Annual Report 2021

imed

Research Institute for Medicines

No Breakthrough is too small.

2020 --- 2021





No break --through is too small. * Contents

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Communication & dissemination of results

Outreach activities

Foreword

message from the coordinator

JOÃO GONÇALVES

Coordinator, imed

Based at the Faculty of Pharmacy of the Universidade de Lisboa but on a world-wide mission to spur medicine innovation, a group of scientists and students who believe that by overcoming micro challenges we may advance health sciences for the benefit of our community. Welcome to the Research Institute for Medicines (imed), a research unit funded by Fundação para a Ciência e Tecnologia, where *no breakthrough is too small.*

2021 marked a new beginning for the imed. During this year, the institute architecture was completely reformulated to better address the most pressing challenges of modern health sciences. The restructuration plan, aimed to better integrate science, technology and translation, to advance health sciences for the benefit of all. With this vision, imed activities were centred around three main research hubs that are expected to promote and advance our discoveries, through a diverse and highly collaborative research environment.

The scientific, technological and translational hubs were built around the collaborative activities of 30 new research laboratories, established across the fields of chemistry, biology, biotechnology, and pharmaceutical sciences. With the assistance of our new Scientific Advisory Board, the research ecosystem was shaped by promoting the institute most talented young investigators, and by combining their energy and integrating their knowledge within the science of imed's well-established Principal Investigators (PIs).



Together, we hope to create an exciting environment to educate new generations of scientists, and to make fundamental discoveries that can be translated into applied research.

The restructuration plan was consolidated by rebranding imed's image, with the creation of a special programme of internal grants, and with the acquisition of state-of-the-art equipment to support the installation and development of the new laboratories. The institute post-graduate students were also actively engaged in the process and, among other actions, organized a meeting in which all PIs showcased their research lines and objectives within imed.

The COVID-19 outbreak severely limited the institute activities, in particular the interaction and exchange of knowledge between our community. To overcome these restrictions, we initiated a series of online seminars featuring imed researchers and eminent international scientists in their fields. Furthermore, we started a series of joint seminars with international institutions that became excellent forums to learn, establish new collaborations and disseminate our science.

In 2021, imed scientistis sucessfully secured competitive funds, despite the difficult financial circumstances. Institutional funds increased by 20%, compared with the budget of 2020, and reached a global value of 3.7 MEuros. These positive numbers were possible because our scientists were particularly successful in securing funds through both national and international competitive calls, as well as from projects with industry and contracted research services. During this year, we published 240 papers and initiated the supervision of 273 master students, and 40 new PhD students.

This year witnessed the launch of a new imed, a research institute where scientists collaborate daily to develop pioneering tools and techniques to prevent, detect and treat complex human diseases. A new centre that establishes strong alliances with industrial partners and the healthcare sector to translate knowledge to society.



1. imed Organization

imed Structure Scientific Advisory Board

imed Structure

Our multidisciplinary research unit comprises 147 researchers that maintain 30 research laboratories covering the fields of chemistry, biology, biotechnology, and pharmaceutical sciences. The laboratory leaders, are responsible for electing the institute coordinator and for supervising the executive board (EB) activities. The EB has a critical role in setting the culture and values of the institute. The EB is responsible for overseeing the daily activities of imed and for ensuring the execution of the initiatives proposed in the strategic plan. The EB is coordinated by João Gonçalves that is the main contact point between imed researchers, our host institution (FFUL) and Fundação para a Ciência e Tecnologia. The coordinator is assisted by Adelaide Fernandes, Helena Florindo, Rui Castro, and Pedro Góis who are responsible for coordinating the different research hub activities, for articulating with imed's postgraduate students commission (ipSC) and for assuring the institute training, communication and outreach activities.



Scientific Advisory Board

imed's scientific advisory board is constituted by eminent international scientists to ensure that our strategic direction is in the best interest of science and society.



PROF. RONIT SATCHI-FAINARO

Head, Cancer Research and Nanomedicine Laboratory The Hermann and Kurt Lion Chair in Nanosciences and Nanotechnologies, Director, Cancer Biology Research Center Full Professor at the Department of Physiology and Pharmacology Faculty of Medicine, Sagol School of Neuroscience, Tel Aviv University, Israel



PROF. NUNO MAULIDE

Full Professor of Organic Synthesis at the University of Vienna and adjunct PI at CeMM



Global Head and SVP Neuroscience, Immunology, Ophthalmology, Infectious and Rare Diseases at Roche



PROF. NADIM BOU-HABIB Lecturer at the Nova School of Business and Economics



2. Scientific Structure

Research Hubs imed Laboratories

Research Hubs & Laboratories

imed's research model is supported by 30 laboratories that integrate distinct perspectives and tools of disciplines across the fields of chemistry, biology, biotechnology and pharmaceutical sciences to tackle key scientific questions in health sciences. The focus of our institute is to discover molecules, molecular mechanisms and technologies that can be translated into breakthrough healthcare solutions. Our laboratories have diverse interests and are flexible workspaces that share knowledge and instrumentation to foster interaction and innovation. Therefore, our capacities cover a wide range of research activities that support our **Scientific, Technological and Translational Hubs.**

Scientific Hub

- Oncology
- Neurodegenerative disorders
- Metabolic diseases
- Infectious diseases

Technological Hub

- Emerging technologies
- Bioorganic and natural products chemistry
- Medicinal and chemical biology
- Pharmaceutical and biotechnology tools and applications

Translational Hub

- Evidence-based interventions
- Regulatory sciences
- Health care sector
- Pharma industry



Scientific Hub

Within the Scientific Hub, we aim at integrating chemistry, biology , biotechnology, and pharmaceutical sciences to develop pioneering tools and techniques to prevent, detect and treat cancer, neurodegenerative, metabolic and infectious diseases.

Oncology

In the field of oncology, we work to provide innovative solutions to cancer patients through disruptive advances in fundamental scientific discoveries, guided by a deeper understanding of the molecular basis of this disease. This advanced knowledge drives imed drug discovery program towards the identification of druggable targets that fuel cancer progression. imed cancer research program integrates biochemistry, molecular/cell biology and immunology with chemistry, nanotechnology and biotechnology to translate this fundamental knowledge into novel tools for cancer diagnosis, prevention and therapy.

Leading Laboratories:

- Drug Delivery & Immunoengineering
- Neurovascular
- Natural Products Chemistry
- Medicinal Organic Chemistry
- Computational Medicinal
 Chemistry

Neurodegenerative disorders

In the field of neurodegenerative disorders, we are studying diseases like Alzheimer, Parkinson, Amyotrophic Lateral Sclerosis or Multiple Sclerosis, characterized by the progressive degeneration of the structure and function of the central nervous system. Although neurodegenerative diseases are typically defined by specific protein accumulations, regional vulnerability and parenchyma atrophy, these disorders share many fundamental processes associated with inflammation, glial reactivity, neuroimmune interactions and progressive neuronal dysfunction. Therefore, we seek to understand the molecular basis of central nervous system pathogenesis, guiding the rational development of innovative therapeutic approaches for these diseases. Our strategy brings together neuroscientists, biophysicists and chemists to identify novel mechanisms driving disease onset and progression, and to envision new treatments.

Our long-term vision encompasses the identification of novel, early biomarkers for pre-symptomatic disease diagnosis; the discovery of new targets for pharmacological intervention; as well as innovative strategies to prevent disease occurrence.

Leading Laboratories:

- Central Nervous System, Blood and Peripheral Inflammation
- Neuroinflammation, Signalling & Neurodegeneration
- Stem Cell Bioenergetics & Neurodegeneration
- Toxicology, Biomarkers & Risk
 Assessment

Metabolic diseases

In the field of metabolic diseases, we recognize the role of metabolism in many different human diseases by affecting the ability of cells to perform critical biochemical reactions that involve the processing or transport of proteins, carbohydrates or lipids. Therefore, we are studying rare inherited diseases and probing novel molecular targets involved in cell function to develop innovative therapeutics for metabolic disorders underlying diabetes, cancer and liver diseases. We perform biochemical and biophysical characterization of enzymes, transporters and channels involved in metabolic pathways, and employ innovative molecular biology techniques upon cellular and animal models of metabolic

diseases to identify novel mechanisms of disease pathogenesis that can translate into druggable biological targets. Benefiting from our ties with the pharma industry, we further synthesize and screen putative drugs for identified targets, while working towards the development of novel medical devices with the same goal.

Leading Laboratories:

- Cell Function and Therapeutic
 Targeting
- Membrane Transporters in Health
 & Disease
- Metabolism, Genetics and Proteins in Health & Disease
- Liver Disease Diagnostics and
 Therapeutics

Infectious diseases

In the field of infectious diseases, we work to gain insights into the mechanisms of infection associated to existing and emerging threats, aiming at the development of multipronged approaches capable of targeting hostinfectious agent interaction, while controlling disease progression. We aim to develop effective vaccines and treatments to combat the spread of infectious diseases and to improve clinical care. Our coordinated efforts are directed towards the prevention, early detection, and intervention against public health threats, including malaria, HIV and COVID-19, as well as tuberculosis, fungal and parasitic diseases.

Leading Laboratories:

- Phage Biology Research and
 Infection Control
- Host-Pathogen Interactions
- Pathogen Genome Bioinformatics and Computational Biology
- Bacterial Pathogenomics and
 Drug Resistance
- HIV Evolution, Epidemiology, and Prevention

Technological Hub

Within the Technological Hub, we are highly engaged in translating our advanced scientific knowledge and technologies into breakthrough healthcare solutions that empower societies to live better and healthier. A vibrant network based on strong partnerships between our scientific community, distinct players within pharmaceutical and biotechnology companies and the Healthcare sector transforms innovative research & technologies into useful everyday products and life-saving medicines.

Emerging technologies

In the field of emerging technologies, recent advances in biology offer a deeper understanding of the molecular basis of complex diseases and unique opportunities to accelerate basic research into healthcare. At imed, we are developing emerging technologies based on chemistry, biology and pharmaceutical sciences to facilitate the translation of these findings into new therapeutic options to detect and treat cancer, neurodegenerative, metabolic and infectious diseases.

