IGTP R

Germans Trias i Pujol Research Institute

Annual Report 2024

Excellence in health research, impacting patients' lives

HR EXCELLENCE IN RESEARCH

Instituto de Salud Carlos III

CERCA Centres de Recerca de Catalunya

Index

Message from the director

Dr Jordi Barretina

Director general, Germans Trias i Pujol Research Institute (IGTP)

The year 2024 has been pivotal for advancing IGTP's research and innovation strategy and strengthening our position as an institution committed to transforming the healthcare system. We have consolidated IGTP as an attractive environment for technological development, the creation of healthcare solutions and connections with the productive and social sectors.

The creation of two new spin-offs –Debios Diagnostics and HealthTech Innovation – marks a milestone in our commitment to ensuring that the knowledge we generate leads to impact. Additionally, we have actively coordinated and participated in the first edition of the Innomed program, an inter-institutional collaboration space which awarded three projects from our ecosystem with high potential for clinical applicability. This dynamism positions us as one of the leading hubs of innovation in the Catalan biomedical field.

This year we also celebrated the fifth anniversary of the Comparative Medicine and Bioimage Centre of Catalonia (CMCiB) with a scientific symposium highlighting its consolidation as a reference centre for preclinical medicine and bioimaging. We have also strengthened our network of strategic alliances by joining the Advanced Therapies Network of Catalonia and continued to work towards a solid and transparent institutional model, as demonstrated by the renewal of our IIS accreditation, made possible by the scientific excellence across the Institute.

Likewise, IGTP successfully passed the CERCA evaluation, which assesses the quality and impact of research centres in Catalonia. For the first time, we were awarded an A rating, placing us among the top-rated centres and confirming the positive evolution of the past five years.

We have also fostered a strong internal culture of collaboration through our fourth annual Retreat, which has become a key meeting point for over 200 professionals across the Can Ruti Campus. Through this cohesive and committed community, we are building a sustainable, competitive, and socially engaged research institute.

We will continue working to ensure IGTP remains an active driver in the development of innovative health solutions, with a vision that integrates research, knowledge transfer, talent and impact.

Message from the scientific director

Dr Julia García Prado

Scientific director and head of the Scientific Management and Technical Secretariat Unit, Germans Trias i Pujol Research Institute (IGTP)

The year 2024 has marked a turning point for research at IGTP, with major scientific advances and the consolidation of our translational research model. The renewal of our accreditation as an Instituto de Investigación Sanitaria (IIS) by Instituto de Salud Carlos III is a key milestone, along with the improved CERCA evaluation rating. Both achievements recognise the quality, coherence and impact of our research activity. This success is the result of the rigorous work of our teams and our strategic commitment to health-oriented, results-driven research within the framework of the IIS alliance.

This year, we have achieved scientific results that exemplify IGTP's capacity to generate clinically applicable knowledge in various fields. The ICREC group has developed pioneering cardiac bioimplants (PeriCord), demonstrating biocompatibility and therapeutic potential as future advanced therapies. In endocrinology, the ACROFAST study has refined treatment for acromegaly and advanced the diagnostic implementation of personalised and precision medicine strategies, supported by the development of artificial intelligence tools. These are examples of our commitment to more advanced and personalised medicine, both in therapy and diagnosis.

At the international level, we successfully concluded the European INNOVA4TB project, coordinated by IGTP, which resulted in 25 publications and extensive training activities. We also launched the European NanoBiCar project, focused on immunotherapies for infections. These initiatives reflect IGTP's scientific leadership in infectious diseases and translational medicine.

I would also like to highlight the recognition of talent within our institute, including awards such as the one received by Dr Manel Puig for his research career, as well as our clear commitment to supporting early-career scientists and fostering generational renewal within the scientific community. This human capital is key to advancing high-level research and ensuring the impact of our work on improving health.

The year 2024 has been one of significant progress and tangible scientific impact. With an increasingly cohesive research community, we face the future with confidence, ready to continue generating useful and transformative knowledge for society.

A year of institutional recognition

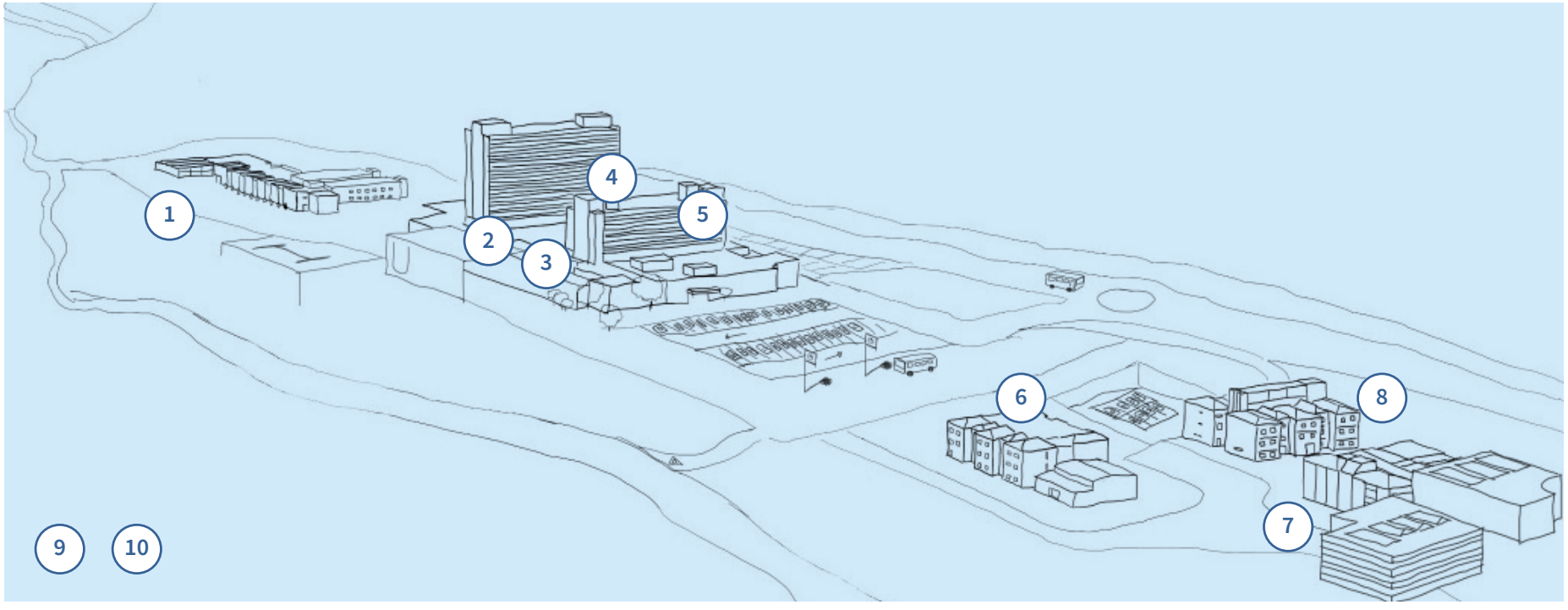
A year of institutional recognition

IGTP is part of the CERCA system of research centres of the Government of Catalonia. In this context, the institute successfully **completed a new evaluation process in 2024, receiving the highest possible rating (Category A)**. This distinction acknowledges IGTP's growing impact in translational research and innovation and reflects its solid progress in recent years within the Catalan research ecosystem.

IGTP was also **reaccredited as an Instituto de Investigación Sanitaria (IIS) by Instituto de Salud Carlos III (ISCIII)**. This recognition reinforces IGTP's role as the coordinating body for research strategy and management across the Can Ruti Campus, working in close collaboration with the other affiliated institutions that make up the IIS: Germans Trias i Pujol University Hospital, Universitat Autònoma de Barcelona, IrsiCaixa, Institut Català d'Oncologia, Banc de Sang i Teixits, Josep Carreras Leukaemia Research Institute, Institut Guttmann, Fundació Institut Universitari per a la Recerca a l'Atenció Primària de Salut Jordi Gol i Gurina, and Consorci Sanitari del Maresme.

IIS IGTP institutions

Learn more



1 Institut Guttmann

3 IrsiCaixa

5 ICO Institut Català d'Oncologia

7 Josep Carreras LEUKAEMIA Research Institute

9 CONSORCI SANITARI DEL MARESME

2 Germans Trias i Pujol Hospital

4 Banc de Sang i Teixits

6 UAB Universitat Autònoma de Barcelona

8 IGTP Germans Trias i Pujol Research Institute

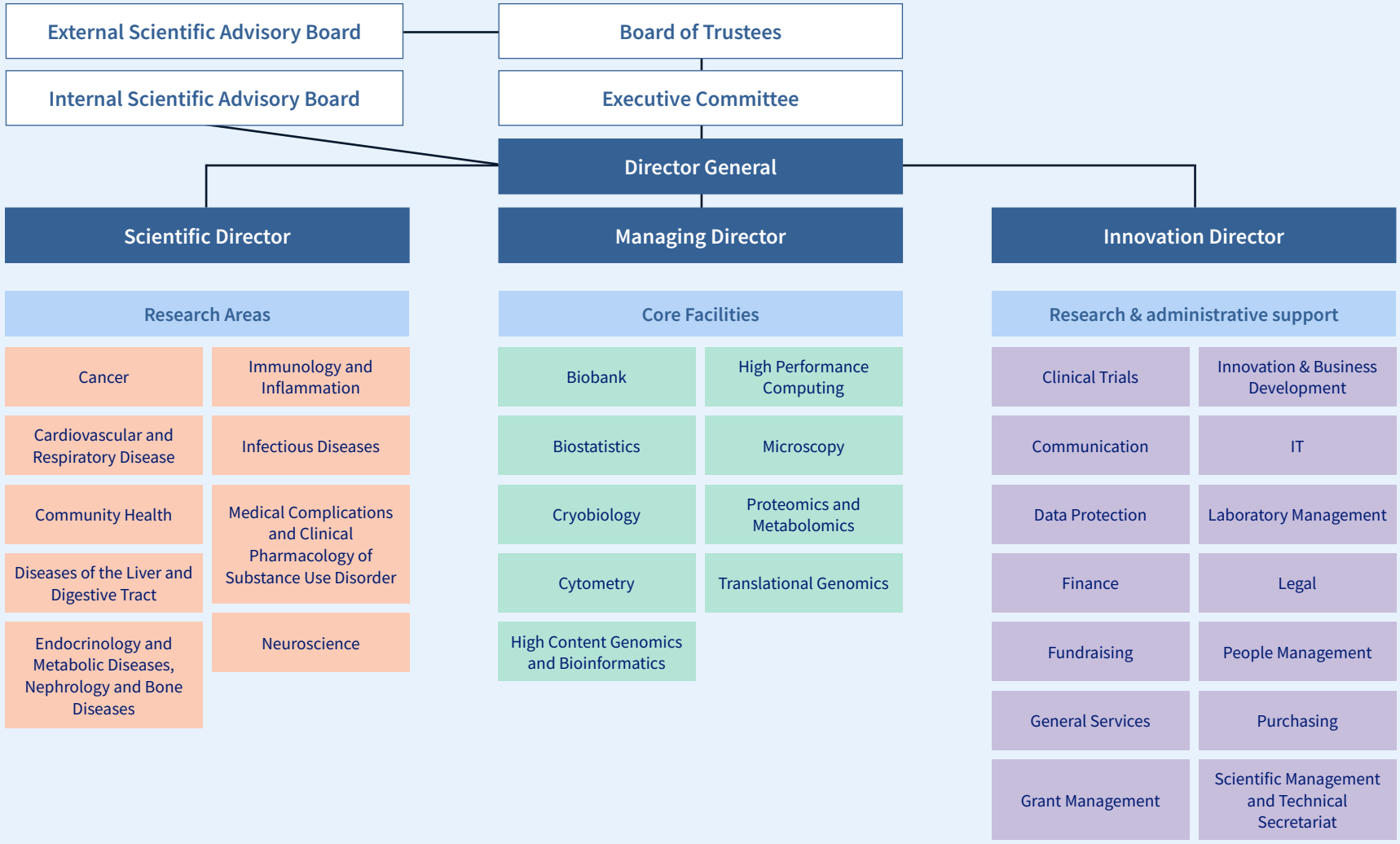
10 IDIAP JORDI GOL

About us

About us

Governance

*This organisational chart is provisional



Management committee

Jordi Barretina
Director general

Meritxell Nevado
Director secretary
mnevado@igtp.cat
T. (+34) 93 033 05 00

Carles Esquerré
Managing director

Jessica Soria
Managing director secretary
jsoria@igtp.cat
T. (+34) 93 554 30 51

Julia García
Scientific director and head of Scientific Management and Technical Secretariat Unit
direccio@igtp.cat

Raül Zurita
Head of the Innovation & Business Development Unit

Heads of research support units

IGTP is dedicated to promoting an optimal research environment, providing its researchers with comprehensive support through its specialised research support units.

Iris Bargalló
Data Protection coordinator

Ruben Cobo
Head of the IT Unit

Anna Duran
Head of the Fundraising Unit

Oscar Fraile
Head of the Project Management Unit

Lourdes Gaig
Head of the Legal Unit

Eva Garcia
Head of the Finance Unit

Carol Gálvez
Core Facilities manager

Juan Giardini
Head of the Purchasing Unit

Tamara Gutiérrez
Head of the Communications Unit

David Izquierdo
Head of the Laboratory Management Unit

Montserrat González
Head of the People Management Unit

Francesc Velarde
Head of the General Services Unit

Raül Zurita
Head of the Innovation & Business Development Unit

**The positions outlined here refer to the year 2024*

Board of trustees

**The positions outlined here refer to the year 2024.*

PRESIDENT
Olga Pané
Minister of Health, Government of Catalonia

FIRST VICE-PRESIDENT
Núria Montserrat
Minister of Research and Universities, Government of Catalonia

SECOND VICE-PRESIDENT
Francisco Javier Lafuente
Vice-chancellor of the Universitat Autònoma de Barcelona (UAB)

OTHER MEMBERS
Joan Gómez
Director general of Research of the Ministry of Research and Universities, Government of Catalonia

Antoni Plasència
Director general of Health Planning of the Department of Health, Government of Catalonia

Laia Pellejà
Director general, CERCA

Assumpció Malgosa
Vicerector of Research and Knowledge Transfer, Universitat Autònoma de Barcelona (UAB)

Anna Millán
Director general, Banc de Sang i Teixits

Joan Brunet
Director general, Institut Català d'Oncologia (ICO)

Jordi Ara
Managing director of the North Metropolitan Territory, Institut Català de la Salut (ICS)

Josep Mª Mòdol
Managing director of the Germans Trias i Pujol University Hospital (HUGTiP)

Xavier Garcia
Mayor of Badalona, Badalona City Council

Montserrat Bernabeu
Assistant director and co-director, Fundació Institut Guttmann

Bonaventura Clotet
Director of IrsiCaixa

Montserrat Llavayol
Deputy director of Research and Innovation of the Department of Governance and Institutional Relations (DGRI), Department of Health of the Government of Catalonia

Evarist Feliu
President of the Management Commission, Josep Carreras Leukaemia Research Institute (IJC)

Marc Vilar
Managing director, Logaritme Serveis Logístics AIE

SECRETARY
Josep M. Alcoberro
CERCA

**The positions outlined here refer to the year 2024.*

Executive committee

PRESIDENT

Montserrat Llavayol
Deputy director of Research and Innovation of the Department of Governance and Institutional Relations (DGRI), Department of Health of the Government of Catalonia

VOCALS

Laia Pellejà
Director general, CERCA

Assumpció Malgosa
Vicerector of Research and Knowledge Transfer, Universitat Autònoma de Barcelona (UAB)

Joan Brunet
Director general, Institut Català d'Oncologia (ICO)

Jordi Ara
Managing director of the North Metropolitan Territory, Institut Català de la Salut (ICS)

Josep Mª Mòdol
Managing director, Germans Trias i Pujol University Hospital (HUGTiP)

SECRETARY

Josep M Alcoberro
CERCA

External Scientific Advisory Board

CHAIR

Angel Pellicer
Adjunct professor, Department of Pathology, New York University School of Medicine

MEMBERS

Justo Castaño
Professor of Cell Biology at the Department of Cell Biology, Physiology and Immunology, University of Cordoba, and head of the Hormones and Cancer Research Group, IMIBIC - Maimónides Biomedical Research Institute of Córdoba

Alfonso Valencia
Director of the Life Sciences Department, Barcelona Super Computing Centre, ICREA Research Professor, IMPACT data coordinator

Eva Tolosa
Director of Immunology, University Medical Center Hamburg-Eppendorf

Amaia Calderón
Principal researcher at the Aging Research Center, Karolinska Institutet

Internal Scientific Advisory Board

PRESIDENT

Julia García Prado
Germans Trias i Pujol Research Institute (IGTP) & IrsiCaixa

SECRETARY

Eduard Serra
Germans Trias i Pujol Research Institute (IGTP)

MEMBERS

Javier Solana
Fundació Institut Guttmann

Julià Blanco
IrsiCaixa

Eva Martínez
Institut Català d'Oncologia (ICO)

Mònica Millán
Germans Trias i Pujol University Hospital (HUGTiP)

Montserrat González
Germans Trias i Pujol Research Institute (IGTP)

Raquel Guillamat
Germans Trias i Pujol Research Institute (IGTP)

Maria Saigí (temporarily Anna Martinez)
Institut Català d'Oncologia (ICO)

Carlos Rodrigo
Germans Trias i Pujol University Hospital (HUGTiP)

Pere Torán
Fundació Institut Universitari per a la Recerca a l'Atenció Primària de Salut Jordi Gol i Gurina (IDIAPJGol)

Magí Farré
Germans Trias i Pujol University Hospital (HUGTiP)

Raül Zurita
Germans Trias i Pujol Research Institute (IGTP)

Santi Roura
Germans Trias i Pujol Research Institute (IGTP)

Iris Bargalló
Germans Trias i Pujol Research Institute (IGTP)

Omar Ortega
Consorci Sanitari del Maresme (CSdM)

Ariadna Huertas
Germans Trias i Pujol University Hospital (HUGTiP)

Eva Martínez
Germans Trias i Pujol University Hospital (HUGTiP)

Our principles

Mission, vision and values

Our mission is to be a centre of excellence that forms the back-bone of a multidisciplinary and multi-institutional environment, allowing for cutting-edge translational research and innovation aimed at solving health challenges, from the prevention to the cure of diseases.

Our vision is to be a prestigious biomedical research centre that works to improve people's health and quality of life through maximum efficiency, sustainability, excellence, professional expertise, technological transfer, access to advanced technologies and cooperation, to ensure the greatest impact.

Our core values are:

- Leadership and research excellence
- Innovation
- Commitment to society
- Multidisciplinarity
- Ethics and humanitarian vision of biomedical research
- Sustainability
- Service orientation

About us

Our strategic goals

Strategic Plan 2023-2027

These objectives are aligned with the Sustainable Development Goals of the 2030 Agenda.

Our strategic goals

1 GROWTH AND INSTITUTIONAL ALLIANCES

SO1 Opting for a campus model that facilitates the participation and coordination of R+D+I activities between institutions and creates an environment with unique capabilities.

SO2 Promoting the participation of professionals from the HUGTiP in research activities and networking with other organizations in the environment.

2 SCIENTIFIC MODEL AND FOSTERING TRANSVERSAL RESEARCH PROGRAMS

SO3 Consolidate collaboration between the research groups of the institutions of the campus, affirm scientific programs and favour high-impact multidisciplinary projects.

SO4 Strengthen scientific infrastructure and coordinate areas and research groups with a system that permits both the redefinition of the areas and the evaluation of groups.

3 DRIVING CLINICAL RESEARCH

SO5 Drive the growth of clinical research in the healthcare services of the HUGTiP, developing the Clinical Trials Unit, the processes and the necessary resources.

4 RESOURCE MANAGEMENT, PROFESSIONAL CAPACITATION AND DEVELOPMENT

SO6 Guarantee the management processes for R+D+I, insure the suitability of resources and the provision and functional distribution of floor space.

SO7 Guarantee the application of initiatives that facilitate the promotion, capacitation, training and development of researchers and ensure gender equality.

5 FLOOR SPACE, INFRASTRUCTURE AND CORE FACILITIES

SO8 Position the IGTP as a reference node for scientific core facilities in the environment and position the CMCiB as a unique national and international facility.

6 INNOVATION AND IMPACT

SO9 Strengthen and consolidate the culture of innovation within the institute and actions aimed at supporting the processes of innovation and technology transfer.

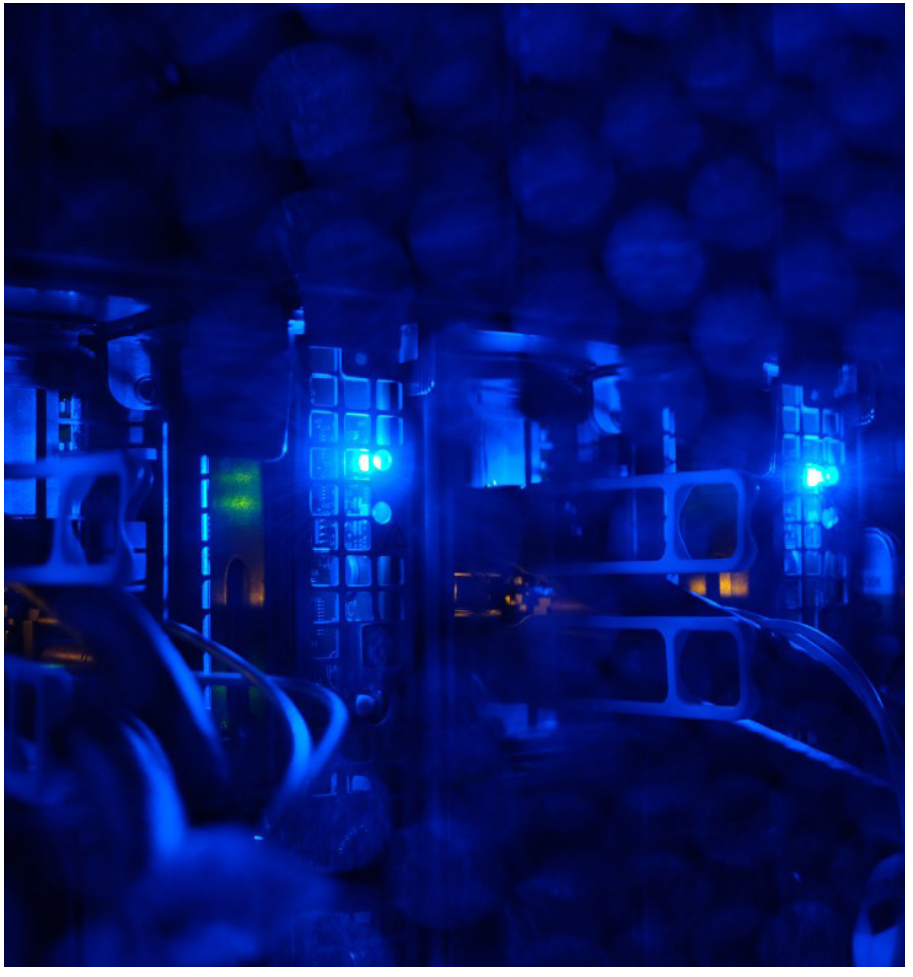
SO10 Promote the communications of the IGTP, considering both scientific activity and those that promote participation by society.

Our commitment to responsible and sustainable practices

IGTP is integrating environmental responsibility into its daily operations, scientific activities and institutional culture. Through cross-unit collaboration and staff engagement, **the institute is taking steps to reduce its environmental footprint and build a more sustainable research environment**.

In 2024, this commitment was translated into tangible progress:

- Improved energy efficiency through the replacement of fluorescent lighting with LED systems and the introduction of presence-based lighting controls.
- Adjustments to the operation schedules of key facilities to reduce energy consumption.
- Preventive maintenance actions aimed at extending the lifespan of infrastructure and equipment.
- Removal of long-stored waste materials as part of improved facility management.
- Exclusive use of electricity from 100% renewable sources.
- Integration of sustainability and equality clauses into procurement processes.
- Staff training to improve waste segregation and recovery, contributing to a lower carbon footprint.
- Reduction of single-use lab materials and increased reuse of packaging and cooling elements.
- Measures to extend the life of scientific equipment and reduce electronic waste.



Promoting water and energy efficiency at CMCiB

In 2024, the Comparative Medicine and Bioimage Centre of Catalonia (CMCiB), a strategic project from IGTP, ran a water-saving campaign combining staff engagement with adjustments to water-intensive procedures such as autoclave sterilisation. This led to a reduction of over 1.5 million litres in water consumption compared to 2023. Improvements to the temperature regulation system also helped maintain energy use at slightly lower levels, despite increased activity.

WATER	↓ 33%
GAS	↓ 1.8%
ELECTRICITY	↓ 1.5%

*Percentage reduction compared to 2023

Our commitment to equality, diversity and inclusion

Women for Equity (W4E)

IGTP continued its support for the independent working group Women for Equity (W4E) previously known as Women in Science. The members of W4E are volunteers from institutions across the campus with an interest in promoting a data-driven approach to gender equality in research institutes and also gender perspective in biomedical research. W4E promotes awareness and understanding through open sessions for personnel from all the institutions on campus.

In 2024, W4E celebrated the International Day of Women and Girls in Science on 11 February by holding its sixth symposium. The event titled "Women and Leadership in Science" included the keynote talk "Gender Gaps at the Academies" by the economist Nagore Iriberri and a report from the W4E observatory, which monitors participation in research and events by women on the campus. The group also organised a round table titled "Taking different routes to success" in March.

IGTP's Equality Committee

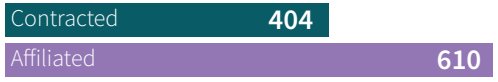
In 2024, the Equality Committee completed most of the 15 actions outlined in the 2021–2025 Gender Equality Plan. Key achievements include:

- Improvements in balances between the sexes in governance and parity in the scientific committees.
- Incorporation of a gender perspective into IGTP regulations and internal documents.
- Participation in the production of guidelines on the use of inclusive communication in health research centres in Catalonia, through the Hypathia Community of Practice coordinated by the Catalan Agency for Health Quality and Evaluation (AQuAS)
- Introduction of new work–life balance measures, based on an annual staff consultation.

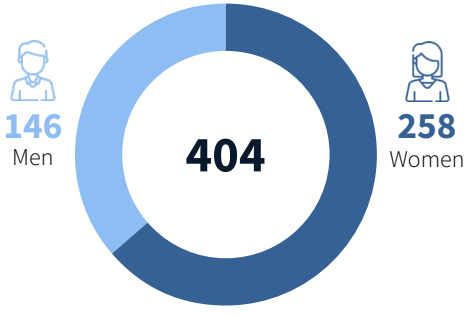
Equality at IGTP

Staff

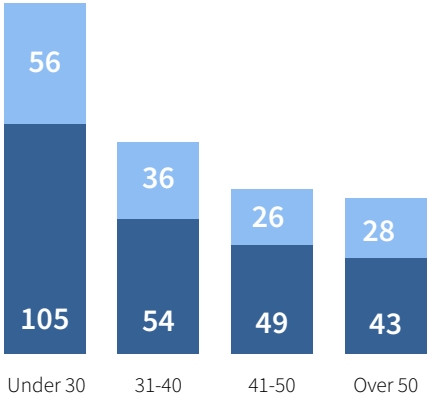
Staff



CONTRACTED STAFF

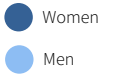


Age

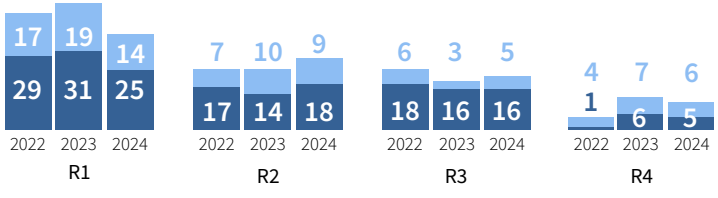


Professional categories

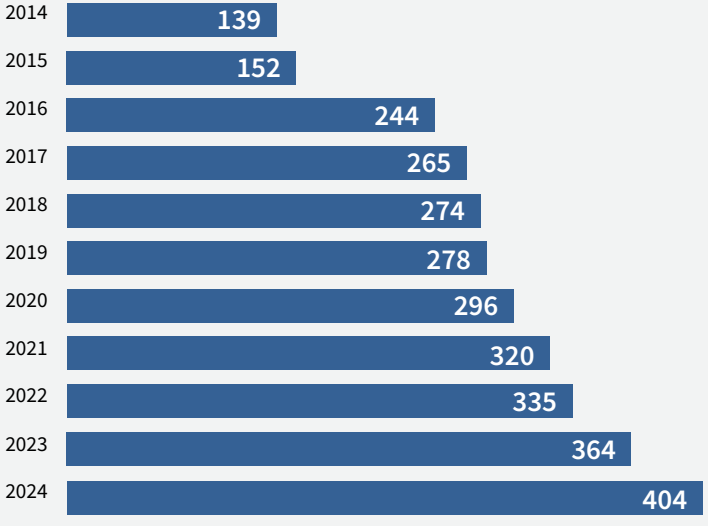
Scientific staff	Research support staff	Administrative and management staff
144	71	43
79	45	22



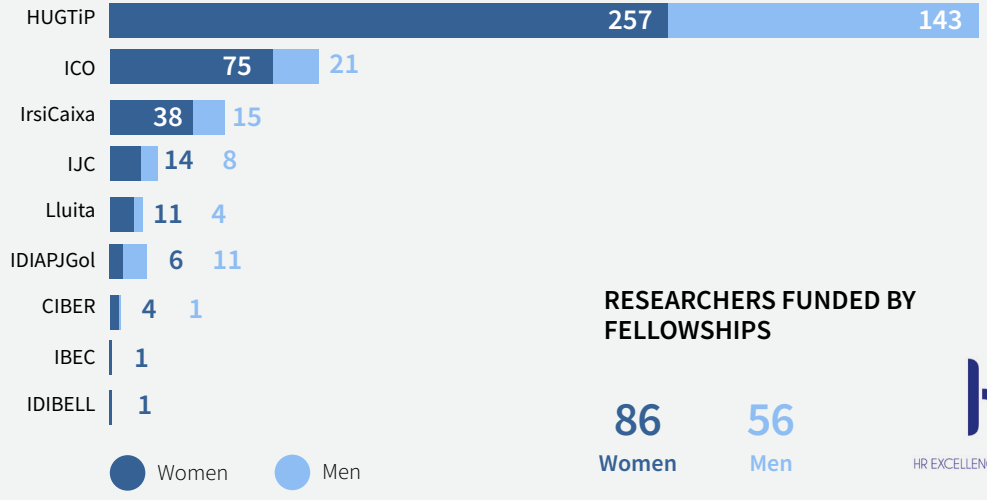
Researchers



STAFF EVOLUTION



AFFILIATION AGREEMENTS



RESEARCHERS FUNDED BY FELLOWSHIPS

Women	Men
86	56

HR EXCELLENCE IN RESEARCH

Research and innovation

Research and innovation

Research areas and groups

44

GROUPS contracted directly by IGTP and affiliated groups from ICO, ISGlobal and Consorci Sanitari del Maresme

8

AFFILIATED INSTITUTIONS

- Barcelona Institute for Global Health (ISGlobal)
- Consorci Sanitari del Maresme (CSdM)
- Fundació Institut Guttmann
- Fundació Institut Universitari per a la Recerca a l'Atenció Primària de Salut Jordi Gol i Gurina (IDIAPJGol)
- Fundació Lluita contra les Infeccions
- Institut Català d'Oncologia (ICO)
- IrsiCaixa
- Josep Carreras Leukaemia Research Institute (IJC)

9

RESEARCH AREAS

Cancer	Cardiovascular and Respiratory Disease	Community Health
Diseases of the Liver and Digestive Tract	Endocrinology and Metabolic Diseases, Nephrology and Bone Diseases	Immunology and Inflammation
Infectious Diseases	Medical Complications and Clinical Pharmacology of Substance Use Disorder	Neuroscience

Read more

Transversal programs

Translational Program in Cancer Research (CARE)

The CARE Program is a multidisciplinary network of researchers who share common interests and resources in the field of cancer research. The program is located on the Can Ruti Campus and is an integral part of the core scientific structure of the IIS IGTP.

