



Annual Report **2021** SUMMARY

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Annual Report

2021

SUMMARY



Dr. Joan X. Comella

VHIR's Director

Editorial

In 2021 we were still in the middle of the Covid Pandemic and it affected our activity considerably, like in the previous year. 2021 has been the best scientific year in VHIR's history. We have published profusely and with great quality. We have nearly reached a 7 point average index impact in our publications and for the first time, we beat the 11,000 mark in our global impact factor. Obviously, a lot of these studies were Covid-related. In fact, we have participated in numerous clinical studies, including the one developing the Hipra vaccine in Catalonia.

But let me talk about what is most important: let's talk about people. Let's talk about people from the point of view of our researchers. Last year we renewed the accreditation for Human Resources Strategy for Researchers by the European Union, which is given to us as an institution which is committed to the highest quality standards in terms of human resources and therefore also those related to research. Also in this context, Vall d'Hebron has established close collaboration with research conducted in primary care by the Catalan Health Institute incorporating 9 primary care research groups working together with our groups.

Our researchers obtain a great deal of funding from international and local public authorities and we co-develop drugs with the pharmaceutical industry. But in particular, it is very important that there are anonymous people who want to collaborate with us becoming 'Amics de la Recerca de Vall d'Hebron'. For the first time in the history of Vall d'Hebron, we have over 5,000 Amics, providing contributions totaling over a million euros a year, allowing us to do things which would otherwise undoubtedly be impossible.

Last year, for six months, I had the honour of being one of the hosts and promoters of the initiatives of the European University Hospital Alliance, created five years ago, in 2017, at Vall d'Hebron Campus with the Karolinska Hospital. This alliance led us to join a club whose members include nine of the best hospitals in Europe. Hospitals that are academic, university hospitals, committed to working towards improving healthcare in our areas and exporting this globally.

This is what gives our work, meaning: working to improve quality of life for our fellow citizens. I believe that this long-term vision in every sense, long-term collaborations, long term ambition to cure disease, is what makes us different. This is what should make us feel proud and work harder and better every day to combat disease and improve our society.



Our Research

Areas and Groups



Oncology

Overview

In 2021, the Area has been composed by nine groups addressing main unsolved issues in cancer, covering the fields of child and adolescent cancer, melanoma, gynecology, urology, cancer stem cells and molecular mechanisms of the tumor pathologies, as well as nanomedicine. We work in close collaboration with the corresponding clinical departments at the Hospital. This provides a unique opportunity to tackle the abovementioned pathologies during the entire journey of the disease, from diagnosis (a focus and strength of our Area) to personalized treatment (with important international impact during 2021 in the field of child cancer). Our research in 2021 has been relevant also in the field of the use of nanotechnology in biomedical applications to improve therapeutic strategies and diagnostics. Despite, the COVID-19 pandemic, the Area has kept active at virtual shared activities and ONCO-VHIR seminars and the organization of the World Cancer Day event to get closer to the society. During 2021 in-Campus collaborations with VHIO have been strengthen and internalization of our research has been amplified. It is also noteworthy the shared scientific production in terms of publications between different groups of the Area and the stable collaborations between groups that have consolidated during these period.

Publications

185

TOTAL

1287

IMPACT FACTOR

6.95

AVERAGE IMPACT
FACTOR

Research groups

- Signalling and New Therapeutic Targets
- Drug Delivery and Targeting
- Biomedical Research in Digestive Tract Tumors
- Biomedical Research in Melanoma
- Translational Research in Child and Adolescent Cancer
- Biomedical Research in Cancer Stem Cells
- Translational Molecular Pathology
- Biomedical research in Urology
- Biomedical Research in Gynecology

Vascular Biology and Metabolism (VAM)

Overview

The VAM area was created to allow a comprehensive, cooperative and multidisciplinary approach in basic, clinical and epidemiology research. The ultimate goal is the innovation and transfer of solutions in a group of diseases that are closely interrelated and that constitute the leading cause of morbidity and mortality in the world: cardio-cerebrovascular disease, diabetes-metabolic syndrome and renal impairment. The VAM area includes preclinical and clinical research staff from our center, and collaborative work with groups of the highest international prestige. VAM area includes 8 groups: Cardiovascular Pathology, Diabetes and Metabolism, Nephrology, Ophthalmology (focused on retinal vascular disease), CIBBIM-Nanomedicine and Kidney Physiopathology, Medical Molecular Imaging, Neurovascular Diseases, and Research on Aging, Frailty and Transitions in Barcelona. All groups use an integrative tridimensional approach to generate knowledge on the mechanisms of diseases to generate new diagnostic and therapeutic tools.