Leading Laboratories:

- Advanced Technologies for Drug
 Delivery
- Bioorganic Chemistry
- Advanced Cell Models for Predictive Toxicology & Cell-based Therapies
- Molecular Microbiology and Biotechnology
- Pharmaceutical Bioengineering, Biotechnology & Bioproducts
- Chemical Biology
- Medicinal Chemistry

Translational Hub

Within the Translational Hub, we are deeply committed to advance pharmacotherapy innovation by developing disruptive translational research to benefit human health, and by converging our fundamental science discoveries into applied research. This is driven by the joint efforts of imed with multiple players within the Healthcare sector, including policy-makers, clinicians, allied healthcare professionals and people living with illness and their representative organizations and associations.

Leading Laboratories:

- Systems Integration
 Pharmacology, Clinical &
 Regulatory Science
- Pharmacy Practice & Health Communication

Health Care Sector

The provision of healthcare to patients in the form of new drugs, devices or services is invaluable to support a healthier society. imed scientists strive to empower the healthcare sector with knowledge in the areas of health promotion, disease prevention and medicines optimization.

Leading Laboratories:

- Pharmaceutical Care and Clinical Pharmacy
- Pharmaceutical Development

Pharma Industry

The pharmaceutical industry plays a decisive role in unravelling innovative therapeutic options to prevent diseases and cure or alleviate patients. imed researchers have established strong collaborations with national and international pharma industry to advance innovative research & technologies into the market, aiming to improve patient's health and to reduce the social burden of human diseases.

Leading Laboratories:

 Pharmaceutical Engineering and Manufacturing

In line with this program, actions will be intensified to promote interactionbetween the different areas of knowledge and the intramural collaborations, ensuring that all the PIs and groups can participate in each research line within the new Scientific Strategic Project.

imed Laboratories

Central Nervous System, Blood and Peripheral Inflammation

The laboratory focuses on the role of inflammation in the emergence or progression of neurodevelopmental and neurodegenerative disorders. We are particularly interested in the interplay between the Central Nervous System (CNS)-centered neuroinflammation and the inflammatory response derived from the periphery.

Leader: Adelaide Fernandes

Pharmacy Practice & Health Communication

The PhP& HC laboratory aims to deliver scientific evidence and knowledge on the real-life use of medicines and health technologies, from the societal and population levels to the individual perspectives. In particular, it is meant to evaluate the contribution of pharmacists and pharmacy services to the rational use of medicines, including information and communication fluxes.

Leader: Afonso Cavaco

Advanced Technologies for Drug Delivery

Our major challenge is to deliver bioactive entities at cellular and intracellular target sites using advanced technologies, thus developing new delivery systems for clinically relevant situations, based on conventional and innovative materials, exploring invasive and non-invasive administration routes.

Leader: António Almeida

Bioorganic Chemistry

The Bioorganic Chemistry laboratory is focused on the interface of organic chemistry and biology, aiming at the discovery and process intensification of new more sustainable synthetic methodologies that, in collaboration with biomedical laboratories, can be further explored to tackle important biological problems related with infectious diseases, oncology and inflammation.

Leader: Carlos Afonso

Infection Control

Phage Biology Research and

The PhaBRIC laboratory addresses

key biologic questions concerning

the interaction of phages with their

bacterial hosts. As a major research

topic, the lab seeks to understand

the action of phage proteins that

and to explore this knowledge to

develop innovative strategies to

Leader: Carlos São-José

fight antibiotic-resistant bacteria.

disrupt the bacterial cell envelope,

Toxicology, Biomarkers & Risk Assessment

The laboratory works on exposure assessment and environmental occurrence of xenobiotics that are considered worldwide concerns to Environment and Public Health. We study the mode of action of toxicants and drugs to identify new biomarkers to support Human and Environmental Risk Assessment processes and develop innovative technologies and therapies.

Leader: Cristina Carvalho

Neuroinflammation, Signaling and Neuroregeneration

The laboratory focuses on neurodevelopmental disabilities, genetic susceptibilities, neuroinflammation and ageing causing homeostatic imbalance and predisposing to neurodegeneration. We investigate how glial phenotypes, neuro-immune deregulation, and paracrine distress lead to disease onset/progression. We aim to identify early biomarkers for non-invasive diagnosis, generate patient-specific stratification tools for disease modelling, and improve healthcare.

Leader: Dora Brites

Cell Function and Therapeutic Targeting

We investigate novel mechanismbased molecular targets to inform drug discovery and biomarker development in inflammation, degenerative and oncogenic diseases. We specifically address cell signalling and the crosstalk with metabolism and interorgan communication, integrating cellular and molecular technologies with multiple preclinical and patientderived models and samples to facilitate the translation from bench to bedside.

Leader: Cecília Rodrigues

Host-Pathogen Interactions

The understanding of how pathogens interact with their hosts is providing the basis for the development of novel therapeutic approaches as well as a number of very sophisticated tools for probing basic aspects of cellular physiology and immunology. As a result, we are beginning to define not only the molecular details of the host pathogen interactions but also potential targets to be manipulated from the host and the pathogen sides. Mycobacterium tuberculosis and other mycobacteria, HIV, Influenza virus. SARS-CoV-2 and other emerging viruses are target pathogens. The group offers expertise to assess the anti-microbial activity of new compounds targeting all these pathogens.

Leader: Elsa Anes

Pharmaceutical Care and Clinical Pharmacy

The laboratory focuses on education, research, and implementation of advanced pharmaceutical care, encompassing health promotion, disease prevention and medicines optimization. Specific topics include medication adherence and medication review, early identification of suspects of noncommunicable diseases (NCDs), health promotion through pharmacy-based interventions, and development of services to manage inappropriate use of medication.

Leader: Filipa Alves da Costa

Pathogen Genome Bioinformatics and Computational Biology

The laboratory focuses on genomic studies based on genome sequencing and application of computational and bioinformatics approaches, as well as computation-driven experimental approaches, to comprehend the evolution, epidemiology, virulence, population level genomic variation and phylogeography of pathogens.

Leader: Filipa Vale

Membrane Transporters in Health & Disease

Our group investigates membrane transport proteins in living organisms and their potential as new biomarkers and drug targets. We identify mechanisms of regulation and dysfunction leading to disease and discover chemical compounds as modulators, characterizing kinetics and pharmacological potential for therapeutics of metabolic disorders, inflammation and cancer.

Leader: Graça Soveral

Drug Delivery & Immunoengineering

Our research is focused on the characterization of the mechanisms of cellular dynamics, cross-talk and networks, to identify new targets that will guide the engineering of translational nanotechnology-based systems for drug delivery, imaging and immunotherapy in specific clinically relevant situations (cancer, inflammation, infectious and genetic diseases).

Leader: Helena Florindo

Pharmaceutical Development

The activities of this specialized group are divided into three main research topics: a) Development of innovative and sustainable drug delivery systems (DDS) and technologies, to be used in theprevention of diseases and optimization of treatments (cosmetics, medical devices and medicines); b) Characterization of the target quality product; c) Safety and efficacy studies – from lab to society.

Leader: Helena M. Ribeiro

Bacterial Pathogenomics and Drug Resistance

Our research activity is focused on the molecular epidemiology, clinical impact of strain diversity and laboratory diagnosis of infectious diseases caused by bacterial pathogens, namely, mycobacteria and Gram-negative pathogens. Moreover, we also focus on the translation of genomic diversity and in-depth knowledge of resistance mechanisms towards development of novel products and computational tools.

Leader: Isabel Portugal

Advanced Cell Models for Predictive Toxicology & Cell-based Therapies

We are composed of a multidisciplinary research team, with expertise in cell/ tissue engineering, regenerative medicine, toxicology and cancer pharmacology, focused on the use of advanced (3D) in vitro models as tools for developing new cellbased therapeutics and studying drug metabolism and mechanisms of diseases (ex.: liver diseases, skin pathologies, lung cancer).

Leader: Joana Miranda

Pharmaceutical Engineering and Manufacturing

The PhEMLab is focused on the underpinning sciences related with the design, optimization and manufacturing of bulk pharmaceutical dosage forms. The PhEmLab is oriented for pharmaceutical materials characterization (solid-state), particle engineering, drug products manufacturing process development (including continuous and 3D printing), modelling and advanced realtime high-throughput monitoring. The PhEMLab operates in strong collaboration with the pharmaceutical industry.

Leader: João Almeida Lopes

Molecular Microbiology and Biotechnology

To tackle disease unmet needs, the Molecular Microbiology and Biotechnology laboratory aims to develop new strategies of antibody engineering and synthetic biology for the advance of new biopharmaceuticals by interrogating the immune humoral and cellular responses in infectious diseases and biologic therapies.

Leader: João Gonçalves

Systems Integration Pharmacology, Clinical & Regulatory Science

Our group aims to support integrative systems pharmacological research focusing in developing innovative pharmacological tools to be used both in a non-clinical and clinical development pipeline, while predicting and modelling preventive or therapeutic clinical effects in a translational approach, profoundly anchored in state-ofthe-art principles and guidance of Regulatory Science.

Leader: João Rocha

Neurovascular

The Neurovascular laboratory focuses on the blood-brain barrier in Neuropathology as a source of peripheral biomarkers reflecting brain dysfunction, a target for modulation to prevent disease onset and progression, and an obstacle to overcome in achieving therapeutic concentrations in the brain for treatment of neurological disorders.

Leader: Maria Alexandra Brito

Pharmaceutical Bioengineering, Biotechnology & Bioproducts

PharmaBB aims at developing innovative research, exploring bioengineering & biotechnology, to disease prevention, health promotion and well-being. Our group brings together different areas of expertise, contributing to achieve a higher knowledge based on the manufacturing of bioactive compounds using green technologies, biofabrication of (bio)materials and gene/drug delivery platforms towards (bio) therapeutics (against infectious, cancer or neuroprotection), medical devices, biomedical and food applications.

Leader: Maria H. Ribeiro

Natural Products Chemistry

The Natural Products Chemistry group is focused on the identification and development of novel hit/lead-drug candidates from natural sources though both isolation and molecular derivatization of novel bioactive chemical scaffolds from plants.

Leader: Maria José Umbelino Ferreira

Natural Products Chemistry

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Leader: Maria José Umbelino Ferreira

Medicinal Organic Chemistry

Our research is focused on the design and synthesis of small molecules for relevant therapeutic targets. To achieve these goals, novel chemical methodologies are developed and applied to library synthesis, while focusing on structure-activity relationships, metabolic stability studies and identification of the possible metabolites for the most promising leads.