Scope and aim

Research carried out within CARE focuses on different forms of cancer, with the goal of accelerating the transfer of cutting-edge knowledge and technological progress to the clinic for the prevention, diagnosis and treatment of cancer. Through this program, the quality of cancer research will be enhanced and its impact on clinical practice will be maximised. The scientific and functional aims of CARE include:

- Promotion of the development and implementation of precision and personalised medicine.
- Advancement of basic and translational research towards innovation and technology transfer.
- Establishment of a collaborative and transversal network of clinical, translational and basic researchers.
- Implementation of an efficient working framework for researchers in order to increase research impact.
- Facilitation of the use of advanced computational tools in translational research practices.

Structure of the program

Institutions

- Core members: IGTP, Germans Trias i Pujol University Hospital, Institut Català d'Oncologia (ICO)
- Associate institutions: Josep Carreras Leukaemia Research Institute (IJC), IrsiCaixa, Universitat Autònoma de Barcelona (UAB)

Executive Committee

- Mireia Margelí, clinical research director
- Miguel A Peinado, basic research director
- Anna Martínez-Cardús, networking coordinator
- Eduard Serra, scientific coordinator
- Arola Fortian, training & communications coordinator

CARE Program nodes

- Preclinical Models (Coordinator: Meritxell Carrió)
- Immunology/Immunotherapy (Coordinators: Esther Ballana, Joan Climent)
- Tumour Heterogeneity & Liquid Biopsy (Coordinators: Sofia España, Berta Martín)
- Bioinformatics (Coordinators: Sergio Alonso, Bernat Gel)

Pathology-focused multidisciplinary groups

- Taskforce for Colorectal Cancer (Coordinators: Eva Martinez-Balibrea, Núria Mulet)
- Can Ruti Sarcoma Group (Coordinator: Eduard Serra)

Highlights

In 2024, CARE completed its consolidation. The different existing nodes unfolded a significant number of activities including regular meetings, technical capsules, etc. The Pathology-Focused Multidisciplinary Groups kept highly operative and new networks were consolidated.

1
Annual scientific meetings

8
Oncology courses and scientific meetings

3
Training capsules

2
Outreach activities

16
CARE translational seminars

Program in Public Health and Primary Healthcare (CORE)

The CORE Program is a multidisciplinary network of researchers united by shared interests and resources in population research on the Can Ruti Campus. As one of the transversal programs of the IIS IGTP, CORE is part of IGTP's strategy for promoting research with a positive impact on the health of citizens.

Scope and aim

The main objectives of the CORE Program are:

- Visualisation of population-based research conducted at the Can Ruti Campus.
- Creation of a multidisciplinary research framework that facilitates synergies to design and implement applied research at the population level.
- Generation of knowledge to promote management and public health policies based on scientific evidence.
- Strengthening of primary care as the core pillar of the health system.

The program will pursue these aims through activities that:

- Encourage population based collaborative multidisciplinary research between the different actors on the Can Ruti Campus, including Primary Healthcare, and other primary care and public health units.
- Promote and visualise action-oriented program-based and participatory research.
- Facilitate the integration of research results into primary care clinical practice, hospital care and public health policies.
- Facilitate the integration of talent into research groups of the program and implement strategies to assure their sustainability and competitivity.
- Facilitate the use of shared technological platforms, facilities and analytical skills.
- Act as a hub for training and teaching to improve the population research abilities of its investigators and those on the Can Ruti Campus.
- Strengthen emerging groups.

Structure of the program

Institutions

- Promoters: Centre for Epidemiological Studies on HIV/AIDS and STI of Catalonia (CEEISCAT) – Germans Trias i Pujol Research Institute (IGTP) / Fundació Institut Universitari per a la Recerca a l'Atenció Primària de Salut Jordi Gol i Gurina (IDIAPJGol)
- Associate institutions: IDIAPJGol / Germans Trias i Pujol University Hospital (HUGTiP) / Institut Català de la Salut (ICS), Barcelona Metropolitana Nord (BMN) / Health Department of the Government of Catalonia

Management Committee

- Directors: Jordi Casabona (CEEISCAT-IGTP) and Pere Toran (IDIAPJGol-USR-MPN)
- Scientific coordinators: Cinta Folch and Rosa García
- Education & training coordinators: Evelin López and Josep Maria Manresa
- Internal operational working group coodinators: Cristina Agustí and Guillem Pera
- Administration: Montse Galdón and Marta Ruiz

Executive Committee

- Jordi Casabona, CEEISCAT-IGTP
- Pere Toran, IDIAPJGol-USR-MPN
- Carmen Cabezas (until August 2024), secretary of Public Health, Health Department
- Esteve Fernández (from September 2024), secretary of Public Health, Health Department
- Jordi Barretina, director general, IGTP
- Julia García, scientific director, IGTP
- Josep Basora, scientific director, IDIAPJGol
- Oriol Estrada, director of Care Strategy and Innovation, HUGTiP
- Josep Maria Mòdol, clinical director, HUGTiP
- Laura Conangla, director of Primary Health Care BMN
- Bonaventura Clotet, clinical territorial director BMN HUGTIP, director of IrsiCaixa and president of Fundació Lluita contra les Infeccions

Highlights

Since its launch in 2024, the CORE Program has focused on building a solid and collaborative structure. In June, the first CORE Scientific Workshop was held, leading to the creation of three working groups: Organisation of Resources, Training and Teaching, and Communication.

Throughout the year, the program organised three themed seminars and continued the successful STD Sessions format with five new editions. In parallel, a new training initiative, the “Douglas Altman Sessions in Biostatistics”, was launched, with two sessions held in 2024 and a full series of eight planned for the 2024–2025 academic year.

Preparations also began for the first CORE Scientific Day, scheduled for June 2025. A scientific committee made up of program members was established to coordinate the event, which will bring together participants across six cross-cutting interest groups to explore synergies, foster collaboration, and define concrete actions for the 2025–2026 period.

Core facilities

Scientific research in the 21st century calls for the use of sophisticated, complex and expensive technologies, which is why IGTP has the presence of the Scientific-Technical Platforms (ICTS). The ICTS have the objective of centralising procedures and equipment, favouring researchers' access to advanced technology, as well as offering their experience in highly complex techniques. IGTP's ICTS serve the research groups at IGTP and the Can Ruti campus, as well as groups of public and private external origin.

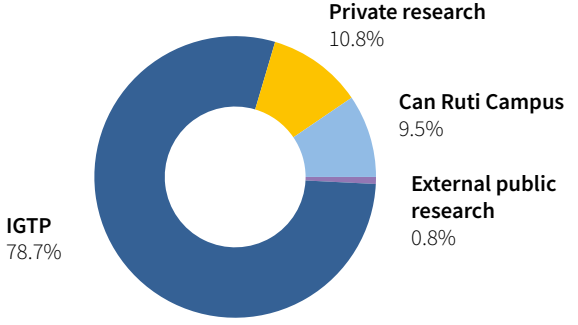
Technology and services at IGTP

	STAFF	PIS SERVED	PROJECTS SERVED
Biobank	6	57	77
Biostatistics	5	29	30
Cryobiology	1	47	53
Cytometry	3	42	46
High Content Genomics and Bioinformatics	5	16	18
High Performance Computing	1	16	22
Microscopy	1	29	34
Proteomics and Metabolomics	2	17	17
Translational Genomics	3	40	55

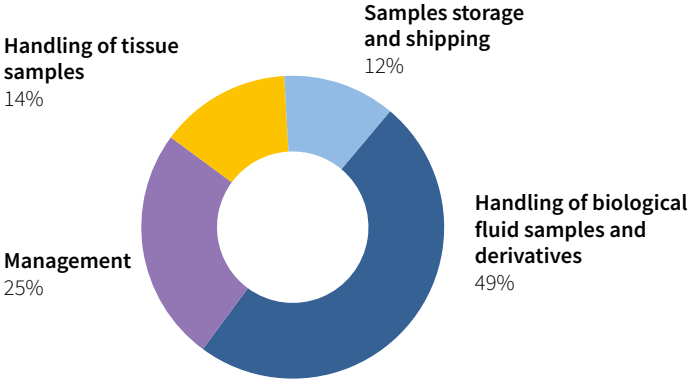
BIOBANK

- Reached a record number of samples transferred for research: 9,703 samples from 5,428 donors.
- Completed the ICH E6 Good Clinical Practice course (The Global Health Network) and Data Stewardship and Research Data Management course (CERCA, Sociedad Española de Documentación e Información Científica)
- Participated in the X Jornadas de Aspectos Éticos de la Investigación Biomédica (Instituto de Salud Carlos III's Research Ethics Committee) and in the 2024 Can Ruti Open Day as part of the Science Week.
- Delivered a training through internship placements at the Fluid Node and the Tumour Bank, and a session on biobanks as part of the "Fundamentals of Basic Research" course within the Postgraduate Program in Research and Innovation in Health Sciences (Universitat Autònoma de Barcelona, Consorci Sanitari del Maresme).
- Attended the II Jornadas de las plataformas ISCIII de apoyo a la I+D+i en biomedicina y ciencias de la salud, held in Lleida.

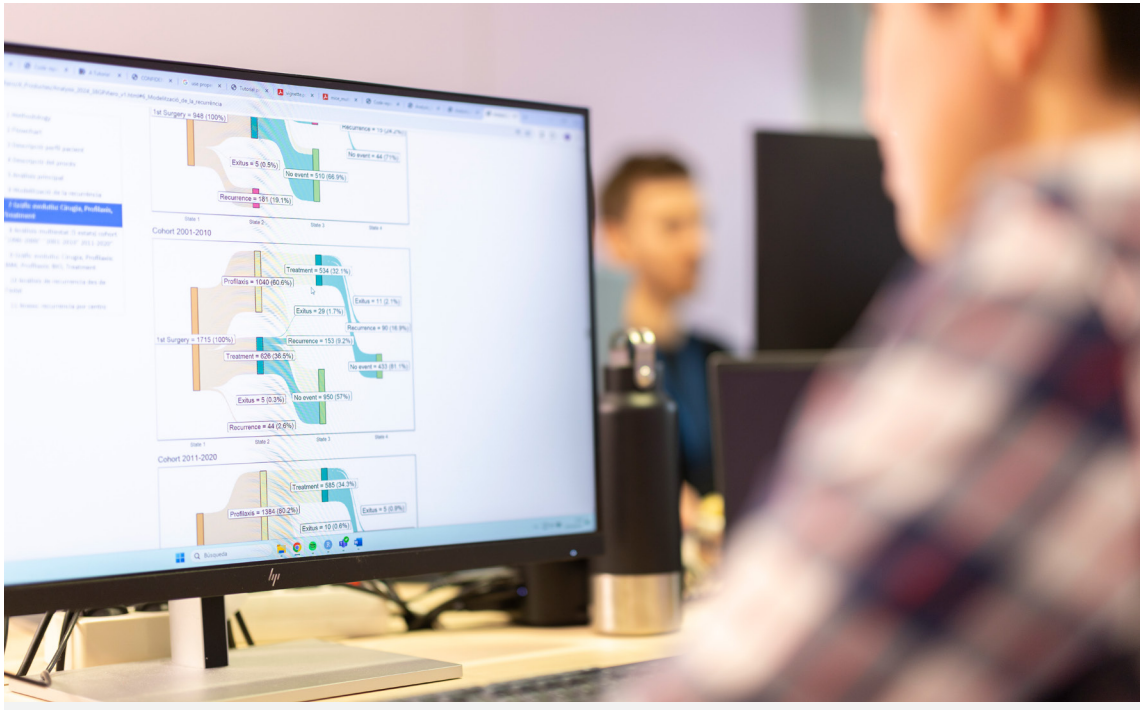
USERS



SERVICES

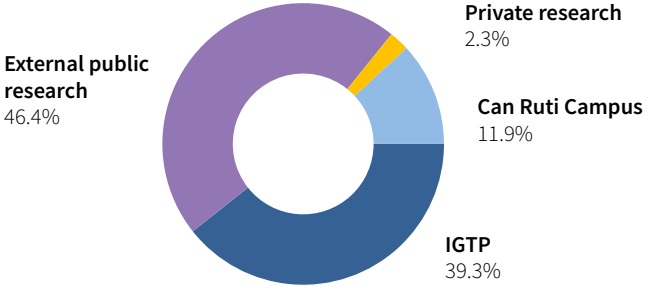


BIOSTATISTICS



- Participated in 5 scientific sessions/seminars organised by IGTP and the GRBIO research group in biostatistics and bioinformatics. Launch of the Douglas Altman Biostatistics Methodology Seminars.
- Contributed to 8 oral or poster presentations at national and international conferences, including the 2024 young researchers meeting of Sociedad Española de Bioestadística (Jornadas SEB), R Hispano 2024, useR! 2024 and the International Society for Clinical Biostatistics (ISCB 2024).
- Published published 3 peer-reviewed scientific articles as first or corresponding authors, and contributed as co-authors to an additional 12 publications.

USERS



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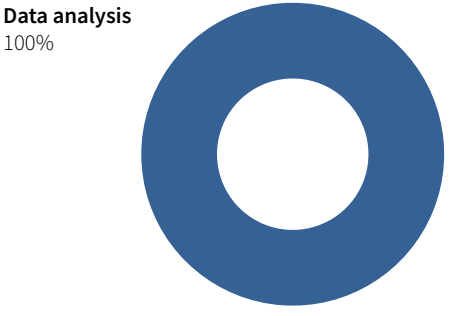
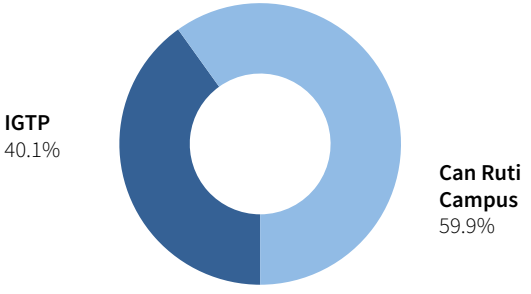


CRYOBIOLOGY

- Acquired three new ultra-low temperature freezers for sample storage, sponsored by research groups.
- Acquired a new back-up ultra-low temperature freezer.
- Piloted the new temperature monitoring system, MySirius.
- Signed an agreement to expand liquid nitrogen equipment.
- Ultra-low freezer -80°Creviews

USERS



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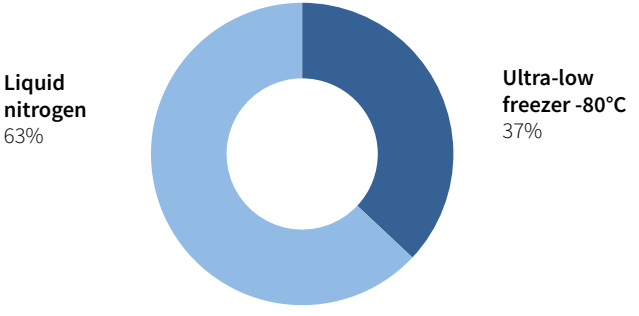
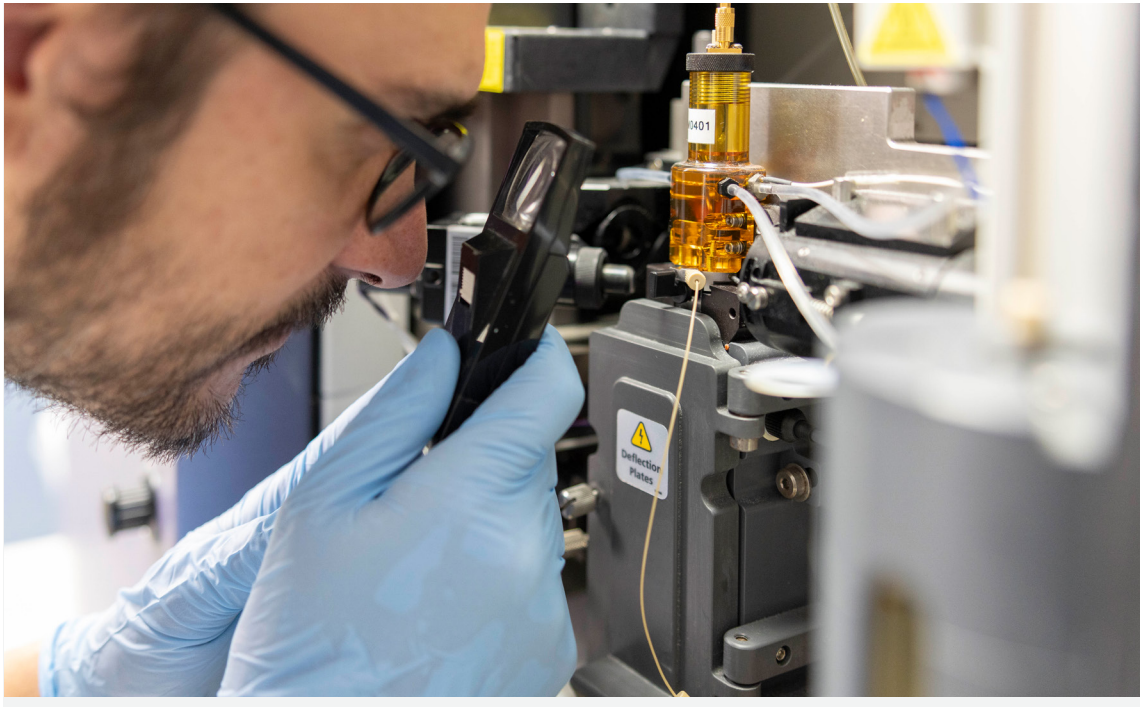
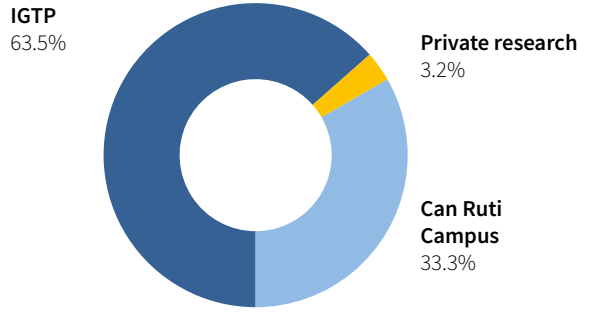


CYTOMETRY



- Introduced the new Bigfoot spectral cell sorter, equipped with 5 lasers and a biosafety cabinet.
- Relaunched the annual Cytometry Course, with full attendance.
- Successfully transitioned two-thirds of the unit's team, including the appointment of a new head.
- Sara Monreal, new member of the unit, was accepted into the Advanced Immunology PhD Program of Universitat Autònoma de Barcelona under the supervision of Eva Martínez Cáceres, Aina Teniente Serra and Joan Puñet Ortiz.

USERS



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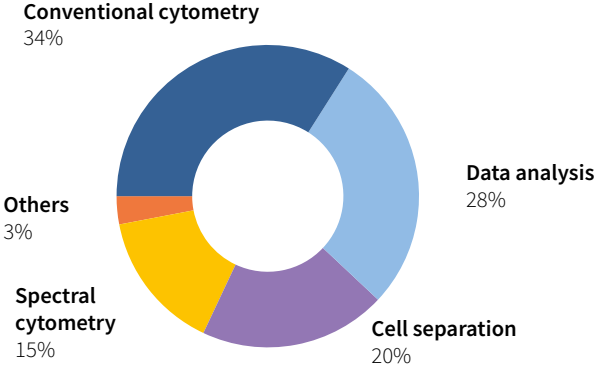

HIGH CONTENT GENOMICS AND BIOINFORMATICS

- Secured funding through four competitive research projects, by Instituto de Salud Carlos III (PI22/01498), the Catalan Agency for Management of University and Research Grants (2021 SGR 01537), Horizon Europe - INFRA-SERV Actions (ISIDORe, 101046133), Horizon Europe - ISIDORe JRA Programme (PATH2XNAT, ISID_JRA_f19x, 2024–2025).
- Co-authored six scientific articles in peer-reviewed journals: Co-authored six peer-reviewed articles in *Microorganisms*, *Front Endocrinol*, *Eur J Endocrinol*, *Stroke*, *J Crohn's Colitis*, and *Int J Mol Sci*.
- Implemented new procedures and analysis methods, including automated small RNA-seq library preparation in the laboratory, and new bioinformatic pipelines for single-cell RNA-seq, spatial transcriptomics, long-read sequencing, Nanostring nCounter, and SNP array data.
- Improved existing pipelines for WGS, metagenomics, small RNA-seq and RNA-seq NGS data, and methylation array analysis.
- Applied data science, machine learning, and AI techniques for the extraction and analysis of electronic health records.

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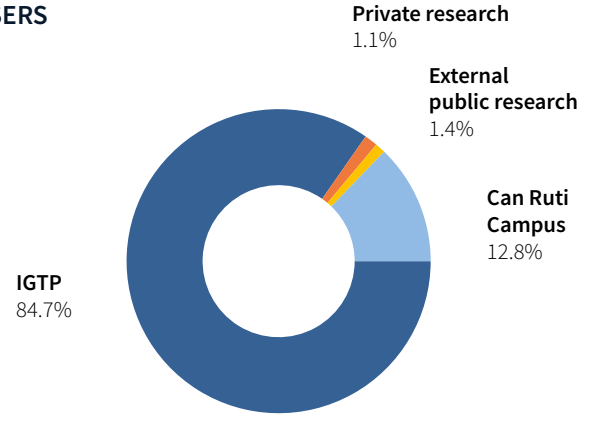

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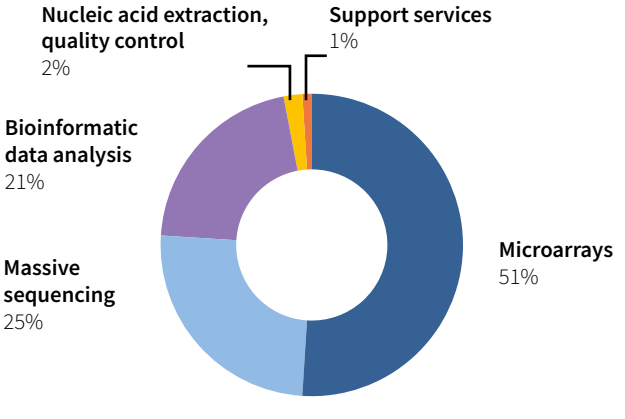
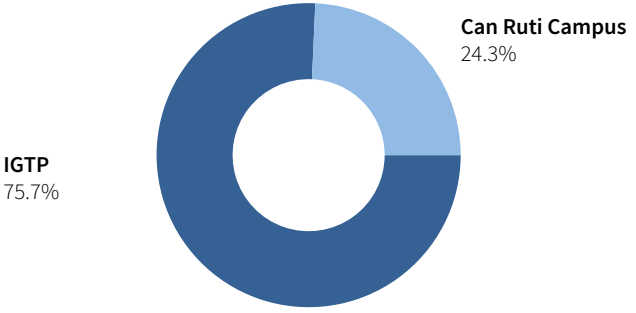


HIGH PERFORMANCE COMPUTING

USERS



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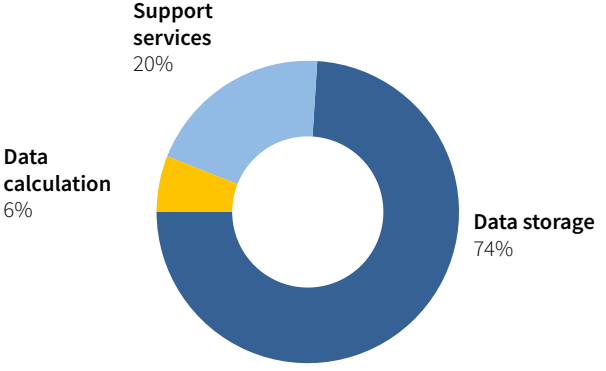
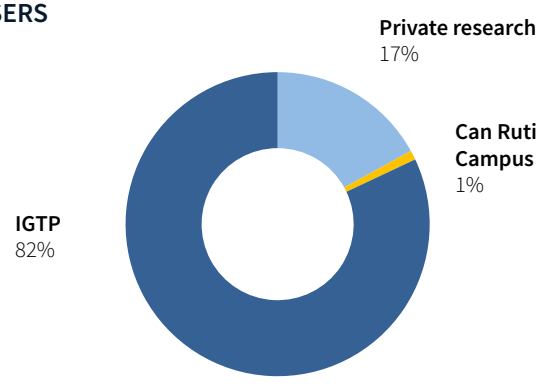


MICROSCOPY

- Recorded high usage of the Abberior STEDYCON super-resolution confocal microscope, installed at the beginning of 2024, averaging 3 hours per working day.
- Introduced a new Image Processing Workstation to support users with image processing tasks and the handling of large data sets.
- Maintained a technical seminar, regular newsletter, and the Image of the Month and Year competition, ensuring a good level of communication and engagement with users.

USERS



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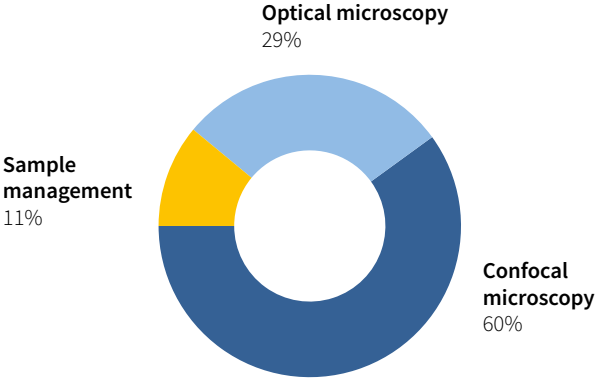
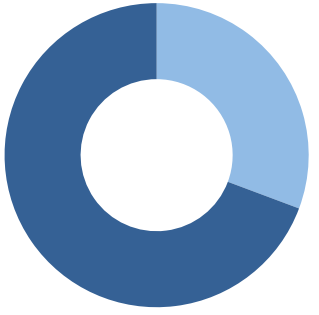


PROTEOMICS AND METABOLOMICS

- Launched a new service for the detection and quantification of bile acid profiles in different tissues.
- Acquired a GC/MS analyser for the detection and quantification of volatile compounds.
- Completed a competitive project funded by Instituto de Salud Carlos III, in collaboration with Hospital Universitari Mútua de Terrassa, focused on biomarker discovery in coeliac disease using metabolomics and proteomics technologies, culminating in the successful defence of a doctoral thesis.

USERS



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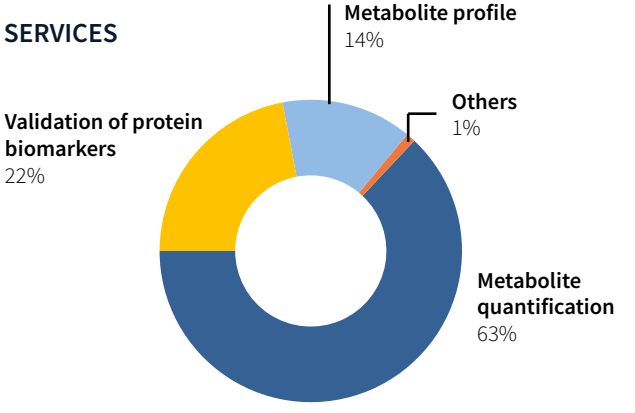
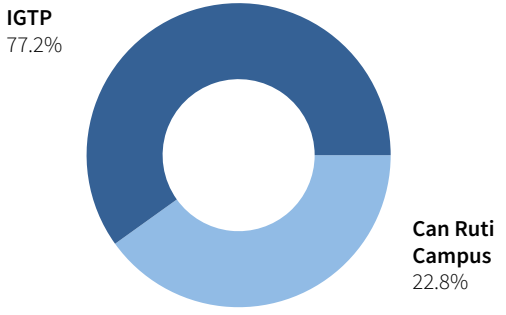


TRANSLATIONAL GENOMICS

- Co-authored 3 scientific publications published in the journals *Int J Mol Sci*, *Proc Natl Acad Sci USA* and *J Epidemiol Glob Health*.
- Participated as a research group in 1 external project.
- Completed the Data Stewardship and Research Data Management course (CERCA, Sociedad Española de Documentación e Información Científica).
- Initiated Phase 1 of the Q1 CERCA-GINYS accreditation.
- Acquired a new equipment to support ongoing activities: BD RhapsodyTM Xpress Single-Cell Analysis System (Becton Dickinson), NextSeq-2000 (Illumina SL) and TapeStation 4250 (Agilent).

USERS



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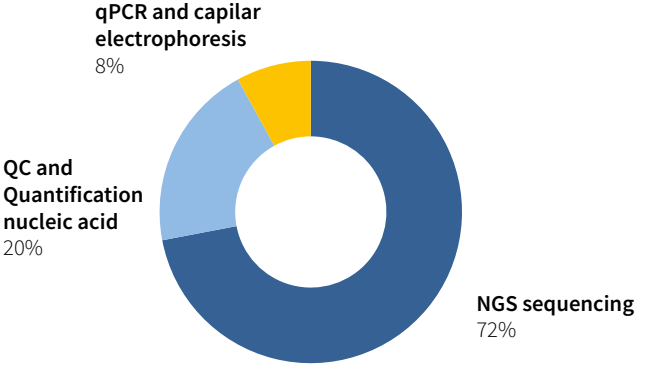
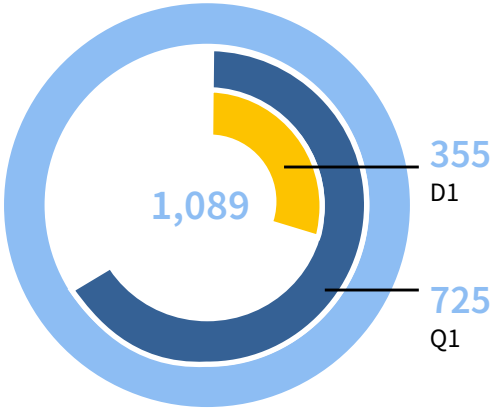


Scientific publications

2024 PUBLICATIONS



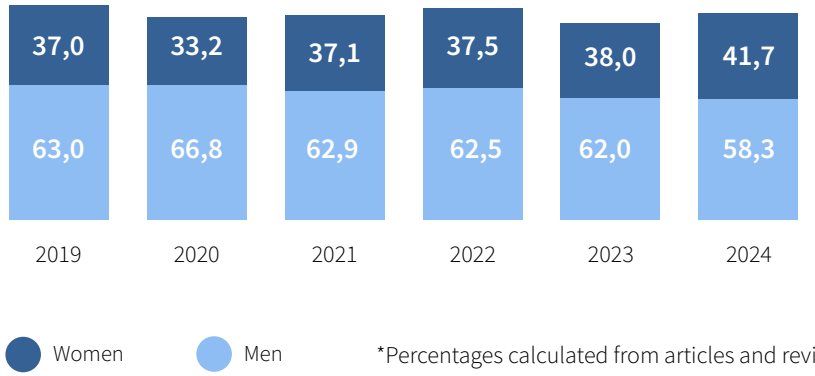
8.36

AVERAGE IMPACT FACTOR

8,321

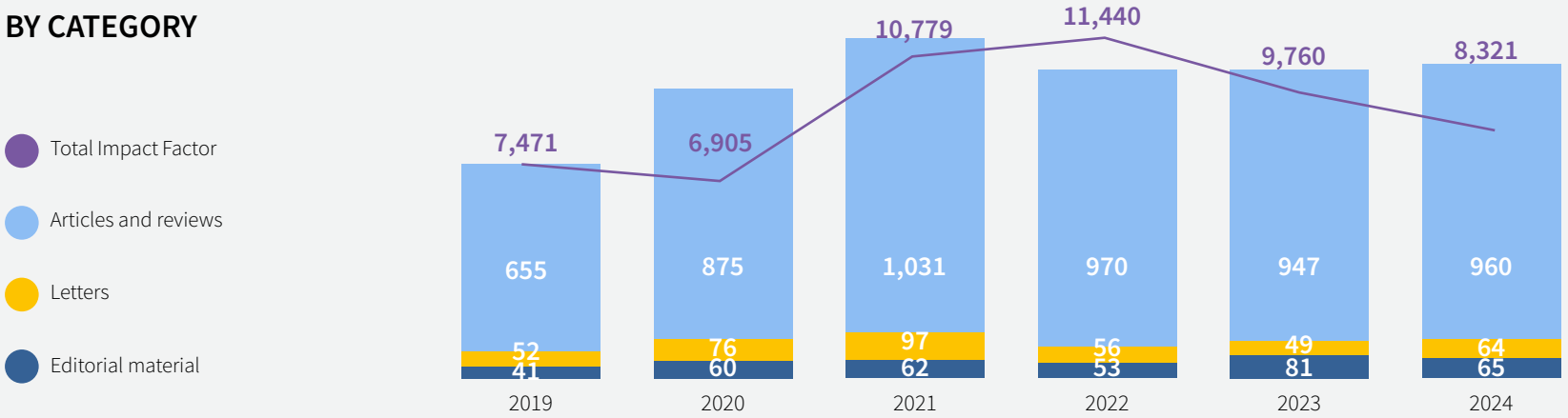
TOTAL IMPACT FACTOR

BY LEADERSHIP



*Percentages calculated from articles and reviews

BY CATEGORY



Innovation and technology transfer

In line with its strategic plan, IGTP continues to strengthen its commitment to fostering a culture of innovation and promoting technology transfer across its research community.