Publications

340

TOTAL

2180

IMPACT FACTOR

6.41

AVERAGE IMPACT
FACTOR

Research groups

- Diabetes and Metabolism
- Research on Aging, Frailty and Transitions in Barcelona
- Medical Molecular Imaging
- Ophthalmology
- Kidney physiopathology
- Neurovascular Diseases
- Nephrology and Kidney Transplant
- Cardiovascular Diseases

Neurosciences

Overview

The Neuroscience area is consolidating its position as one of the largest clusters of research labs working on neurological diseases across Europe. At present, the area comprises 14 groups with more than one hundred fully dedicated researchers in close contact with top clinicians in the hospital. These research groups pursue a better and multifaceted understanding of the etiopathogenic mechanisms underlying a large variety of mostly adult but also pediatric neurological disorders including stroke, multiple sclerosis, Alzheimer's disease, Parkinson's disease, primary headaches, epilepsy, neuromuscular disorders, and also neurosurgical and psychiatric pathologies. The area also integrates groups involved in neuroimaging, analysis and interpretation of high-throughput data, and gene therapy strategies to target inflammatory and neurodegenerative neurological conditions.

Publications

377

TOTAL

2687

IMPACT FACTOR

7.13

AVERAGE IMPACT
FACTOR

Research groups

- Research group on Status Epilepticus and Acute Seizures
- Neuroradiology
- Stroke Research
- Gene Therapy at Nervous System
- Clinical and Translational Bioinformatics
- Peripheral Nervous System
- Headache and Neurological Pain
- Cell signaling and Apoptosis
- Neurodegenerative Diseases
- Neurotraumatology and Neurosurgery Research Unit (UNINN)
- Clinical Neuroimmunology
- Pediatric Neurology
- Psychiatry, Mental Health and Addictions
- Neuromuscular and Mitochondrial Pathology

Infectious Diseases

Overview

The Infectious Diseases research area is composed by eight groups, whose main goal is to develop strategies to diagnose, control, prevent and solve clinical problems caused by infectious diseases agents. The members of this group also work in the characterization of the mechanisms of pathogenicity and antimicrobial resistance of microorganisms, in the research of critical care and sepsis as well as in aspects related to children's infectious diseases and primary immunodeficiencies. During 2021, we have additionally continued developing basic, translational and clinical research in the field of the COVID-19 infection, including the virus characterization, the study of the mechanisms of pathogenesis, the diagnosis, the epidemiology, the prevention of the disease and the therapeutics and management options to improve the outcome of the patients suffering this infection.

Publications

327

TOTAL

2367

IMPACT FACTOR

7.24

AVERAGE IMPACT
FACTOR

Research groups

- Diagnostic Nanotools
- Pharmacokinetic Nanoparticles
- Epidemiology and Public Health
- Infection in Immunocompromised Pediatric Patients
- Shock, Organ Dysfunction and Resuscitation
- Clinical Research/Innovation in Pneumonia & Sepsis (CRIPS)
- Microbiology
- Infectious Diseases

Digestive and Liver Diseases / Nursing

Overview

The Digestive and Liver Diseases / Nursing research area is composed by three groups, whose main goal is to develop basic and translational studies on the most frequent and impacting digestive and liver disorders afflicting the general population. In particular, the group of Physiology and Pathophysiology of the Digestive Tract integrates investigations on the function of the gastrointestinal tract including secretion, motility and absorption with cellular, molecular, immune and genetic aspects and their interactions with the microbiota and the brain-gut axis. The Liver Diseases Group deals clinical and basic research in viral hepatitis, liver cirrhosis, liver cancer and also non-alcoholic fatty liver disease and their complications. Finally, our area includes the Multidisciplinary Nursing Research Group which aims to generate knowledge in the specific area of activity of nurses and collaborate with other health professionals to improve care given to patients.

Publications

144

TOTAL

1148

IMPACT FACTOR

7.97

AVERAGE IMPACT
FACTOR

Research groups

- Multidisciplinary Nursing Research Group
- Physiology and Pathophysiology of the Digestive Tract
- Liver Diseases

Immunomediated Diseases and Innovative Therapies

Overview

The Immunomediated Diseases and Innovative Therapies is a heterogeneous area composed by both translational and clinical research groups which cover fields such as immunology, respiratory and systemic diseases, pharmacology, clinical biochemistry, rheumatology, advanced therapies or transfusional medicine. Its main strength derives precisely from this heterogeneity and the complementarity of the scientific interests and expertise of the different groups, many of which are currently joining efforts and synergizing in a variety of collaborative research projects.

Publications

315

TOTAL

2256

IMPACT FACTOR

7.16

AVERAGE IMPACT
FACTOR

Research groups

- Donation and transplantation of organs, tissues and cells
- Clinical Biochemistry
- Rheumatology
- Transfusional Medicine
- Gene and Cell Therapy
- Clinical Pharmacology
- Translational Immunology
- Systemic Diseases
- Pneumology

Research in Surgery

Overview

The area of Research in Surgery includes more than 50 investigators distributed in five groups of research focused respectively on general and thoracic surgery, cranio-maxillofacial surgery, spinal disorders, skeletal reconstructive surgery and musculoskeletal tissue engineering. Their activity combines basic and clinical research together with robotics and virtual surgical planning. Their aims are to advance in the understanding of the causes and mechanisms underlying surgical pathologies, to deliver new knowledge and better integrated patient-centered solutions, improving surgical care and outcomes.