Leader: Maria M. M. Santos

HIV Evolution, Epidemiology, and Prevention

Our main areas of activity are: a) Epidemiology, drug resistance and evolution of HIV, HCV and HBV; b) HIV-2 infection (diagnosis, pathogenesis, natural history, neutralizing antibody response); c) Design and pre-clinical evaluation HIV vaccines and microbicides; d) Design and pre-clinical evaluation of antiviral drugs.

Leader: Nuno Taveira

Metabolism, Genetics and Proteins in Health & Disease

Our research lies at the interface of cell metabolism and gene expression. We focus on molecular genetics and alterations in metabolic pathways or enzyme structure/function in response to drugs, gene variants and disease states. Our studies range from basic biomedical research to translational areas addressing personalized medicine for better diagnosis, prognosis and therapies.

Leader: Paula Leandro

Chemical Biology

Chemical biology offers unique possibilities to rationally manipulate biological processes and will most certainly play a major role in unravelling solutions for current unmet medical needs. Broadly our laboratory is focusing on discovering innovative chemical technologies that permit the construction of functional molecules, and on applying these technologies to the construction of therapeutic bioconjugates and small molecule probes.

Medicinal Chemistry

We design molecules and develop technologies to cure human diseases and accelerate drug discovery. Our research programme uses chemistry-centric approaches to interrogate biological systems and to modulate target-ligand interactions that underlie infection, cancer, and neurodegenerative disorders.

Leader: Rui Moreira

Leader: Pedro Gois

Computational Medicinal Chemistry

We design and apply protocols and computational algorithms to gain insight into biological and chemical systems with pharmacological importance and use this knowledge to rationally design and repurpose new potential therapeutic agents that can contribute to the treatment of human diseases. We use a vast range of methods, such as virtual screening, docking, homology and pharmacophore modeling, molecular dynamics, quantum chemistry, cheminformatics and machine learning.

Leader: Rita Guedes

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Liver Disease Diagnostics and Therapeutics

We study the role of microRNAs and other modulators of gene expression in liver disease pathogenesis, while exploring their use in disease diagnosis, treatment, monitoring and prevention.

Leader: Rui Castro

Stem Cell Bioenergetics and Neuroregeneration

Our lab is interested in understanding and exploiting the contribution of bioenergetics to neural stem cell fate in the adult brain. By bridging areas of stem cell biology and metabolism, we aim to discover checkpoint mechanisms and promising molecules capable of improving the neuroregenerative potential of these cells throughout adulthood.

Leader: Susana Solá

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3. imed Training Structure

Undergraduate course Master program Doctoral students Committed with the training of the next generation of scientists working at the interface of chemistry, biology and pharmaceutical sciences, imed researchers provide extensive training activities for undergraduate and graduate students, in addition to post-doctoral scientists.

Undergraduate students

Most of imed researchers participate in the teaching activities of the department of Pharmaceutical Sciences and Medicines; and department of Pharmacy, Pharmacology and Health Technologies at the Faculty of Pharmacy, Universidade de Lisboa. In this context, teaching activities of imed researchers are spread over the many different disciplines of the Integrated Master's in Pharmaceutical Sciences. Furthermore, most of imed laboratories offer positions for undergraduate students. In 2021, 28 undergraduate students initiated their scientific careers in imed laboratories.

Master students

imed scientists are also responsible for most of the faculty master courses. This involvement encompasses teaching of individual courses and the supervision of thesis. In 2021, 99 master students concluded their studies under the supervision of imed scientists.

Over this year, imed scientists coordinated the following masters courses that were attended by 275 students.





- Food Quality and Health
- Medicinal Chemistry and Biopharmaceuticals
- Pharmaceutical Engineering

Laboratory Medicine

Coordinator: Maria Cristina Marques

The Master in Laboratory Medicine aims to provide a solid and up-todate training in different scientific domains of the clinical analysis, guaranteeing a comprehensive laboratory component to confer skills for the achievement of laboratory techniques applicable to the prevention, diagnosis and monitoring of the disease, as well as to ensure a professional specialization.

This course further promotes the academic training necessary to follow studies of higher cycle in different scientific areas of the clinical analyses.

Biopharmaceutical Sciences

Coordinator: Cecília Rodrigues

This course offers a multidisciplinary approach to understanding the discovery phase of drug development. Students will learn about molecular mechanisms of disease, biomarkers, therapeutic targets, and cutting-edge therapeutic strategies. The program includes real-world scenarios and hands-on experience, with expert instructors and collaborations with R&D units in academia and beyond. The course prepares students for a career in the biopharmaceutical field and offers the opportunity to be part of a community dedicated to improving global health.

Food Quality and Health

Coordinator: Maria Eduardo Figueira

This course aims to contribute to the acquisition and / or updating of professional and scientific skills in the area, in order to improve the Quality and Food Safety in Portugal, indispensable in the guarantor of public health, in line with the requirements of the European Community.

Medicinal and Biopharmaceutical Chemistry

Coordinator: Maria José Umbelino

Pharmaceutical Chemistry, a core subject of Pharmaceutical Sciences, is essential for a comprehensive understanding of the drug discovery and development pathway. Named Medicinal Chemistry in the Anglo-Saxon and Northern Europe and Pharmaceutical Chemistry in the countries of southern and central Europe, it is internationally recognized as a transversal subject able to integrate many knowledge areas as Chemistry, Biology or Pharmacology, aiming at the development of new therapeutic agents based on their mechanisms of action and molecular targets.

Pharmaceutical Engineering

Coordinator: António Almeida

The Master in Pharmaceutical **Engineering aims to train** professionals with competence in the most modern tools for the design and operation of processes for manufacturing, managing and quality control of the product throughout its life cycle (including active substances of chemical or biological origin, drug products and health products) and capable of contributing significantly to technological innovation, improvement of industrial competitiveness and leadership in certain pharmaceutical areas, as well as to the resolution of public health problems in current or emerging therapeutic areas.

Advance Cosmetology

Coordinator: Helena Margarida Ribeiro and Joana Marto

The Master in Advance Cosmetology covers a general view of cosmetics, from regulation aspects to the development, production, control, and counselling for all categories of these products. It is a sector of high economical value and high technical-scientific and regulatory complexity, which involves researchers, manufacturers, users, and regulatory entities, and with an important role in the healthcare. The objective is to prepare students for the skills demanded by the society: teamwork, selection knowledge, relate and summarize information, critical and initiative skills in problem solving. Thus, the learning allows diversifying and adapting strategies, putting the students in cognitive contexts appropriate for the proposed objectives.

Regulation and Evaluation of Medicines and Health Product

Coordinator: Maria Beatriz da Silva Lima

This course aims to increase knowledge of all the regulatory aspects, laws, and directives, and science based approaches to the marketing Authorization in the European Union for Medicinal Human Medicines and Veterinary Medicines. Furthermore, this course includes legislation in Health Products based on Medicinal Plants, Medical Devices as well as patent laws, price regulations and others.

Doctoral students

imed scientists contribute intensely for the PhD in Pharmacy at the Faculty of Pharmacy, Universidade de Lisboa, with the direct supervision of PhD candidates and with the organization of post-graduate courses. In 2021, imed scientists recruited 40 new PhD students and 8 concluded their studies. In 2021, 146 students were enrolled in the PhD program at the Pharmacy Faculty, funded by FCT (92) and other schemes that include collaborations with the industry and patient associations (46).

imed scientists are actively involved in training activities at the post-graduate level and offer the following advanced doctoral programs:



Topical and Transdermal Delivery

Coordinator: Sandra Simões

Laboratory: Advanced Technologies for Drug Delivery

Topical and transdermal drug delivery systems are designed to support the development of new and effective therapeutics. The human stratum corneum acting as a barrier for the permeation of active substances has limited the number of molecules commercially available as transcutaneous delivery systems. Several strategies have been employed over the past few decades to optimize drug delivery across the skin of several poorly permeable compounds. However, passive techniques present limited potential to facilitate the delivery of macromolecules. Topical and transdermal delivery is therefore an area of research with many challenging objectives but also with great opportunities to work envisaging the patient compliance as it refers to a convenient painless non-invasive drug administration route.

Advanced Research Methods in Health and Pharmacy Practice

Coordinators: Afonso Miguel Cavaco; Filipa Alves da Costa

Laboratories: Pharmacy Practice & Health Communication; Public Health & Medicines Use

Pharmacy practice is an area of study within health services research that focuses on the role of pharmacists in promoting the safe and effective use of medicines and medical devices. Therefore, pharmacy practice research studies come to play and can adopt varied formats. resorting to methodologies used initially in epidemiology, including observational and experimental studies, whilst combining these with methods primarily used in the social sciences. These methodologies enable a more person-centred approach to understanding the experience of people living with illness and relying on medication and medical devices to maintain their health and well-being. Gaining in-depth knowledge in health services

research is essential for pharmacy doctorates to develop their research projects by selecting the most appropriate methodologies for reviewing state of the art in their areas of interest, selecting suitable study designs, collecting and analysing data emerging and producing high-quality evidence that supports the advancement of this area of practice.

Redox Signaling and Redox Systems in Health and Disease: implications for drug design and development

Coordinator: Vasco Branco

Laboratory: Toxicology, Biomarkers & Risk Assessment

Redox signalling achieved by reactive oxygen species (ROS) is a key aspect of signal transduction in various cellular processes such as cell death, differentiation and inflammation. However, the line separating redox signalling from oxidative stress is a thin one and redox homeostasis is reliant on the action of redox active systems. These systems are complex arrays of enzymes controlling ROS levels but also the oxidation-reduction cycle of critical protein residues (e.g. cysteines) that enable signal transduction. Disruption of redox signalling has been implicated in the aetiology of several pathologies including cancer and neurodegenerative diseases. Moreover, redox enzymes have very reactive residues (cysteines and selenocysteines) and are, therefore, candidate targets for inhibition by electrophilic compounds, creating opportunities for therapeutic strategies. This Advanced Course approaches these aspects in detail which are of widespread interest for many PhD candidates in Pharmacy.