Highlights from 2024 include the creation of two new spin-offs (Debios Diagnostics and HealthTech Innovations), as well as continued progress and funding success for existing ones. Among the funding achievements, IGTP secured over €2 million in state support for research projects focused on technological innovation and scientific advancement, and will take part in a European-funded initiative to develop an innovative immunotherapeutic strategy against bacterial infections. The institute also strengthened its collaboration with industry through a new partnership with DevsHealth and joined the Advanced Therapies Network of Catalonia to contribute to the development of cutting-edge biomedical solutions.

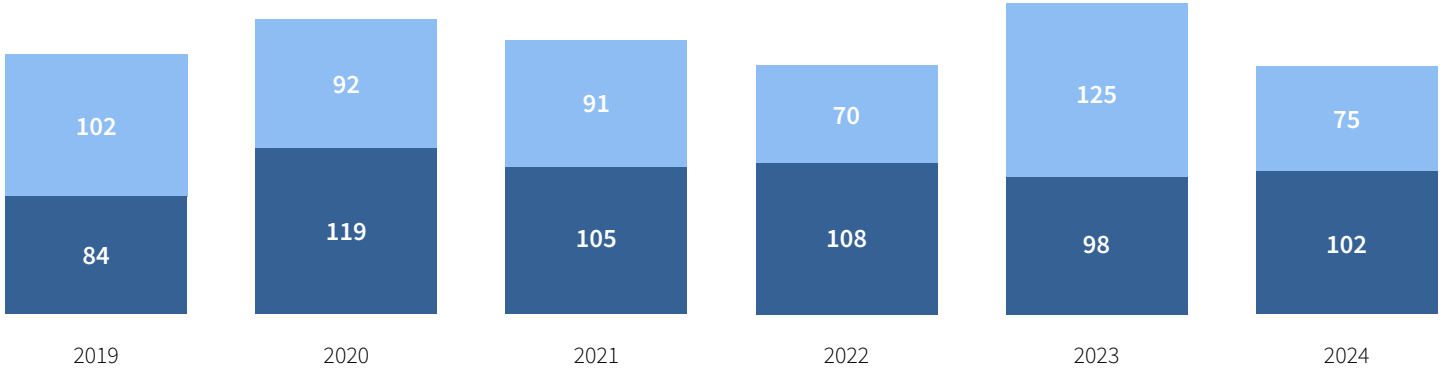
Check innovation-oriented news on the IGTP website

LAUNCH OF THE INNOMED PROGRAM

IGTP, with support from ITEMAS-ISCIII, launched the first edition of the Innomed program, a collaboration between institutions from the Can Ruti Campus and its surroundings aimed at sharing skills, knowledge, and resources to boost innovation. As part of this initiative, the GrowInn incubator was created to support early-stage innovation projects and help them move closer to market and clinical application. The most promising projects were recognised at the Innomed Awards, held on 13 June.

Clinical trials

SIGNED CONTRACTS



613

ACTIVE CLINICAL TRIALS AND MULTICENTRE OBSERVATIONAL STUDIES

Patents and license agreements

40
ACTIVE PATENT FAMILIES

25
ACTIVE LICENSE AGREEMENTS

12
NEW IDEAS

55%
LICENSED PATENTS

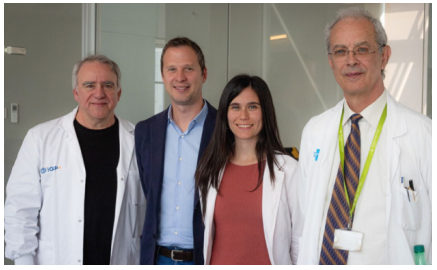
11
TECHNOLOGY OFFER PORTFOLIO

24
INCUBATED PROJECTS

Spin-offs

IGTP currently has 10 spin-offs, created to turn scientific advances into real-world solutions. These companies play a key role in bringing innovative health technologies to the market and driving the social impact of the institute's research.

CREATION OF TWO NEW SPIN-OFFS:



DEBIOS DIAGNOSTICS

Debios Diagnostics develops non-invasive techniques for the diagnosis of genitourinary diseases. Its first product, Fibrokit, is a urine test used to monitor kidney fibrosis, offering an alternative to traditional kidney biopsies, which are invasive and costly.

HEALTHTECH INNOVATIONS

HealthTech Innovations aims to transform the surgical environment by providing advanced technological solutions to support and optimise the work of scrub nurses. This initiative seeks to improve efficiency, precision, and safety in operating theatres, contributing to a more advanced and human-centred healthcare system.

MANREMYC Health first

Founded in 2013

involex Therapeutics, S.L.

Founded in 2014

aniling accelerating epigenomics

Founded in 2014

AHEAD THERAPEUTICS

Founded in 2017

Biointaxis

Founded in 2018

timeisbrain

Founded in 2020

breaz

Founded in 2021

NIMBLE Diagnostics

Founded in 2022

DEBIOS

Founded in 2025

HealthTech INNOVATIONS

Founded in 2025

Strategic projects

Strategic projects

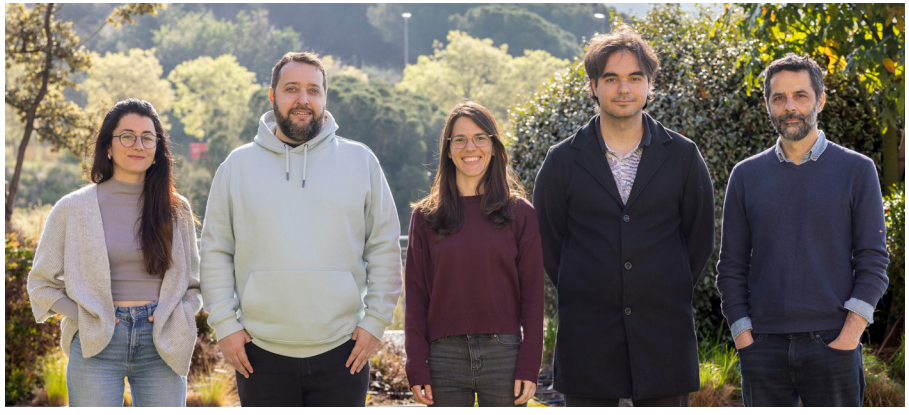
GCAT|GENOMES FOR LIFE

GCAT is a population-based multi-purpose cohort designed to identify genomic, epigenomic and environmental factors in the development of complex chronic diseases. The research team contributes to national and European consortia across areas such as diabetes, stroke, Long COVID, the urban exposome and occupational health.

COMPARATIVE MEDICINE & BIOIMAGE CENTRE OF CATALONIA (CMCIB)

CMCiB is the translational medicine centre of IGTP, affiliated with the Germans Trias i Pujol University Hospital on the Can Ruti Campus in Badalona. This state-of-the-art high-tech biomedical research site has been designed and equipped to accommodate and support a wide range of biomedical research and technological development projects while maintaining strict sustainability and research standards within the 3R policy.

GCAT|Genomes for Life



Strategic project leader: Rafael de Cid Ibeas

Research lines

- **Molecular epidemiology of multimorbidity**
- **Molecular epidemiology of COVID-19**
- **Molecular epidemiology of environmental health**
- **Digital ecosystems for health research**

Featured publications

Farré X, Blay N, Espinosa A, Castaño-Vinyals G, Carreras A, Garcia-Aymerich J, Cardis E, Kogevinas M, Goldberg X, de Cid R. **Decoding depression by exploring the exposome-genome edge amidst COVID-19 lockdown**. *Sci Rep*. 2024 Jun 12;14(1):13562. DOI: 10.1038/s41598-024-64200-7.

Carreras-Torres R, Galván-Femenía I, Farré X, Cortés B, Díez-Obrero V, Carreras A, Moratalla-Navarro F, Iraola-Guzmán S, Blay N, Obón-Santacana M, Moreno V, de Cid R. **Multiomic integration analysis identifies atherogenic metabolites mediating between novel immune genes and cardiovascular risk.** *Genome Med*. 2024 Oct 24;16(1):122. DOI: 10.1186/s13073-024-01397-2.

Pardo-Cea MA, Farré X, Esteve A, Palade J, Espín R, Mateo F, Alsop E, Alorda M, Blay N, Baiges A, Shabbir A, Comellas F, Gómez A, Arnan M, Teulé A, Salinas M, Berrocal L, Brunet J, Rofes P, Lázaro C, Conesa M, Rojas JJ, Velten L, Fendler W, Smyczynska U, Chowdhury D, Zeng Y, He HH, Li R, Van Keuren-Jensen K, de Cid R, Pujana MA. **Biological basis of extensive pleiotropy between blood traits and cancer risk**. *Genome Med*. 2024 Feb 2;16(1):21. DOI: 10.1186/s13073-024-01294-8.

Highlights

Over 2024, the GCAT team made significant progress in integrating molecular and environmental data to advance precision health research.

A key achievement was the publication of a comprehensive metabolome map in Genome Medicine, focusing on cardiovascular risk. This breakthrough integrates metabolic and genetic data to enhance understanding of cardiovascular health and identify new biomarkers for disease prevention.

The team also contributed to the creation of an international hub for environmental health research through the EXPANSE project, incorporating updated datasets and advanced geolocation techniques. This map provides valuable insights into how environmental factors impact health across diverse European populations.

These efforts were complemented by the CUPID project, which studies the intersection of epigenetics, the exposome and chronobiology, exploring their impact on genetic susceptibility to diseases. The project, awarded for its innovative approach, represents a significant step in understanding the relationship between environmental exposures, epigenetics, and genetic risk.

GCAT also joined the CORDELIA initiative. This is the largest cohort study in Catalonia and Spain and is focused on cardiovascular health. By integrating extensive genetic, environmental, and clinical data, the project aims to advance the understanding of cardiovascular diseases and develop personalised prevention strategies.

Other milestones of the year include progress on the epigenomic map of GCAT, with comprehensive methylation and regulatory element profiling; the strengthening of the strategic partnership with IGTP's CORE Program on molecular epidemiology research; and strategic integration into ELIXIR ESFRI, supporting European life science data infrastructure and the development of the Health European Data Space.

COMPARATIVE MEDICINE & BIOIMAGE CENTRE OF CATALONIA (CMCIB)

2024 in numbers

21
Approved animal model procedures by the Ethics Committee

63
Active translational studies

7
Active clinical research studies

~120
Human volunteers in bioimaging projects (Human MRI)

504
Registered researchers

250
Visitors

>550
Advanced surgical trainings

>1,500
Trained KOL's/surgeons

1
Plenary keynote lecture

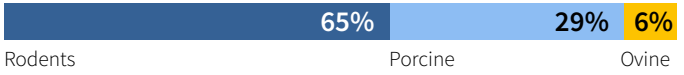
10
Scientific talks & success stories

15
Speakers

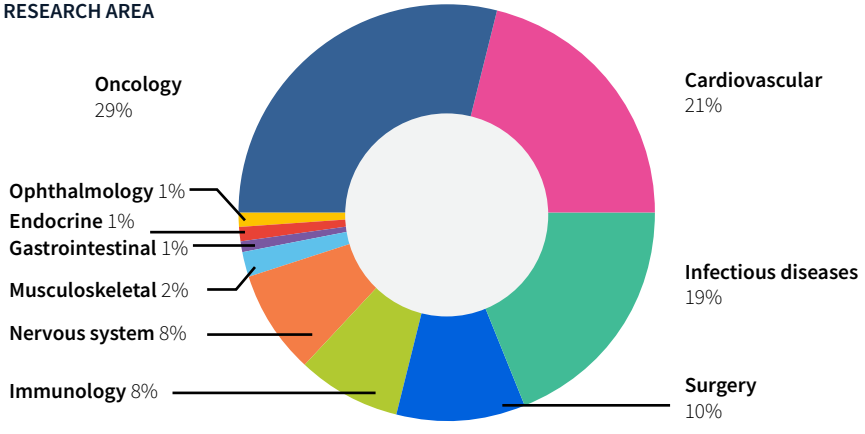
205
Attendees

ACTIVE TRANSLATIONAL STUDIES

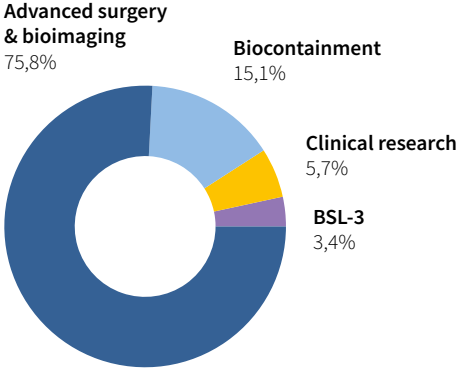
MODEL ORGANISM



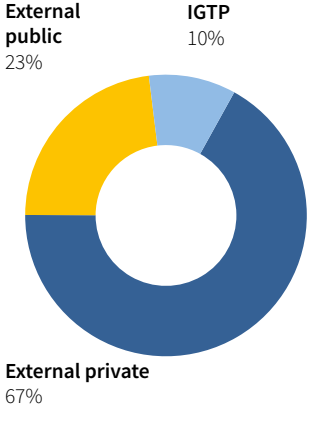
RESEARCH AREA



REVENUES PER ACTIVITY



REVENUE STREAMS



Highlights

- Increased activity with humanised and GMO mouse models and expanded in-vitro and in-vivo research in infectious diseases.
- Expanded surgical capacity with four new operating theatres dedicated to surgical robotics.
- Growth in the number of Advanced Surgical Training sessions.
- Renewal of GLP certification and consolidation as a reference centre for GLP-compliant preclinical studies.
- Participation in six active EU projects; providing animal trial support across several EU consortia and international/national research projects in various therapeutic areas (regenerative medicine, neurology, infectious diseases, oncology, respiratory diseases, etc.) using a range of animal models and alternative methods (organoids, alternative tissue models, computer simulators, *Drosophila melanogaster*, rodents, porcine and ovine models).
- Participation in an EATRIS project (ISIDORe).
- Roll-out of Computational Anatomy Unit services and team expansion (data analyst and biomedical engineer); implementation of a fully operational imaging management system (PACS) and data distribution platform (XNAT).
- Institutional visits from the director of CERCA, Dr Laia Pellejà, as well as representatives from Farmaindustria and ACCIÓ.
- Active contribution to IGTP's accreditation processes by CERCA and ISCIII.

3R program

~150
Researchers trained

7
Seminars on the 3Rs

286
Certificates in Laboratory Animal Science

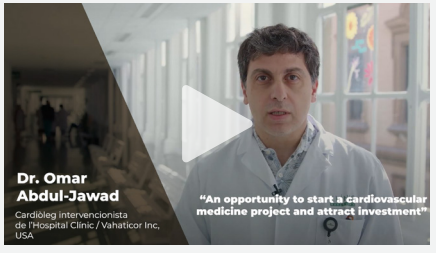
17
Certificates of supervised practice for the training of staff Iinvolved in the handling of experimental animals

CMCiB Symposium: 5 years enabling pioneering biomedical research

To mark its fifth anniversary, CMCiB brought together researchers, collaborators and institutional representatives in a symposium held at CosmoCaixa (Barcelona) that celebrated five years of progress in biomedical research, innovation and training. The event highlighted the centre's strategic role in translational research and its continued commitment to excellence in animal models, imaging, and computational medicine.

CMCiB institutional video

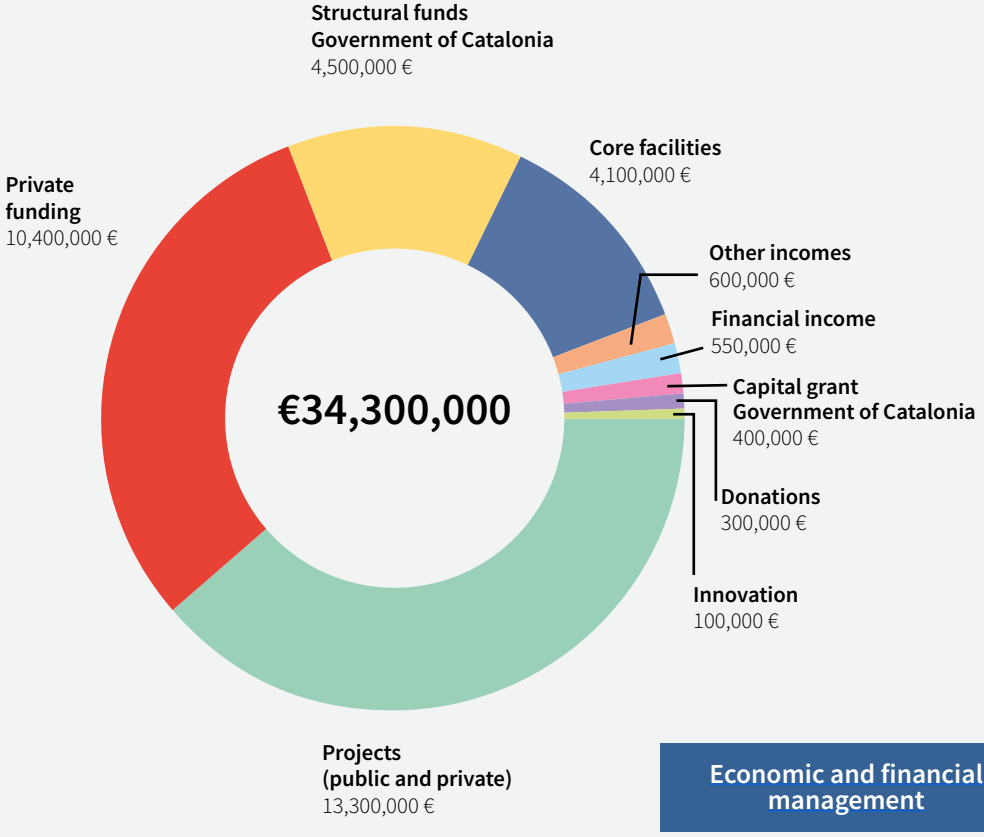
CMCiB testimonials



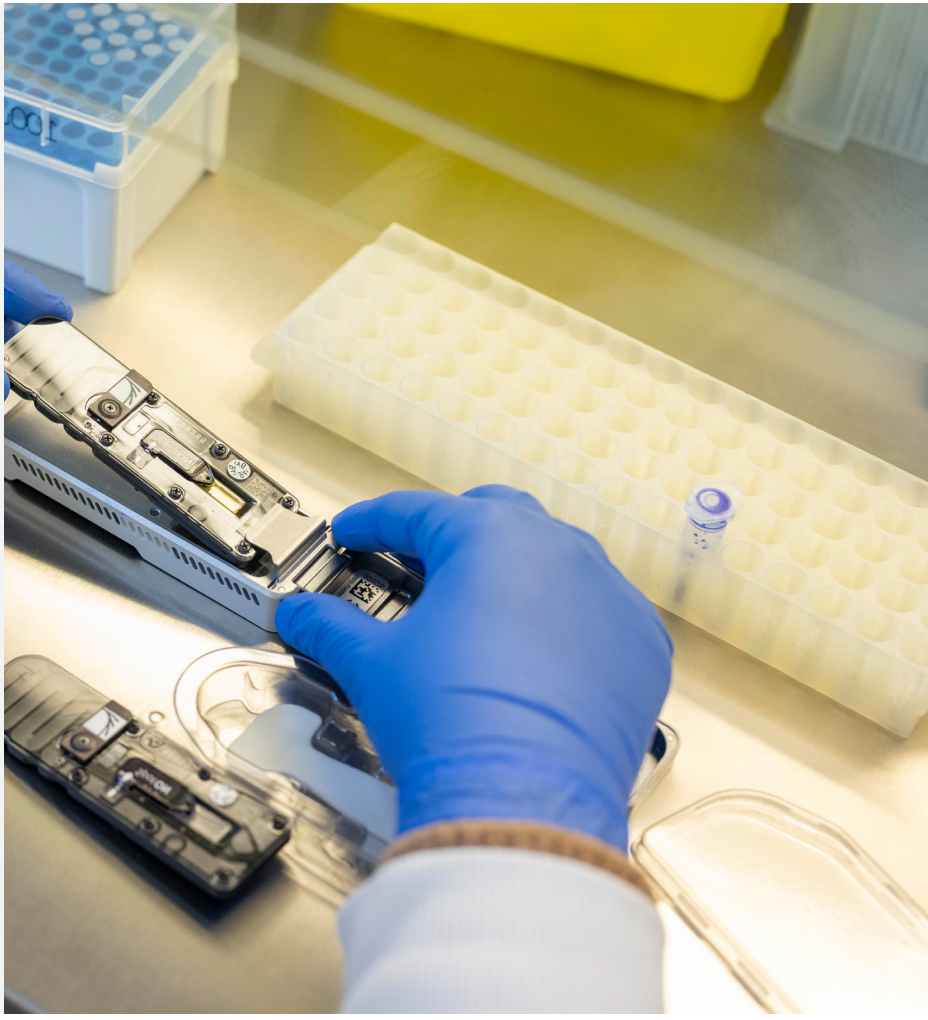
Funding

Funding

Sources of funding

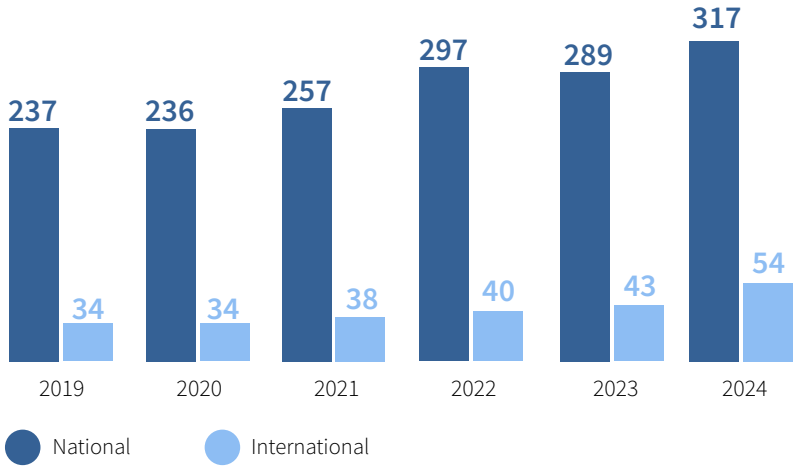


Economic and financial management

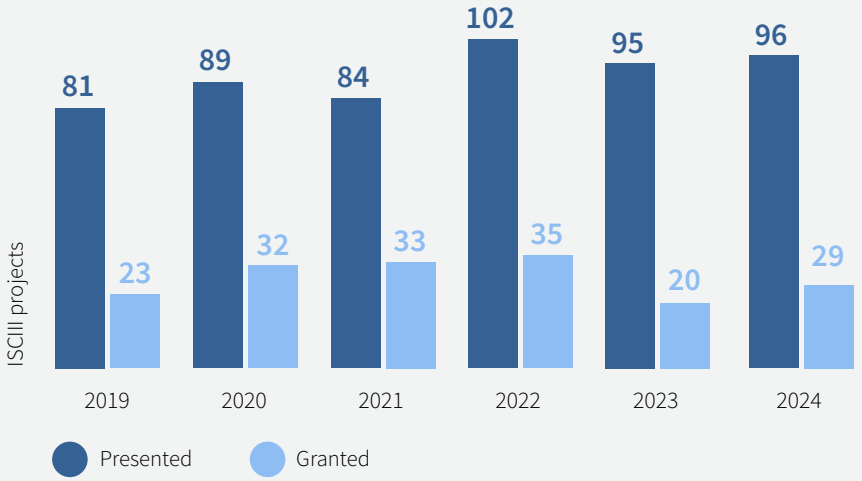


Competitive projects

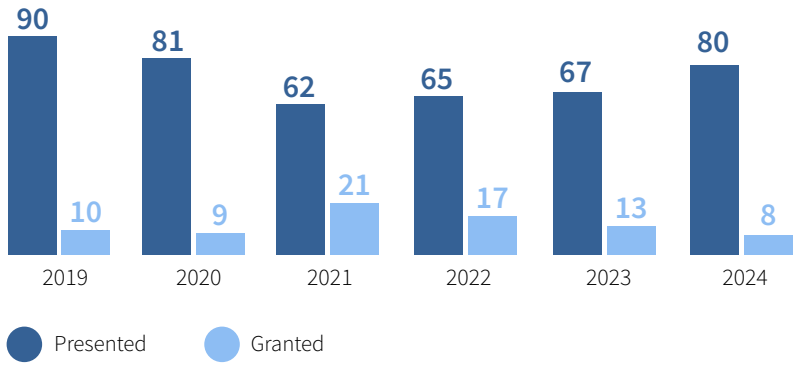
ACTIVE PROJECTS 2019-2024



ISCIII FUNDED PROJECTS 2019-2024



INTERNATIONALLY FUNDED PROJECTS 2019-2024



TOTAL SUBMITTED PROJECTS 2024

96	32	80	35
6	6	27	92

Others

Highlights

In 2024, IGTP continued to support its researchers in securing competitive funding and conducting high-impact research projects. The institute obtained funding at the Catalan, Spanish and European levels, enabling the launch of new initiatives, the consolidation of strategic collaborations, the development of research talent, and the strengthening of translational efforts. At the same time, key projects were successfully completed, international consortium work continued, and new agreements were established with industry partners to help bring research results closer to clinical application.

INNOVA4TB, an international consortium made up of 16 institutions and companies and led by IGTP, wrapped up five years of cutting-edge tuberculosis research

The European Innovation Council provided €3 million in funding for NanoBiCar, a project on immunotherapy for bacterial infections with IGTP involvement

The development of a gene therapy for Friedreich's ataxia received €2.17 million in new public funding; the therapy is being developed by Biointaxis, an IGTP spin-off

Research networks

Researchers from IIS IGTP take part in a variety of networks that connect them with other teams, encourage collaboration, and help move shared research goals forward.

5

Groups within Redes de Investigación Cooperativa Orientadas a Resultados en Salud (RICORS)

IGTP's Clinical Trials Unit (UPIC) participates in SCReN, ISCIII's Clinical Research Support Platform

21

SGR Groups accredited by the Government of Catalonia

Program of Advanced THerapies (PATH group) within Consorcio Estatal en Red para el desarrollo de medicamentos de TERapias Avanzadas (CERTERA)

6

Groups within Centros de Investigación Biomédica en Red (CIBER)

European Commission ERIC (EATRIS)

IGTP and EATRIS strengthened ties with a symposium focused on driving translational research with patient involvement

Catalonia Advanced Therapies Network (ATMP Catalonia)

IGTP joins the Advanced Therapies Network of Catalonia

Fundraising

AMICS DE CAN RUTI

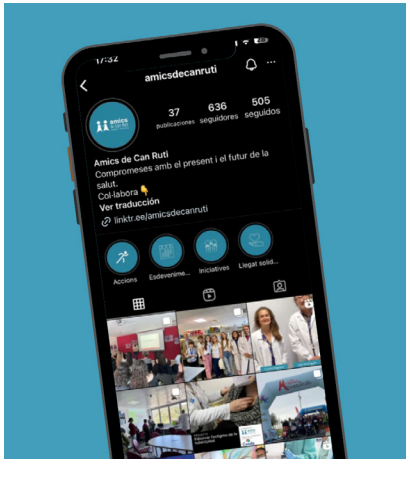
857

Amics de Can Ruti members

€182,621

In donations received in 2024

FOLLOW US ON INSTAGRAM



Highlights

Involvement in a variety of charity sports and cultural events, including the 12th Charity Run, 1st Trail Run and Charity Gala for Rare Diseases; the 5th Amics de Can Ruti – Pep Anglès Charity Golf Tournament for thyroid cancer research; Cursa Dani Vilassar de Mar for youth and adolescent mental health research; and Cursa Dani Maresme for cardiovascular research.

Participation in community engagement initiatives in Badalona, including a charity stand at the Sant Jordi Fair, an awareness campaign with Badacentre (150 local shops), a colorectal cancer prevention talk at Badiu Jove, and ticket donations for Joventut de Badalona basketball games for the Amics de Can Ruti community.

Two laboratory visits at IGTP and a visit to the Paediatrics Department at Germans Trias i Pujol University Hospital (HUGTiP) for Amics de Can Ruti members, as well as a visit from the "Mi dulce guerrero" diabetes charity association to IGTP.

Donations received through other solidarity initiatives, including contributions from Mi dulce Guerrero (for diabetes research), ACNefi - the Catalan Neurofibromatosis Association (for emotional wellbeing and quality of life research), and Unión Cultural Andaluza de Martorelles.

Launch of a Peer-to-Peer fundraising platform for solidarity initiatives on the Amics de Can Ruti website.

Two legacy donations received in support of HUGTiP and rare disease research at IGTP.

Corporate partnerships with Condis supermarkets (supporting tuberculosis research), Menarini (supporting research on severe infections and antibiotic resistance), and Conservas Dani (through sponsorships and registrations for Cursa Dani).

Face to Face fundraising campaign to acquire new donors.

Communication and promotional support for the 40th anniversary of HUGTiP.

Training and events

Training and events

Doctoral theses

23

Theses read in the academic year 2023-2024

Events

CARE	Annual Meeting	1
	Translational Seminars	16
	Oncology Courses	8
	Node Capsules	3
CORE	Workshop	1
	Douglas Altman Sessions	2
	ITS Seminars	5
Institutional	IGTP Group Leaders Meeting	2
	EATRIS Meeting	1
	CMCiB 5th Anniversary Celebration	1
	Scientific Retreat	1
Open science	Women for Equity	1
Early career	PhD Symposium	1
Scientific training	Bioinformatics Talks	14
	Core Facility Seminars	10
	CMCiB 3Rs Training	7
	Coffee Talks	32

106

Events organised by IGTP

> 4,327

People attending

65%

Women attending (ranging from 30-86%)

59%

Women organisers and speakers

Highlighted community events

In 2024, the IIS IGTP continued to strengthen alliances and promote translational research across the Can Ruti Campus through institutional initiatives, activities led by its transversal programs, and scientific training.

