

Microbiology and Infectious Diseases



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Main Lines of Research

Clinical Microbiology

- ▶ Study of resistance mechanisms.
- ▶ Tuberculosis, epidemiology and antituberculosis resistance mechanisms.
- ▶ Molecular biology applications in infectious disease detection, taxonomy and epidemiology.
- ▶ Medical care projects.

Kidney Transplantation

- ▶ Biomarkers for BKV in urine samples.
- ▶ T CD8+ immunity from CMV in renal transplant patients treated with Thymoglobulin.
- ▶ Medical care projects.

Infectious Pathologies

- ▶ Restricted-use policies for antibiotic and antimicrobial agents and suitable use of antimicrobial agents.
- ▶ Study of infections associated with foreign bodies (joint prostheses, catheters, cardiac prostheses and pacemakers).
- ▶ Study of infections due to multiresistant microorganisms or requiring isolation.
- ▶ Tuberculosis.

Challenges

Clinical Microbiology

- ▶ Detection and characterization of Leishmanias from clinical samples.
- ▶ Study of molecular epidemiology (population and clonality studies in bacteria, mycobacteria, fungi and viruses).
- ▶ Molecular bases of bacterial resistance to antibiotics, vectors that convey resistance genes (plasmids, transposons, integrons, phages).
- ▶ The use of molecular techniques in diagnosis of infectious diseases.
- ▶ Research related to bacteraemia and endocarditis, nosocomial infections, prosthetic joint infections, central nervous system infections and tuberculosis.

Tuberculosis, Epidemiology and Resistance Mechanisms

- ▶ Prospective monitoring of primary and acquired Mycobacterium tuberculosis resistance to first-second-line drugs.
- ▶ Molecular detection of resistance using a molecular antibiogram.
- ▶ Study of the epidemiology and spread of resistant strains and assessment of the impact of immigration and the contribution of new Mycobacterium tuberculosis families (Beijing, EAI, CAS).

Molecular Biology Applications to Infectious Disease Detection, Taxonomy and Epidemiology

- ▶ Study of the usefulness of the 16S RNA gene for microbiological diagnosis and molecular identification.

- ▶ Genotype characterization of Cryptosporidium spp. oocysts from stool samples collected by the HSCSP Microbiology Unit.

Medical Care

- ▶ Government Health Department agreement (ongoing) regarding the development of epidemiological surveillance support functions for nosocomial infections and flaccid paralysis.
- ▶ Study of mycoses in depth, especially invasive fusariosis and aspergillosis and respiratory tract viral infections in patients with onco-haematological diseases.
- ▶ Multicentre studies of HIV (ongoing).
- ▶ Monitoring of congenital infection in prenat women with Chagas disease.

Kidney Surgery

- ▶ Biomarkers for BKV in urine sample: Determination of a diagnostic and prognostic biomarker in urine by proteomics of nephropathy by BK virus in renal transplant receptors, sponsored by the Infectious Diseases Department, Vall d'Hebron University Hospital, Barcelona, Spain.
- ▶ Estudio de la cinética de la Inmunidad T CD8+frente a CMV en trasplantados renales tratados con Timoglobulina. Financiación: Convocatoria de ayudas de la Fundación, Proyecto y Salud de la Junta de Andalucía.
- ▶ Ensayo clínico de suspensión de la profilaxis con valganciclovir en trasplantados renales CMV-seropositivo que mantienen la inmunidad celular CD8+ CMV-especifica tras recibir timoglobulina. Financiación: Convocatoria de Ayudas Proyectos de Investigación de Salud del ISC III. FIS (PI15/00402)

Challenges

Infectious Pathologies**Restricted-use Antibiotic and Antimicrobial Policies**

- ▶ To minimize resistance, reduce cost and improve compliance with surgical prophylaxis (at the time of administration) through suitable use of antimicrobial agents.

Epidemic Outbreaks and Infections Caused by Multiresistant Microorganisms and Microorganisms Requiring Isolation

- ▶ To study epidemiology for our hospital.
- ▶ To reduce incidence.
- ▶ To prevent/contain epidemic outbreaks and work with the Microbiology Unit in epidemiology and molecular studies.

Infections Associated with Foreign Bodies (Joint Prostheses, Catheters, Cardiac Prostheses, Pacemakers)

- ▶ To reduce incidence.
- ▶ To develop effective conservative treatment regimes.

Infections in Transplant Patients (Heart, Haemopoietic Progenitors)

- ▶ To study current epidemiology.
- ▶ To assess the efficacy of prophylaxis and other preventive measures.

Tuberculosis

- ▶ To cooperate with studies of resistance and with new treatment regimes for tuberculosis.

Other Projects

To continue with the Government Health Department agreement regarding the development of support functions as follows:

- ▶ Epidemiological surveillance of nosocomial infections (VINCat).
- ▶ Tuberculosis control: Barcelona-Dreta Tuberculosis Operations Committee (coordinator: Dr Sambeat).
- ▶ New influenza control: Barcelona-Dreta Epidemiological Surveillance Operations Committee (coordinator: Dr López-Contreras).
- ▶ Database for monitoring CMV infections after renal transplantation.
- ▶ Database for monitoring BK virus infections after renal transplantation.
- ▶ Observational and multicentre case-controlled (1:2) study to compare the evolution of renal transplantation in patients with HIV infection (Dr Canal, Dr Facundo and Dr Serra), sponsored by the Andalusian Organ and Tissue Transplantation Society.