Advanced Topics in Medicinal Chemistry and Chemical Biology

Coordinator: Rui Moreira

Laboratory: Medicinal Chemistry

The advanced specialization course in Medicinal Chemistry and Chemistry Biology is intended to frame the training of students who have been admitted to the PhD program in Pharmacy. It is a highly flexible programme covering a wide range of courses taught by chemists, pharmacists, biologists and industrial medicinal chemists. It provides a strong foundation in core chemistry, supplemented by specialist knowledge of medicinal chemistry and chemical biology.

Advanced Drug Delivery

Coordinators: António Almeida; Helena Florindo

Laboratories: Advanced Technologies for Drug Delivery; Drug Delivery & Immunoengineering

The Advanced Drug Delivery program, trains students in the development of advanced medicinal products, covering crucial aspects that determine the fate of drugs in the human or animal body, from their fundamentals to the advanced strategies to overcome the physiological barriers, including innovative technological and therapeutic applications. The training program is aimed at PhD students but welcomes the participation of external academic and scientific community members. The course intends to improve PhD students' knowledge in the discovery of potential biotherapeutics, the improvement of production and monitoring of drugs and the translation of these drugs to the clinics.

Advanced Analytical Tools: Multiple Applications for Mass Spectrometry

Coordinator: Maria Rosário Bronze; Noélia Duarte

Laboratory: Natural Products Chemistry

Mass Spectrometry (MS) is an advanced analytical technique that has reached an outstanding position due to its unique characteristics: high selectivity, low detection limits, speed and a large diversity of applications. During the last two decades, MS has progressed rapidly through the advances on ionization methods and mass analysers that have led to the advent of new equipment. This progress has allowed the development of new applications mostly oriented towards health promoting areas such as proteomics, lipidomics, metabolomics, foodomics, drug discovery, pollution control and forensic and toxicological sciences. This course aims to give an overview on basic MS fundamentals and instrumentation highlighting several recent applications.

Course Stem Cell Technologies

Coordinator: Susana Solá

Laboratory: Stem Cell Bioenergetics and Neuroregeneration

Stem cell-based therapies are thriving. In fact, pharmaceutical companies are increasingly investing in stem cell technology to develop innovative and potentially valuable new treatments for severe human diseases, including cancer and neurological disorders, such as multiple sclerosis, Alzheimer's and Parkinson's disease, mood disorders, brain tumours and even stroke. Moreover, although seminal advances have occurred in understanding stem cell biology, further work is still needed to bridge the current gap between stem cell technologies and effective treatments in brainrelated disorders. Stimulating the scientific interest on the topic will certainly accelerate and improve the successful transfer of stem cellbased discoveries from the bench to the bedside.

Molecular Biomarkers and Technologies

Coordinator: Elsa Rodrigues

Laboratory: Cell Function and Therapeutic Targeting

Biomarkers are now an integral part of the drug discovery and development process, acting as indicators of drug mechanism of action, efficacy, safety and disease progression, as well as assisting in disease diagnosis, patient selection and clinical trial design. Biomarkers also offer the potential to inform treatment decisions and bring personalized medicine into clinical practice. Latest advances in clinical and translational biomarkers will be covered, including patient selection and predicting response to therapy, liquid biopsy and cell free DNA, companion diagnostics and personalized medicine, biomarker assay development and validation, and biomarker-based clinical trials. The new frontier of digital health and its impact on drug and diagnostic development will be explored, covering emerging digital biomarkers and their utility in clinical trials, advances in biosensors and wearables as clinical endpoints, integration of mobile health into drug development, and the latest applications in point-ofcare testing and remote patient monitoring.

Pathogen Multiomics and Bioinformatics

Coordinator: João Perdigão

Laboratory: Bacterial Pathogenomics and Drug Resistance

The Pathogen Multiomics and **Bioinformatics advanced course** is structured around six distinct modules that spans the entire spectrum from the introduction to NGS data and quality control to genome-wide association studies applied to different pathogens. While the course comprehends a solid theoretical component that underpins the learning and execution of the different analytical stages in the practical sessions which comprise most of the course. It is intended that the participants apprehend the concepts and fundaments of the analytical procedures that are necessary to translate the large data volumes generated by NGS platforms while systematically consolidating the theoretical basis of this knowledge.

Multidisciplinary Project-based Learning in Pharmacy

Coordinators: André Santos; Isabel Rivera; Maria M.M Santos

Laboratories: Cell Function and Therapeutic Targeting; Bacterial Pathogenomics and Drug Resistance; Medicinal Organic Chemistry

The Multidisciplinary Project-based Learning in Pharmacy course is part of the Doctor of Pharmacy Program, and trains students to embrace new ways of thinking, outside their comfort zone, to generate a new approach to solving a real-world based problem (e.g., a pandemic disease). To achieve this goal, mixed groups of students (with backgrounds in chemistry, biology, or pharmaceutical sciences) will provide the starting point for productive discussions that will culminate in the development of a project capable of answering the proposed problem. Understanding how to integrate multi- and translational disciplines will facilitate students in strengthening their critical thinking, communication skills, and peer networking. The course is a key tool to develop a scientific personality, crucial for any PhD program.

Neuropharmaceutics

Coordinator: Adelaide Fernandes

Laboratory: Central Nervous System, Blood, and Peripheral Inflammation

Neuropharmaceutics focuses on the identification of therapeutic targets in nervous system diseases, and then translating those discoveries into drug and therapy development. Neurological disorders have a crucial impact on our society accounting for increased health costs, while drug development to central nervous system (CNS) disorders represents the second investment priority of the pharmaceutical industry, following cancer. Thus, advances in neuropharmaceutics is a key area for students of a PhD programme aiming to target discovery, drug design, medicine development and usage.



ANNUAL REPORT 2021

4. Resources

Facilities

New equipment

imed research ecosystem is supported by 30 laboratories across the fields of chemistry, biology and pharmaceutical sciences. All research groups benefit from laboratory facilities and shared scientific platforms.

Facilities

imed state-of-the-art facilities and world-class services provide an ideal environment for the discovery and development of new medicines and for generating breakthroughs in health sciences. Our facilities are equipped with the latest equipments and stateof-the-art technologies, allowing us to conduct research and provide services that are at the forefront of modern science. In parallel, we offer a wide range of services, including research and development of new drugs and therapies, advanced imaging and flow cytometry. We are committed to advancing healthcare through innovation, research, and collaboration, and our facilities are open to the scientific and health community, as well as the pharma and industry sector.
Animal Facility

Head: Maria Manuela Gaspar

The Animal Facility supports the discovery and development of innovative medicines for the benefit of humans and animals. This Facility consists of several rooms for animal maintenance with housing capacity of around 500 small rodents (rats and mice) and rooms for experimental procedures (small surgeries and dissections). Metabolic cages are also available. Support rooms are used for cleaning, washing and sterilization of cages and other equipment, food, and bedding. Several rodent models are established and typically available, including models of infection, acute and chronic inflammation, xenograft or metastatic tumors, non-alcoholic fatty liver disease, neurodegenerative diseases as well as biodistribution and toxicity studies. Upon request and contract, these or other animal models may be provided to external entities. The Animal Facility provides technical and scientific support to investigators on protocol development, refinement of experimental procedures, small surgery techniques, and services of husbandry and routine daily care (feeding, watering, and cage changing).

The Animal Facility is licensed by "Direção Geral de Alimentação e Veterinária" (DGAV), the competent national authority responsible for implementing the legislation for the protection of animals for scientific purposes All animal experiments conducted in the Animal Facility are subject to rigorous review and must be previously submitted to the Animal Welfare Board (ORBEA – Orgão de Bem-Estar Animal) at the Faculty of Pharmacy, University of Lisbon (Regulamento 806/2016), and then approved by DGAV. Together, they ensure that research animals are used only when necessary and under humane conditions. Personnel and users are certified researchers for conducting animal experimentation. All procedures are performed according to the EU Directive (2010/63/UE) and Portuguese laws (DR 113/2013, 2880/2015, Portaria 260/2016 and 1/2019).

imed is committed to following the 3Rs, Replacement, Reduction and Refinement, and carrying out research of the highest quality and providing animals used in research with the best care available. Alternatives to animal use, which include computer modeling, cell culture and bacterial systems, are available and used whenever possible.

Cell Culture

Head: Joana Amaral; Rui Silva

Laboratory: Cell Function and Therapeutic Targeting; Neuroinflammation, Signalling and Neuroregeneration

> The Cell Culture Facility comprises dedicated cell culture rooms equipped with the required environment and equipment for a wide range of cell and tissue culture procedures, from maintenance and manipulation of cell lines and tissue samples to cell observation and data analysis. In addition, the facility provides routine mycoplasma detection testing for mammalian cell lines. Consists of laminar flow hoods (Esco, Class II Type A2), CO2 incubators (Hera Cell), inverted microscopes (Zeiss) coupled to an imaging system (Leica), and support equipment (automated cell counter, centrifuges, water baths, refrigerators, freezers). Fluorescence and bright-field microscopes (Zeiss) with dedicated cameras (Leica) and imaging and acquisition systems are available, including an Invitrogen EVOS™ FL Auto 2 fully automated, inverted, multi-channel fluorescence and transmitted light imaging system.

Additional dedicated equipment provides cell analysis high-throughput capabilities with Multidrop Combi Reagent Dispenser (Thermo Scientific) for 6 to 1536-well plates; GloMax®-Multi+Microplate Multimode Reader (Promega), accepting 6 to 384well plates, and accommodating luminometer, fluorescence, and visible/UV absorbance modules and dual injector system for 6 to 96-well plate formats; and xCELLigence RTCA SP (ACEA Biosciences) for real-time label free impedance-based cell analysis in 96-well format.

The facility provides biological evaluation of cell function, routinely determining the role of transgenes and the cytotoxic and cytoprotective activities of synthetic and natural compounds in multiple cell models, including immortalized cells (human, monkey, rat, mouse), embryonic stem cells (rat and mouse), primary cultures (rat and mouse liver, brain), and organotypic cultures.

Gene and Protein Expression

Head: Rui Castro

Laboratory: Liver Disease Diagnostics and Therapeutics

The Gene and Protein Expression Facility is equipped with cuttingedge technologies that allow for high-throughput, accurate and sensitive measurements of gene and protein expression levels, enabling researchers to gain a deeper understanding of the molecular mechanisms underlying biological processes.