IGTP GROUP LEADERS MEETING
1 Feb

6TH SYMPOSIUM WOMEN FOR EQUITY: WOMEN AND LEADERSHIP IN SCIENCE
8 Feb

FIRST CORE WORKSHOP
18 June

5TH CAN RUTI PHD DAY
6 June

FIRST INNOMED AWARDS
13 June

CELEBRATION 5 YEARS CMCIB
9 July

IGTP-EATRIS NETWORKING EVENT
31 Oct

2ND CARE WORKSHOP
10 Oct

IGTP GROUP LEADERS MEETING
10 Oct

IIS IGTP RETREAT
4 Dec

January · February · March · April · May · June · July · August · September · October · November · December

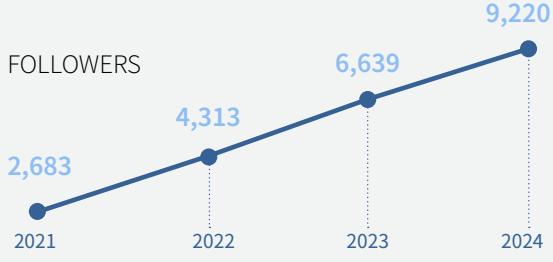
Communication and outreach

Communication and outreach

GROWING ON SOCIAL MEDIA

LINKEDIN

+100
POSTS



X

+900
POSTS

9,900
FOLLOWERS

GENERATING CONTENT

195
DAILY NEWS CLIPPING

269
INTERNAL COMMUNICATIONS

54
INTERNAL BULLETINS

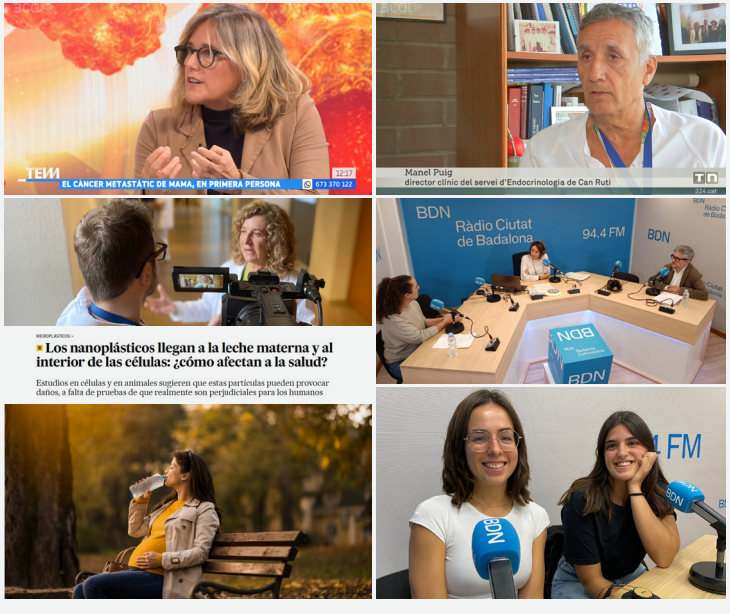
727
MEDIA IMPACTS

82
NEWS STORIES

234,000
WEBSITE VISITS

TRAINING

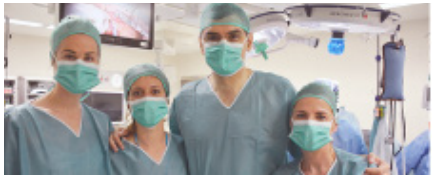
30 May
What makes a good figure? Visual explanations of science and data
Martin Krzywinski, expert in data visualisation from Canada's Michael Smith Genome Sciences at BC Cancer



MOST RELEVANT NEWS

Check the latest IGTP news

MARCH
The international consortium INNOVA4TB wraps up five years of cutting-edge tuberculosis research



APRIL
First cardiac bioimplants for the treatment of patients with myocardial infarction using umbilical cord stem cells

JUNE
IGTP joins the Advanced Therapies Network of Catalonia

JUNE
Innomed Awards drive biomedical innovation

JULY
The Comparative Medicine and Bioimage Centre of Catalonia celebrates its fifth anniversary

JULY
IGTP obtains reaccreditation as Instituto de Investigación Sanitaria by Instituto de Salud Carlos

AUGUST
The Research Institute of the Germans Trias i Pujol Hospital demonstrates how personalised medicine helps to control the effects of acromegaly earlier

OCTOBER
The European Innovation Council provides €3 million in funding for a project with IGTP involvement

NOVEMBER
IGTP welcomes two new spin-offs: Debios Diagnostics and HealthTech Innovations

DECEMBER
The 4th IGTP Retreat establishes itself as a key space to foster scientific collaboration at the Can Ruti Campus

OUTREACH

As outlined in IGTP's strategy, the centre is dedicated to strengthening communication, increasing visibility, and enhancing social impact. Beyond sharing researchers' work through traditional media, the institute also develops initiatives aimed at bringing science closer to society, particularly young people, and fostering their engagement.

Outreach initiatives at IGTP

Can Ruti Open House – Science Week

European Researchers' Night

#100tífiques

Street Science Fair of ESO with a STEAM focus

Workshop #20 - Neural Networks

School visits

Visita la recerca - La Marató de TV3

The Gate Pro Festival

Science up close for everyone – Science Week

Un bri de ciència

Research areas and groups

Research areas and groups

The research activity at IGTP is conducted within nine scientific areas, to which the various research groups belonging to the institute are affiliated.

- Cancer
- Cardiovascular and Respiratory Disease
- Community Health
- Diseases of the Liver and Digestive Tract
- Endocrinology and Metabolic Diseases, Nephrology and Bone Diseases
- Immunology and Inflammation
- Infectious Diseases
- Medical Complications and Clinical Pharmacology of Substance Use Disorder
- Neuroscience

The research is also organised into two transversal programs that are being developed to create a more coordinated strategy among the different Can Ruti Campus stakeholders.

- Translational Program in Cancer Research (CARE)
- Transversal Program in Public Health and Primary Healthcare (CORE)

Cancer

Badalona Applied Research Group in Oncology (B·ARGO)
Ricard Mesia Nin
Anna Martínez Cardús

Cancer Genetics and Epigenetics (CGE)
Sergio Alonso Utrilla

Cancer Mechanisms and Pathways
Miguel Ángel Peinado

Childhood Liver Oncology (c-LOG)
Carolina Armengol Niell

Clinical Genomics Unit (UGC)
Ignacio Blanco Guillermo
Elisabeth Castellanos Pérez

Endocrine Tumours (E.T.)
Mireia Jordà Ramos

Hereditary Cancer
Eduard Serra Arenas

Molecular and Translational Pathology
Pedro Luis Fernández Ruiz

Oncology Translational Research (OTR)
Jordi Barretina Ginesta

Resistance, Chemotherapy and Predictive Biomarkers (RCPB)
Eva Martínez Balibrea

Badalona Applied Research Group in Oncology (B·ARGO)

Group leaders: Ricard Mesía Nin, Anna Martínez Cardús

Research lines

- **IMMUNOLUNG: Identification of biomarkers associated with immunotherapy in lung cancer**
- **iPARPResist: Identification of resistance biomarkers to PARP inhibitors in gynaecological and other cancers**
- **Precision oncology in urological tumours: Identification of therapeutic resistance biomarkers**
- **RESIST: Tumoural and immunological mechanisms of resistance to CDK4/6 inhibitors in hormone-sensitive breast cancer**
- **Precision therapy in BRAF-mutated melanoma: Selecting the optimal therapeutic approach for melanomas harbouring BRAF gene mutations**
- **VAL-GLIO-THERINT: Validation of genomic alterations in glioblastoma: identifying vulnerabilities for therapeutic intervention**
- **HERMION-3: Impact of tumour heterogeneity on resistance to chemo-immunotherapy in head and neck cancers. Focus on the STAT3 signalling pathway**
- **ONCODRIVERS: Monitoring biomarkers throughout treatment to detect acquired resistance to targeted therapies in a pan-cancer setting**
- **INTRIGA Project: INtegrative TRanslational research In GAstric cancer – integrative translational research in gastric cancer**
- **BTC-CROMA: Study of chromatin regulator genes associated with treatment outcomes in cholangiocarcinoma**
- **APP-OXA: Implementation of an app for monitoring and managing side effects during oxaliplatin-based chemotherapy in colorectal cancer patients**
- **EMERLAC Project: Biomarkers in Locally Advanced Rectal Cancer – exploring the role of the microbiome and liquid biopsy**

Featured publications

Ruiz de Porras V, Bernat-Peguera A, Alcon C, Laguia F, Fernández-Saorin M, Jiménez N, Senan-Salinas A, Solé-Blanch C, Feu A, Marín-Aguilera M, Pardo JC, Ochoa-de-Olza M, Montero J, Mellado B, Font A. **Dual inhibition of MEK and PI3Kβ/δ-a potential therapeutic strategy in PTEN-wild-type docetaxel-resistant metastatic prostate cancer.** *Front Pharmacol*. 2024 Jan 22;15:1331648. DOI: 10.3389/fphar.2024.1331648.

Saigí M, Mate JL, Carcereny E, Martínez-Cardús A, Esteve A, Andreo F, Centeno C, Cucurull M, Mesia R, Pros E, Sanchez-Cespedes M. **HLA-I levels correlate with survival outcomes in response to immune checkpoint inhibitors in non-small cell lung cancer.** *Lung Cancer*. 2024 Mar;189:107502. DOI: 10.1016/j.lungcan.2024.107502.

Teruel I, Castellà E, Recalde S, Viñas G, Petit A, Trigueros M, Martínez-Balibrea E, Felip E, Bergamino M, Bernat-Peguera A, Cirauqui B, Quiroga V, Ferrando-Díez A, Pous A, López A, Boronat L, Soler G, Recuero J, Romeo M, Guillén P, Mesía R, Ballana E, Martínez-Cardús A, Margelí M. **Assessing the Prognostic Value of Cytoplasmic and Stromal Caveolin-1 in Early Triple-Negative Breast Cancer Undergoing Neoadjuvant Chemotherapy**. *Int J Mol Sci*. 2024 Nov 14;25(22):12241. DOI: 10.3390/ijms252212241.

Highlights

B·ARGO is a multidisciplinary group accredited as a consolidated research group by SGR-AGAUR (2021SGR01330 - TransICOBad). It brings together over 30 professionals working across diverse areas of research. The group's mission is to be a translational research group of excellence that contributes to the application of personalized oncology and its vision is to maintain an integrated cancer research and healthcare system that optimises the management of cancer patients and improves the length and quality of their lives.

In 2024, B·ARGO published 67 scientific articles, with a total impact factor (IF) of 548 and a mean IF of 8.18. The group currently has more than 25 competitive research projects underway, 11 of which were awarded in 2024. In addition, two non-competitive agreements were signed, and three PhD theses were defended during the year.

The group also demonstrated strong capacity to attract promising talent through competitive human resources grants. Over the past three years, it has been awarded one Rio Hortega and two Juan Rodés grants from Instituto de Salud Carlos III, as well as one AECC Clínicos Junior grant.

B·ARGO maintained a high level of dissemination activity, with 45 talks delivered at national events, 11 oral communications presented at national and international conferences, and more than 100 poster presentations (24 at national and 77 at international congresses).

Cancer Genetics and Epigenetics (CGE)

Group leader: Sergio Alonso Utrilla

Research lines

- **Epigenetic dysregulation of pericentromeric and subtelomeric regions: association with telomere dysfunction and endoreduplication in the first steps of gastrointestinal carcinogenesis**
- **Epigenetic determinants of enhanced tumour immunogenicity in colorectal cancer: towards targeted therapies to improve immunotherapy response**
- **Development of cost-efficient and scalable 3D co-culture models for immuno-oncology studies**

Highlights

The predoctoral student Carlos Mateos received the Best Research Poster Award at the 15th Research Conference of Institut Català de la Salut (ICS). The conference, held in Girona, focused on respiratory diseases and brought together over 200 professionals to discuss the latest advances in the field. Mateos received this recognition for his research on the morphological characterisation of colorectal cancer cell line tumourspheres produced using different methodologies.

Cancer Mechanisms and Pathways

Group leader: Miguel Ángel Peinado

Research lines

- **Chromatin architecture in cell differentiation and cancer**
- **The role of repeat elements in genome structure and function**
- **Clinically oriented research on the epigenetic changes involved in human cancer**

Featured publications

Sun C, España S, Richarz N, Solé-Blanch C, Boada A, Martinez-Cardús A, Chu A, Liu Z, Manzano JL. **Targeted therapy or immunotherapy in BRAF-mutated metastatic melanoma: a Spanish center's decade of experience**. *Front Oncol*. 2024 Feb 21;14:1322116. DOI: 10.3389/fonc.2024.1322116.

Highlights

In 2024, the team made substantial progress in advancing a novel multimodal diagnostic technology that integrates genetic and epigenetic data through a unique platform. This innovative approach merges targeted and shallow genome sequencing to pinpoint critical genetic and epigenetic alterations simultaneously with various types of genomic instability. This comprehensive molecular profiling technique enables the analysis of diverse clinical specimens, including tissue, stool, and notably, liquid biopsy samples. The platform's versatility holds substantial potential for early cancer detection, patient stratification, and recurrence monitoring. Recent studies have demonstrated the potential of this approach across colorectal and other cancer types. Collaborating with clinical partners, the project laid the groundwork for broader clinical validation and future regulatory development.

Childhood Liver Oncology (c-LOG)

Group leader: Carolina Armengol Niell

Research lines

- **Establishing a unique European biorepository for childhood liver cancer**
- **Unravelling the molecular biology of childhood liver cancer**
- **Diagnostic and prognostic biomarker discovery to enhance patient outcomes**
- **Advancing precision medicine in childhood liver cancer**

Featured publications

Failli M, Demir S, Del Río-Álvarez Á, Carrillo-Reixach J, Royo L, Domingo-Sàbat M, Childs M, Maibach R, Alaggio R, Czauderna P, Morland B, Branchereau S, Cairo S, Kappler R, Armengol C, di Bernardo D. **Computational drug prediction in hepatoblastoma by integrating pan-cancer transcriptomics with pharmacological response**. *Hepatology*. 2024 Jul 1;80(1):55-68. DOI: 10.1097/HEP.0000000000000601.

Highlights

The Childhood Liver Oncology Group (c-LOG) is a pioneering research organisation with 15 years of experience dedicated to improving the survival and quality of life of children affected by liver cancer. With a primary focus on hepatoblastoma -a rare (1 case in 1 million people) but aggressive cancer that affects infants and young children- c-LOG strives to uncover the underlying causes of the disease, develop more effective treatments, and refine risk stratification algorithms. These efforts aim to minimise the side effects of chemotherapy while improving patient outcomes. Additionally, the group is dedicated to translating its findings from childhood liver cancer research to the most common primary liver cancer in adults, hepatocellular carcinoma (HCC). Highlights of the group in 2024 include:

Highlights

Expanding the global biorepository of childhood liver cancer

c-LOG has consolidated one of the largest worldwide collections of childhood liver cancer samples, gathered from European patients participating in the Pediatric Hepatic International Tumor Trial (PHITT). This unique biorepository spans up to samples from > 400 patients from 12 countries and over 100 hospitals, providing an invaluable resource for ongoing and future research.
Following the conclusion of PHITT, the group initiated sample collection within Spain, offering molecular testing and centralized pathological review in collaboration with Hospital Sant Joan de Déu.

Advancing to precision medicine for children with liver cancer

Using biological samples from the retrospective European clinical trial SIOPEL-3, c-LOG has identified and validated prognostic biomarkers to enhance clinical risk stratification. Building on the Molecular Risk Stratification of Hepatoblastoma published in 2020, the group successfully validated the approach with an independent patient cohort and refined methods for molecular tumour classification.

Therapeutic target discovery against aggressive hepatoblastomas

Through proteomic analysis, c-LOG identified a promising therapeutic target for aggressive and refractory hepatoblastoma. Leveraging a platform of patient-derived xenografts, the group demonstrated the potential of this target to improve treatment efficacy in challenging cases.
With 15 years of dedicated research, c-LOG continues to lead the way in childhood liver cancer studies, working towards a future with improved outcomes for infants and children with liver cancer.

Clinical Genomics Unit (UGC)

Group leaders: Ignacio Blanco Guillermo, Elisabeth Castellanos Pérez

Research lines

- **Increase of the cost-effectiveness of genetic testing and our knowledge of the genetic basis of some diseases (mostly hereditary diseases with a predisposition to develop tumours, as well as renal diseases)**
- **Development of personalised medicine for neurofibromatoses and schwannomatosis patients, which include the discovery of new prognostic biomarkers, understanding the role of patient's genomic alterations in the development of disease-associated lesions and the implementation of different gene therapy strategies as a potential treatment for these group of diseases**
- **Improvement of the management of phakomatoses patients considering not only clinical diagnosis but also emotional, social, religious and physical dimensions that could impact patients with these rare diseases**
- **Development of strategies to evaluate genetic individual susceptibility to illness**

Featured publications

Mazuelas H, Magallón-Lorenz M, Uriarte-Arrazola I, Negro A, Rosas I, Blanco I, Castellanos E, Lázaro C, Gel B, Carrió M, Serra E. **Unbalancing cAMP and Ras/MAPK pathways as a therapeutic strategy for cutaneous neurofibromas**. *JCI Insight*. 2024 Jan 4;9(3):e168826. doi: 10.1172/jci.insight.168826.

Munté E, Roca C, Del Valle J, Feliubadaló L, Pineda M, Gel B, Castellanos E, Rivera B, Cordero D, Moreno V, Lázaro C, Moreno-Cabrera JM. **Detection of germline CNVs from gene panel data: benchmarking the state of the art**. *Brief Bioinform*. 2024 Nov 22;26(1):bbae645. DOI: 10.1093/bib/bbae645.

Mastromoro G, Santoro C, Motta M, Sorrentino U, Daniele P, Peduto C, Petrizzelli F, Tripodi M, Pinna V, Zanobio M, Rotundo G, Bellacchio E, Lepri F, Farina A, D'Asdia MC, Piceci-Sparascio F, Biagini T, Petracca A, Castori M, Melis D, Accadia M, Traficante G, Tarani L, Fontana P, Sirchia F, Paparella R, Currò A, Benedicenti F, Scala I, Dentici ML, Leoni C, Trevisan V, Cecconi A, Giustini S, Pizzuti A, Salviati L, Novelli A, Zampino G, Zenker M, Genuardi M, Digilio MC, Papi L, Perrotta S, Nigro V, Castellanos E, Mazza T, Trevisson E, Tartaglia M, Piluso G, De Luca A. **Heterozygosity for loss-of-function variants in LZTR1 is associated with isolated multiple café-au-lait macules**. *Genet Med*. 2024 Nov;26(11):101241. DOI: 10.1016/j.gim.2024.101241.

Highlights

The Clinical Genomics Unit focuses on improving the understanding, diagnosis, and treatment of neurofibromatoses. For NF2-related schwannomatosis (NF2-SWN), caused by pathogenic variants in the NF2 gene, the team is developing cellular systems that closely mimic the genetic and expression profiles of

NF2-deficient Schwann cells to study the role of NF2 and assess gene therapy strategies. In the case of neurofibromatosis type 1 (NF1), the team investigates two underexplored areas that significantly affect patients' lives: cognitive function in adulthood and quality of life related to body image. The group aims to address both the biological and psychosocial dimensions of these conditions, emphasising the need for integrated care models.

International classification effort for NF/SWN gene variants

Elisabeth Castellanos is chair of the Neurofibromatosis (NF) and Schwannomatosis (SWN) Genes Variant Curation Expert Panel (VCEP), part of the NIH-funded ClinGen initiative. This international consortium of 35 experts is developing disease-specific guidelines for classifying genetic variants associated with NF1, Legius syndrome, NF2-related and non-NF2 schwannomatosis. Since its approval in 2022, the panel has piloted rules for NF1 and SPRED1 and is currently evaluating ACMG classification codes for NF2, SMARCB1, and LZTR1. This collaborative effort aims to address a major clinical need and improve diagnostic accuracy for patients with these rare neurogenetic conditions.

Cognitive function in adults with NF1

In a cohort study of 81 adults with NF1 and no diagnosed intellectual disability, the team assessed seven cognitive domains commonly affected in children. Although most scores fell within the normative range, they were consistently below average, with executive function showing clinically significant impairment and attention showing notable deficits, the latter being associated with skin severity. Visuospatial performance was also strongly linked to depressive symptoms. These results suggest that cognitive difficulties are inherent to NF1 and persist into adulthood, impacting patients' quality of life and engagement with care. The findings highlight the importance of including cognitive evaluation and support strategies in the long-term management of NF1.

Body image and quality of life in NF1

A cross-sectional study involving 205 NF1 patients aged 16-74 explored the link between skin severity, body image, psychological support, and quality of life. The results showed that body image dissatisfaction was the strongest predictor of reduced quality of life, surpassing even clinical skin severity. Patients who reported poorer body image were also more likely to seek psychological help but paradoxically reported lower levels of perceived social support. These findings position body image as a critical marker of psychosocial vulnerability and underline the need for tailored mental health support as part of routine NF1 care.

iPSC-based NF2-deficient Schwann cell-like spheroids

The group generated three isogenic induced pluripotent stem cell (iPSC) lines carrying mono- or bi-allelic NF2 loss-of-function variants using CRISPR/Cas9 and direct reprogramming from vestibular schwannoma cells. These lines were differentiated into the neural crest–Schwann cell lineage using 3D culture protocols, resulting in spheroids expressing relevant lineage markers. Transcriptomic analyses confirmed that NF2(-/-) spheroids display dysregulated signalling pathways consistent with merlin-deficient Schwann cells and human schwannomas. This cellular model represents a valuable and physiologically relevant system for studying NF2-associated tumour biology and evaluating therapeutic strategies, including gene therapy.

Endocrine Tumours (E.T.)

Group leader: Mireia Jordà Ramos

Research lines

- **Molecular mechanisms of thyroid cancer progression and therapy resistance**
- **Epigenetic biomarkers in thyroid cancer**
- **Biomarkers and mechanisms of treatment response in somatotroph pituitary tumours (acromegaly)**

Featured publications

Sampedro-Nuñez M, Herrera-Martínez AD, Ibáñez-Costa A, Rivero-Cortés E, Venegas E, Robledo M, Martínez-Hernández R, García-Martínez A, Gil J, Jordà M, López-Fernández J, Gavilán I, Maraver S, Marqués-Pamies M, Cámara R, Fajardo-Montañana C, Valassi E, Dios E, Aulinas A, Biagetti B, Álvarez Escola C, Araujo-Castro M, Blanco C, Paz M, Villar-Taibo R, Álvarez CV, Gaztambide S, Webb SM, Castaño L, Bernabéu I, Picó A, Gálvez MÁ, Soto-Moreno A, Puig-Domingo M, Castaño JP, Marazuela M, Luque RM; REMAH investigators. **Integrative clinical, hormonal, and molecular data associate with invasiveness in acromegaly: REMAH study**. *Eur J Endocrinol*. 2024 Jun 5;190(6):421-433. DOI: 10.1093/ejendo/lvae045.

Marques-Pamies M, Gil J, Sampedro-Nuñez M, Valassi E, Biagetti B, Giménez-Palop O, Hernández M, Martínez S, Carrato C, Villar-Taibo R, Araujo-Castro M, Blanco C, Simón-Muela I, Simó-Servat A, Xifra G, Vázquez F, Pavón I, Rosado JA, García-Centeno R, Zavala R, Hanzu FA, Mora M, Aulinas A, Vilarrasa N, Librizzi S, Calatayud M, de Miguel P, Alvarez-Escola C, Picó A, Salinas I, Fajardo-Montañana C, Cámara R, Bernabéu I, Jordà M, Webb SM, Marazuela M, Puig-Domingo M. **Personalized Medicine in Acromegaly: The ACROFAST Study**. *J Clin Endocrinol Metab*. 2024 Dec 18;110(1):30-40. DOI: 10.1210/clinem/dgae444.

Highlights

In 2024, the Endocrine Tumours group was awarded several distinctions, including the FSEEN Senior Research Project Grant from Sociedad Española de Endocrinología y Nutrición (SEEN) and the Clinical Regulatory Study Award, sponsored by Ingecal, for their project Thyromet, which focuses on a DNA methylation signature capable of predicting metastatic progression in thyroid cancer. This latter award was granted within the framework of the Innomed Program, an initiative promoting healthcare innovation on the Can Ruti Campus.

In line with this work, the group filed a European patent application (EP Application No.: 24 383 456.1) titled “DNA Methylation Markers for Determining the Risk of Metastatic Progression of Thyroid Cancer”.

The group’s principal investigator, Dr Mireia Jordà, joined the group CB06/07/0044 of the Centro de Investigación Biomédica en Red de Enfermedades Raras (CIBERER), which specialises in pituitary tumours, thereby reinforcing the group’s commitment to rare disease research.

Throughout the year, members of the group actively participated in several national and international scientific meetings, contributing one invited talk, five oral communications, and two poster presentations. These included the 46th Annual Meeting of the European Thyroid Association (ETA), the 65th Congress of the SEEN, and the CIBER Congress “10 años avanzando juntos en salud”.

The group also engaged in various outreach initiatives, including the Science Week at IGTP and public activities organised by Amics de Can Ruti, demonstrating their commitment to scientific communication and public engagement.

Hereditary Cancer

Group leader: Eduard Serra Arenas

Research lines

- **Cancer genomics and integrative biology of tumours of the peripheral nervous system, other neural crest-derived tumours and sarcomas**
- **Primary and iPSC-based models for cancer and regeneration**
- **Molecular pathogenesis of neurofibromatosis type 1**

Featured publications

Mazuelas H, Magallón-Lorenz M, Uriarte-Arrazola I, Negro A, Rosas I, Blanco I, Castellanos E, Lázaro C, Gel B, Carrió M, Serra E. **Unbalancing cAMP and Ras/MAPK pathways as a therapeutic strategy for cutaneous neurofibromas**. *JCI Insight*. 2024 Jan 4;9(3):e168826. DOI: 10.1172/jci.insight.168826.

Creus-Bachiller E, Fernández-Rodríguez J, Magallón-Lorenz M, Ortega-Bertran S, Navas-Rutete S, Romagosa C, Silva TM, Pané M, Estival A, Perez Sidelnikova D, Morell M, Mazuelas H, Carrió M, Lausová T, Reuss D, Gel B, Villanueva A, Serra E, Lázaro C. **Expanding a precision medicine platform for malignant peripheral nerve sheath tumors: New patient-derived orthotopic xenografts, cell lines and tumor entities**. *Mol Oncol*. 2024 Apr;18(4):895-917. DOI: 10.1002/1878-0261.13534.

Moreno-Cabrera JM, Feliubadaló L, Pineda M, Prada-Dacasa P, Ramos-Muntada M, Del Valle J, Brunet J, Gel B, Currás-Freixes M, Calsina B, Salazar-Hidalgo ME, Rodríguez-Balada M, Roig B, Fernández-Castillejo S, Durán Domínguez M, Arranz Ledo M, Infante Sanz M, Castillejo A, Dámaso E, Soto JL, de Miguel M, Hidalgo Calero B, Sánchez-Zapardiel JM, Ramon Y Cajal T, Lasa A, Gisbert-Beamud A, López-Novo A, Ruiz-Ponte C, Potrony M, Álvarez-Mora MI, Osorio A, Lorda-Sánchez I, Robledo M, Cascón A, Ruiz A, Spataro N, Hernan I, Borràs E, Moles-Fernández A, Earl J, Cadiñanos J, Sánchez-Heras AB, Bigas A, Capellá G, Lázaro C. **SpadaHC: a database to improve the classification of variants in hereditary cancer genes in the Spanish population**. *Database (Oxford)*. 2024 Jul 4;2024:baae055. DOI: 10.1093/database/baae055.

Highlights

In 2024, the Hereditary Cancer Group identified a new potential therapeutic strategy for cutaneous neurofibromas (cNFs), which often develop in multiple form in patients with neurofibromatosis type 1. The approach combined inhibition of the Ras/MAPK pathway using a MEK inhibitor (MEKi) with different agents that elevate intracellular cAMP levels. This combination triggered both cell differentiation and cell death. The team employed primary Schwann cells derived from cNFs and a 3D model known as the "neurofibromasphere", generated from induced pluripotent stem cells (iPSCs).

In collaboration with Dr Conxi Lázaro's group at IDIBELL, the team expanded a pre-clinical platform for malignant peripheral nerve sheath tumours (MPNSTs), which are aggressive sarcomas for which surgery remains the only current treatment. This platform includes patient-derived xenograft (PDX) models and associated cell lines. It serves as a critical tool for generating pre-clinical data to support the progression of therapeutic combinations into clinical trials or compassionate use cases.

The group presented four oral communications and several posters at the 2024 Global NF Conference (Brussels, Belgium). They also took part in an Experts Workshop on Neurofibromatosis, organised by Sant Joan de Déu's Paediatric Cancer Centre (15 November 2024), which brought together NF specialists from across Spain.

At the European level, the group participated in the COST Action application INTERACT-NF, in which IGTP acted as coordinating partner. The proposal involved 11 countries and 55 participants, including researchers, clinicians, and patient advocacy groups.

The team also engaged in outreach activities organised by patient and family associations: "Congreso Annual de Neurofibromatosis 2024" (Sanlúcar de Barrameda, Cádiz), hosted by Asociación de Afectados de Neurofibromatosis, and "2a Jornada para Familias con Neurofibromatosis", organised by AcNefi and Sant Joan de Déu (16 November 2024).

Molecular and Translational Pathology

Group leader: Pedro Luis Fernández Ruiz

Research lines

- Breast and genitourinary neoplasms
- Lymphoid and mesenchymal neoplasms
- Respiratory tract, and head & neck neoplasms
- Digestive and hepatobiliary tract neoplasms
- Nervous and endocrine systems neoplasms, and neurodegenerative disorders
- Skin neoplasms
- Nefropathology and fetal pathology
- Molecular pathology
- Paleopathology
- Confocal microscopy

Featured publications

Gorria T, Crous C, Pineda E, Hernandez A, Domenech M, Sanz C, Jares P, Muñoz-Mármol AM, Arpí-Llucía O, Melendez B, Gut M, Esteve A, Esteve-Codina A, Parra G, Alameda F, Carrato C, Aldecoa I, Mallo M, de la Iglesia N, Balana C. **The C250T Mutation of TERTp Might Grant a Better Prognosis to Glioblastoma by Exerting Less Biological Effect on Telomeres and Chromosomes Than the C228T Mutation**. *Cancers (Basel)*. 2024 Feb 9;16(4):735. DOI: 10.3390/cancers16040735.

Papaleo N, Climent F, Tapia G, Luizaga L, Azcarate J, Bosch-Schips J, Muñoz-Marmol AM, Salido M, Lome-Maldonado C, Vazquez I, Colomo L. **Round-robin testing for LMO2 and MYC as immunohistochemical markers to screen MYC rearrangements in aggressive large B-cell lymphoma**. *Virchows Arch*. 2024 Aug;485(2):307-314. DOI: 10.1007/s00428-023-03584-9.

Humaran D, Pérez-Anker J, Fernández PL, Blay L, Pascual I, Castellà E, Pérez L, Puig S, Malvehy J, Julián JF. **Unveiling a Surgical Revolution: The Use of Conventional Histology versus Ex Vivo Fusion Confocal Microscopy in Breast Cancer Surgery**. *Cells*. 2024 Oct 12;13(20):1692. doi: 10.3390/cells13201692.

Highlights

In 2024, the Molecular and Translational Pathology group actively worked on the analysis of genomic and transcriptomic data from pre- and post-neoadjuvant therapy breast carcinoma samples, generated in previous projects, and one resulting manuscript is currently under review. Progress was also made in a proof-of-concept study evaluating the use of ex vivo confocal microscopy for the assessment of breast carcinoma samples, both in tumourectomies and needle biopsies, which led to the publication of two scientific articles.

