as joint prostheses, catheters, cardiac prosthesis, and pacemakers.
- Tuberculosis infectious diseases.

### SCIENTIFIC CHALLENGES

- **Technique Standardization:** Each research area, including Clinical Microbiology, Kidney Transplant, Infectious Diseases, and cfDNA analysis, requires standardized techniques. Ensuring consistency in methodologies across diverse disciplines poses a significant challenge.
- **Data Management and Analysis:** With the adoption of advanced techniques like Next Generation Sequencing and bioinformatics in various fields, managing and analyzing large datasets becomes crucial. Developing robust analytical tools and strategies applicable to different research domains is a challenge.
- **Sample Quality and Handling:** Maintaining sample integrity and minimizing contamination during collection, processing, and storage is vital across all research areas. Developing standardized protocols and ensuring reproducibility are key challenges.
- **Interdisciplinary Collaboration:** As research becomes increasingly multidisciplinary, fostering effective collaboration among experts from diverse fields poses a challenge. Overcoming communication barriers and integrating knowledge from different disciplines are essential for holistic research outcomes.
- **Addressing Antimicrobial Resistance:** Understanding and combating antimicrobial resistance remains a critical challenge in Clinical Microbiology and Infectious Diseases research. Developing novel strategies to tackle resistant pathogens while preserving antibiotic efficacy is imperative.
- **Integration into Healthcare Systems:** Successfully integrating research findings and innovative

technologies into existing healthcare systems presents logistical and structural challenges.

### ACTIVE GRANTS

- Rivera Martinez, Maria Alba. Diagnóstico etiológico de la infección del torrente sanguíneo en pacientes adultos con sepsis mediante secuenciación masiva. PI22/00280. Instituto de Salud Carlos III (ISCIII). Duration: 2023-2025. 87.120,00 €.

### DOCTORAL THESES DEFENDED

- Lucena Nemirosky, Judith. Resistencia a azitromicina en *Mycoplasma genitalium* y *Neisseria gonorrhoeae* en Barcelona. 27/03/2023. Universitat Autònoma de Barcelona. Supervisors: Sánchez Reus, Fernando; Prim Bosch, Núria. <http://hdl.handle.net/10803/689778>.

### SCIENTIFIC PRODUCTION

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## 5.1.5 Translational Medicine Area

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