Consists of equipment for sample quality monitoring and quantification, including a Qubit 4 fluorometer and a NanoDrop 2000c spectrophotometer (ThermoFisher Scientific); and microplate readers, including a Multiskan FC and a Varioskan LUX multimode reader (ThermoFisher Scientific), equipped with a flexible range of measurement technologies including Absorbance, Fluorescence Intensity, Luminescence, AlphaScreen, and Time-Resolved Fluorescence.

Protein Electrophoresis & Western Blotting equipment includes standard and mini-gel electrophoresis systems (Bio-Rad and ThermoFisher Scientific); Trans-Blot Turbo (Bio-Rad) and iBlot 2 (ThermoFisher Scientific) transfer systems; and the Chemidoc MP (Bio-Rad), iBright CL750 and iBright FL1500 (ThermoFisher Scientific) Imaging Systems, supporting imaging applications of fluorescent, chemiluminescent, and colorimetric western blots, in addition to fluorescent stained nucleic acid gels, fluorescent stained protein gels, colorimetric stained protein gels, and colorimetric membrane stains.

Gene expression equipment encompasses end-point thermocyclers (Bio-Rad and ThermoFisher Scientific) and real time PCR systems, including the Applied Biosystems 7300 and state-of-the-art QuantStudio 7 Flex Real-Time PCR Systems. The later enables high-throughput, quantitative gene expression, combining 384well microfluidic gene expression, predesigned or customed card arrays, with multiplexing (21 filter combinations), and fast real-time capabilities.

The facility provides personalized guidance and training to researchers in designing and conducting experiments, data analysis and interpretation; and provides a wide range of services, including protein and RNA isolation, quantification and quality control, protein and gene expression profiling, and data analysis.

Biosafety Level 3

Head: Quirina Santos Costa

Laboratory: Host-Pathogen Interactions

> The Biosafety Level 3 Facility is specifically dedicated to research involving biological pathogens of level 3 security. It was designed to minimize the risk of personnel and environmental exposure to potential hazardous agents according to European and Portuguese legislation. All users must undergo specific biosafety level 3 training and must follow strict rules and guidelines while working in the facility.

Consists of an anteroom for material and personnel preparation, and a main procedure room equipped with tree vertical laminar flow chambers (type A2 and type B2), three CO2 incubators (Hera Cell), one regular incubator, two benchtop centrifuges (Eppendorff), a benchtop ultracentrifuge (Beckman), an aerosoltight microfuge (Eppendorff), a Tecan infinite 200 multimode microplate reader, water baths, freezers, refrigerators, optical and inverted phase-contrast microscopes (Leica), and a dedicated double door passthrough autoclave (Matachana).

Mass Spectrometry

Head: Maria do Rosário Bronze and Fábio Santos

Laboratory: Chemical Biology

The Mass Spectrometry Facility is part of the National Mass Spectrometry Network.

Consists of a Triple Quadruple mass spectrometer (Micromass Quattro Micro API, Waters) with electrospray ionization (ESI) atmospheric pressure chemical ionization (APCI) ion sources. This facility is also equipped with an Ion-Trap (LCQ-Fleet, Thermo) mass spectrometer dedicated to the characterization of proteins and biological conjugates.

Provides identification and quantification of small molecules in complex matrices, as biological fluids, and extracts of natural products. Services are available for users on a "do-it-yourself" basis or self-service, for long-term studies, upon initial training requirements. A technician is also available for a full-service.

Molecular BioScreening

Head: Vanda Marques; Cecília Rodrigues

Laboratory: Cell Function and Therapeutic Targeting

> The Molecular BioScreening Facility offers an innovative and integrated approach of cell-based medium- to high-throughput assays for screening small molecules (natural or synthetic) and biologics. It provides cellbased assays, including untargeted phenotypic assay approaches, using human and non-human cell lines, primary cells, stem cells and organoids that recapitulate human biology.

Primary screens are designed and optimized to deliver solutions that help achieve specific experimental goals; and are available for adherent and 3D cell cultures, optimized for 96well and/or 384-well formats, include IC50 and EC50 determination, drug interaction evaluation, or cell death arrays (apoptosis, necroptosis and ferroptosis).

The facility is equipped with

instrumentation, automation, and software for running medium- to highthroughput screens using a variety of assay technologies, including an automatic liquid handling platform for 6 to 1536-well plates (Thermo Scientific); multi-label plate readers; and real-time label free impedancebased cell analysis (xCELLigence RTCA SP – ACEA Biosciences)

The Molecular BioScreening unit is available to both internal and external researchers. Inquiries regarding other specific assays are welcome from academia, biotechnology and pharmaceutical industries seeking solutions in bioscreening.

The facility is core for many researchers at imed, as it combines the power of relevant cell models, phenotypic screens, and live cell functional assays to ultimately lead to the discovery of new therapeutic agents.

Confocal Microscopy

Head: Liana Silva

Laboratory: Central Nervous System, Blood and Peripheral Inflammation

> The Confocal Microscopy Facility supports the highest level of research at imed by providing confocal imaging training, services and bioimage analysis. Activities are divided among three key areas: sample preparation, confocal miscroscope image acquisition and data analysis with Aivia, a powerful artificial intelligenceguided image analysis software.

> The Leica TCS SP8 laser scanning confocal microscope is a fully motorized high-resolution inverted confocal microscope for fluorescence imaging. The DMi8 fluorescence microscope is equipped with a fully motorized stage, fast z movement (Leica Super Z Galvo stage), 4 solid state lasers (405, 488, 552, 638 nm), four detectors (one HyD high-sensitivity and three PMT), a transmitted light detector with CCD camera, three dry objectives (5x, 10x and 20x) and two oil immersion objectives (40x and 63x). The advantage over conventional widefield light microscopy is that the optics of this confocal microscope remove scattered light and light originating from outside the focal plane of interest, thus generating a high contrast "optical section".

Moreover, this microscope allows several types of image acquisition, such as 2D, z-stack, multi-positions, tile scanning/image stitching of large samples and time-lapse.

Nuclear Magnetic Spectroscopy

Head: Noélia Duarte Laboratory: Natural Products Chemistry

> Nuclear magnetic resonance (NMR) spectroscopy is an advanced analytical technique that has reached an outstanding position in several scientific areas, including chemistry, biochemistry, medicine, physics, material sciences and geology. At imed, the NMR facility is equipped with a Bruker[®] - Biospin Fourier 300 MHz (7.1 T) spectrometer, with a 1H & 13C (5 mm) probe and autosampler SampleXpress Lite. The equipment is used to support R&D projects and advanced training activities. 1D and 2D-NMR experiments are routinely carried out to elucidate the structure of small molecules obtained both from synthesis or natural sources; and kinetic studies to elucidate reaction mechanisms.

Additional applications include metabolic studies (for instance, metabolite identification), and compound quantification in drug development studies. Basic training of users (students or researchers) for in-house data collection and processing, as well as external services for academia and pharmaceutical industries are also provided.

Computer Assisted Drug Design

Head: Rita Guedes

Laboratory: Computational Medicinal Chemistry

> The Computer Assisted Drug Design Facility consists of a Linux-based high performance computer cluster with 424 CPU cores, 4 to 8GB per CPU/ GPU and 2 TB per node with a specific implementation of state-of-the-art software for molecular modeling, molecular dynamics, virtual screening, and de novo design. Provides technical support ranging from advice in experimental design to data analysis.



Flow Cytometry

Head: Catarina Godinho Santos Staff: Miguel Cardoso

Laboratory: Molecular Microbiology and Biotechnology

The cytometry system at imed consists of the Cytek® Aurora full spectrum flow cytometer and a computer workstation running SpectroFlo® software for sample acquisition and data analysis. This spectral flow cytometry system allows unique fluorochrome combinations in comparison to conventional flow cytometry and enables analysis of cells with high autofluorescence.

The cytometer is an air-cooled, compact benchtop instrument. It is equipped with 4 lasers (Violet, Blue, Yellow-Green and Red), 48 detection channels for fluorescence, and three channels for scatter (blue laser FSC, blue laser SSC, and violet laser SSC). High-throughput sample loaders are available to automate sample delivery and acquisition and currently are compatible with 96-well plates. An independent workstation for analysis of flow cytometry data is available upon booking, where SpectroFlo® and FCS ExpressTM 7 softwares can be used.

Technical support in panel design, experimental planning, sample preparation, sample acquisition and data analysis can be requested.

New equipment

In 2021, we made a strong investment in new equipment to strength our research capacities. In particular, we acquired a Cytek Aurora flow cytometer.

Spectral flow cytometry offers several advantages over conventional flow cytometry, making it a powerful tool for multi-parameter analysis of cells and particles. Unlike conventional flow cytometry, spectral flow cytometry uses spectral overlap to differentiate fluorescent signals and provides higher resolution for identification and quantification of rare populations. The ability to analyze multiple parameters in a single run reduces the time and cost of sample preparation, and increases the throughput and accuracy of the analysis. The Cytek Aurora equipment is a high-end spectral flow cytometer with several fluidic and excitation optics improvements over existing conventional cytometers. It uses 6 lasers with a range of wavelengths to excite up to 30 parameters, including fluorescent proteins, dyes, and antibodies. Its unique optical design maximizes sensitivity and resolution, resulting in higher-quality data and reduced signal spillover. The system also has a user-friendly software interface and automated workflows that streamline sample processing, data acquisition, and analysis. With its advanced capabilities, the Cytek Aurora flow cytometer is ideal for research applications in immunology, oncology, and drug discovery, where high-throughput and high-content analysis of cells and particles are required.



5. Scientific Development

Human resources Research funding Research outputs Internationalization imed joint seminars

Human resources



Research associates Postdoctoral researchers PhD Students MSc students In December 2021, more than 560 people were working at imed: 90 research associates (73:27; F:M), 57 postdoctoral researchers (41:16; F:M), 138 PhD candidates (70:30; F:M) and 275 MSc students (82:18; F:M).

Recruitment policy

At imed, we aim to establish an organic environment that leads to breakthroughs in health sciences for the benefit of all. This can only be achieved with the best researchers working together.

Therefore, as the research centre of the Faculty of Pharmacy at Universidade de Lisboa, imed recruiting strategy is aligned with the host institution policy, which during this year was able to recruit 12 new researchers that are now fully integrated in imed.