The recruitment of breast cancer cases for a liquid biopsy study, funded by an intramural grant, continued throughout the year, alongside the genomic characterisation of gliomas, supported by a FIS grant. At the end of the year, the group was awarded a research project by Fundació La Marató de 3Cat, focused on identifying biomarkers of breast carcinoma in situ through spatial transcriptomics. The project is co-led by the group and reflects its growing involvement in precision oncology.

The group maintains active collaborations with several IGTP teams on research related to colon cancer, lymphomas, and other tumour types, and contributes fresh biological samples to multiple ongoing studies. In addition, the team plays an important role in clinical research through its participation in numerous clinical trials, in close collaboration with the Medical Oncology Department at Germans Trias I Pujol University Hospital and other clinical services.

Oncology Translational Research (OTR)

Group leader: Jordi Barretina Ginesta

Research lines

- **Multi-omics approach to ovarian cancer research**
- **Organoid-based treatment testing tlatform to optimize cancer management**
- **The non-genetic tumor evolution focusing on cancer biology and understanding the cancer cell reprogramming to different insults**

Featured publications

Boos J, van der Made CI, Ramakrishnan G, Coughlan E, Asselta R, Löscher BS, Valenti LVC, de Cid R, Bujanda L, Julià A, Pairo-Castineira E, Baillie JK, May S, Zametica B, Heggemann J, Albillos A, Banales JM, Barretina J, Blay N, Bonfanti P, Buti M, Fernandez J, Marsal S, Prati D, Ronzoni L, Sacchi N; Spanish/Italian Severe COVID-19 Sequencing group; GenOMICC Investigators; Schultze JL, Riess O, Franke A, Rawlik K, Ellinghaus D, Hoischen A, Schmidt A, Ludwig KU. **Stratified analyses refine association between TLR7 rare variants and severe COVID-19**. *HGG Adv.* 2024 Oct 10;5(4):100323. DOI 10.1016/j.xhgg.2024.100323.

Resistance, chemotherapy and predictive biomarkers (RCPB)

Group leader: Eva Martínez Balibrea

Research lines

- **Deciphering mechanisms of resistance to treatment in colorectal cancer**
- **Finding predictive biomarkers for treatment selection**
- **Development and implementation of in vitro and ex vivo models of acquired resistance to different anti-cancer therapies**

Featured publications

Lopez-Bujanda ZA, Hadavi SH, Ruiz De Porras V, Martínez-Balibrea E, Dallos MC. **Chemotactic signaling pathways in prostate cancer: Implications in the tumor microenvironment and as potential therapeutic targets.** *Int Rev Cell Mol Biol*. 2024 May;388:162-205. DOI: 10.1016/bs.ircmb.2024.03.008.

Cabrero-de Las Heras S, Hernández-Yagüe X, González A, Losa F, Soler G, Bugés C, Baraibar I, Esteve A, Pardo-Cea MÁ, Ree AH, Martínez-Bosch N, Nieva M, Musulén E, Meltzer S, Lobato T, Vendrell-Ayats C, Queralt C, Navarro P, Montagut C, Grau-Leal F, Camacho D, Legido R, Mulet-Margalef N, Martínez-Balibrea E. **Changes In Serum CXCL13 Levels Are Associated With Outcomes of Colorectal Cancer Patients Undergoing First-Line Oxaliplatin-Based Treatment**. *Biomed Pharmacother*. 2024 Jul;176:116857. DOI: 10.1016/j.biopha.2024.116857.

Teruel I, Castellà E, Recalde S, Viñas G, Petit A, Trigueros M, Martínez-Balibrea E, Felip E, Bergamino M, Bernat-Peguera A, Cirauqui B, Quiroga V, Ferrando-Díez A, Pous A, López A, Boronat L, Soler G, Recuero J, Romeo M, Guillén P, Mesía R, Ballana E, Martínez-Cardús A, Margelí M. **Assessing the Prognostic Value of Cytoplasmic and Stromal Caveolin-1 in Early Triple-Negative Breast Cancer Undergoing Neoadjuvant Chemotherapy.** *Int J Mol Sci*. 2024 Nov 14;25(22):12241. DOI: 10.3390/ijms252212241.

Highlights

One of the main research lines of the group focuses on the role of chemokines as biomarkers in colorectal cancer (CRC). The team identified CXCL13 -a chemokine involved in the formation of tertiary lymphoid structures (TLS), which are associated with tumour immunogenicity- as a biomarker of good prognosis in patients receiving first-line oxaliplatin-based chemotherapy. These findings were published in the journal Biomedicine & Pharmacotherapy and presented at the Precision Medicine in Oncology: 2024 Summit, held in Barcelona in November 2024.

This research line was further strengthened by the award of a FIS project (PI24/00824). In parallel, the group leader contributed as co-author to a book chapter on the role of chemokines in prostate cancer (*Int Rev Cell Mol Biol*, 2024).

Another priority area for the group is the study of the KRAS oncogene and its role in tumour immunosuppression. This project is supported by funding from the Spanish Ministry of Science and Innovation (PID2023-153089OB-I00). As part of this work, PhD student Carla Vendrell presented preliminary results at the ASEICA International Congress, held in Zaragoza in November 2024.

In addition to its research activities, the group organised the XXII Conference on Translational Research and Digestive Tumours, hosted at BCIN in Badalona. This year's edition featured internationally renowned speakers, including Professor Francesc X. Real (CNIO) and Dr Josep Llovet (Hospital Clínic of Barcelona & Mount Sinai Hospital, New York).

Cardiovascular and Respiratory Diseases

Heart Failure and Cardiac Regeneration (ICREC)
Antoni Bayés-Genís

Respiratory and Immune Repair (REPAIR)
Raquel Guillamat Prats

Heart Failure and Cardiac Regeneration (ICREC)

Group leader: Antoni Bayés-Genís

Research lines

- **Advanced therapies**
- **Heart Precision Medicine Platform (PMP-Heart)**
- **Translational animal models (mouse, rat and pig)**
- **Clinical Trials Support Area / Clinical Trials Unit – ASAC**
- **Cardiometabolism**
- **Innovation and technology transfer**

Featured publications

Bayes-Genis A, Gastelurrutia P, Monguió-Tortajada M, Cámara ML, Prat-Vidal C, Cediel G, Rodríguez-Gómez L, Teis A, Revuelta-López E, Ferrer-Curriu G, Roura S, Gálvez-Montón C, Bisbal F, Vives J, Vilarrodona A, Muñoz-Guijosa C, Querol S. **Implantation of a double allogeneic human engineered tissue graft on damaged heart: insights from the PERISCOPE phase I clinical trial**. *EBioMedicine*. 2024 Apr;102:105060. DOI: 10.1016/j.ebiom.2024.105060.

Hahn RT, Muraru D, Lindman BR, Delgado V, Dweck MR. **Heart valve disease: at the threshold of a new era in patient management**. *Lancet*. 2024 Apr 20;403(10436):1519-1522. DOI: 10.1016/S0140-6736(24)00423-9.

Anker SD, Friede T, von Bardeleben RS, Butler J, Khan MS, Diek M, Heinrich J, Geyer M, Placzek M, Ferrari R, Abraham WT, Alfieri O, Auricchio A, Bayes-Genis A, Cleland JGF, Filippatos G, Gustafsson F, Haverkamp W, Kelm M, Kuck KH, Landmesser U, Maggioni AP, Metra M, Ninios V, Petrie MC, Rassaf T, Ruschitzka F, Schäfer U, Schulze PC, Spargias K, Vahanian A, Zamorano JL, Zeiher A, Karakas M, Koehler F, Lainscak M, Öner A, Mezilis N, Theofilogiannakos EK, Ninios I, Chrissoheris M, Kourkoveli P, Papadopoulos K, Smolka G, Wojakowski W, Reczuch K, Pinto FJ, Wiewiórka Ł, Kalarus Z, Adamo M, Santiago-Vacas E, Ruf TF, Gross M, Tongers J, Hasenfuss G, Schillinger W, Ponikowski P; RESHAPE-HF2 Investigators. **Transcatheter Valve Repair in Heart Failure with Moderate to Severe Mitral Regurgitation**. *N Engl J Med*. 2024 Nov 14;391(19):1799-1809. DOI: 10.1056/NEJMoa2314328.

Highlights

The ICREC group is one of the core teams within the Heart Institute (iCor) and leads its translational research efforts. In 2024, iCor carried out an intense and sustained scientific activity in 2024, encompassing basic, clinical, and translational research. The cornerstone of this work was the production of 170 PubMed-indexed scientific publications, with a cumulative impact factor of 2,255.7 and an average of 13.27 per article, alongside active participation in conferences, involvement in multicentre studies, and the acquisition of competitive funding.

Participation in scientific conferences

The group maintained a strong presence at major national and international cardiovascular conferences, including the Heart Failure Congress, the European Society of Cardiology Congress, the Congreso de la Salud Cardiovascular – SEC, and the Congrés de la Societat Catalana de Cardiologia. Topics presented covered prognosis and biomarkers in heart failure, cardiac resynchronisation, advanced imaging, frailty assessment, and ongoing clinical trials such as COLICA and Shock-CAT. Several professionals also contributed as moderators and speakers in expert sessions.

In addition, iCor participated in numerous specialised meetings throughout the year, such as EHRA, EuroPCR, ICNC-CT, EuroEcho, SECCE, SEIQ, SIAC Congress, and ESC Acute Cardiovascular Care. Contributions came from both clinical and basic research teams, addressing a wide range of topics including structural interventions, non-invasive monitoring, left bundle branch pacing, and artificial intelligence applications in cardiology.

Clinical trials

The group participated in several clinical trials and observational studies at various phases. Highlights include the NIMBLE-I trial, led by NIMBLE Diagnostics, using microwave spectrometry for non-invasive stent monitoring; the continued development of the COLICA trial; and completion of AGTP II patient recruitment. Other key areas included biomarkers in atrial remodelling, resynchronisation response predictors, and hospital-to-home transition care.

ICREC group activity

In the field of translational research, the ICREC group pursued multiple lines of work centred on myocardial infarction, acute inflammation, tissue regeneration, and advanced therapies. In 2024, preclinical porcine models were used to assess the effects of drugs like empagliflozin and sacubitril/valsartan post-infarction. Research also advanced on therapeutic extracellular vesicles and the development of decellularised and re-endothelialised human vascular grafts (VASCRAFT project).

In the area of cellular biotechnology, the group employed 3D cardiac organoids to study molecular mechanisms and validate therapeutic interventions in vitro, integrating these models with molecular, proteomic, and transcriptomic analyses in collaboration with internal platforms at IGTP and other research centres.

Competitive funding

iCor secured €725,025 in competitive research funding. Projects funded under the 2023 Public-Private Collaboration Programme included NIMBLE and GALVANO, focused on developing a non-invasive technology for coronary stent monitoring and validating a platform for producing extracellular vesicles under GMP conditions, respectively. The SEC funded two basic research projects led by Dr Bayés-Genís (targeted immunotherapy for fibrosis) and Dr Rueda Sobella (role of Oncostatin M in myocardial infarction).

Training and education

Educational activities included update courses on heart failure and workshops on sensor-based follow-up, echo-congestion, risk stratification, and care coordination. Collaborations continued with Catalan universities and medical societies such as the SCC, Fundació Catalana d'HTA, CAMFiC, SEMI, and SEIC. iCor professionals also contributed as reviewers, moderators, and advisors at scientific events and in research networks. Among the professionals involved were Dr Mar Domingo, Dr Evelyn Santiago, Dr Pau Codina, Ms Beatriz González, and other team members.

Institutional collaboration

The Heart Institute actively contributed to advisory roles, scientific evaluations, and editorial reviewing for conferences, funding agencies, journals, and research networks. Several professionals served as moderators, reviewers, and coordinators at both national and international scientific events. These activities were complemented by participation in thematic networks, multicentre studies, and joint technological developments with public and private institutions.

Respiratory and Immune Repair (REPAIR)

Group leader: Raquel Guillamat Prats

Research lines

- **Characterisation of the endocannabinoid system and its possible therapeutic use for interstitial lung pathologies**
- **Identification of immune markers associated to the progression and response to antifibrotic treatments of pulmonary fibrosis patients**
- **Description of the genetic and molecular profiles of lung cancer in patients with chronic lung pathologies**
- **Innate and adaptive immune response in front of respiratory diseases, focusing on how certain comorbidities, such as diet-associated obesity, or repetitive infections impact the immune response**

Featured publications

Meiners S, Reynaert NL, Matthaiou AM, Rajesh R, Ahmed E, Guillamat-Prats R, Heijink IH, Cuevas-Ocaña S. **The importance of translational science within the respiratory field**. *Breathe (Sheff)*. 2024 Mar;20(1):230183. DOI: 10.1183/20734735.0183-2023.

Bianquis C, Leiva Agüero S, Cantero C, Golfe Bonmatí A, González J, Hu X, Lacoste-Palasset T, Livesey A, Guillamat Prats R, Salai G, Sykes DL, Toland S, van Zeller C, Viegas P, Vieira AL, Zaneli S, Karagiannidis C, Fisser C. **ERS International Congress 2023: highlights from the Respiratory Intensive Care Assembly**. *ERJ Open Res*. 2024 Apr 22;10(2):00886-2023. DOI: 10.1183/23120541.00886-2023.

Wang Y, Li G, Chen B, Shakir G, Volz M, van der Vorst EPC, Maas SL, Geiger M, Jethwa C, Bartelt A, Li Z, Wettich J, Sachs N, Maegdefessel L, Nazari Jahantigh M, Hristov M, Lacy M, Lutz B, Weber C, Herzig S, Guillamat Prats R, Steffens S. **Myeloid cannabinoid CB1 receptor deletion confers atheroprotection in male mice by reducing macrophage proliferation in a sex-dependent manner.** *Cardiovasc Res*. 2024 Oct 14;120(12):1411-1426. DOI: 10.1093/cvr/cvae125.

Highlights

In 2024, the Respiratory and Immune Repair (REPAIR) group was awarded a Doctorat Industrial grant from AGAUR, in collaboration with Aniling, to develop an ambitious research project aimed at identifying genetic and epigenetic biomarkers for detecting patients with chronic respiratory diseases who are at risk of developing lung cancer. The project also seeks to discover prognostic and predictive markers to support therapeutic decision-making. As part of this initiative, the group welcomed a new PhD student, Marina Tuxans, who will carry out her industrial doctorate within the framework of this collaboration.

The group's principal investigator, Dr Raquel Guillamat Prats, received the Multidisciplinary Care Award 2024 from the European Society of Intensive Care Medicine (ESICM). This prestigious recognition will help drive forward a collaborative project involving the Pulmonology and Intensive Care departments at Germans Trias i Pujol University Hospital, further reinforcing the group's translational focus.

Throughout the year, REPAIR maintained a strong commitment to scientific dissemination, presenting research at key national and international meetings such as the European Respiratory Society (ERS) Conference in Vienna, Neutrophil 2024 in Munich, the Emerging Concepts and Novel Mechanisms in Organ Fibrosis workshop in Malaga, and the annual meetings of the Catalan Societies of Pulmonology and Immunology.

In parallel, the group actively engaged with society through numerous public outreach activities targeting non-scientific audiences. These included participation in #100tífiques for the International Day of Women and Girls in Science, the European Researchers' Night, the Fira STEAM in Badalona, school talks for La Marató de 3CAT, and events organised by Amics de Can Ruti.

In line with its commitment to education and training, the group also hosted and mentored two Master's thesis students (Estela Marín and Audrey Limousin) and two laboratory technician trainees (David Moreno and Lucía Pecharroman) during 2024.

Community Health

Centre for Epidemiological Studies on HIV/AIDS and STI of Catalonia (CEEISCAT)
Jordi Casabona i Barbarà

Innovation, Health Economics and Digital Transformation Research Group (INEDIT)
Oriol Estrada Cuxart

Maresme Study Group on Community-Acquired Pneumonia and COPD (GEMPAC)
Ramon Boixeda Viu
Maria del Carmen de la Torre
Maria Bartolomé

Nursing Research Care Group (NURECARE)
Cristina Casanovas Cuellar
Ariadna Huertas Zurriaga

Woman & Health
Inés Velasco López

Centre for Epidemiological Studies on HIV/AIDS and STI of Catalonia (CEEISCAT)

Group leader: Jordi Casabona i Barbarà

Research lines

- **Formal systems of epidemiological surveillance of HIV and other STIs**
- **Monitoring of the diagnosis and evaluation of new technologies and screening strategies for HIV and other STIs**
- **Antiretroviral treatment monitoring and study of the effect of comorbidities and aging in HIV positive patients**
- **Study and monitoring of the multilevel determinants of HIV transmission and other STIs**
- **Determinants of transmission and knowledge, behaviours and attitudes regarding the prevention of SARS-CoV-2 and other emerging and re-emerging biological agents**
- **Coverage and determinants of early diagnosis and healthcare linkage of hepatitis C**

Featured publications

Fernàndez-López L, Reyes-Urueña J, Egea L, Chernyshev A, Upmace I, Ćosić M, Mejías W, González V, Blondeel K, Thwin SS, Gios L, Mirandola M, Peeling R, Kiarie J, Casabona J, Toskin I; ProSPeRo group. **A clinical utility evaluation of dual HIV/Syphilis point-of-care tests in non-clinical settings for screening for HIV and syphilis in men who have sex with men.** *BMC Infect Dis*. 2024 Feb 29;24(Suppl 1):264. DOI: 10.1186/s12879-024-09017-5.

Llibre JM, Revollo B, Aceiton J, Díaz Y, Domingo P, Burgos J, Sorni P, Saumoy M, Knobel H, Navarro M, Leon E, Orti A, Arbonés L, Mera A, Deig E, Sirera G, Miró JM, Casabona J, Martin-Iguacel R; PISCIS Cohort Study Group. **Identifying risk factors for anal cancer in people with HIV in Spain: a multicentre retrospective cohort study nested in the PISCIS cohort.** *Lancet HIV*. 2024 Sep;11(9):e598-e606. DOI: 10.1016/S2352-3018(24)00174-7.

Martínez-Riveros H, Alarcón Gutiérrez M, Aceiton Cardona J, Montoro-Fernández M, Díaz Y, Alonso L, Rius Gibert C, Casabona J, Fernàndez-López L, Agustí C. **Determinants of Repeating an HIV Test Among Gay, Bisexual, and Other Men Who have Sex with Men, and Transgender People Who Use an Online-Requested Self-Sampling Program and Attending Community-Based Testing Venues in Spain (2018-2021).** *AIDS Behav.* 2024 Sep;28(9):3139-3150. DOI: 10.1007/s10461-024-04399-8.

Highlights

Throughout 2024, the group maintained and analysed the HIV and AIDS case registry in Catalonia, in coordination with regional epidemiological surveillance services and the Public Health Agency of Barcelona. Quality control and analysis were performed for all cases diagnosed up to 31 December 2023, and data were submitted to national and European agencies. The annual report on HIV and AIDS epidemiological surveillance was published, and the epidemiological questionnaire was updated.

Similarly, the team conducted surveillance of notifiable STIs (syphilis, gonorrhoea, lymphogranuloma venereum, and genital chlamydia) using data from both mandatory notification systems and microbiological reporting. Reports were published, and data supported public health planning documents and institutional requests. Monitoring extended to infections reported exclusively through microbiological surveillance, including herpes simplex and *Trichomonas vaginalis*.

Key studies launched or advanced in 2024 include the REDAN study among people who inject drugs, and a prevalence study on HIV, HCV and STIs in people experiencing homelessness. The European MSM and Trans People Internet Survey (EMIS 2024) was implemented, gathering responses from 4,300 participants in Spain, including non-binary and trans individuals. The LIBEROPOX study concluded data analysis and submitted a manuscript to The Lancet Regional Health – Americas.

The PISCIS cohort published several studies, including articles on anal cancer risk, quality of life in people over 60 with HIV, mortality trends, and patient retention. Collaborative efforts continued with COHERE, HIVCausal, HepCausal, and ART-CC. COVID-19 substudies examined vaccination outcomes, cardiovascular effects, and access to healthcare during the pandemic among people with HIV.

Monitoring of diagnostic testing was reinforced through HIVLABCAT and HIVDEVO in Catalonia and through the COBATEST Network in Europe and Central Asia. The TESTATE projects (HIV, STIs, PrEP) advanced, including subanalyses on first-time testers and rural–urban differences, with findings presented at the XLII Reunión Científica de la SEE. TESTATE PrEP continued as a non-inferiority RCT, integrating online and in-person follow-up. The aSELFGEN study on HPV self-sampling among GBMSM and trans people presented findings at the 36th International Papillomavirus Conference.

In school settings, the Sentinel Schools Network continued to grow, with 24 participating schools in the 2023–24 academic year and 31 in 2024–25. Thousands of students were involved in various public health initiatives, including participatory research, health surveys, syndromic surveillance, and studies on vaccine acceptability. Topics explored included infectious diseases, mental health, and sexual health.

Two awards recognised the team's 2024 work. As part of the World AIDS Day Gala organised by Stop Sida and the Locamente collective, CEEISCAT was honoured with the second edition of the Stop Sida Award, which recognises outstanding contributions to sexual health and the care of people living with HIV in Catalonia. In addition, Helena González Casals received the SEE-APE Award for best presentation of a study conducted between Spain and Portugal, granted during the Reunión Anual de la Sociedad Española de Epidemiología.

Innovation, Health Economics and Digital Transformation Research Group (INEDIT)

Group leader: Oriol Estrada Cuxart

Research lines

- Evaluation and health economics
- Assistance transformation line: alliances and cross-cutting processes
- Technological innovation
- Early-stage evaluation of new health technologies (early HTA)
- Digital transformation and health

Featured publications

Martínez-Gaitero C, Dennerlein SM, Dobrowolska B, Fessl A, Moreno-Martínez D, Herbstreit S, Peffer G, Cabrera E; 4D Project Consortium. **Connecting Actors With the Introduction of Mobile Technology in Health Care Practice Placements (4D Project): Protocol for a Mixed Methods Study**. *JMIR Res Protoc*. 2024 Feb 8;13:e53284. DOI: 10.2196/53284.

Pérez-Montes de Oca A, Ricou Ríos L, López Seguí F, Alonso N. **Economic impact of introducing a multidisciplinary diabetic foot clinic in a tertiary hospital.** *Med Clin (Barc)*. 2024 Jul 12;163(1):40-45. DOI: 10.1016/j.medcli.2024.01.029.

Domingo-Gardeta T, Montero-Cabezas JM, Jurado-Román A, Sabaté M, Aboal J, Baranchuk A, Carrillo X, García-Zamora S, Dores H, van der Valk V, Scherptong RWC, Andrés-Cordón JF, Vidal P, Moreno-Martínez D, Toribio-Fernández R, Lillo-Castellano JM, Cruz R, De Guio F, Marina-Breysse M, Martínez-Sellés M. **Rationale and design of the artificial intelligence scalable solution for acute myocardial infarction (ASSIST) study**. *J Electrocardiol*. 2024 Sep-Oct;86:153768. DOI: 10.1016/j.jelectrocard.2024.153768.

Maresme Study Group on Community-Acquired Pneumonia and COPD (GEMPAC)

Group leaders: Ramon Boixeda i Viu, Maria del Carmen de la Torre, Maria Bartolomé

Research lines

- Population study on COPD (misdiagnosis and comorbidity)
- Study of risk factors for exacerbation of COPD
- Study of risk factors for pneumonia
- Study of the aetiology and treatment of patients admitted to the hospital for pneumonia
- Study of risk factors for pneumonia in patients with respiratory conditions (asthma and COPD)
- Definition of a diagnostic algorithm for aspiration pneumonia
- Study of patients admitted to a general hospital for acute COPD
- Study of infectious comorbidity in patients admitted to the hospital for acute COPD
- COVID-19

Featured publications

Serra-Prat M, Bolíbar I, Palomera E, Lavado À, Almirall J. **Effectiveness of the 23-Valent Pneumococcal Polysaccharide Vaccine (PPV23) in Preventing Community-Acquired Pneumonia in Adults: A Population-Based Cohort Study.** *Vaccines (Basel)*. 2024 Sep 6;12(9):1023. DOI: 10.3390/vaccines12091023.

Díez-Manglano J, Díaz-Peromingo JA, Boixeda-Viu R. **Circadian pattern of blood pressure in patients with stable COPD.** *Rev Clin Esp (Barc)*. 2024 Oct 30;225(1):45-50. DOI: 10.1016/j.rceng.2024.10.011.

Almirall J, Boixeda R, de la Torre MC, Torres A. **Epidemiology and Pathogenesis of Aspiration Pneumonia.** *Semin Respir Crit Care Med*. 2024 Dec;45(6):621-625. DOI: 10.1055/s-0044-1793907.

Highlights

The Maresme Study Group on Community-Acquired Pneumonia and COPD (GEMPAC) is a consolidated group recognised by the Agency for Management of University and Research Grants (AGAUR) of the Government of Catalonia. It is part of Group 14 of the CIBERES network, focused on research in aetiology, prognostic risk factors associated with community acquired lower tract respiratory infections (LRTI), and of the PREPARE project (Platform for European Preparedness Against (Re-)Emerging Epidemics) in its work packages 3 and 5.

The group has produced seven doctoral theses in recent years, with another three currently underway. Additionally, they currently have eight contracts with pharmaceutical companies to conduct clinical trials.

Throughout the years, the group has made important contributions in the areas of incidence, microbiology, prognostic risk factors, costing, diagnostic errors and the value of inflammatory markers for the prediction of pneumonia and aetiological orientation. GEMP@C has participated as partners in the European projects GRACE (Genomics to combat Resistance against Antibiotics in Community acquired LRTI in Europe), COMBACTE CLIN-Net and LAB net (Innovative Initiatives in Medicine). The group has also been awarded eight FIS grants in which different health professionals have taken part as principal investigators. Their work has been reflected in 40 publications in international journals and 30 more in Spanish ones, with a total impact factor of 204.

Nursing Research Care Group (NURECARE)

Group leaders: Cristina Casanovas Cuellar, Ariadna Huertas Zurriaga

Research lines

- Innovation and evidence-based care
- High complexity care for people in acute, chronic and maternal-child situations
- Care management and models: care based on quality, safety and efficiency

Featured publications

Castellà L, Casas I, Giménez M, Reina D, Sopena N, García-Quesada MJ; Clinical Working Group. **Hygiene with wet wipes in bedridden patients to prevent catheter-associated urinary tract infection in cardiac surgery: A randomized controlled trial.** *Infect Control Hosp Epidemiol.* 2024 Feb;45(2):227-230. DOI: 1 0.1017/ice.2023.178.

Huertas-Zurriaga A, Alonso-Fernández S, Leyva-Moral JM. **Reproductive Decision Making of Spanish Women Living With HIV: A Constructivist Grounded Theory Study.** *J Assoc Nurses AIDS Care.* 2024 May-Jun 01;35(3):201-209. DOI: 10.1097/JNC.0000000000000455.

Cabrera-Jaime S, Hernández-Marfil A, Adamuz-Tomas J, Sánchez-Martín S. **Early Telephone-Based Frailty Screening With the Vulnerable Elders Survey in Adults Aged 75 Years and Older With Lung and Gynecological Cancer.** *Cancer Nurs.* 2024 Nov 5. DOI: 10.1097/NCC.0000000000001421.

Highlights

Throughout 2024, the NURECARE research group continued to demonstrate leadership and innovation in nursing research, receiving multiple prestigious recognitions and securing competitive funding.

In the 2024 call for Nursing Research Projects by Col·legi d'Infermeres i Infermers de Barcelona (COIB), Cristina Gaona, nurse at the vascular access team of Germans Trias i Pujol University Hospital and member of NURECARE, was awarded €4,895 in funding for a clinical trial evaluating the impact of using long peripheral or midline catheters on the incidence of asymptomatic thrombosis in hospitalised patients.

As part of the Pla Estratègic de Recerca i Innovació en Salut (PERIS) 2022–2027, researchers Laura Cabrera, Anna Moreno, and Miriam Moreno were each awarded €75,000 nursing intensification grants, allowing them to dedicate two full years to research through the incorporation of substitute professionals to cover clinical duties. Laura Cabrera also received First Prize (€10,000) for Hospital-Based Research from Consejo General de Enfermería de España for her doctoral thesis, "Improvement Program for Nosocomial Infection in Haematological Patients Through Participatory Action Research". Four other group members (Laura Gómez, Maricel Call, Violeta Díaz, and Edgar Cervantes) were recognised with the "La Pedrera - Consolidació i Llavor" Talent Nursing Fellowship, awarded by Fundació Institut de Recerca Germans Trias i Pujol, receiving a total of €22,250 for the innovation and impact potential of their projects.

NURECARE also stood out in scientific communication throughout the year. Beatriz Díez was awarded Best Oral Communication at the XL Congress of the Spanish Society for Healthcare Quality. Patricia Barroso received Third Prize for Best Oral Presentation at the Scientific Conference on Sex and Gender in Health, organised by the Academy of Medical Sciences. At the II Conference of Asociación Española de Prevención y Control de Infecciones, L. Castellà et al. received the Best Poster Award for their study on the impact of wipe-based hygiene in urinary tract infection prevention. Similarly, at the XXXIII Conference of Societat Catalana de Malalties Infeccioses i Microbiologia Clínica, MJ García was awarded Best Poster for her research on multimodal strategies to reduce catheter-related bacteraemia in conventional hospitalisation wards.

Further recognition was achieved at other scientific events. At the 36th Congress of the Societat Catalana de Cardiologia, a multidisciplinary team including Violeta Díaz received the Best Nursing Oral Communication Award for their work on fatigue progression in heart failure. Natalia Calderón and Rosa Cano were honoured with the Fundación Ángel Muriel Medical Research Award for their oncology research, and Isabel Granados won Best Nursing Oral Communication at the first SECUDEM Scientific Conference.

These recognitions reflect the group's growing influence in nursing research and their continued commitment to clinical innovation and excellence in patient care.

Woman & Health

Group leader: Inés Velasco López

Research lines

- **Fetal programming**
- **Gender dimension**
- **Gender perspective**
- **Epigenetics and endocrine disruptors**
- **Breastfeeding action**

Featured publications

Bonacina E, Garcia-Manau P, López M, Caamiña S, Vives À, Lopez-Quesada E, Ricart M, Maroto A, de Mingo L, Pintado E, Castillo-Ribelles L, Martín L, Rodriguez-Zurita A, Garcia E, Pallarols M, Vidal-Sagnier L, Teixidor M, Orizales-Lago C, Pérez-Gomez A, Ocaña V, Puerto L, Millán P, Alsius M, Diaz S, Maiz N, Carreras E, Suy A, Mendoza M. **Mid-trimester uterine artery Doppler for aspirin discontinuation in pregnancies at high risk for preterm pre-eclampsia: Post-hoc analysis of StopPRE trial.** *BJOG*. 2024 Feb;131(3):334-342. DOI: 10.1111/1471-0528.17631.

Alcaraz-Vidal L, Velasco I, Pascual M, I Gomez RG, Escuriet R, Comas C. **First alongside midwifery led unit in a high complexity public hospital in Spain: Maternal and neonatal outcomes.** *Women Birth*. 2024 May;37(3):101577. DOI: 10.1016/j.wombi.2024.01.003.

Ricart M, Bonacina E, Garcia-Manau P, López M, Caamiña S, Vives À, Lopez-Quesada E, Maroto A, de Mingo L, Pintado E, Ferrer-Costa R, Martín L, Rodriguez-Zurita A, Garcia E, Pallarols M, Pratcorona L, Teixidor M, Orizales-Lago C, Ocaña V, Del Barco E, Carreras E, Suy A, Mendoza M. **Placental growth factor at 24-28 weeks for aspirin discontinuation in pregnancies at high risk for preterm preeclampsia: Post hoc analysis of StopPRE trial.** *Acta Obstet Gynecol Scand*. 2024 Nov;103(11):2273-2280. DOI: 10.1111/aogs.14955.