Publications

137

TOTAL

692

IMPACT FACTOR

5.05

AVERAGE IMPACT
FACTOR

Research groups

- Research Group of Physical Medicine and Rehabilitation
- Musculoskeletal Tissue Engineering
- Reconstructive Surgery of the Locomotor System
- General Surgery
- Spine Research Unit
- New Technologies and Craniofacial Microsurgery

Obstetrics, Pediatrics and Genetics

Overview

The Obstetrics, Pediatrics and Genetics area is focused on the research on the congenital malformations and pediatric diseases. The Fetal Maternal Medicine group creates synergies through the combined work of basic science researchers and clinical investigators in the preclinical basis of placental insufficiency complications and congenital heart disease. The Bio-Cell Fetal group, recently incorporated, studies basic pathophysiological mechanisms of fetal and pediatric congenital malformations, while the Growth and Development group does research on pediatric endocrine diseases. There is also a Genetics Medicine group that combines genetic diagnosis and research and is pioneer in Spain.

Publications

82

TOTAL

460

IMPACT FACTOR

5.61

AVERAGE IMPACT
FACTOR

Research groups

- Bioengineering, Cell therapy and Surgery in Congenital Malformations
- Growth and Development
- Genetics Medicine
- Maternal Fetal Medicine

Our Activity

Facts and Figures



Human Resources

In April 2015, the Fundació Hospital Universitari Vall d'Hebron – Institut de Recerca (VHIR) was recognised with 'HR Excellence in Research' accreditation by the European Commission (also known as HRS4R). Once the European Commission (EC) validated our Action Plan 2021-2024, in October we were evaluated and we received confirmation that VHIR has renewed the HRS4R Seal for the next 3 years.

Maintaining this Seal is an opportunity to continue improving as an institution and carry on aiming for excellence. This strategy provides a framework in which VHIR can build an attractive and researcher-oriented working environment.

VHIR's commitment to this strategy is in line with our institutional Strategic Plan, which clearly embeds the HRS4R as one of its key topics.

1828

Total Staff

962

Research Staff

65%

% Woman Staff

Publications

1641

Number of publications

11375

Total Impact Factor

40.5%

% Publications leadership

Research projects and networks

During 2021, the Projects Unit has provided a service to the research community in the preparation and application of a total of 611 grants, of which 495 through national calls, and 116 with international calls.

The total amount granted through competitive projects was 19,167,715.99 euros, being the second best year in the history of the VHIR.

150

New Project & HR grants

17.98M€

Grants funding

411

Ongoing projects

Clinical Studies

Clinical studies are our business strategy to bring the newest approaches, both in diagnostic and therapeutic techniques, to our patients. With this goal in mind, we have been working to increase our capacity to face a higher number of clinical trials, even more complex, growing in the last five years, from 1000 to almost 2000 last year in the whole Vall d'Hebron Campus (VHIR and VHIO). More than 1000 participants were enrolled in 2021 at VHIR clinical studies.

More than a half of these trials were in early phases, phase one or phase two. Clinical trials allow us to reach pharma industry confidence in very critical projects, to get a very high an immediate impact on patient life and health, and to give back society with transparency and credibility.

227

New clinical studies

849

Active clinical studies

1067

New patient inclusions

Innovation

During 2020-2021, the work of the Innovation Unit intensified and bore fruit with the creation of 4 spin-offs (Nora, Frontwave Imaging, Tesai and Manina Medtech). To reach this point, it is important to highlight the in-depth work of recent years to professionalize the team and bet on a strategy of valorization and transfer of knowledge that has culminated in the deployment and consolidation of its own incubation model, which already proves competitive, efficient and successful.

VHIR's model of valorisation and technology transfer involves having talent and knowledge, being skilled and efficient in using in each case the strategy that is most effective or that is optimal for the occasion. The creation of spin-offs and start-ups is one strategy to commercialise this knowledge. But there are more, such as licensing the innovation model.

30%

% Licensed Patents

4

Spin-offs/
start-ups approved

2.54M€

Revenue from
Innovation



MANINA MEDTECH
Boosting IVF Success

✦ Nora



Economic Summary

45.65M€

2021 Income

38%

Public funds

62%

Private funds

Core Facilities

101

LAS active procedures

21

ESU active procedures

67

PIP active projects

68

Biobank projects with samples

9814

UAT services performed

343

USIC active clinical trials

244

UEB total services

62

ARO active studies

LAS: Lab Animal Service. **ESU:** Experimental Surgery Unit. **PIP:** Preclinical Imaging Platform.

UAT: High Technology Unit. **USIC:** Clinical Research Support Unit. **UEB:** Statistics And Bioinformatics Unit.

ARO: Academic Research Organization

Trustees



Public funding

ACCIÓ



Collaborators





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