Research funding

imed scientists have been successful in securing competitive funds despite the difficult financial circumstances experienced in 2021. The institute funds increased 20%, compared with the available budget of 2020, and reached a global value of 3.7 M Euros.

Total available funding



These positive numbers were possible as our scientists sucessfully secured funds through both national (2.5 MEuros) and international competitive calls (550 kEuros), as well as from projects with industry and contracted research services (650 KEuros), following our commitment to strengthen our knowledge transfer capacity.

Globally, on 31 December 2021, imed was hosting 67 active national projects, 10 international projects, and 9 funded contracts with the private sector. The overall budget of imed also considers Fundação para a Ciência e Tecnologia support in the form of R&D Unit Pluriannual funding; contracts of postdoctoral researchers and PhD and other scholarships.



Total awarded funding







List of projects starting in 2021

National projects

In evolution and disease: The underlying role of helicobacter prophages

Fundação para a Ciência e Tecnologia (PTDC/BTM-TEC/3238/2020)

PI: Ana F. Vale

TRYP4MUTP53 - Tryptophanol derivatives for reactivation of mutant forms of p53

Fundação para a Ciência e Tecnologia (PTDC/BTM-TEC/3238/2020)

PI: Maria M. Santos

Novel insights into treatment strategies for hyperammonemiaassociated urea cycle disorders and organic acidurias

Sociedade Portuguesa de Doenças Metabólicas

PI: Margarida Silva

TRESPASS2TREAT: an innovative approach in the pharmacotherapy of patients with brain metastases from breast cancer

Fundação para a Ciência e Tecnologia (TDC/BIA-BQM/5027/2020)

PI: João B. Gonçalves

1Pot2Cat: Bimetallic catalysis one-pot for the synthesis of N-heterocyclic compounds

Fundação para a Ciência e Tecnologia (PTDC/QUI-QOR/0712/2020)

PI: Pedro M. P. Góis

Novel nanoplatforms for targeting melanoma with 8-hydroxyquinoline metal complexes

Fundação para a Ciência e Tecnologia (PTDC/QUI-QIN/0586/2020)

PI: Manuela Gaspar

Stereoselective functionalization and increase of chemical acid complexity by hydrogen transfer and oxidation

Fundação para a Ciência e Tecnologia (PTDC/QUI-QOR/1131/2020)

PI: Carlos A. M. Afonso

ROADMAP - Investigation into the artistic production of illuminations from António de Holanda

Fundação para a Ciência e Tecnologia (PTDC/ART-HIS/0985/2021)

PI: Joao Lopes

BioPinus - Biotransformation of Pinus resin for the production of natural pigment biofixers with textile application

PT2020 (CENTRO-01-0247-FEDER-072630)

PI: Carlos A. M. Afonso

(NER-ib) NER Inhibitors: Increasing the effectiveness of platinumbased therapy in non-small cell lung cancer

Champalimaud Foundation

PI: Nuno Oliveira

International projects

LiVERRip - RIPK3 biology and targeting in metabolic liver disease

EnzIL - Biofriendly Decontamination

"la Caixa" Banking Foundation (HR21-00793)

of Chemical Warfare Agents

PI: Cecilia Rodrigues

SPS-Nato (SPS G5713)

PI: Carlos A. M. Afonso

BREAST-BRAIN-N-BBB - Protecting the brain from metastatic breast cancer

"la Caixa" Banking Foundation (HR21-00605)

PI: João B. Gonçalves

Industry and contracted research

Pipeline for discovery of CDK4/6 inhibitors for metastatic breast cancer treatment

Pfizer Inc. (68977633)

PI: Alexandra Brito

Covi-Vac: The response of immunocompromised people to COVID-19 vaccine

AstraZeneca

PI: Joao B. Gonçalves

Biomass4Synthons - Straightening training, research and innovation capacities in the valorization of biorenewable resource

H2020 (GA 951996)

PI: Carlos A. M. Afonso

Rifabutin liposomes: a novel nanotechnological strategy for effective treatment of systemic methicilin-resistant staphylococus aureus infections

Phospholipid Research Center, Heidelberg, Germany (MMG-2021-092/1-1)

PI: Manuela Gaspar

DRUGS4ALS - Targeting TDP-43 with protein kinase inhibitors: a effective and measurable therapy for ALS

"la Caixa" Banking Foundation (HR21-00931)

PI: Dora Brites

FUJIFILM Covid-19 Ag Test, a highly-sensitive and rapid antigen test kit for the detection of SARS-CoV-2-infection

FujiFilm YCU-FF22

PI: Joao Gonçalves

Contracted research with different institutions

PI: Various

Research outputs

Scientific publications

imed maintained a good track-record of scientific contributions in 2021, with 240 articles published in Journal Citation Reports (JCR) referenced Journals. These 189 research papers and 49 reviews are a main output of the institute recently created research Hubs. 47% of these articles are a contribute from the Scientific Hub, 39% from the Technologic Hub and 14% from the Translational Hub. 59% of imed JCR articles were published in journals indexed in the first quartile (Q1) and 12% in the first decile (D1) of their respective thematic areas of the Web of Science (WoS) database. 56% of all articles have imed scientists as corresponding authors and 17% result from collaborative efforts of imed laboratories.



Q1

Q2

Q3

<Q3

141

80

Article

quartile



Furthermore, imed researchers achieved a sharp increase in the number of publications in top-ranked journals. In 2021, imed published a total number of 30 papers with IF>10, which represents 12% of imed research papers in this year. Many of the publications in top journals are the result of research lead by imed researchers (56%), which demonstrates that imed PIs can themselves be highly competitive. At the same time, there is a progressive increase in publications (42%) arising from international collaborations, which confirms the internationalization of the institute research and the importance of scientific collaboration to pursue

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Research Highlights

imed's research program aims at discovering molecules, mechanisms and technologies that can be translated into breakthrough healthcare solutions. Our research methodology combines the expertise of disciplines across the fields of chemistry, biotechnology, and pharmaceutical sciences to tackle key scientific questions in health sciences. The institute capacities cover a wide range of research activities that support our **Scientific, Technological and Translational Hubs**.

Scientific Hub

Within the Scientific Hub, we integrate chemistry, biotechnology, and pharmaceutical sciences to develop new tools and techniques to prevent, detect and treat cancer, neurodegenerative, metabolic and infectious diseases.

Selected publications from the Scientific Hub

RIPK3 acts as a lipid metabolism regulator contributing to inflammation and carcinogenesis in non-alcoholic fatty liver disease

Gut 2021, 70, 2359

http://dx.doi.org/10.1136/ gutjnl-2020-321767

Laboratory: Cell Function and Therapeutic Targeting

Research area: Metabolic Diseases

Aquaporin-3 is involved in NLRP3-inflammasome activation contributing to the setting of inflammatory response

Cell. Mol Life Sci. 2021, 78, 3073

http://dx.doi.org/10.1136/https://doi. org/10.1007/s00018-020-03708-3

Laboratory: Membrane Transporters in Health & Disease

Research area: Metabolic Diseases

Diazaborines are a Versatile Platform to Develop ROS Responsive Antibody Drug Conjugates

Angew. Chem. Int. Ed. 2021, 60, 25914

https://doi.org/10.1002/ anie.202109835

Laboratory: Chemical Biology

Research area: Oncology

BBIT20 inhibits homologous DNA repair with disruption of the BRCA1-BARD1 interaction in breast and ovarian cancer

Br. J. Pharmacol. 2021, 178, 3627

https://doi.org/10.1111/bph.15506

Laboratory: Natural Product Chemistry

Research area: Oncology

Repurposing Saquinavir for Host-Directed Therapy to Control Mycobacterium Tuberculosis Infection

Front. Immunol. 2021, 647728

https://doi.org/10.3389/ fimmu.2021.647728

Laboratory: Natural Product Chemistry Research area: infectious diseases

Technological Hub

Within the Technological Hub, we are highly engaged in advancing our scientific knowledge into innovative chemical, biotechnological and pharmaceutical technologies that may lead to breakthrough healthcare solutions.

Selected publications from the Technological Hub

Efficient Amino-Sulfhydryl Stapling on Peptides and Proteins Using Bifunctional NHS-Activated Acrylamides

Angew. Chem. Int. Ed. 2021, 60, 10850 (IF 14.94)

https://doi.org/10.1002/ anie.202016936

Laboratory: Chemical Biology

Research area: Emerging technologies

The 2-hydroxy-nevirapine metabolite as a candidate for boosting apolipoprotein A1 and for modulating anti-HDL antibodies

Pharmacological Research 2021, 165, 105446 (IF 10.334)

https://doi.org/10.1016/j. phrs.2021.105446

Laboratory: Advanced Cell Models for Predictive Toxicology & Cell-based Therapies

Research area: Emerging technologies

Exploring the potential of chitosanbased particles as delivery-carriers for promising antimicrobial glycolipid biosurfactants

Carbohydrate Polymers 2021, 254, 117433 (IF 10.25)

https://doi.org/10.1016/j. carbpol.2020.117433

Laboratory: Pharmaceutical Bioengineering, Biotechnology & Bioproducts

Research area: Emerging technologies

Combating small-molecule aggregation with machine learning

Cell Reports Physical Science 2021, 2, 100573 (IF available only in 2022)

https://doi.org/10.1016/j. xcrp.2021.100573

Laboratory: Medicinal Chemistry

Research area: Emerging technologies

Silica-Supported Copper for the Preparation of trans-4,5-DiaminoCyclopent-2-Enones under Continuous Flow Conditions

ACS Sustainable Chem. Eng. 2021, 9, 16038 (IF 8.41)

https://doi.org/10.1021/ acssuschemeng.1c00884

Laboratory: Bioorganic Chemistry

Research area: Emerging technologies

Translational Hub

Within the Translational Hub, we are deeply committed to advance pharmacotherapy innovation by developing disruptive translational research to benefit human health, by converging our fundamental science discoveries into applied research. This is driven by the joint efforts of our institute with multiple players within the Healthcare sector, including policy-makers, clinicians and allied healthcare professionals and people living with illness and their representative organizations and associations.