Diseases of the Liver and Digestive Tract

Childhood Liver Oncology (c-LOG)
Carolina Armengol Niell

Inflammatory Bowel Diseases Research Group (GReMII)
Eugeni Domènech Morral
Josep Manyé Almero

Innate Immunity
Maria Rosa Sarrias Fornés

Oropharyngeal Dysphagia and Neurogastroenterology
Pere Clavé Civit
Omar Ortega Fernández

Translational Research in Hepatic Diseases
Rosa M. Morillas Cunill
Ramon Bartolí Solé

Inflammatory Bowel Diseases Research Group (GReMII)

Group leaders: Eugeni Domènech Morral, Josep Manyé Almero

Research lines

- **Aging and frailty in inflammatory bowel disease**
- **Obesity and visceral fat in inflammatory bowel disease**
- **Fecal calprotectin in the monitoring of inflammatory bowel disease**
- **Epitranscriptomic biomarkers for steroid-refractory ulcerative colitis and for postoperative recurrence in Crohn's disease**
- **Development of acellular therapies targeting adipose tissue for Crohn's disease**

Featured publications

Calafat M, Torres P, Tosca-Cuquerella J, Sánchez-Aldehuelo R, Rivero M, Iborra M, González-Vivo M, Vera I, de Castro L, Bujanda L, Barreiro-de Acosta M, González-Muñoza C, Calvet X, Benítez JM, Llorente-Barrio M, Surís G, Cañete F, Arias-García L, Monfort D, Castaño-García A, Garcia-Alonso FJ, Huguet JM, Marín-Jímenez I, Lorente R, Martín-Cardona A, Ferrer JÁ, Camo P, Gisbert JP, Pajares R, Gomollón F, Castro-Poceiro J, Morales-Alvarado J, Llaó J, Rodríguez A, Rodríguez C, Pérez-Galindo P, Navarro M, Jiménez-García N, Carrillo-Palau M, Blázquez-Gómez I, Sesé E, Almela P, Ramírez de la Piscina P, Taxonera C, Rodríguez-Lago I, Cabrinety L, Vela M, Mínguez M, Mesonero F, García MJ, Aguas M, Márquez L, Silva Porto M, Pineda JR, García-Etxebarría K, Bertoletti F, Brunet E, Mañosa M, Domènech E. **Clinical and treatment outcomes of a second subcutaneous or intravenous anti-TNF in patients with ulcerative colitis treated with two consecutive anti-TNF agents: data from the ENEIDA registry**. *Therap Adv Gastroenterol*. 2024 Jan 5;17:17562848231221713. DOI: 10.1177/17562848231221713.

Mañosa M, Rivière P, de Greef I, Oller B, Roig C, Calafat M, Garcia-Planella E, Laharie D, Ferrante M, Domènech E. **Long-term risk of delayed postoperative Crohn's disease recurrence in patients with no or mild endoscopic recurrence at first assessment**. *Eur J Clin Invest*. 2024 Aug;54(8):e14219. DOI: 10.1111/eci.14219.

Clua-Ferré L, Suau R, Vañó-Segarra I, Ginés I, Serena C, Manyé J. Therapeutic potential of mesenchymal stem cell-derived extracellular vesicles: **A focus on inflammatory bowel disease**. *Clin Transl Med*. 2024 Nov;14(11):e70075. DOI: 10.1002/ctm2.70075.

Highlights

In 2024, the GReMII group initiated a new research line focused on extracellular vesicles derived from adipose tissue for therapeutic use in Crohn's disease. In this sense, the group was awarded a competitive grant (PID2023-146315OB-I00) from the Spanish Ministry of Science, Innovation and Universities for the project titled "Vesiculas extracelulares tolerogénicas de células madre para restaurar el papel protector del tejido adiposo mesentérico en la inflamación intestinal en la enfermedad de Crohn". The project is led by Dr Carol Serena and Dr Josep Manyé, in collaboration with the IBODI group from Pere Virgili Institute for Health Research (IISPV).

In parallel, Margalida Calafat received an Odyssea Grant from the Spanish Working Group on IBD (GETECCU) to undertake a research stay at Massachusetts General Hospital (Boston), where she will explore the relationship between inflammatory bowel disease (IBD) and frailty. In this context, GReMII is also leading two multicentre, prospective studies that will begin in 2025.

In the area of postoperative recurrence in Crohn's disease, the group published a landmark study on the long-term outcomes of patients without early recurrence, presenting robust collaborative data from three leading European research centres in the field. Additionally, GReMII delivered oral presentations at national and European conferences, highlighting results from their ENEIDA-based research on time trends in postoperative strategies and the long-term benefits of systematic prophylaxis.

Innate Immunity

Group leader: Maria Rosa Sarrias Fornés

Research lines

- **Role of innate immunity in liver disease**
- **Novel cancer immunotherapy strategy targeting macrophages**
- **Role of macrophage protein CD5L in infection**

Featured publications

Fortuny M, Sarrias MR, Torner M, Iborra I, Clos A, Ardèvol A, Bartolí R, Morillas RM, Domènech E, Masnou H. **Systematic review of the role of calprotectin in cirrhosis**. *Eur J Clin Invest*. 2024 Feb;54(2):e14111. DOI: 10.1111/eci.14111.

Cardoso MS, Gonçalves R, Oliveira L, Silvério D, Téllez É, Paul T, Sarrias MR, Carmo AM, Saraiva M. **CD5L is upregulated upon infection with Mycobacterium tuberculosis with no effect on disease progression**. *Immunology*. 2024 Oct;173(2):310-320. DOI: 10.1111/imm.13825.

Highlights

Throughout 2024, the Innate Immunity group has continued to consolidate its research, innovation, and outreach activities across multiple fronts, supported by competitive funding, strong collaborations, and an expanding educational role.

Personnel and funding

The team was supported by several research grants: a FIS-funded PI contract (Tony Paul, ISCIII 2020–24), an AGAUR-FI grant (Qiaoling Ye, 2023–27, co-supervised by Clara Prats, UPC), and an Innovadors contract (Marc Cusachs, 2024–25).

Research projects and consortiums

Current clinical and translational research include a new I+D 2024 project (Ministry of Education, 2024–26) and the ongoing SMA-TB project (C. Vilaplana, IGTP, 2020–25). Innovation-related projects include funding from CaixaImpulse Consolidate (2023–25), the Catalan Department of Health (2023–24), and AGAUR (2024–26).

The group leads an SGR-accredited research group (AGAUR 2022–25) and contributes to major national and international initiatives, including CIBERehd and the COST Action Myeinfobank (2022–24).

Collaborations

The group maintains active collaborations across the Can Ruti Campus, including with C. Armengol (Innate Immunity & Liver Pathology SGR), C. Vilaplana, IrsiCaixa (C. Cabrera, J. Carrillo), ICO-IGTP (V. Ruiz-de-Porras, A. Font), and Germans Trias i Pujol University Hospital (particularly with the Gastroenterology Service and H. Masnou). Externally, they collaborate with national and international partners such as A. Valledor (UB), C. Prats (UPC), L. Kremer (CNB-CSIC, Madrid), and researchers from the Myeinfobank network: N. Graham (Edinburgh), V. Cheng (Birmingham), C. Chipollina (RI.Med), E. Sønderaal Bækkevold (Oslo), and K. Serre (Lisbon). The group also contributes to the SMA-TB H2020 consortium (#847762, Europe and South Africa).

The group also maintains an active agreement with Lionex (Germany) to test in vitro diagnostic kits developed in-house for TB diagnosis and prognosis.

Education and training

Dr Tony Paul successfully defended his PhD thesis (UB, 2024, supervised by M.R. Sarrias). Ongoing PhD projects include Marta Fortuny (UB, co-supervised by M.R. Sarrias and H. Masnou) and Qiaoling Ye (UPC, co-supervised by M.R. Sarrias and C. Prats). Undergraduate training included a summer research internship by Marc Rovira (UCL). The group also contributes to several PhD academic committees (UAB, UB).

Teaching activities in 2024 included co-organising the course “Fundamentals of Basic Research” (HUGTiP–IGTP–Mataró Master’s), delivering the annual HUGTiP Talents Talk on “How to Write a Paper”, and organising the 9th Basic/Translational Gastro Research Course at Societat Catalana de Digestologia’s annual meeting.

Scientific dissemination and conferences

The group presented their work at various conferences in 2024, including Societat Catalana de Digestologia, Asociación Española para el Estudio del Hígado, Myeinfobank meetings, as well as invited talks at CNB (Madrid), the IGTP Annual Retreat, and the IGTP Coffee Talks series.

Innovation and technology transfer

The group leads a project on a novel therapeutic strategy using an anti-CD5L antibody for oncology applications (IGTP, WO2019086480A1), which is also the basis of a newly approved spin-off company, TAM Therapeutics. This macrophage-reprogramming platform has potential for high-impact clinical applications.

Additionally, the group has developed an in vitro diagnostic kit (EP3653646A) currently under clinical validation within the SMA-TB project, in collaboration with Lionex. This partnership aims to enhance diagnostic/prognostic accuracy in inflammatory diseases.

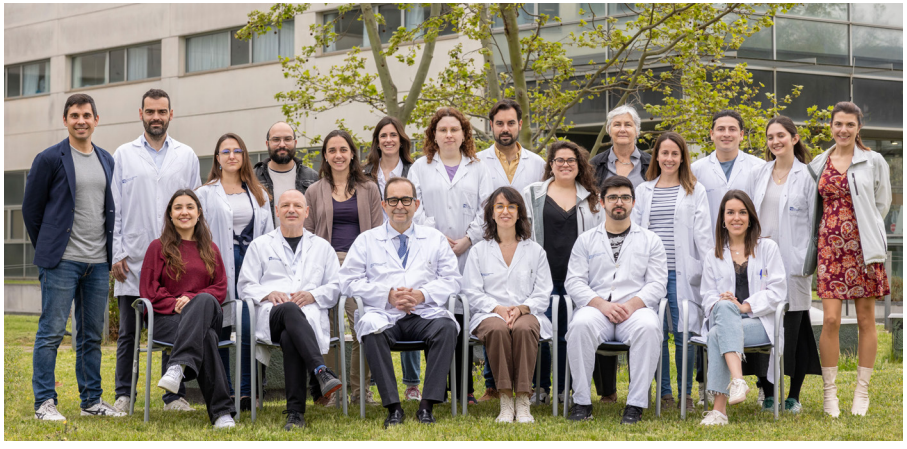
Public engagement

The group actively disseminates its work through the IGTP communication platforms and social media (X: @Innate_IGTP; @GTRecerca, and LinkedIn). They also participated in the International Day of Women and Girls in Science, engaging with high school students from Institut Pau Claris and Jaume Balmes (Barcelona) to promote scientific careers among young people.

Evaluation and peer review

Members of the group contributed as expert reviewers for national and international grant panels, including ANEP (Spain), FCT (Portugal), and MSCA 2024.

Oropharyngeal Dysphagia and Neurogastroenterology



Group leader: Pere Clavé Civit

Research lines

- Oropharyngeal dysphagia, pathophysiology, neurophysiology and new treatments
- Oropharyngeal dysphagia, complications and compensatory interventions
- TRP receptors and pharmacological treatment of oropharyngeal dysphagia
- Neurorehabilitation and neuroplasticity
- Oropharyngeal dysphagia, rheology and texture of alimentary fluids and texture modified diets
- Big data and artificial intelligence tools for massive screening of prevalent pathologies
- Gastro-esophageal motility
- Gastrointestinal basic studies

Featured publications

Tomsen N, Ortega O, Clavé P. **Comparing biomechanics and neurophysiology between different phenotypes of patients with oropharyngeal dysphagia**. *Ann N Y Acad Sci*. 2024 Mar;1533(1):181-191. DOI: 10.1111/nyas.15103.

Martín-Martínez A, Viñas P, Carrillo I, Martos J, Clavé P, Ortega O. **The Impact of Frailty, Oropharyngeal Dysphagia and Malnutrition on Mortality in Older Patients Hospitalized for Covid-19**. *Aging Dis*. 2024 Apr 1;15(2):927-938. DOI: 10.14336/AD.2023.0425-2.

Guanyabens N, Tomsen N, Palomeras E, Mundet L, Clavé P, Ortega O. **Neurophysiological characterization of oropharyngeal dysphagia in older patients**. *Clin Neurophysiol*. 2024 Jun;162:129-140. DOI: 10.1016/j.clinph.2024.03.030.

Highlights

Pathophysiology of oropharyngeal dysphagia

In 2024, the group published the first study demonstrating the critical role of altered afferent pathways (delayed conduction of sensory inputs) and reduced excitability in motor cortical areas in the neurophysiological response to swallowing in older adults with oropharyngeal dysphagia (OD) (Clin Neurophysiol, 2024).

They also described key pathophysiological differences across the four main OD phenotypes. All groups showed delayed laryngeal vestibule closure and impaired sensory integration, but only older adults presented delayed upper oesophageal sphincter opening and prolonged overall response time. In contrast, stroke patients were the only group with delayed sensory conduction (Ann N Y Acad Sci, 2024).

Treatment and management of oropharyngeal dysphagia

The team reported that dehydration affects up to 80% of hospitalised older patients with OD, with most requiring thickened fluids and texture-modified diets. Hydration status was significantly associated with clinical outcomes such as frailty, comorbidities, and mortality (Geroscience, 2024).

They also defined the methodology and key metrics for using pharyngo-oesophageal high-resolution manometry with impedance as a diagnostic tool in OD (Gastroenterol Hepatol, 2024).

Clinically, the group consolidated their minimal-massive intervention protocol for OD management, which is now being implemented in nine hospitals within the Catalan public health system as part of the CSC-iNEXES initiative.

In addition, the group edited a comprehensive international volume on swallowing disorders in older adults, covering pathophysiology, diagnosis, and treatment, with contributions from over 70 experts, including members of CIBERehd, CIBERFES, and CIBERES (Elsevier, 2024).

Anorectal pathophysiology

A cohort of 588 patients enabled the group to functionally and structurally characterise obstructive defecation disorders, highlighting links between clinical symptoms and impaired expulsion capacity (Gastroenterol Hepatol, 2024).

Another study showed a strong correlation between stool consistency (Bristol Stool Scale) and both clinical severity and quality of life in women with faecal incontinence (J Clin Gastroenterol, 2024).

Recognition and dissemination

The group organised the 2nd CareCityLab Scientific Conference, with scientific support from CIBERehd. The event focused on citizen science and gave a central voice to patients in research discussions.

The Barcelona Medical Association recognised the group's work with the 2024 Award for Professional Excellence, awarded to the Dysphagia Research Team at Hospital de Mataró.

Translational Research in Hepatic Diseases

Group leaders: Rosa M. Morillas Cunill, Ramon Bartolí Solé

Research lines

- **Chronic hepatitis**
- **Metabolic dysfunction-associated steatotic liver disease (MASLD)**
- **Cirrhosis and portal hypertension complications**
- **Hepatocellular carcinoma**

Featured publications

Balcar L, Mandorfer M, Hernández-Gea V, Procopet B, Meyer EL, Giráldez Á, Amitrano L, Villanueva C, Thabut D, Samaniego LI, Silva-Junior G, Martinez J, Genescà J, Bureau C, Trebicka J, Herrera EL, Laleman W, Palazón Azorín JM, Alonso JC, Gluud LL, Ferreira CN, Cañete N, Rodríguez M, Ferlitsch A, Mundi JL, Grønbæk H, Hernandez Guerra MN, Sassatelli R, Dell'Era A, Senzolo M, Abraldes JG, Romero-Gómez M, Zipprich A, Casas M, Masnou H, Primignani M, Krag A, Nevens F, Calleja JL, Jansen C, Catalina MV, Albillos A, Rudler M, Tapias EA, Guardascione MA, Tantau M, Schwarzer R, Reiberger T, Laursen SB, Lopez-Gomez M, Cachero A, Ferrarese A, Ripoll C, La Mura V, Bosch J, García-Pagán JC; International Variceal Bleeding Observational Study Group by the Baveno Cooperation: an EASL consortium. **Predicting survival in patients with 'non-high-risk' acute variceal bleeding receiving β-blockers+ligation to prevent re-bleeding**. *J Hepatol*. 2024 Jan;80(1):73-81. DOI: 10.1016/j.jhep.2023.10.007.

Paternostro R, Kwanten WJ, Hofer BS, Semmler G, Bagdadi A, Luzko I, Hernández-Gea V, Graupera I, García-Pagán JC, Saltini D, Indulti F, Schepis F, Moga L, Rautou PE, Llop E, Téllez L, Albillos A, Fortea JI, Puente A, Tosetti G, Primignani M, Zipprich A, Vuille-Lessard E, Berzigotti A, Taru MG, Taru V, Procopet B, Jansen C, Praktiknjo M, Gu W, Trebicka J, Ibanez-Samaniego L, Bañares R, Rivera-Esteban J, Pericas JM, Genesca J, Alvarado E, Villanueva C, Larrue H, Bureau C, Laleman W, Ardevol A, Masnou H, Vanwolleghem T, Trauner M, Mandorfer M, Francque S, Reiberger T; a study by the Baveno Cooperation: an EASL consortium. **Hepatic venous pressure gradient predicts risk of hepatic decompensation and liver-related mortality in patients with MASLD**. *J Hepatol*. 2024 Nov;81(5):827-836. DOI: 10.1016/j.jhep.2024.05.033.

Endocrinology and Metabolic Diseases, Nephrology and Bone Diseases

Diabetes Research Group
Núria Alonso Pedrol

Endocrine, Thyroid and Obesity
Manel Puig Domingo

Experimental Nephrology and Cell-based Therapies (ENACT)
Marcel·la Franquesa Bartolomé

Innovation in Vesicles and Cells for Application in Therapy (IVECAT)
Francesc Enric Borràs Serres

Research Group on Sarcopenia, Frailty and Dependency (GRESFD)
Mateu Serra Prat

Research in Kidney Affecting Diseases Group (REMAR)
Jordi Bover Sanjuán
Marcel·la Franquesa Bartolomé

Diabetes Research Group

Group leader: Núria Alonso Pedrol

Research lines

- **Study of atherosclerosis and other complications associated with diabetes**
- **Epidemiological studies of diabetes: studies with real-life practice databases**

Featured publications

Rojo-López MI, Bermúdez-López M, Castro E, Farràs C, Torres G, Pamplona R, Lecube A, Valdivieso JM, Fernández E, Julve J, Castelblanco E, Alonso N, Antentas M, Barranco-Altirriba M, Perera-Lluna A, Franch-Nadal J, Granado-Casas M, Mauricio D, On Behalf Of The Ilervas Project Collaborators. **Mediterranean Diet Is a Predictor of Progression of Subclinical Atherosclerosis in a Mediterranean Population: The ILERVAS Prospective Cohort Study**. *Nutrients*. 2024 Oct 24;16(21):3607. DOI: 10.3390/nu16213607.

Antentas M, Rojo-López MI, Vendrell P, Granado-Casas M, Genua I, Fernandez-Camins B, Rossell J, Niño-Narvión J, Moreira E, Castelblanco E, Ortega E, Vlacho B, Alonso N, Mauricio D, Julve J. **Impact of Dietary Niacin on Metabolic Dysfunction-Associated Steatotic Liver Disease in Mediterranean Subjects: A Population-Based Study**. *Nutrients*. 2024 Nov 30;16(23):4178. DOI: 10.3390/nu16234178.

Endocrine, Thyroid and Obesity

Group leader: Manel Puig Domingo

Research lines

- **Molecular phenotyping of pituitary tumors and its application to personalised medicine**
- **Thyroid pathology**
- **Obesity**

Featured publications

Giuliodori A, Soudah E, Malouf J, Martel-Duguech L, Amodru V, Gil J, Hernández JA, Domingo MP, Webb SM, Valassi E. **Evaluation of bone-related mechanical properties in female patients with long-term remission of Cushing's syndrome using quantitative computed tomography-based finite element analysis.** *Eur J Endocrinol*. 2024 Jan 3;190(1):86-95. DOI: 10.1093/ejendo/lvae004.

Julián MT, Arteaga I, Torán-Monserrat P, Pera G, Pérez-Montes de Oca A, Ruiz-Rojano I, Casademunt-Gras E, Chacón C, Alonso N. **The Link between Abdominal Obesity Indices and the Progression of Liver Fibrosis: Insights from a Population-Based Study.** *Nutrients.* 2024 May 23;16(11):1586. DOI: 10.3390/nu16111586.

Marques-Pamies M, Gil J, Sampedro-Nuñez M, Valassi E, Biagetti B, Giménez-Palop O, Hernández M, Martínez S, Carrato C, Villar-Taibo R, Araujo-Castro M, Blanco C, Simón-Muela I, Simó-Servat A, Xifra G, Vázquez F, Pavón I, Rosado JA, García-Centeno R, Zavala R, Hanzu FA, Mora M, Aulinas A, Vilarrasa N, Librizzi S, Calatayud M, de Miguel P, Alvarez-Escola C, Picó A, Salinas I, Fajardo-Montañana C, Cámara R, Bernabéu I, Jordà M, Webb SM, Marazuela M, Puig-Domingo M. **Personalized Medicine in Acromegaly: The ACROFAST Study**. *J Clin Endocrinol Metab*. 2024 Dec 18;110(1):30-40. DOI: 10.1210/clinem/dgae444.

Experimental Nephrology and Cell-based Therapies (ENACT)

Group leader: Marcel·la Franquesa Bartolomé

Research lines

- **Novel therapeutic approaches in experimental kidney disease**
- **Non-invasive biomarkers**

Featured publications

Garcia SG, Sanroque-Muñoz M, Clos-Sansalvador M, Font-Morón M, Monguió-Tortajada M, Borràs FE, Franquesa M. **Hollow fiber bioreactor allows sustained production of immortalized mesenchymal stromal cell-derived extracellular vesicles.** *Extracell Vesicles Circ Nucl Acids*. 2024 May 14;5(2):201-220. DOI: 10.20517/evcna.2023.76.

Perezpayá I, Garcia SG, Clos-Sansalvador M, Sanroque-Muñoz M, Font-Morón M, Rodríguez-Martínez P, Vila-Santandreu A, Bover J, Borràs FE, Cañas L, Franquesa M. **Molecular screening of transitional B cells as a prognostic marker of improved graft outcome and reduced rejection risk in kidney transplant.** *Front Immunol.* 2024 Aug 12;15:1433832. DOI: 10.3389/fimmu.2024.1433832.

Clos-Sansalvador M, Taco O, Rodríguez-Martínez P, Garcia SG, Font-Morón M, Bover J, Vila-Santandreu A, Franquesa M, Juega J, Borràs FE. **Towards clinical translation of urinary vitronectin for non-invasive detection and monitoring of renal fibrosis in kidney transplant patients.** *J Transl Med.* 2024 Nov 15;22(1):1030. DOI: 10.1186/s12967-024-05777-5.

Highlights

In 2024, the ENACT group published two scientific articles that reflect two of its core research interests:

Therapeutic applications of extracellular vesicles: they demonstrated that a hollow fibre bioreactor enables the sustained production of extracellular vesicles (EVs) derived from immortalised mesenchymal stromal cells, representing a scalable and reproducible strategy for therapeutic EV production (*Extracell Vesicles Circ Nucl Acids*, 2024).

Regulatory B cells as biomarkers in kidney transplantation: they reported that transitional B cells may serve as prognostic biomarkers for improved graft outcomes and reduced rejection risk in kidney transplant recipients, through a comprehensive molecular profiling approach (*Front Immunol*, 2024).

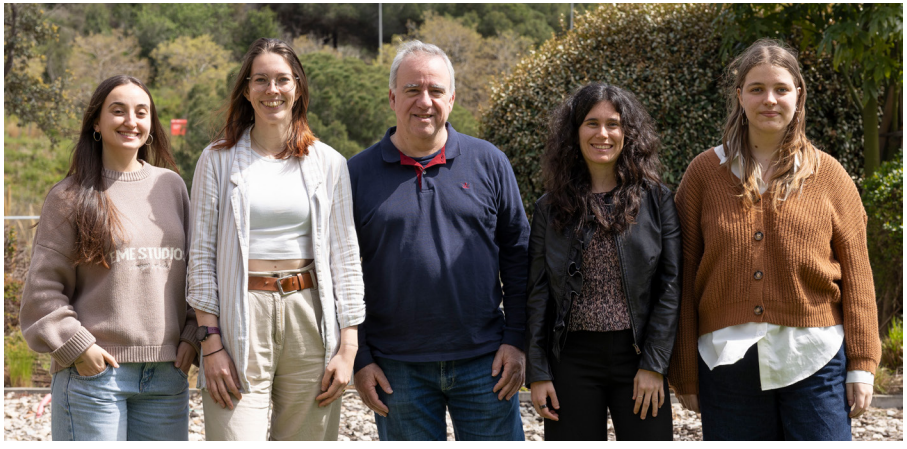
The group also played a key role in scientific training and dissemination. In March, ENACT contributed to the organisation of a PhD Training Course on "Extracellular Vesicles for Gene and Cell Therapies" held in Jaca. The course was co-organised by the Spanish Group for Extracellular Vesicles (GEIVEX) and the Spanish Society of Cell and Gene Therapy (SETGyC), and was highly successful.

In addition, Dr Marcel·la Franquesa, the group's principal investigator, was invited to lecture on cell therapies and organ regeneration at the prestigious Hesperis Course organised by the European Society of Organ Transplantation (ESOT) for transplant clinical fellows.

The group also actively participated in the 7th GEIVEX Symposium, held in Palma in October 2024, further strengthening its presence in the national extracellular vesicle research community.

Finally, the group secured a new competitive research grant from Instituto de Salud Carlos III for the project "Vesículas extracelulares en la innovación renal: Modelización, biomarcadores y terapéutica MSC-EV para la glomeruloesclerosis focal y segmentaria (EV-FSGS)" (PI24/00615), led by Dr Franquesa. The project, which will run from 2025 to 2027 with a total funding of €190,000, aims to explore extracellular vesicles as therapeutic tools and biomarkers in focal segmental glomerulosclerosis.

Innovation in Vesicles and Cells for Application in Therapy (IVECAT)



Group leader: Francesc Enric Borràs Serres

Research lines

- **Development of new strategies for the improvement in the objective diagnosis of diseases/pathologies**
- **Research in the field of preventive and therapeutic Cell & "Cell-free" advanced therapies for immunomodulation and regenerative medicine**

Featured publications

Garcia SG, Sanroque-Muñoz M, Clos-Sansalvador M, Font-Morón M, Monguió-Tortajada M, Borràs FE, Franquesa M. **Hollow fiber bioreactor allows sustained production of immortalized mesenchymal stromal cell-derived extracellular vesicles.** *Extracell Vesicles Circ Nucl Acids*. 2024 May 14;5(2):201-220. DOI: 10.20517/evcna.2023.76.

Perezpayá I, Garcia SG, Clos-Sansalvador M, Sanroque-Muñoz M, Font-Morón M, Rodríguez-Martínez P, Vila-Santandreu A, Bover J, Borràs FE, Cañas L, Franquesa M. **Molecular screening of transitional B cells as a prognostic marker of improved graft outcome and reduced rejection risk in kidney transplant.** *Front Immunol*. 2024 Aug 12;15:1433832. DOI: 10.3389/fimmu.2024.1433832.

Clos-Sansalvador M, Taco O, Rodríguez-Martínez P, Garcia SG, Font-Morón M, Bover J, Vila-Santandreu A, Franquesa M, Juega J, Borràs FE. **Towards clinical translation of urinary vitronectin for non-invasive detection and monitoring of renal fibrosis in kidney transplant patients.** *J Transl Med*. 2024 Nov 15;22(1):1030. DOI: 10.1186/s12967-024-05777-5.

Research Group on Sarcopenia, Frailty and Dependency (GRESFD)

Group leader: Mateu Serra Prat

Research lines

- Evaluation of the pathophysiology and risk factors of sarcopenia, frailty and functional decline in the elderly
- Evaluation of the effectiveness and safety of multimodal interventions aimed at preventing and/or reversing frailty and disability in the elderly
- Assessment of the impact of frailty on the health and quality of life and assessment of the economic impact of frailty
- Development and validation of electronic and automatic instruments for mass screening of frailty and/or disability to generate information at population level useful for health planning and management

Featured publications

Pleguezuelos E, Del Carmen A, Moreno E, Serra-Prat M, Serra-Payá N, Garnacho-Castaño MV. **Telerehabilitation improves cardiorespiratory and muscular fitness and body composition in older people with post-COVID-19 syndrome.** *J Cachexia Sarcopenia Muscle*. 2024 Oct;15(5):1785-1796. DOI: 10.1002/jcsm.13530.

Serra-Prat M, Moreno-Carmona MR, Fortuny A, Lavado À, Papiol M, Muñoz L, Martínez-Cerdá JF, Serra-Colomer J, Burdoy E, Cabré M. **Frailty trends in Catalonia 2017-2021: An epidemiological study with 1.5 million people aged ≥65 years.** *Public Health*. 2024 Dec;237:14-21. DOI: 10.1016/j.puhe.2024.09.016.

Research in Kidney Affecting Diseases Group (REMAR)

Group leaders: Jordi Bover Sanjuán, Marcel·la Franquesa Bartolomé

Research lines

- **Novel therapeutic approaches in experimental kidney disease**
- **Non-invasive biomarkers**
- **Cardiorenal syndrome**
- **Point-of-Care Ultrasound (POCUS)**
- **MONIK study**
- **Chronic Kidney Disease - Mineral and Bone Disorder (CKD-MBD) and CKD associated-osteoporosis**

Featured publications

Zamora E, Codina P, Aimo A, Lupón J, Domingo M, Troya M, Santiago-Vacas E, Cediel G, Borrellas A, Ruiz-Cueto M, Romero-González GA, Santesmases J, Nuñez J, Bover J, Ara J, Bayes-Genis A. **Trajectories of Kidney Function in Heart Failure Over a 15-Year Follow-Up: Clinical Profiling and Mortality.** *JACC Heart Fail.* 2024 May;12(5):849-859. DOI: 10.1016/j.jchf.2024.01.004.

Perezpayá I, Garcia SG, Clos-Sansalvador M, Sanroque-Muñoz M, Font-Morón M, Rodríguez-Martínez P, Vila-Santandreu A, Bover J, Borràs FE, Cañas L, Franquesa M. **Molecular screening of transitional B cells as a prognostic marker of improved graft outcome and reduced rejection risk in kidney transplant**. *Front Immunol.* 2024 Aug 12;15:1433832. DOI: 10.3389/fimmu.2024.1433832.

Clos-Sansalvador M, Taco O, Rodríguez-Martínez P, Garcia SG, Font-Morón M, Bover J, Vila-Santandreu A, Franquesa M, Juega J, Borràs FE. **Towards clinical translation of urinary vitronectin for non-invasive detection and monitoring of renal fibrosis in kidney transplant patients.** *J Transl Med*. 2024 Nov 15;22(1):1030. DOI: 10.1186/s12967-024-05777-5.

Highlights

In 2024, the REMAR group renewed its commitment to the national research network RICORS-2040, which focuses on advancing knowledge and treatment of kidney disease through both clinical and basic research approaches.

The Nephrology Department at Germans Trias i Pujol University Hospital, where the group is based, was recognised by the Sociedad Española de Nefrología (SEN) as a Centre of Excellence in Cardiorenal Syndrome, Hypertension, and Diabetes. The group was also actively involved in the development of the universal KDIGO Guidelines on Chronic Kidney Disease (CKD) and CKD–Mineral and Bone Disorder (CKD-MBD), where its contributions were formally acknowledged.

REMAR researchers participated in the preparation of two key European consensus documents:

- Calcium intake recommendations in CKD (Nephrol Dial Transplant, 2024).
- Role of nutritional vitamin D in CKD (Nephrol Dial Transplant, 2025).