Collaborations

Active Grants

- ▶ Estudio de la cinética de la Inmunidad T CD8+frente a CMV en trasplantados renales tratados con Timoglobulina. Convocatoria de ayudas de la Fundación, Proyecto y Salud de la Junta de Andalucía.
- ▶ Ensayo clínico de suspensión de la profilaxis con valganciclovir en trasplantados renales CMV-seropositivo que mantienen la inmunidad celular CD8+ CMV-específica tras recibir timoglobulina. Convocatoria de Ayudas Proyectos de Investigación de Salud del ISC III. FIS (PI15/00402)

External Collaborations

- ▶ Montserrat Gállego Culleré Sección de Parasitología, Dep. de Biología, Sanitat I Media Ambient, Facultat de Farmàcia. Universitat de Barcelona. Topic: Chagas and leishmaniasis
- ▶ Alejandro Gabriel Schijman Laboratorio de Biología molecular de la enfermedad de Chagas (LabMECh). Instituto de Investigaciones en Ingeniería Genética y Biología Molecular (INGEBI-CONICET). Buenos Aires, Argentina. Topic: Chagas
- ▶ Renaud Piarroux Université Aix-Marseille, INSERM-IRD-AMU UMR 912, Marseille, France. Topic: Leishmaniasis. Characterization
- ▶ Patrick Bastien, Laurence Lachaud. Département de Parasitologie-Mycologie, Centre National de Référence des Leishmanioses, Centre Hospitalier Universitaire de Montpellier, France. Topic: Leishmaniasis. Characterization

- ▶ Francisco Bolás Fernández. Departamento de Parasitología. Universidad Complutense de Madrid (UCM). Topic: Leishmaniasis
- ▶ Marcia Dalastra Laurenti. Universidade de São Paulo (USP). Brasil. Topic: Tegumentary leishmaniasis
- ▶ Mary Cruz Torrico de Solano. Parasitology laboratory –Medicine Faculty. Universidad Mayor de San Simón and Laboratorio de Investigación-Fundación CEADES de Cochabamba, Bolivia. Topic: Leishmaniasis in Bolivia.
- ▶ Dr. Kathryn Harris. Great Ormond Street Hospital (Camelia Botnar Laboratories). Londres, UK. Topic: Epidemiology of Mycobacterium abscessus complex using whole genome sequencing. Interhuman transmission?
- ▶ Aurora Garcia Fernández. Istituto Superiore di Sanità. Department of Infectious Diseases. Rome, Italy. Topic: Epidemiology of enteropathogenic bacteria.
- ▶ Alessandra Carattoli. Istituto Superiore di Sanità. Department of Infectious Diseases. Rome, Italy. Topic: Characterization of plasmids
- ▶ Maite Muniesa. Departament de Genètica, Microbiologia I estadística, Universitat de Barcelona. Topic: Presence of phages in clinical samples
- ▶ Carlos Balsalobre and Cristina Madrid. Departament de Genètica, Microbiologia I estadística, Universitat de Barcelona. Topic: Campilobacteriosis
- ▶ Alex Friedrik and Silvia Garcia-Cobos. University Medical Center (UMCG) Groningen, The Netherlands. Topic: Whole genome sequence in carbapenemase-producing Enterobacteriaceae.

Microbiology and Infectious Diseases

Active Grants

- ▶ Pere Coll Figa. Conveni Dpt. Salut - Dr. Coll (IR). Desenvolupar conjuntament funcions de vigilància epidemiològica de les infeccions nosocomials i la poliomielitis (Vigilància de les paralisis flaccides). Dpt. Salut - Coll. Departament de Salut. Duration: 2011-2017. 104,670.49 €.
 - ▶ Pere Coll Figa. Red Española de Investigación en Patología Infecciosa. RD12/0015/0017. Instituto de Salud Carlos III. Duration: 2013-2017. 212,100.41 €.
 - ▶ Pere Domingo Pedrol. Red de sida (RIS). RD12/0017/0014. Instituto de Salud Carlos III. Duration: 2013-2017. 121,000.00 €.
 - ▶ Paula Andrea Espinal Marin. Contratos Sara Borrell 2015. CD15/00017. Instituto de Salud Carlos III. Duration: 2016-2019. 80,598.00 €.
 - ▶ Maria Natividad de Benito Hernández. Optimización de la profilaxis quirúrgica antimicrobiana en los pacientes a los que se implanta una prótesis articular electiva en España. PI15/01026. Instituto de Salud Carlos III. Duration: 2016-2018. 59,000.00 €.
 - ▶ Ferran Navarro Risueño. Presencia de bacteriofagos en muestras clínicas estériles e interferencia de los mismos en el diagnóstico microbiológico de las infecciones. PI16/00158. Instituto de Salud Carlos III. Duration: 2017-2019. 66,000.00 €.
 - ▶ Pere Coll Figa. Grup de Recerca en Patologia Infecciosa i Microbiologia Clínica. 2014 SGR 333. Agència de Gestió d'Ajuts Universitaris i de Recerca. Duration: 2014-2017.
- Note: Total amount granted to PI. It does not include indirect costs.

Grants Awarded in 2017

- ▶ María Natividad de Benito Hernández, Factors de risc i prevenció de les infeccions del peu diabètic: paper del control glicèmic i el microbioma de l'úlcer. SLT002/16/00089. Departament de Salut. Duration: 2017-2019. 58,714.20 €.
 - ▶ Paula Andrea Espinal Marín. Movilidad AES-Instituto Superiore di Sanita. Departament of Infectious Diseases, Rome, Italy., MV17/00046. Instituto de Salud Carlos III. Duration: 2018, 11,895.00 €.
- Note: Total amount granted to PI. It does not include indirect costs.

Theses

- ▶ Alba Abras Feliu. Utilidad de diferentes técnicas serológicas y moleculares en el diagnóstico y seguimiento de la enfermedad de Chagas y en la caracterización de *Trypanosoma cruzi*, UAB. Directors: Montse Gállego and Carme Muñoz. Date of defense: 08/03/2017.

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Scientific Production

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