Selected publications from the Translational Hub

Development of cranberry extract films for the enhancement of food packaging antimicrobial properties

Food Packaging and Shelf Life 2021, 28, 100646

http://dx.doi.org/10.1136/ gutjnl-2020-321767

Laboratory: Pharmaceutical Bioengineering, Biotechnology & Bioproducts

Research area: Pharma industry

A mathematical modeling strategy to predict the spreading behavior on skin of sustainable alternatives to personal care emollients

Colloids and Surfaces B: Biointerfaces 2021, 205, 111865

https://doi.org/10.1016/j. colsurfb.2021.111865

Laboratory: Pharmaceutical Development

Research area: Pharma industry

Safety and efficacy assessment of aerogels for biomedical applications

Biomedicine & Pharmacotherapy 2021, 144, 112356

https://doi.org/10.1016/j. biopha.2021.112356

Laboratory: Advanced Technologies for Drug Delivery

Research area: Health Care Sector

Increased Therapeutic Efficacy of SLN Containing Etofenamate and Ibuprofen in Topical Treatment of Inflammation

Pharmaceutics 2021, 13, 328

https://doi.org/10.3390/ pharmaceutics13030328

Laboratory: Advanced Technologies for Drug Delivery

Research area: Health Care Sector

Laser diffraction as a powerful tool for amorphous solid dispersion screening and dissolution understanding

European Journal of Pharmaceutical Sciences 2021, 163, 105853

https://doi.org/10.1016/j. ejps.2021.105853

Laboratory: Pharmaceutical Engineering and Manufacturing

Research area: Pharma industry

In 2021, imed scientists contributed with 50 reviews and perspectives articles on the most advanced areas of research across the different imed hubs. The following list highlights some of these contributions.

Towards the sustainable discovery and development of new antibiotics

Nature Reviews Chemistry 2021, 5, 726

https://doi.org/10.1038/ s41570-021-00313-1

Laboratory: Medicinal Chemistry

Research area: Infectious Diseases

Immunogenicity of biologic agents in rheumatology

Nature Reviews Rheumatology 2021, 17, 81

https://doi.org/10.1038/ s41584-020-00540-8

Laboratory: Molecular Microbiology and Biotechnology

Research area: Health Care Sector

Diagnostic accuracy of elastography and magnetic resonance imaging in patients with NAFLD: A systematic review and meta-analysis

Journal of Hepatology 2021, 75, 770

https://doi.org/10.1016/j. jhep.2021.04.044

Laboratory: Cell Function and Therapeutic Targeting

Research area: Metabolic Diseases

Machine learning for nextgeneration nanotechnology in healthcare

Matter 2021, 4, 2078

https://doi.org/10.1016/j. matt.2021.09.014

Laboratory: Medicinal Chemistry

Research area: Emerging Technologies

Preclinical models and technologies to advance nanovaccine development

Advanced Drug Delivery Reviews 2021, 172, 148

https://doi.org/10.1016/j. addr.2021.03.001

Laboratory: Drug Delivery & Immunoengineering

Research area: Emerging Technologies

Intellectual property

Intellectual property protection, including patents, is critical to foster innovation and to build a strong alliance with the private sector. At imed, we aim at translating our findings into commercially valuable technologies and/or products. In 2021, we filled 2 national and 2 international patent requests.

PT117644 - 1,2,4,5-Tetraoxane compounds, a drug delivery system based in said compounds useful in diagnosis and therapy, and methods thereof, submitted 16-12-2021

Diogo Silva and co-workers

PCT/IB2021/057430 – Air quality enhancement system based on fluid mechanics and integrated UV emission, submitted 12-18-2021

João Almeida Nunes and coworkers

PT11728 - ROS sensitive Diazaborines for the Construction of stimuliresponsive bioconjugates, submitted 02-03-2021

Pedro M. P. Gois and co-workers

PCT/IB2021/058241 - New pharmaceutical compounds, methods and uses thereof, submitted 10-09-21

Maria José Umbelino and co-workers

Internationalization

Addressing current health problems requires a multidisciplinary approach which often implies the constitution of highly collaborative international teams. imed researchers have demonstrated their commitment with internationalization, both in funding and publications.

International collaborations

Over the year, imed researchers have established a strong network of collaborations with prestigious international institutions. The following list highlights some of the international institutions that had active collaborations with imed scientists throughout 2021.

Cambridge University, UK University of Oxford, UK Max Plank Institute for Polymer Science, Germany **Univiversity of Vienna, Austria Chimie Paristech, France CIC bioGUNE-Ciberehd**, Spain **Finland f Helsinki Institute of Life** Science (HiLIFE), Finland Karolinska Institutet, Sweden **Medical University Lodz, Poland University of Lausanne, Swiss University of Michigan, USA** Stanford University, USA Penn State University, USA Weizmann Insitute of Science, Israel

Participation in international projects

LiVERRip - RIPK3 biology and targeting in metabolic liver disease

"la Caixa" Banking Foundation (HR21-00793)

PI: Cecilia Rodrigues

DRUGS4ALS - Targeting TDP-43 with protein kinase inhibitors: a effective and measurable therapy for ALS

"la Caixa" Banking Foundation (HR21-00931)

BREAST-BRAIN-N-BBB - Protecting

the brain from metastatic breast

"la Caixa" Banking Foundation

Pl: Dora Brites

cancer

(HR21-00605)

PI: João B. Gonçalves

EnzIL - Biofriendly Decontamination of Chemical Warfare Agents

SPS-Nato (SPS G5713)

PI: Carlos A. M. Afonso

Biomass4Synthons - Straightening training, research and innovation capacities in the valorization of biorenewable resource

H2020 (GA 951996)

PI: Carlos A. M. Afonso

Rifabutin liposomes: a novel nanotechnological strategy for effective treatment of systemic methicilin-resistant staphylococus aureus infections

Phospholipid Research Center, Heidelberg, Germany (MMG-2021-092/1-1)

PI: Manuela Gaspar

Participation in international networks

imed scientists participate in an extensive number of international networks that strength transnational collaboration with the objective of addressing important scientific problems. The following list highlights some of the networks that included imed scientists in 2021.

Marie Skłodowska-Curie Innovative Training Networks (MSCA ITN)

H2020 MSCA-ITN-ETN - FOIEGRAS - Bioenergetic remodeling in the pathophysiology and treatment of non-alcoholic fatty liver disease 2016-21

imed: Cecilia Rodrigues

European Innovative Medicines Initiative 2

EU H2020 IMI-RIA - Litmus - Liver Investigation: Testing Marker Utility in Steatohepatitis 2017-23

imed: Cecilia Rodrigues

European Cooperation in Science and Technology (COST) actions

CA18117 - European network for Gynaecological Rare Cancer research: From Concept to Cure, 2019-23

imed: Maria Santos

CA 18127 - International Nucleome Consortium, 2019-23

imed: Maria Santos

CA 17104 - Multidrug Resistance in Cancer, 2018-22

imed: Maria Santos

CA18122 - European Cholangiocarcinoma Network, 2019-23

imed: Rui Castro

CA16217 - ENIUS - European network of multidisciplinary research to improve the urinary stents, 2019-23

imed: Ana F. Bettencourt

Other EU funded networks

CA19124 - Rethinking Packaging for Circular and Sustainable Food supply chains of the Future (CIRCUL-A-BILITY), 2021-25

imed: Ana F. Bettencourt

CA20121 – BenBedPhar: Bench to bedside transition for pharmacological regulation of NRF2 in noncommunicable diseases, 2021-25

imed: Joana Miranda

CA19144 - Venon: European Venom Network, 2020-24

imed: Joana Miranda

CA17112 - Pro-Euro Dili Network: Prospective European Drug-Induced Liver Injury Network, 2018-22

imed: Joana Miranda

CA16119 - CellFit: In vitro 3-D total cell guidance and fitness, 2017-21

imed: Joana Miranda

CA16113 - CliniMARK: Good biomarker practices to increase the number of clinically validated biomarkers, 2017-21

imed: Joana Miranda

CA16119 - CellFit: In vitro 3-D total cell guidance and fitness, 2017-21

imed: Joana Miranda

CA17104 - New diagnostic and therapeutic tools against multidrug resistant tumors, 2019-22

imed: Maria José U. Ferreira

CA18116 - Aniridia: networking to address an unmet medical, scientific, and societal challenge, 2019-23

imed: Susana Solá

European Network for the Study of Cholangiocarcinoma (ENS-CCA)

imed: Rui Castro

The HEPCOViVac Registry -Immunological response in patients with liver disease vaccinated against COVID-19

imed: Rui Castro

Publication with international teams

Around 42 % of imed publications result from ongoing projects involving international collaborators. The following examples reflect some outputs of these collaborations in 2021.

Expanded tracking of a Beijing Mycobacterium tuberculosis strain involved in an outbreak in France

Travel Medicine and Infectious Disease 2021, 44, 102167

With the Université Claude Bernard Lyon and others

https://doi.org/10.1016/j. tmaid.2021.102167

Laboratory: Bacterial Pathogenomics and Drug Resistance

Research area: Infectious diseases

Allosteric Antagonist Modulation of TRPV2 by Piperlongumine Impairs Glioblastoma Progression

ACS Cent. Sci. 2021, 7, 868

With the University of Cambridge

https://doi.org/10.1021/ acscentsci.1c00070

Laboratory: Medicinal Chemistry

Research area: Emerging technologies

GMP-grade nanoparticle targeted to nucleolin downregulates tumor molecular signature, blocking growth and invasion, at low systemic exposure

Nanotoday 2021, 37, 101095

With Biogem, Istituto di Biologia e Genetica Molecolare, Italy

https://doi.org/10.1021/acs. jmedchem.1c01080

Laboratory: Laboratory: Advanced Technologies for Drug Delivery

Research area: Emerging technologies

Dual Stimuli-Responsive Dynamic Covalent Peptide Tags: Toward Sequence-Controlled Release in Tumor-like Microenvironments

J. Am. Chem. Soc. 2021, 143, 17047

With the Max Plank Institute for Polymer Science

https://doi.org/10.1021/jacs.1c06559

Laboratory: Chemical Biology

Research area: Emerging technologies

Noncovalent Interactions with PAMAM and PPI Dendrimers Promote the Cellular Uptake and Photodynamic Activity of Rose Bengal: The Role of the Dendrimer Structure