They were also contributors to both international and national position statements:

- International position statement on Point-of-Care Ultrasound (POCUS) (Clin Kidney J, 2024).
- National consensus on hydrosaline overload in acute renal failure, coordinated by SEMI/SEC/SEN (Rev Esp Cardiol (Engl Ed), 2024).

In the field of gender and renal health, the group showed strong leadership. Members of REMAR coordinate and lead the Spanish group GENDEREN (Gender and Renal Disease), and collaborate with KDIGO and the International Society of Nephrology on initiatives focused on Women and CKD (Clin Kidney J, 2024).

Finally, 2024 also marked the launch of a new spin-off company, Debios Diagnostics, which emerged from the group's innovative work and is led by Dr Francesc Borràs.

Immunology and Inflammation

Immunology of Diabetes
Marta Vives-Pi

Immunopathology
Eva Mª Martínez Cáceres

Immunology of Diabetes

Group leader: Marta Vives-Pi

Research lines

- **Immunotherapies for the prevention and treatment of T1D**
- **Antigen-specific tolerance induction**
- **Spontaneous remission of T1D**
- **Biomarkers of immunoregulation**

Featured publications

Gomez-Muñoz L, Dominguez-Bendala J, Pastori RL, Vives-Pi M. **Immunometabolic biomarkers for partial remission in type 1 diabetes mellitus**. *Trends Endocrinol Metab*. 2024 Feb;35(2):151-163. DOI: 10.1016/j.tem.2023.10.005.

Garcia-Loza I, Perna-Barrull D, Aguilera E, Almenara-Fuentes L, Gomez-Muñoz L, Greco D, Vila M, Salvado M, Mancera-Arteu M, Olszowy MW, Petriz J, Dalmases M, Rodriguez-Vidal S, Barneda-Zahonero B, Vives-Pi M. **Targeting macrophages with phosphatidylserine-rich liposomes as a potential antigen-specific immunotherapy for type 1 diabetes.** *J Autoimmun*. 2024 May;145:103196. DOI: 10.1016/j.jaut.2024.103196.

Cobo-Vuilleumier N, Rodríguez-Fernandez S, López-Noriega L, Lorenzo PI, Franco JM, Lachaud CC, Vazquez EM, Legido RA, Dorronsoro A, López-Férnandez-Sobrino R, Fernández-Santos B, Serrano CE, Salas-Lloret D, van Overbeek N, Ramos-Rodriguez M, Mateo-Rodríguez C, Hidalgo L, Marin-Canas S, Nano R, Arroba AI, Caro AC, Vertegaal AC, Martin-Montalvo A, Martín F, Aguilar-Diosdado M, Piemonti L, Pasquali L, Prieto RG, Sánchez MIG, Eizirik DL, Martínez-Brocca MA, Vives-Pi M, Gauthier BR. **LRH-1/NR5A2 targets mitochondrial dynamics to reprogram type 1 diabetes macrophages and dendritic cells into an immune tolerance phenotype.** *Clin Transl Med*. 2024 Dec;14(12):e70134. DOI: 10.1002/ctm2.70134.

Highlights

The research conducted by the team during 2024 allowed them to continue with their solid research lines and generate new hypotheses to initiate innovative projects. Basic and clinical researchers worked together optimally and in collaboration with other institutions while effectively disseminating and exploiting the results. The group have focused on the translational aspect of research for the prevention and treatment of type 1 diabetes and other autoimmune diseases, in line with IGTP's Strategic Plan. Key achievements include:

- Advancing knowledge of the etiology of autoimmune type 1 diabetes: identification of prenatal susceptibility factors and the effect of miRNAs on target cells. A drug (betamethasone, a synthetic glucocorticoid) was identified with a protective effect and a potential new application (drug repositioning) for improving graft survival in umbilical cord transplantation.
- Immunomonitoring for type 1 diabetes: description of new biomarkers of partial remission in type 1 diabetes (lymphocyte subpopulations, cytokines, and miRNAs). Development of predictive algorithms for partial remission in type 1 diabetes.
- Innovative immunotherapies for autoimmune diseases: the nanomedicine platform for seven autoimmune diseases was consolidated, advancing toward a clinical trial in myasthenia gravis. A new patent (WO2024110516A1) was granted and licensed to Ahead Therapeutics SL.

Immunopathology

Group leader: Eva Mª Martínez Cáceres

Research lines

- **Innovation and diagnostic immunology**
- **Clinical epidemiology research**
- **Immune therapies inducing tolerance**
- **Neuroimmunology: cellular tolerance therapy in multiple sclerosis**

Featured publications

López C, Depreux N, Bielsa I, Roger A, Quirant-Sanchez B, Basagaña M, Jurgens Y, Padró C, Miquel S, Martinez-Caceres E, Teniente-Serra A. Peripheral blood T-cell modulation by omalizumab in chronic urticaria patients. *Front Immunol*. 2024 Aug 20;15:1413233. DOI: 10.3389/fimmu.2024.1413233.

Fondelli F, Willemyns J, Domenech-Garcia R, Mansilla MJ, Godoy-Tena G, Ferreté-Bonastre AG, Agúndez-Moreno A, Presas-Rodriguez S, Ramo-Tello C, Ballestar E, Martínez-Cáceres E. **Targeting aryl hydrocarbon receptor functionally restores tolerogenic dendritic cells derived from patients with multiple sclerosis.** *J Clin Invest*. 2024 Nov 1;134(21):e178949. DOI: 10.1172/JCI178949.

Torán-Monserrat P, Lamonja-Vicente N, Costa-Garrido A, Carrasco-Ribelles LA, Quirant B, Boigues M, Molina X, Chacón C, Dacosta-Aguayo R, Arméstar F, Martínez Cáceres EM, Prado JG, Violán C; ProHEpiC-19 study group. **SARS-CoV-2 Infection Risk by Vaccine Doses and Prior Infections Over 24 Months: ProHEpiC-19 Longitudinal Study.** *JMIR Public Health Surveill*. 2024 Nov 22;10:e56926. DOI: 10.2196/56926.

Highlights

Among the highlights of the group in 2024 was the discussion of a Marie Curie Fellow PhD thesis (Federico Fondelli, *Cum Laude*) and the publication of the results of this thesis in the *Journal of Clinical Investigation*.

The team also experienced significant growth, incorporating new international researchers, made possible by the successful acquisition of two competitive European projects, reinforcing the group's international positioning and research capacity.

On 23-25 September, the group co-organised the First exTra Workshop, as part of the training activities of the exTra consortium, in which the group has been a partner since 2023. The workshop, titled "Standardisation of Research and Clinical Lab Methods", aimed to foster cross-institutional alignment by bringing together experts and researchers to promote consistent, reliable methodologies across both research and clinical laboratories throughout the consortium network.

Additionally, Maria Iglesias Escudero was awarded a Strategic Research Project through the Legacy Call 2024 for the project "Immunomonitoring of Kidney Transplantation", receiving funding of €125,471.

Infectious Diseases

Clinical and Environmental Infectious Diseases Study Group (CEID)
Maria Luisa Pedro Botet
Noemí Párraga Niño

Clinical and Experimental Microbiology Unit (UMCiE)
Pere-Joan Cardona Iglesias

Experimental Tuberculosis Unit (UTE)
Cristina Vilaplana Massaguer

Innovation in Respiratory Infections and Tuberculosis
José Domínguez Benítez

Pathogen Diagnostics and Genomic Epidemiology (DxEpiPath)
Elisa Martró Català

***Plasmodium vivax* and Exosome Research Group (PvREX)**
Hernando A. Del Portillo
Carmen Fernández Becerra

Clinical and Environmental Infectious Diseases Study Group (CEID)

Group leaders: Maria Luisa Pedro Botet, Noemí Párraga Niño

Research lines

- *Legionella*
- Nosocomial pneumonia outside the ICU
- Intestinal microbiota
- Immunocompromised Unit
- Community-acquired pneumonia
- One Health

Featured publications

Díez de Los Ríos J, Navarro M, Vilamala A, Rubio JM, Vilaró I, Besolí A, Serra-Pladevall J. **Hospital-acquired malaria in Catalonia: an unexpected post-surgical complication**. *J Travel Med*. 2024 Apr 6;31(3):taae028. DOI: 10.1093/jtm/taae028.

Párraga-Niño N, Cortès-Tarragó R, Quero S, Garcia-Núñez M, Arqué E, Sabaté S, Ramirez D, Gavaldà L. **Persistence of viable but nonculturable Legionella pneumophila state in hospital water systems: A hidden enemy?** *Sci Total Environ*. 2024 Jun 1;927:172410. DOI: 10.1016/j.scitotenv.2024.172410.

Abelenda-Alonso G, Calatayud L, Rombauts A, Meije Y, Oriol I, Sopena N, Padullés A, Niubó J, Duarte A, Llaberia J, Aranda J, Gudiol C, Satorra P, Tebé C, Ardanuy C, Carratalà J. **Multiplex real-time PCR in non-invasive respiratory samples to reduce antibiotic use in community-acquired pneumonia: a randomised trial**. *Nat Commun*. 2024 Aug 17;15(1):7098. DOI: 10.1038/s41467-024-51547-8.

Highlights

In 2024, members of the CEID group contributed to the creation of the Functional Unit for Septic Diseases of the Musculoskeletal System (UFSAL), in collaboration with professionals from other clinical departments. The main objective of UFSAL is to offer a joint and multidisciplinary assessment to guarantee a correct diagnosis, staging and treatment of osteoarticular infections, improving the intervals between first visit and treatment, improving hospital control and early detection and treatment of relapses and complications of patients in the Northern and Maresme Metropolitan Area. This objective is fundamental in order to optimise clinical control, reduce complications and mortality, improve hospital stay times and facilitate patient accessibility.

In terms of professional development, two CEID members were awarded clinical fellowships to carry out international placements in leading healthcare centres:

- Carme Bracke completed a fellowship at the National Institutes of Health (NIH) in Bethesda, Maryland, USA, under the supervision of Dr Irini Sereti, from June to December 2024, in the Laboratory of Immunoregulation.
- Alba Romero stayed at Toronto General Hospital from September 2023 to March 2024, working with Dr Shahid Husain, an expert in fungal infections, and Dr Kumar, a specialist in cytomegalovirus infections, both specialised in transplant immunodeficiencies

Clinical and Experimental Microbiology Unit (UMCiE)

Group leader: Pere-Joan Cardona Iglesias

Research lines

- SARS-CoV-2
- Viral hepatitis (B and C)
- Genomic Epidemiology of *Mycobacterium tuberculosis* Complex (MTBC)
- Study of *M. tuberculosis* virulence
- Control of environmental mycobacteria outbreaks
- Molecular epidemiology of syphilis
- Study of quinolone resistance mechanisms in *Mycoplasma genitalium*
- Determination of pAmpC plasmid in sepsis
- Diagnosis of meningitis
- Interaction between *Pseudomonas aeruginosa* and *Staphylococcus aureus*
- Impact of faecal microbiota on the selection of multiresistance
- Study of the dissemination of multidrug-resistant bacteria

Featured publications

Villanueva I, Conesa D, Català M, López Cano C, Perramon-Malavez A, Molinuevo D, de Rioja VL, López D, Alonso S, Cardona PJ, Montañola-Sales C, Prats C, Alvarez-Lacalle E. **Country-report pattern corrections of new cases allow accurate 2-week predictions of COVID-19 evolution with the Gompertz model**. *Sci Rep*. 2024 May 11;14(1):10775. DOI: 10.1038/s41598-024-61233-w.

Cortacans M, Arch M, Fuentes E, Cardona PJ. **Candida albicans infection model in Drosophila melanogaster suggests a strain-specific virulent factor boosting a stormy innate immune response**. *Front Immunol*. 2024 Oct 31;15:1474516. DOI: 10.3389/fimmu.2024.1474516.

Vidal M, Arch M, Fuentes E, Cardona PJ. **Drosophila melanogaster experimental model to test new antimicrobials: a methodological approach**. *Front Microbiol*. 2024 Nov 6;15:1478263. DOI: 10.3389/fmicb.2024.1478263.

Highlights

Over 2024, the Clinical and Experimental Microbiology Unit (UMCiE) made significant progress in consolidating various methodologies and strategic lines of research.

One of the key advances was the consolidation of the *Drosophila melanogaster* infection model as a robust methodological platform to evaluate new antimicrobial candidates, anti-virulence factors and host-directed therapies. This model was applied not only in the context of tuberculosis research (within the ITHEMYC project), but also extended to pathogens such as *Staphylococcus aureus, Candida albicans, Enterococcus spp. and Pseudomonas aeruginosa*.

In parallel, the unit strengthened its role within the Institut Català de la Salut laboratory network, particularly through its involvement in the SIVEM program on genomic epidemiology. This included the weekly sequencing of circulating variants of SARS-CoV-2, as well as ongoing work on *Mycobacterium tuberculosis* and *Listeria monocytogenes*.

Progress was also made in the use of Fourier-transform infrared spectroscopy (FTIR) through the Biotyper system to characterise bacterial strains. This technology enabled the identification of clonal populations of multidrug-resistant bacteria, most notably extended-spectrum beta-lactamase (ESBL)-producing *Klebsiella pneumoniae* and vancomycin-resistant *Enterococcus faecium*. Additionally, it proved useful for serotyping *Streptococcus pneumoniae* strains with potential vaccine escape, *Salmonella spp*. for epidemiological purposes, and highly virulent strains of *Campylobacter spp*.

Finally, the unit validated a new screening system for sexually transmitted infections (STIs) based on the pooling of three different anatomical site samples per patient into a single test, a methodology referred to as “3-in-1” or pooling. This approach aims to enhance the sustainability of STI screening programs targeting asymptomatic individuals at higher risk.

Experimental Tuberculosis Unit (UTE)

Group leader: Cristina Vilaplana Massaguer

Research lines

- **Study of biomarkers and tools for monitoring TB disease course and prognosis**
- **Evaluation of new prophylactic and therapeutic strategies against TB**
- **Study of health dimensions and quality of life in the context of infectious diseases**

Featured publications

Gogichadze N, Sagrera A, Vicente JÁ, Millet JP, López-Seguí F, Vilaplana C. **Cost-effectiveness of active tuberculosis screening among high-risk populations in low tuberculosis incidence countries: a systematic review, 2008 to 2023**. *Euro Surveill*. 2024 Mar;29(12):2300614. doi: 10.2807/1560-7917.ES.2024.29.12.2300614.

Romero-Tamarit A, Vallès X, Munar-García M, Espinosa-Pereiro J, Saborit N, Tortola MT, Stojanovic Z, Roure S, Antuori A, Cardona PJ, Soriano-Arandes A, Martin-Nalda A, Espiau M, de Souza-Galvão ML, Jiménez MÁ, Noguera-Julian A, Molina I, Casas X, Domínguez-Álvarez M, Jové N, Gogichadze N, L Fonseca K, Arias L, Millet JP, Sánchez-Montalvá A, Vilaplana C. **A longitudinal prospective study of active tuberculosis in a Western Europe setting: insights and findings**. *Infection*. 2024 Apr;52(2):611-623. DOI: 10.1007/s15010-024-02184-2.

Sanchez-Montalva A, Caminero JA, Guna MR, Sanz TR, Rabuñal R, Millet JP, Gullón-Blanco JA, Anibarro L, Perez-Mendoza G, Medina JF, González-Galán V, Tabernero E; Writing committee of the Spanish MDR TB consortium (in alphabetical order); Annex. Members of the Spanish MDR TB consortium group. **Executive summary: Clinical practice guidelines on the management of resistant tuberculosis of the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR) and the Spanish Society of Infectious Diseases and Clinical Microbiology (SEIMC)**. *Enferm Infecc Microbiol Clin (Engl Ed)*. 2024 Dec;42(10):588-596. DOI: 10.1016/j.eimce.2024.09.001.

Highlights

In 2024, the Experimental Tuberculosis Unit (UTE) marked the successful completion of the SMA-TB project, a European initiative aimed at accelerating tuberculosis treatment development. Coordinated by UTE and funded by the Horizon 2020 program, the project led to significant advances, including the identification of host and pathogen biomarkers, the creation of an open-access training kit, and the development of a personalised medicine algorithm. These results reinforce UTE's leadership in translational tuberculosis research.

The group also reinforced its commitment to public engagement and scientific outreach by developing a collaborative board game designed to raise awareness and understanding of tuberculosis. The game has been featured in various educational and public initiatives, including the 2024 European Researchers' Night.

Another achievement that marked the year was the recognition of Dr Cristina Vilaplana, leader of UTE, who received the 2024 Professional Excellence Award from Col·legi de Metges de Barcelona (CoMB), in acknowledgement of her distinguished career and contributions to research and public health.

Innovation in Respiratory Infections and Tuberculosis

Group leader: José Domínguez Benítez

Research lines

- **Microbial interactions**
- **Immune response characterisation**
- **Impact of external factors**
- **Diagnostic technology innovation**
- **New therapeutic approaches**

Featured publications

Safont G, Villar-Hernández R, Smalchuk D, Stojanovic Z, Marín A, Lacoma A, Pérez-Cano C, López-Martínez A, Molina-Moya B, Solis AJ, Arméstar F, Matllo J, Díaz-Fernández S, Romero I, Casas I, Strecker K, Preyer R, Rosell A, Latorre I, Domínguez J. **Measurement of IFN-ɣ and IL-2 for the assessment of the cellular immunity against SARS-CoV-2**. *Sci Rep*. 2024 Jan 11;14(1):1137. DOI: 10.1038/s41598-024-51505-w.

Rodríguez-Fernández P, Romero-Andrada I, Molina-Moya B, Latorre I, Lacoma A, Prat-Aymerich C, Tabernero L, Domínguez J. **Impact of diesel exhaust particles on infections with Mycobacterium bovis BCG in in vitro human macrophages and an in vivo Galleria mellonella model**. *Environ Pollut*. 2024 Jan 15;341:122597. DOI: 10.1016/j.envpol.2023.122597.

Villar-Hernández R, Latorre I, Noguera-Julian A, Martínez-Planas A, Minguell L, Vallmanya T, Méndez M, Soriano-Arandes A, Baquero-Artigao F, Rodríguez-Molino P, Guillén-Martín S, Toro-Rueda C, De Souza-Galvão ML, Jiménez-Fuentes MÁ, Stojanovic Z, Sabriá J, Santos JR, Puig J, Domínguez-Álvarez M, Millet JP, Altet N, Galea Y, Muriel-Moreno B, García-García E, Bach-Griera M, Prat-Aymerich C, Julián E, Torrelles JB, Rodrigo C, Domínguez J. **Development and Evaluation of an NTM-IGRA to Guide Pediatric Lymphadenitis Diagnosis**. *Pediatr Infect Dis J*. 2024 Mar 1;43(3):278-285. DOI: 10.1097/INF.0000000000004211.

Highlights

In 2024, the group published 10 scientific articles in international peer-reviewed journals, the majority of which were the result of collaborations with national and international research partners.

The COST Action ADVANCE-TB consortium, chaired by Dr Alícia Lacoma, was further consolidated during the year. The consortium currently brings together 250 members from 47 countries. In June, a successful meeting of the network took place in Ljubljana (Slovenia), bringing together more than 70 professionals from different countries.

The group also secured new competitive funding from Instituto de Salud Carlos III to study the combined impact of environmental pollutants on respiratory infections, a research line led by Dr Lacoma in collaboration with Iris Romero, a PhD student.

In November, Sergio Díaz successfully defended his PhD thesis, which was awarded an international mention. Supervised by Dr José Domínguez and Dr Irene Latorre, his thesis focused on pulmonary and systemic markers for the characterisation of the immune response against *Mycobacterium tuberculosis* in mice and human.

Finally, Daria Smalchuk was awarded a predoctoral fellowship from the Catalan Agency for Management of University and Research Grants (AGAUR) to carry out her PhD research on the use of mycobacteriophages as an alternative therapy for tuberculosis.

Pathogen Diagnostics and Genomic Epidemiology (DxEpiPath)

Group leader: Elisa Martró Català

Research lines

- Viral hepatitis
  - Hepatitis C
  - Hepatitis B
- Molecular diagnostics and genomic epidemiology of other infectious diseases
  - Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
  - Tuberculosis (TB)
  - Antimicrobial resistant bacteria
  - Sexually Transmitted Infections (STI)
  - 16S rRNA sequencing applications

Featured publications

Levinsson A, Zolopa C, Vakili F, Udhesister S, Kronfli N, Maheu-Giroux M, Bruneau J, Valerio H, Bajis S, Read P, Martró E, Boucher L, Morris L, Grebely J, Artenie A, Stone J, Vickerman P, Larney S. **Sex and gender differences in hepatitis C virus risk, prevention, and cascade of care in people who inject drugs: systematic review and meta-analysis**. *EClinicalMedicine*. 2024 Apr 10;72:102596. DOI: 10.1016/j.eclinm.2024.102596.

Antuori A, Not A, Mesías-Gazmuri J, González V, Montoro-Fernandez M, Folch C, Saludes V, Villar M, Meroño M, Paytubi S, Alemany L, Casabona J, Martró E; SexCohort Group. **High Hepatitis B Prevalence and Vaccination Needs Among Transgender Women and Men Sex Workers in Barcelona, Spain**. *Open Forum Infect Dis*. 2024 Jul 17;11(8):ofae410. DOI: 10.1093/ofid/ofae410.

Bordoy AE, Vallès X, Fernández-Náger J, Sánchez-Roig M, Fernández-Recio J, Saludes V, Noguera-Julian M, Blanco I, Martró E; Quatre Camins COVID-19 Study Group. **Analysis of a Large Severe Acute Respiratory Syndrome Coronavirus 2 (Alpha) Outbreak in a Catalan Prison Using Conventional and Genomic Epidemiology**. *J Infect Dis*. 2024 Aug 16;230(2):374-381. DOI: 10.1093/infdis/jiae161.

Highlights

In the field of viral hepatitis B and C, the group has been actively working to promote micro-elimination in several vulnerable populations, in multidisciplinary collaborations with other research groups, epidemiologists at CEEISCAT, civil society and with support from the Public Health Agency of Catalonia. This work has led to pioneering new models of care that have increased access to diagnosis and treatment, and has also contributed to the characterisation of the local epidemiology of this infection. This line of research, funded by both public and private sources through several projects, led to the incorporation of a new Master's student, and to a doctoral thesis defended in 2024. Furthermore, Dr Martró has been involved in HCV screening at the Emergency Department, Germans Trias i Pujol University Hospital (HUGTiP), which recently expanded to also include HBV (FOCUS). Dr Martró is also part of the Commission for the monitoring of the "Plan for the Prevention and Control of Hepatitis C in Catalonia" of the Public Health Agency of Catalonia.

The group has specialised in genomic epidemiology and surveillance of several pathogens of clinical and public health interest, by translating whole genome sequencing into meaningful information for the management of outbreaks through direct reporting to the Nosocomial Infection Control team at HUGTiP and to regional Epidemiological Surveillance teams (Public Health).

- The DxEpiPath group has been immersed in SARS-CoV-2 genomic sequencing throughout the COVID-19 pandemic, specialising in phylogenetic analysis of outbreaks in closed settings (*J Infect Dis*, 2024) and rapid nanopore-based sequencing of nosocomial outbreaks (part of an ongoing PhD started during a project previously funded by La Marató de TV3). The team also participates in EU-funded projects for genomic surveillance (RELECOV) and vaccine effectiveness (COVIDRIVE and Id.DRIVE).
- The group has expanded its research activity to genomic epidemiology studies of multi-drug resistant bacteria involved in nosocomial outbreaks, and in resistance surveillance by participating in SIVEM (Xarxa de Seqüenciació per a la Vigilància de Microorganismes del Departament de Salut) and RedLabRA (Red de Laboratorios para la Vigilancia de Microorganismos Resistentes, Instituto de Salud Carlos III).
- Thirdly, together with Pere-Joan Cardona, DxEpiPath is involved in the TB-SEQ strategy, a population-based, multicentre study of genomic epidemiology of *Mycobacterium tuberculosis* complex (MTBC) strains circulating in Catalonia. This has been implemented within the formal tuberculosis prevention and control activities by the Public Health Agency of Catalonia (Health Department, Generalitat de Catalunya) since 2022, based on a pilot project co-led by Dr Martró.

In 2024, a new project was funded (PI23/00528) to develop and pilot a new decentralised tuberculosis screening strategy, integrated into viral hepatitis and HIV/STI screening programmes in vulnerable populations. Over the course of the TB-SEQ project, evidence showed the involvement of some of the same vulnerable populations (such as people who use drugs, homeless people, and migrants from countries with a high tuberculosis incidence) in clusters of active transmission. Based on these findings, this project aims to fight transmission hotspots by improving the screening of active tuberculosis in the most affected populations and integrating the screening of all infections affecting these vulnerable populations at once.

Finally, a nanopore-based sequencing assay of the full 16S rRNA gene was evaluated from direct clinical samples for the microbiological diagnosis of bacterial infections requiring urgent diagnosis where conventional diagnostic methods show limitations, such as infective endocarditis and prosthetic joint infections.

Plasmodium vivax and Exosome Research Group (PvREX)

Group leaders: Hernando A. Del Portillo, Carmen Fernández Becerra

Research lines

- **Exosome-mediated mechanisms of non-hypnozoite cryptic infections in P. *vivax* malaria**
- **Reticulocyte-derived exosomes (Rex) vaccines against P. vivax**
- **Hypnozoite biomarker discovery**
- **Functional analysis of subtelomeric variant genes**
- **Extracellular vesicles (EVs) as potential new biomarkers in parasitic infections**

Featured publications

Ayllon-Hermida A, Nicolau-Fernandez M, Larrinaga AM, Aparici-Herraiz I, Tintó-Font E, Llorà-Batlle O, Orban A, Yasnot MF, Graupera M, Esteller M, Popovici J, Cortés A, Del Portillo HA, Fernandez-Becerra C. ***Plasmodium vivax* spleen-dependent protein 1 and its role in extracellular vesicles-mediated intrasplenic infections**. *Front Cell Infect Microbiol*. 2024 May 17;14:1408451. DOI: 10.3389/fcimb.2024.1408451.

Gualdrón-López M, Ayllon-Hermida A, Cortes-Serra N, Resa-Infante P, Bech-Serra JJ, Aparici-Herraiz I, Nicolau-Fernandez M, Erkizia I, Gutierrez-Chamorro L, Marfil S, Pradenas E, Ávila Nieto C, Cucurull B, Montaner-Tarbés S, Muelas M, Sotil R, Ballana E, Urrea V, Fraile L, Montoya M, Vergara J, Segales J, Carrillo J, Izquierdo-Useros N, Blanco J, Fernandez-Becerra C, de La Torre C, Pinazo MJ, Martinez-Picado J, Del Portillo HA. **Proteomics of circulating extracellular vesicles reveals diverse clinical presentations of COVID-19 but fails to identify viral peptides**. *Front Cell Infect Microbiol*. 2024 Nov 6;14:1442743. DOI: 10.3389/fcimb.2024.1442743.

Fernandez-Becerra C, Xander P, Olivier M, Torrecilhas AC. **Advancing research on parasitic infections: Standardized extracellular vesicle guideline**. *J Extracell Vesicles*. 2024 Dec;13(12):e70009. DOI: 10.1002/jev2.70009.

Highlights

In 2024, the PvREX group received recognition for its innovation with the Campus Clínic Innova Award in the Incubem Idees category (€15,000) for the project "Novel Extracellular Vesicle-Derived Biomarkers for the Diagnosis of Severe Malaria in Africa".

The group continued to advance its research in the biology of *Plasmodium vivax* infections. A study led by the team revealed new insights into the role of the spleen in P. *vivax* malaria. Using reverse genetics and single-cell analysis, they identified a spleen-dependent P. *vivax* gene that promotes parasite adhesion, enhanced by extracellular vesicles (EVs). These EVs also trigger splenic cells to express adhesion-related proteins, facilitating parasite sequestration. Their findings support the spleen as a key reservoir and immune evasion site in chronic P. vivax infections.

Throughout the year, PvREX researchers maintained a strong presence in international scientific forums. Dr Carmen Fernández-Becerra served as invited chair at both the 7th GEIVEX Symposium on Extracellular Vesicles in Palma (Spain) and the 2nd MOVE Symposium on EVs in Interspecies Communication in Belgrade (Serbia). She also delivered invited talks at the XXII Meeting of the Brazilian Society for Cell Biology in São Paulo (Brazil) and at the ISEV 2024 Annual Meeting in Melbourne (Australia), where she spoke on the role of EVs in cryptic erythrocytic infections in P. *vivax* malaria, as well as on plasma-derived EVs as potential biomarkers for chronic Chagas disease. Dr Hernando A. del Portillo, who co-leads the group alongside Dr Fernández-Becerra, was also invited to present the team's work at the Seminarios IP-BLN-CSIC in Granada (Spain), where he highlighted the potential of circulating EVs from P. *vivax* patients as biomarkers of hypnozoite infections and vaccine candidates. He also spoke on the role of EVs as vaccines at the GEIVEX Symposium in Palma (Spain).

In addition to these scientific contributions, group leaders continued to play an active role in research governance, training and scientific outreach. Dr Fernández-Becerra currently serves as co-chair of ISGlobal's Plenary Scientific Committee and as a member of the International Advisory Committee for the 9th International Conference on P. *vivax* Research (India, February 2025). She also co-chaired the 2024 ISGlobal Scientific Retreat and remains a member of the IGTP Coffee Talk Organising Committee. In the field of education, she organised the online course Study of Extracellular Vesicles in Parasitic Diseases (University of Antioquia and ISGlobal), and coordinated the ISGlobal Summer School module on EVs in pathogen infections, supported by the Severo Ochoa Grant.

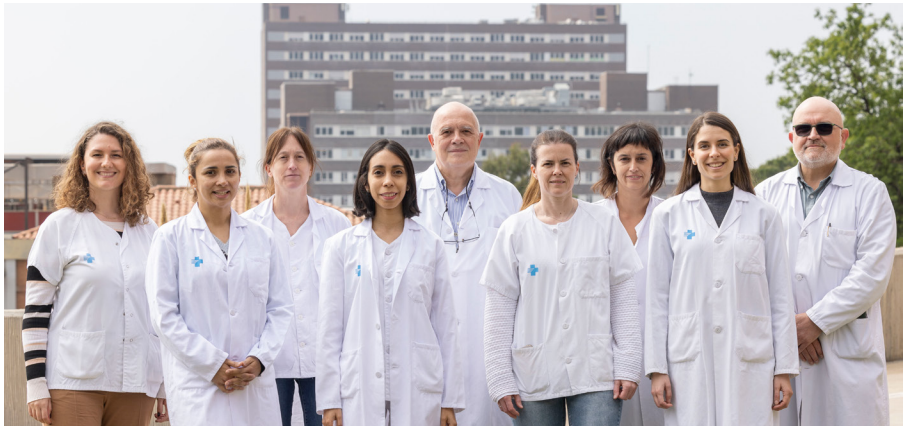
Dr del Portillo continues to lead the Malaria and Neglected Parasitic Diseases Program at ISGlobal. In 2024, he organised the ISGlobal-FIOCRUZ institutional meeting in Barcelona and served on the thesis jury for Christian Sánchez at Universitat de València, where the doctoral work focused on the characterisation of extracellular vesicles from *Fasciola hepatica* and *Dicrocoelium dendriticum* and their effects on macrophages and hepatic cells.

Medical Complications and Clinical Pharmacology of Substance Use Disorder

Clinical Pharmacology of Substance Use Disorder
Magí Farré Albaladejo

Medical Complications of Substance Use Disorder
Robert Muga Bustamante
Daniel Fuster Martí

Clinical Pharmacology of Substance Use Disorder



Group leader: Magí Farré Albaladejo

Research lines

- **Evaluation of the acute effects and pharmacokinetics of new psychoactive substances (synthetic cathinones such as methylone, pyrovalerone derivatives, and others), and classical psychostimulants (MDMA, amphetamines and cocaine) in humans**
- **Evaluation of the acute effects of binge alcohol consumption in young people and its combination with other substances (cannabis, energy drinks) in humans**
- **Evaluation of the effects and pharmacokinetics of natural, semisynthetic and synthetic cannabinoids, including cannabis and its components (different compositions of THC/CBD) in humans, and their therapeutic use (medicinal cannabis) in humans**
- **Pharmacogenomics and substance use, including drugs of abuse and medicines, with a focus on the influence of genetic polymorphisms on drug effects and pharmacokinetics, as well as gender differences**
- **Therapeutic use of psychedelic substances, including the use of ayahuasca in severe grief**

Featured publications

Massano M, Nuñez-Montero M, Papaseit E, Hladun O, Pérez-Maña C, Ventura M, Marchei E, Alladio E, Gerace E, Pichini S, Farrè M, Salomone A. **Metabolic profile of N-ethylhexedrone, N-ethylpentedrone, and 4-chloromethcathinone in urine samples by UHPLC-QTOF-HRMS**. *J Pharm Biomed Anal*. 2024 Apr 15;241:115994. DOI: 10.1016/j.jpba.2024.115994.

Cárdenas-Quesada J, Mestre-Pintó J, Maldonado R, Rodríguez de Fonseca F, Torrens M, Farré M; on behalf the RIAPAd research group. **Substance use disorders and cooperative research on addictions: Spanish approach as a model**. *Pharmacol Res*. 2024 Aug;206:107233. DOI: 10.1016/j.phrs.2024.107233.

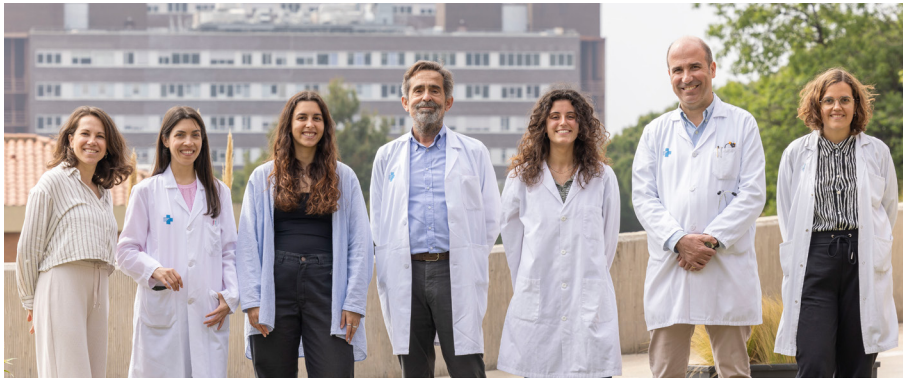
Jorbenadze S, Khatiashvili T, Giunashvili L, Tchelidze A, Lo Faro AF, Pichini S, Farré M, Papaseit E, Nuñez-Montero M, Carlier J, Farkas T, Busardo FP, Chankvetadze B. **Challenges encountered in the enantioselective analysis of new psychoactive substances exemplified by clephedrone (4-CMC)**. *J Pharm Biomed Anal*. 2024 Sep 15;248:116275. DOI: 10.1016/j.jpba.2024.116275.

Highlights

During 2024, the main scientific achievement was the group's contribution to advancing knowledge of the metabolic profiles of new synthetic cathinones in humans. The team described the metabolic routes of clephedrone (4-CMC), N-ethylhexedrone, and N-ethylpentedrone. As these substances were administered under controlled conditions, the findings are highly relevant for interpreting real-world samples from intoxicated individuals or in drug-driving cases.

In addition, the team had the opportunity to contribute to describe the situation of pharmacological research in Spain, published in the journal *Pharmacological Research*. The article provided an overview of Spanish research groups in the field, along with a brief history of scientific collaborative networks in Spain, specifically the former Red de Trastornos Adictivos (RTA) and the current Red de Investigación en Atención Primaria de Adicciones (RIAPAd), funded through Instituto de Salud Carlos III's Redes de Investigación Cooperativa Orientadas al Resultado en Salud (RICORS) program.

Medical Complications of Substance Use Disorder



Group leaders: Robert Muga Bustamante, Daniel Fuster Martí

Research lines

- **Clinical consequences of Substance Use Disorder (SUD)**
- **Alcohol-associated morbidity and mortality**
- **Therapeutic interventions in Alcohol Use Disorder (AUD)**
- **Monitoring viral infections (HCV, HIV, HBV) in SUD**
- **Intestinal permeability and systemic inflammation in AUD**
- **Cardiometabolic alterations of AUD**
- **Alcohol-associated immune alterations**

Featured publications

Zuluaga P, Casado-Carbajo J, Hernández-Rubio A, Bueno-Vélez M, García-Martin C, Muga R, Fuster D. **Vitamin D Deficiency Is Associated with Advanced Liver Fibrosis and Impaired Fasting Glucose in Alcohol Use Disorder**. *Nutrients*. 2024 Apr 9;16(8):1099. DOI: 10.3390/nu16081099.

Zuluaga P, Fuster D, Blanes R, Hernández-Rubio A, Miquel L, Torrens M, Rubio G, Bolao F, Liangpunsakul S, Abellí-Deulofeu E, Rodriguez de Fonseca F, Muga R; Co-hRTA. **Clinical features of individuals with laboratory values suggestive of advanced liver fibrosis when first treated for alcohol use disorder**. *Alcohol Clin Exp Res (Hoboken)*. 2024 Jul;48(7):1313-1321. DOI: 10.1111/acer.15345.

Haque LY, Zuluaga P, Muga R, Fuster D. **Treatment of alcohol use disorder in patients with alcohol-associated liver disease: Innovative approaches and a call to action.** *Addict Sci Clin Pract*. 2024 Mar 19;19(1):19. DOI: 10.1186/s13722-024-00448-8.

Highlights

During 2024, the research group achieved various milestones in the field of substance use disorder.

The Redes de Investigación Cooperativa Orientadas al Resultado en Salud (RICORS) - Red de Investigación en Atención Primaria de Adicciones (RIAPAd) was extended and funded by Instituto de Salud Carlos III for the 2025-2027 period. Within this national research network on substance use disorder, the IGTP-based group leads a multicentre study focused on alcohol use disorder. The RIAPAd/RICORS group at IGTP (RD24/0003/0019) includes clinicians from the Internal Medicine/Addiction Unit and pharmacologists from the Department of Clinical Pharmacology. In the current RICORS renewal, members of the group are principal investigators in three different work packages. The group is also officially recognised as a consolidated research group by the Government of Catalonia (2021-SGR-00945).

In terms of career development, Dr Anna Hernández-Rubio completed a six-month postdoctoral research stay at King's College London (School of Cardiovascular and Metabolic Medicine) and is currently pursuing a Master of Science at the London School of Hygiene and Tropical Medicine. Dr Julia Casado-Carbajo carried out a three-month predoctoral research stay at Boston University School of Medicine, within the Clinical Addiction Research and Education Unit. Her stay was partially funded by an award from Sociedad Española de Medicina Interna. Both researchers applied for the Río Hortega career development fellowships aimed at early-career physician scientists.

The group also maintained a strong presence at international scientific meetings, with three oral communications delivered in 2024: at the Conference on Retroviruses and Opportunistic Infections (CROI) in Denver (USA), the College on Problems of Drug Dependence (CPDD) Annual Meeting in Montreal (Canada), and 2024 Lisbon Addictions (Portugal).

Lastly, Dr Fuster currently supervises three PhD candidates whose theses focus on the medical consequences of substance use disorder.

Neuroscience

Badalona Neuromuscular Research Group (GRENBA)
Gisela Nogales Gadea
Mònica Suelves Esteban

Cellular and Molecular Neurobiology (CMN)
Teresa Gasull Dalmau
Octavi Martí Sistac

Genomics and Transcriptomics of Synucleinopathies (GTS)
Katrin Beyer

Neurogenetics Unit
Antoni Matilla Dueñas
Ivelisse Sánchez Díaz

Neurovascular Research Group
Mònica Millán Torné

Psychiatry and Mental Health

Psychoneuroendocrinology and Stress in Psychosis (PSICPNEC)
Javier Labad Arias

Badalona Neuromuscular Research Group (GRENBA)

Group leaders: Gisela Nogales Gadea, Mònica Suelves Esteban

Research lines

- **Myotonic dystrophy type 1**
- **McArdle disease**
- **Duchenne muscular dystrophy**
- **Sarcopenia**

Featured publications

Núñez-Manchón J, Capó J, Martínez-Piñeiro A, Juanola E, Pesovic J, Mosqueira-Martín L, González-Imaz K, Maestre-Mora P, Odria R, Cerro-Herreros E, Naldaiz-Gastesi N, López de Munain A, Artero R, Savic-Pavicevic D, Vallejo-Illarramendi A, Mamchaoui K, Bigot A, Mouly V, Suelves M, Nogales-Gadea G. **Immortalized human myotonic dystrophy type 1 muscle cell lines to address patient heterogeneity**. *iScience*. 2024 May 7;27(6):109930. DOI: 10.1016/j.isci.2024.109930.

Cerro-Herreros E, Núñez-Manchón J, Naldaiz-Gastesi N, Carrascosa-Sàez M, García-Rey A, Losilla DP, González-Martínez I, Espinosa-Espinosa J, Moreno K, Poyatos-García J, Vilchez JJ, de Munain AL, Suelves M, Nogales-Gadea G, Llamusí B, Artero R. **AntimiR treatment corrects myotonic dystrophy primary cell defects across several CTG repeat expansions with a dual mechanism of action**. *Sci Adv*. 2024 Oct 11;10(41):eadn6525. DOI: 10.1126/sciadv.adn6525.

Highlights

Throughout 2024, GRENBA continued to advance its main research lines focused on the neuromuscular diseases Myotonic Dystrophy type 1 (DM1) and Duchenne Muscular Dystrophy (DMD). The group generated and characterised three new immortalised muscle cell models for the study of DM1, derived from three clinically heterogeneous DM1 patients. These models provide a unique tool for both fundamental and translational research in DM1. Additionally, the group identified HDAC11 as an emerging therapeutic target to reduce fibrosis, intramuscular fat accumulation and inflammation, leading to improved muscle function in DMD mouse models.

The group was awarded a research project on DM1 entitled "DM1-Hub: Creation of an integral node for Myotonic Dystrophy type 1 in Spain: clinical record, genomic, epigenomic and proteomic maps", funded by Instituto de Salud Carlos III through a competitive call for rare disease research, in which only eight projects across Spain were selected. With a total national budget of €20 million, the project is coordinated by Dr Gisela Nogales and involves over 100 healthcare professionals and more than 40 hospitals across the country. In addition, Dr Mònica Suelves was awarded funding from Duchenne Parent Project Spain for the project "Evaluation of HDAC11 inhibitors as anti-fibrotic and pro-regenerative molecules to treat DMD," and Dr Eduard Juanola obtained funding from Llegat de Can Ruti for the project "Whole-DM1".

The group's scientific activity was also reflected in its presence at international conferences. Dr Gisela Nogales was invited to speak at the 8th Myology Conference (April, Paris), while Dr Mònica Suelves gave an invited talk at the IX Workshop on the Transfer of Scientific Knowledge in Duchenne Muscular Dystrophy (September, Barcelona). GRENBA also presented six posters at national and international congresses, including the 8th Myology Conference (April, Paris), the 14th International Myotonic Dystrophy Consortium (April, Nijmegen), the 7th International Symposium on Peripheral Nerve Regeneration (May, Milan), and the European Human Genetics Conference (June, Berlin).

New collaborations were initiated through the development of the DM1-Hub project, which involved contact with numerous neurologists and paediatric neurologists across Spain. As part of this initiative, the group also began collaborations with Dr Andreas Roos (Essen University, Germany) to analyse the plasma proteome of DM1 patients; Dr Javier Ramón (Institute for Bioengineering of Catalonia) to develop muscle-on-a-chip models for DM1; Dr Domingo (University of Barcelona) for lipidomic studies in DMD samples; and Dr Sippl (Institute of Pharmacy, Martin-Luther-University of Halle-Wittenberg, Germany), an expert in HDAC11 catalytic activities and inhibitors.

The group was active in public engagement and outreach, organising several events including the XII Cursa Benèfica per les Malalties Minoritàries, the I Trail de Muntanya per les Malalties Minoritàries and the IX Gala Solidària per

la Recerca de les Malalties Minoritàries (Teatre Zorrilla, Badalona). Dr Gisela Nogales-Gadea participated in IGTP's 'Un bri de ciència' with a podcast episode on neuromuscular diseases, and Dr Mònica Suelves delivered a talk to secondary school students at Institut Caterina Albert in Barcelona. Both principal investigators also contributed to national and international project evaluation panels (ANEP, Instituto de Salud Carlos III, AFM-Téléthon and the Czech Science Foundation), and served on thesis committees at the Universidad del País Vasco, Universitat Pompeu Fabra, and the Universitat de València.

Regarding doctoral and academic training within the group, in June, Paula Bueno completed her Master's degree in Experimental Biomedical Research at the Universitat Internacional de Catalunya, and Alicia López Martín was awarded a diploma in Genetic Counselling and Clinical Genomics by the Universitat de València. In December, Judit Núñez Manchón successfully defended her PhD in Genetics at the University of Barcelona, with a thesis entitled "Deciphering the importance of heterogeneity in Myotonic Dystrophy type 1".

Finally, GRENBA received the ASEM Fem Pinya Award 2024, in the category Special Jury Award, for its commitment and dedication to research in neuromuscular diseases.

Cellular and Molecular Neurobiology (CMN)

Group leaders: Teresa Gasull Dalmau, Octavi Martí Sistac

Research lines

- **Novel glutamate-related targets for neuroprotection**
- **Ferroptosis in neuronal death and antiferroptotic neuroprotective compounds**
- **Experimental modelling of stroke in rodents and swine**
- **Discovery of new biomarkers to improve stroke treatment**
- **Computational biology: machine/deep learning assessment of behaviour in in vivo stroke models**

Featured publications

Gasull T, Arboix A. **Molecular Mechanisms and Pathophysiology of Acute Stroke: Recent Advances and Controversies**. *Curr Issues Mol Biol*. 2024 Mar 27;46(4):2926-2930. DOI: 10.3390/cimb46040182.

Dortez S, Pacheco M, Gasull T, Crevillen AG, Escarpa A. **A dual colorimetric-electrochemical microfluidic paper-based analytical device for point-of-care testing of ischemic strokes**. *Lab Chip*. 2024 Sep 10;24(18):4253-4263. DOI: 10.1039/d4lc00398e.

Highlights

In 2024, the group made key strides in stroke research by introducing promising therapies, diagnostic innovations, and translational preclinical models. These advances strengthened their efforts toward early intervention and clinical application in the lines of research described below.

Apotransferrin (ATf) as a universal early stroke treatment

The group demonstrated that ATf holds promise as an early treatment for both ischaemic and haemorrhagic stroke by reducing blood transferrin saturation. In murine models of intracerebral haemorrhage, intravenous administration of ATf improved neurobehavioural outcomes and reduced brain injury by lowering oxidative stress markers and transferrin receptor levels, a key indicator of ferroptosis.

Combined with previous findings in ischaemic stroke, these results underscore ATf's potential as a frontline, pre-hospital therapy, effective within a critical therapeutic window and independent of stroke type.

In parallel, the team developed a paper-based analytical device capable of rapid, low-cost measurement of blood transferrin saturation. This tool offers a scalable solution for point-of-care testing in future clinical studies of the effect of ATf on the blood transferrin saturation index as a surrogate marker. It is also a point-of-care innovation of interest for other studies assessing iron-related brain injury.

Development of a minimally invasive porcine stroke model for translational research

To overcome the translational limitations of rodent models, the group established reproducible, minimally invasive porcine models of both ischaemic and haemorrhagic stroke using endovascular approaches. These models reliably reproduce human stroke pathology, as confirmed by longitudinal MRI showing consistent infarct patterns closely resembling those observed in patients. The porcine models provide a robust platform for evaluating novel therapies and medical devices in a brain anatomy more comparable to humans. The group presented this work as distinguished speakers at the 4th SIGN Conference in India and at the Neuroprotection and Neurorepair Conference in Germany.

New diagnostic insights and funding for innovative preclinical stroke research

These advances also led to the identification of new diagnostic biomarkers with potential clinical relevance and the award of two new research grants. One project is a randomised preclinical study evaluating intravenous apotransferrin for acute ischaemic stroke using the IGTP/CMCiB/CMN porcine model. It pioneers the use of longitudinal multimodal MRI to monitor infarct progression and applies machine learning (DeepLabCut) to assess stroke-induced neurofunctional impairment and treatment-induced improvement. The second project explores the neuroprotective properties of hydroxytyrosol, a nutraceutical compound, in stroke recovery, also employing swine models, multimodal MRI neuroimaging and DeepLabCut.

Together, these achievements position the group at the forefront of translational stroke research, bridging laboratory discoveries and clinical innovation.

Genomics and Transcriptomics of Synucleinopathies (GTS)

Group leader: Katrin Beyer

Research lines

- **Molecular characterisation of dementia with Lewy bodies and identification of molecular subtypes**
- **Biomarker research. Identification and characterization of peripheral biomarkers**
- **Identification of platelet-specific changes in dementia with Lewy bodies**
- **Establishment of cell models suitable for testing of results**

Featured publications

Kim JJ, Vitale D, Otani DV, Lian MM, Heilbron K; 23andMe Research Team; Iwaki H, Lake J, Solsberg CW, Leonard H, Makarious MB, Tan EK, Singleton AB, Bandres-Ciga S, Noyce AJ; Global Parkinson's Genetics Program (GP2); Blauwendraat C, Nalls MA, Foo JN, Mata I. **Multi-ancestry genome-wide association meta-analysis of Parkinson's disease**. *Nat Genet*. 2024 Jan;56(1):27-36. doi: 10.1038/s41588-023-01584-8.

Ojo OO, Bandres-Ciga S, Makarious MB, Crea PW, Hernandez DG, Houlden H, Rizig M, Singleton AB, Noyce AJ, Nalls MA, Blauwendraat C, Okubadejo NU; **Nigeria Parkinson's Disease Research Network and the Global Parkinson's Genetics Program (GP2). GBA1 rs3115534 Is Associated with REM Sleep Behavior Disorder in Parkinson's Disease in Nigerians**. *Mov Disord*. 2024 Apr;39(4):728-733. DOI: 10.1002/mds.29753.

Planas-Ballvé A, Rios J, Gea M, Rabaneda-Lombarte N, Ispierto L, Grau L, Jiménez M, Cáceres C, Martínez S, Beyer K, Álvarez R, Pastor P, Vilas D. **Substantia nigra hyperechogenicity and brain ventricular size as biomarkers of early dementia with Lewy bodies**. *Alzheimers Res Ther*. 2024 Oct 15;16(1):227. DOI: 10.1186/s13195-024-01590-w.

Highlights

During 2024, the GTS group made significant progress in its biomarker research for dementia with Lewy bodies (DLB), focusing on two main areas: platelet-based and whole blood and saliva-based approaches.

The team advanced the development of a platelet-derived miRNA biomarker for the differential diagnosis of DLB. To study whether and how platelets may contribute to disease development, they analysed the full platelet transcriptome of DLB patients and compared it with that of individuals with related conditions (Alzheimer's disease, Parkinson's disease, and REM sleep behaviour disorder) as well as healthy controls. The first results of this work were presented as an oral poster at the 18th International Conference on Alzheimer's and Parkinson's Diseases (AD/PD24) in Lisbon. In parallel, the group secured competitive funding from Instituto de Salud Carlos III to continue their research on the role of platelets in DLB development.

The group is also working on a second biomarker, where differential expression of SNCA transcripts in whole blood inversely correlates with the alpha-synuclein aggregation process in the brain. This biomarker holds potential for monitoring the efficacy of alpha-synuclein anti-aggregation therapies currently in development for DLB and Parkinson's disease. Following the publication of a validation study in 2023, the group was invited to provide a talk at the 29th World Congress on Parkinson's Disease and Related Disorders (IAPRD) held in May 2024 in Lisbon.

Neurogenetics Unit

Group leaders: Antoni Matilla Dueñas, Ivelisse Sánchez Díaz

Research lines

- **Identification of the genetic causative deficits and the molecular mechanisms underlying hereditary ataxias, spastic paraplegias and other neurodegenerative disorders**
- **Genetic diagnosis of over 400 neurological diseases**
- **Multiomics-based identification of biomarkers of disease progression in Friedreich's ataxia and other neurodegenerative disorders**
- **Definition of clinical-genetic-molecular correlations implementing machine learning**
- **Identification of signaling targets and therapeutic strategies for neurological disorders in cellular and animal disease models**
- **Development of a gene therapy for Friedreich's ataxia and its evaluation in pre-clinical models of the disease**
- **Establishment of iPS cells and 3D-organoids to validate therapies and disease biomarkers**

Featured publications

Sanchez-Flores M, Corral-Juan M, Gasch-Navalón E, Cirillo D, Sanchez I, Matilla-Dueñas A. **Novel genotype-phenotype correlations, differential cerebellar allele-specific methylation, and a common origin of the (ATTTC)n insertion in spinocerebellar ataxia type 37**. *Hum Genet*. 2024 Mar;143(3):211-232. DOI: 10.1007/s00439-024-02644-7.

Highlights

In 2024, the Neurogenetics Unit made steady progress across its research lines, with advances in diagnostics, gene therapy, and disease monitoring for hereditary ataxias.

The team successfully established a new CRISPR-Cas targeted nanopore sequencing method to identify and characterise pathogenic alleles with long expanded repeat tracts. This technology improves genetic-clinical correlation in spinocerebellar ataxias and other neurological disorders.

In parallel, the group advanced its gene therapy pipeline for Friedreich's ataxia, demonstrating excellent safety and biodistribution profiles in two disease mouse models and in non-human primates.

The team also identified clinically relevant biomarkers of disease progression in Friedreich's ataxia, supporting improved patient monitoring and the evaluation of future therapeutic strategies.

Neurovascular Research Group

Group leader: Mònica Millán Torné

Research lines

- **Therapies in patients with acute stroke**
- **Territorial organisation for stroke care**
- **Multimodal neuroimaging techniques (CT and MR in acute stroke)**
- **Diagnostic and prognostic clinical and biological markers of stroke and its complications**
- **Neurocardiology**
- **Brain recovery and post-stroke care**
- **Stroke prevention**

Featured publications

Bustamante A, Balboa M, Ezcurra G, Sánchez-Fortún A, Ruiz J, Castellví J, Castillo-Acedo S, Matas È, Bouchikh R, Martínez-Sánchez M, Castaño C, Remollo S, Werner M, Salgado MC, Villodres S, Gea M, Millán M, Pérez de la Ossa N, Ruiz-Bilbao S. **Implementation of a retinal stroke-code protocol results in visual recovery in patients receiving reperfusion therapies**. *Eur Stroke J*. 2024 Jun;9(2):486-493. DOI: 10.1177/23969873231221366.

Turón-Viñas E, Boronat S, Gich I, González Álvarez V, García-Puig M, Camós Carreras M, Rodriguez-Palmero A, Felipe-Rucián A, Aznar-Laín G, Jiménez-Fàbrega X, Pérez de la Ossa N; Catalan Pediatric Stroke Study Group. **Design and Interrater Reliability of the Pediatric Version of the Race Scale: PedRACE**. *Stroke*. 2024 Sep;55(9):2240-2246. DOI: 10.1161/STROKEAHA.124.046846.

Costalat V, Jovin TG, Albucher JF, Cognard C, Henon H, Nouri N, Gory B, Richard S, Marnat G, Sibon I, Di Maria F, Annan M, Boulouis G, Cardona P, Obadia M, Piotin M, Bourcier R, Guillon B, Godard S, Pasco-Papon A, Eker OF, Cho TH, Turc G, Naggara O, Velasco S, Lamy M, Clarençon F, Alamowitch S, Renu A, Suissa L, Brunel H, Gentric JC, Timsit S, Lamy C, Chivot C, Macian-Montoro F, Mounayer C, Ozkul-Wermester O, Papagiannaki C, Wolff V, Pop R, Ferrier A, Chabert E, Ricolfi F, Béjot Y, Lopez-Cancio E, Vega P, Spelle L, Denier C, Millán M, Arenillas JF, Mazighi M, Houdart E, Del Mar Freijo M, Duhamel A, Sanossian N, Liebeskind DS, Labreuche J, Lapergue B, Arquizan C; LASTE Trial Investigators. T**rial of Thrombectomy for Stroke with a Large Infarct of Unrestricted Size**. *N Engl J Med*. 2024 May 9;390(18):1677-1689. DOI: 10.1056/NEJMoa2314063.

Highlights

The group, based at Germans Trias i Pujol University Hospital, treated over 1,200 patients with suspected stroke in 2024, of whom approximately 1,000 were confirmed cases. Around 600 patients admitted to the Stroke Unit, and 250 reperfusion treatments were administered to patients with ischaemic stroke. Notably, 9% of admitted patients were included in clinical trials or academic research projects.

The team's most significant healthcare achievement during the year was the consolidation of the Retina Code implementation, in collaboration with the Ophthalmology Department. After five years of accumulated experience, and as the first hospital in Spain to implement this approach, the main results were published in a high-impact international journal, alongside an editorial in *Medicina Clínica*. The work also generated considerable attention in the media and on social networks. The team is now recognised as a national leader in this field and will lead this line of research within the RICORS-Ictus project.

The group has long demonstrated its capacity in specialist training, having delivered annual courses on cerebrovascular diseases over the past 15 years. In 2024, particular highlights included the direction and organisation of the course "Neurosciences 3.2 Course: Innovation and Research" and the "International Symposium on Intracerebral Hemorrhage: New insights and perspectives on intracerebral hemorrhage: a comprehensive update", which received sponsorship from the *Journal of Cerebral Blood Flow & Metabolism*.

The team led the publication of nine original research articles and two editorials, and contributed to 26 additional publications in collaboration with other national and international research groups. Key scientific contributions included: the implementation of a coordinated protocol showing that reperfusion therapy improves visual recovery in central retinal artery occlusion; the design and validation of a prehospital score for the detection of paediatric stroke (PED-RACE); the identification of the impact of clinically diagnosed post-stroke pneumonia on prognosis and antibiotic use; the establishment of optimal transport and neuroimaging strategies for patients transferred from community hospitals to a Comprehensive Stroke Centre within the RACECAT study; and importantly, the demonstration of the benefit of mechanical thrombectomy over best medical treatment in patients with large vessel occlusion and extensive infarction, potentially expanding the eligibility criteria for endovascular treatment.

Recently, the group was once again recognised by Instituto de Salud Carlos III as a member of the RICORS network. It currently leads 13 competitively funded research projects and collaborates on a further 21.

Psychiatry and Mental Health

Research lines

- **Innovation in psychiatric hospitalisation and emergency services**
- **Consultation-liaison psychiatry**
- **Psychosis**
- **Neurodevelopmental disorders and perinatal mental health**

Featured publications

Baenas I, Etxandi M, Fernández-Aranda F. **Medical complications in anorexia and bulimia nervosa**. *Med Clin (Barc)*. 2024 Jan 26;162(2):67-72. DOI: 10.1016/j.medcli.2023.07.028.

Punsoda-Puche P, Barajas A, Mamano-Grande M, Jiménez-Lafuente A, Ochoa S. **Relationship between social cognition and premorbid adjustment in psychosis: a systematic review**. *Schizophrenia (Heidelb)*. 2024 Mar 15;10(1):36. DOI: 10.1038/s41537-023-00428-y.

Giralt-López M, Miret S, Campanera S, Moreira M, Sotero-Moreno A, Krebs MO, Fañanás L, Fatjó-Vilas M. **Theory of mind in schizophrenia through a clinical liability approach: a sib-pair study**. *Front Psychol*. 2024 Dec 13;15:1391646. DOI: 10.3389/fpsyg.2024.1391646.

Psychoneuroendocrinology and Stress in Psychosis (PSICPNEC)

Group leader: Javier Labad Arias

Research lines

- Biomarkers of stress and risk of developing a psychotic disorder
- Impact of hormones on the clinical expression of psychotic disorders
- Neurocognition and social cognition in early psychotic disorders: prognostic and therapeutic implications
- Psychopathological and biological consequences of abuse in adolescents and young adults

Featured publications

Campana M, Yakimov V, Moussiopoulou J, Maurus I, Löhrs L, Raabe F, Jäger I, Mortazavi M, Benros ME, Jeppesen R, Meyer Zu Hörste G, Heming M, Giné-Servén E, Labad J, Boix E, Lennox B, Yeeles K, Steiner J, Meyer-Lotz G, Dobrowolny H, Malchow B, Hansen N, Falkai P, Siafis S, Leucht S, Halstead S, Warren N, Siskind D, Strube W, Hasan A, Wagner E. **Association of symptom severity and cerebrospinal fluid alterations in recent onset psychosis in schizophrenia-spectrum disorders - An individual patient data meta-analysis**. *Brain Behav Immun*. 2024 Jul;119:353-362. DOI: 10.1016/j.bbi.2024.04.011.

Armario A, Nadal R, Fuentes S, Visa J, Belda X, Serrano S, Labad J. **Prenatal immune activation in rats and adult exposure to inescapable shocks reveal sex-dependent effects on fear conditioning that might be relevant for schizophrenia**. *Psychiatry Res*. 2024 Dec;342:116219. DOI: 10.1016/j.psychres.2024.116219.

Highlights

In 2024, the group made important scientific contributions spanning clinical, translational, and basic neuroscience research. Several peer-reviewed articles were published in high-impact journals, new research collaborations were established, and both doctoral and clinical training milestones were achieved.

A highlight of the year was the publication of a large-scale individual patient data meta-analysis in *Brain, Behavior, and Immunity*, exploring cerebrospinal fluid (CSF) alterations and blood-CSF barrier (BCB) dysfunction in recent-onset psychosis. The study revealed a potential sex-specific association between BCB disruption and symptom severity, underlining the relevance of neuroinflammatory markers in schizophrenia-spectrum disorders. Another publication in Psychiatry Research presented an animal model study on prenatal immune activation and stress, identifying sex-dependent abnormalities in fear conditioning, with implications for schizophrenia vulnerability mechanisms.

Furthering the focus on biomarkers, a study by Lourdes Villegas et al., published in *Psychoneuroendocrinology*, examined inflammatory ratios in bipolar disorder type I. Results showed that the monocyte-to-HDL ratio (MHR) had predictive value for disease presence and identified an association between lithium treatment and elevated inflammation-related indices, contributing to the field of psychoneuroimmunology.

In clinical research, preliminary results from the GEPI-BIOPSY project were presented at the XXVII Congreso Nacional de Psiquiatría in San Sebastián. The study linked proteomic biomarkers involved in cellular migration and extracellular matrix regulation with cognitive performance in early psychosis, supporting the search for mechanistic pathways and novel therapeutic targets.

The group was also recognised in competitive research environments. Rosa Hernández Ribas received an award at the same national congress for her project comparing the effects of long-acting risperidone and paliperidone on prolactin levels and sexual side effects. This project reflects growing interest in optimizing antipsychotic tolerability profiles in routine care.

The year also marked academic achievements in doctoral training. Marta Llorens Capdevila successfully defended her PhD thesis titled “Influence of Stress Biomarkers on Cognitive Performance in Adolescents with ADHD”, conducted at Universitat Autònoma de Barcelona. Her work contributed to the understanding of physiological stress responses and cognitive functioning in neurodevelopmental disorders.

IGTP affiliated groups

Barcelona Institute for Global Health (ISGlobal)

Consorci Sanitari del Maresme (CSdM)

Fundació Lluita contra les Infeccions

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Fundació Institut Guttmann

Institut Català d'Oncologia (ICO)

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