J. Med. Chem. 2021, 64, 21, 15758

With the University of Lodz

https://doi.org/10.1021/acs. jmedchem.1c01080

Laboratory: Advanced Technologies for Drug Delivery

Research area: Emerging technologies

imed Joint Seminars

The COVID-19 outbreak severely limited imed activities, in particular the interaction and exchange of knowledge between our community. To overcome these restrictions, we initiated a series of online seminars featuring eminent national and international scientists. Furthermore, we started a series of joint seminars with international institutions that turnout to be excellent forums to learn, establish new collaborations, and disseminate our science. In 2021, we organized joint seminars with the Universidade Federal do Rio de Ianeiro and the Max Plank Institute for Polymer Science.

imed-UFRJ joint seminars

May 2021

Chemical Tools for Hypoxia and Ferrous Iron-Dependent **Pharmacology**

Prof. Rui Moreira, imed

Faculty of Pharmacy, Universidade de Lisboa

Searching and pharmacological profiling of novel candidates for the treatment of lung inflammatory diseases

Prof. Marco Aurélio Martins, IOC, Fiocruz, RI

Turning molecules into medicines, lessons for liver disease biology

Prof. Cecilia Rodrigues, imed

Faculty of Pharmacy, Universidade de Lisboa

Brazilian network in Academia Drug Discovery

Prof. Eliezer J. Barreiro, LASSBio, ICB, UFRJ

Development and evaluation of medicines for treatment and prevention of HIV infection

Prof. Nuno Taveira, imed

Faculty of Pharmacy, Universidade de Lisboa

Title of talk: Building Therapeutic Nanostructures in Cancer Cells

Dr. David Ng, Max Planck Institute for Polymer Research

imed-Max Planck Institute for Polymer Research joint seminars

October 2021

Translational neuroimmunology in multiple sclerosis pathogenesis

Prof. Adelaide Fernandes, imed

Faculty of Pharmacy, Universidade de Lisboa

Title of talk: Macromolecular **Strategies for Enhancing Immunotherapy Responses**

Dr. Lutz Nuhn, Max Planck Institute for Polymer Research

Regulation of tumor immune microenvironment using advanced nano-immunotherapy

Prof. Helena Florindo, imed

Faculty of Pharmacy, Universidade de Lisboa

Title of talk: Nature Inspired

Materials for Biomedical Applications

Prof. Dr. Tanja Weil, Max Planck Institute for Polymer Research



6. Leadership & Recognition

Participation in national & international institutions

Prizes and recognitions

Participation in national & international institutions

imed scientist are actively involved in the governing bodies of national and international institutions. The following list highlights some of these activities.

Multiple iMed PIs are members of several Healthcare sector institutions, and their expertise is instrumental in supporting iMed efforts in translating our findings into products benefiting human health. For example, Prof. Bruno Sepodes is currently Vice-Chairperson of the Committee of Human Medicinal Products at the European Medicines Agency, while several PIs are members of the Medicines Evaluation Board at INFARMED, the Portuguese National Authority of Medicines and Health Products.

National

Cecília Rodrigues

Univerisidade de Lisboa Vice-Rector for research, inovation and development

https://www.ulisboa. pt/membro-equipa/ cecilia-maria-pereira-rodrigues

Graça Soveral

President of the Portuguese Biochemistry Society, 2018-22

https://www.spb.pt/Governance.html

Maria Alexandra Brito

Sociedade Anatómica Portuguesa/ Associação Anatómica Portuguesa

Executive board member, 2019-21

https://sociedadeanatomica.pt/

Maria de Fátima Pinela da Silva Mousinho de Palhares Falcão

Centro Hospitalar de Lisboa Ocidental (Hospitais de Santa Cruz, Egas Moniz e S. Francisco Xavier)

Director of the pharmacy service since 2019

https://www.chlo.min-saude.pt/

International

Rui Moreira

President and member of the executive commission of the European Federation for Medicinal Chemistry and Chemical Biology

https://www.efmc.info/

Cecília Rodrigues

Associate editor, Hepatology jornal 2021-24

Função desempenhada na organização: Associate editor

https://aasldpubs.onlinelibrary. wiley.com/hub/journal/15273350/ editorial-board/editorial-board

Cecília Rodrigues

Executive editor, Journal of Physiology and Biochemitry 2020-2024

https://aasldpubs.onlinelibrary. wiley.com/hub/journal/15273350/ editorial-board/editorial-board

Marta Bento Afonso

European Association for the Study of the Liver (EASL)

Member of the young Investigator task force, 2020-2023

Graça Soveral

Federation of European Biochemical Societies Fellowships committee, 2019-22

IUBMB - International Union of Biochemistry and Molecular Biology coucil member, 2019-22

Filipa Alves da Costa

International Society for Medication Adherence (ESPACOMP)

Executive Committee Board Member and Co-chair of the Research, Policy and Implementation Committee, 2021

https://www.espacomp.eu/

Filipa Alves da Costa

Educational Committee of the European Society of Clinical Pharmacy

President and Immediate Pastpresident, 2021

https://escpweb.org/

Isabel Rivera

Executive comity member Galactosemias Network (GalNet), 2021 https://www.galactosemianetwork.org/

Prizes & Recognitions

imed scientists have been awarded several distinctions for scientific and social activities. The following list highlights some of these awards.

José Augusto Guimarães Morais

Life Time Achievement Award,

Frankfurt Foundation Quality of Medicines, 2021

https://frankfurt-foundation.org/en/

Nuno Taveira

Born From knowledge ideas (Bfk) of National Agency for Inovation (ANI)

First prize for: Spiro4malaids, 2021 https://www.f6s.com/spiro4malaids

António J. Almeida, Joana Marto

Pegadas Award Ordem dos Farmacêuticos, 2021 https://www.ordemfarmaceuticos.pt/ pt/

Maria de Fátima Pinela da Silva Mousinho de Palhares Falcão

Honour medal

Ordem dos farmacêuticos, 2021

https://www.ordemfarmaceuticos.pt/ pt/
Filipa Alves da Costa

Honorary member

Pharmaceutical Care Network Europe, 2021

https://www.pcne.org/

Helena Rebelo de Andrade

Honor praise

Ministry of Health, Louvor n°318/2021, Diário da República n° 143, 20/06/2021

Susana Solá

Honoured in the 3rd Edition of the Women in Science Book

Associação Viver a Ciência, 2021

https://www.viveraciencia.org/pt/

Adelaide Fernandes

Honoured in the 3rd Edition of the Women in Science Book

Associação Viver a Ciência, 2021

https://www.viveraciencia.org/pt/



7. Communication, Dissemination & Outreach

Communication & dissemination activities Outreach activities ANNUAL REPORT 2021

The European Charter for Researchers clearly states that researches have the duty to actively engage in the communication of science to the general public. imed is deeply committed with this goal and has actively participated in different communication, dissemination and public outreach activities during 2021.

Communication & dissemination activities

Website and social media

imed website (https://imed.ulisboa. pt/) is our primary mechanism of communication with the general public. In 2021, we rebranded imed's image and designed a new website to strengthen our vision of a collaborative institute at the interface of chemistry, biology and pharmaceutical sciences. The website features information about research areas, scientific production, research groups, facilities, job offers, training programs and comprehensive information about the institute's activities and research outputs. It is currently complemented with social networks: Facebook, LinkedIn and Twitter.

Conferences

imed communicates with the scientific community mainly by publishing in peer-reviewed journals, though scientific results are also disseminated through participation in international conferences, as well as local scientific meetings. In 2021, imed scientists delivered more than 77 oral communications in national and international meetings.

imed Webinars

In a time that we are faced with complex societal challenges, imed is focusing on promoting human health through the integrated discovery of new molecules, mechanisms and technologies that can translate into innovative therapeutic and care options. To fulfill imed's cuttingedge research program, this webinar series placed under the microscope innovations developed by leading scientists to address pressing health challenges, the translation of discoveries into clinical options, and the mentorship of young researchers by scientists at the forefront of health sciences. In 2021, we held 16 scientific seminars (62% by international scientists) and 2 seminars on science communication.

imed post-graduate students comission (iPsc)

The iPsc is also actively contributing to the communication and dissemination of imed's results, namely by organizing the 12th imed Meeting, in which all PIs showcased their research lines and objectives within imed's new structure.

Outreach activities

imed aims to connect with the society by sharing the knowledge produced by researchers with the general public; and by encouraging the venue of young students and scientific curious citizens to our labs to discover our most recent breakthroughs.

In 2021, imed participated in several outreach activities including the "Brain awareness week" created by the Dana Foundation, USA, which aims to raise awareness among the general public, particularly students, of the progress and benefit of brain study, through lectures at High School and by welcoming undergraduate visiting students at imed.

Also, in close collaboration with CienciaViva, imed participated in "Ciência Viva no Laboratório -Ocupação Científica de Jovens nas Férias", and received 22 high school students in 14 different activities, with the main objective of opening the paths to convergence with the principles of promoting experimental science teaching and attracting scientific careers among secondary school students. imed also promoted the "Era uma vez o medicamento... " activity, during "Semana da Ciência e Tecnologia", aiming to open Scientific Institutions and Universities to the general public in order to provide the population with opportunities for scientific observation and personal contact with specialists from different areas of knowledge.

Last but not least, several imed researchers are also Professors at the Faculty of Pharmacy, Universidade de Lisboa (FFULisboa), and participated in the annual ULisboa outreach event for high school students "O dia aberto da FFULisboa" and "Verão na ULisboa", where the Pharmaceutical Sciences course from FFULisboa is publicized.

Other activities

Out of the Health Box Podcast: COVID-19 Immunity – José Miguel Azevedo Pereira

14/02/21

Webinar "ULisboa nos Trópicos | Padrões globais de saúde, ambiente e poluição – reflexões sobre One Health e o impacto nas regiões tropicais"

07/11/21

Webinar "Cooperação internacional no combate à COVID-19: o papel do ACT -Accelerator e a centralidade da OMS na articulação operacional

12/03/21

5ª Conferência Anual da redeSAÚDE – "A Health Research Agenda Towards 2030"

30/11/21

1° "Symposium on Advanced Technologies for Drug Delivery

21/10/21

WEBINAR: Molecular Detection and Genotyping of Helicobacter pylori in Dyspeptic Patients treated at the Central Hospital of Maputo, Mozambique

1/11/21



imed

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