

**University  
of Minho**

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# School of Medicine Research



**ICVS**  
Life and Health Sciences Research Institute  
Instituto de Investigação em Ciências da Vida e Saúde

**2CABraga**  
Centro Clínico Académico

**University of Minho**  
School of Medicine

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**Medicine**  
Research

# Mission

# 0.



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# **Life and Health Sciences Research Institute**

[www.icvs.uminho.pt](http://www.icvs.uminho.pt)

# **1.**



## **Life and Health Sciences Research Institute**



The ICVS | Life and Health Sciences Research Institute aims to improve human health through outstanding life-science research, cutting-edge medical innovation and delivery of specialized services. The ICVS is a R&D Unit incorporated in the School of Medicine - University of Minho, strategically located in the Northern region of Portugal within a fast growing Cluster of Biomedical Science, Technology and Healthcare institutions, being organized around three interdisciplinary Research Domains - Microbiology and Infection, Neurosciences and Surgical Sciences - and two pilot lines – Community Health and Education on Life and Health Sciences. The ICVS integrates the ICVS/3B's - Associate Laboratory and is a member of the Clinical Academic Centre – Braga, Association (2CABraga). More than 250 researchers with complementary academic backgrounds

are presently working at the ICVS. The biomedical, translational and clinical research results in more than 150 publications/year in international top-level scientific journals. Many of the ICVS researchers, including young scientists and MDs, have been honored with awards for their scientific achievements. The ICVS has an overall area of approximately 6000 m<sup>2</sup>. Its technological platform consists of high standard laboratories, with state-of-the-art scientific equipment for areas such as Cell and Tissue Culture, Electrophysiology, Biosafety Level 2 and 3, Molecular Biology, Imagiology, Microscopy Imaging, Neuroanatomy/ Neuroimaging, Histology, Biological Resources, Cytometry, Endoscopy as well as a fully equipped Centre for Animal Experimentation including areas for behavioral studies, experimental infections and surgical techniques.

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# **Microbiology and Infection**

**(MIRD)**

# **2.**



## **Microbiology and Infection Research Domain**



The Microbiology and Infection Research Domain (MIRD) aims at unraveling mechanisms involved in host-pathogen interaction, with a special focus on those underlying resistance and susceptibility to infectious diseases. Specific cellular mechanisms, from microorganisms and mammals, are studied transversally in various cellular and animal models and in patients; these include autophagy and programmed cell death and molecular mechanisms underlying immune responses. This Domain takes an all-inclusive view on host-pathogen interactions and encompasses a multidisciplinary team dedicated to projects involving a diverse set of pathogens: bacteria (*Mycobacterium* spp.), virus (HIV-1), fungi (*Paracoccidioides* spp.; *Aspergillus* spp.) and parasites (*Plasmodium* spp.; *Leishmania* spp.). These integrative projects will have a major impact on understanding and control of the clinical and laboratory aspects of emerging and re-emerging

infectious diseases and immune related disorders. The research is organized in two main research topics: i) Cellular and Molecular Microbiology mainly devoted to the comprehension of molecular mechanisms of virulence, resistance/susceptibility to antimicrobial drugs, evolution of pathogenic microorganisms and the use of microorganisms as models to study human diseases and to develop industrial applications; ii) Immunology of Infection is dedicated to diverse aspects of the host response to infection and related immune mechanisms. Projects in this research topic are devoted to unravel genetic profiles associated with susceptibility to infection; immunological mechanisms relevant in the host-pathogen interaction; development of new prophylactic and diagnostic methods and drug delivery systems for infectious diseases.

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# **ICVS Neurosciences**

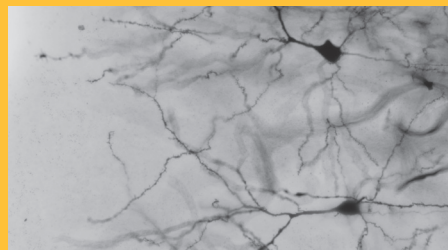
**(NERD)**

# **3.**





## **Neurosciences Research Domain**



The Neurosciences Research Domain (NERD) is composed of a multidisciplinary team that permits a multimodal approach, covering fundamental, translational and clinical dimension to distinct research projects. This Domain objectives are: i) identify the molecular and cellular basis of neurodevelopmental processes and senescence, ii) dissect neuronal circuits underlying emotional, reward, locomotor and cognitive behaviors, iii) identify pathophysiological mechanisms associated with chronic pain and psychiatric disorders such as depression, anxiety and obsessive-compulsive disorders, iv) explore the interplay between the immune and nervous systems and its contri-

bution for behavior, v) find molecular, cellular and functional correlates of healthy aging and neurodegenerative disorders including Machado-Joseph disease, Alzheimer and Parkinson's diseases, vi) develop cellular and molecular strategies for neuronal repair, vii) study the effects of acute and chronic stress, and identify how stress hormones program neuronal circuits. The broadness of expertise and the fact that the NERD benefits from an extensive technological platform provides a vibrant atmosphere for young and senior researchers, being translated into excellent publications and prizes, and the recognition by the national and international scientific community.

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# **Surgical Sciences**

**(SSRD)**

# **4.**



## **Surgical Sciences Research Domain**



The main aims of the Surgical Sciences Research Domain (SSRD) are to: i) understand the mechanisms that regulate development and differentiation of embryonic cells/organs ii) study new risk factors for cancer, molecular markers of diagnostic, prognostic and response to cancer therapy; iii) explore novel surgical techniques to decrease aggressiveness of current interventions; iv) develop technically innovative solutions to optimize surgical procedures. A better understanding of the pathophysiology of diseases is crucial to uncover novel therapeutic strategies for malignant and congenital diseases. Several of the mechanisms involved in embryo development are common to disease conditions and injury repair. In this context, the SSRD studies the mechanisms

underlying organ development, with special emphasis on macrophages and neuroendocrine cells. The SSRD screens for new biomarkers of risk to develop cancer, and novel markers of diagnostic and response to cancer therapy, aiming to offer new personalized therapies. To minimize surgical aggression, the team explores new scarless interventions through Natural Orifice Transluminal Endoscopic Surgery (N.O.T.E.S.). Using 3D images and endoscopy, the team develops innovative technical solutions (personalized prosthesis and surgical plans) to optimize clinical procedures. The SSRD offers an extensive post-graduation international program in basic and translational science, as well as minimally invasive surgery to over 500 surgeons per year.

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# **ICVS Pilot Research Lines**

# **5.**



## **Education on Life and Health Sciences**

The pilot research line on Education on Life and Health Sciences was established in 2014. The current objectives of the team are to develop a program of research to address international contemporary questions on health sciences education. The main areas of activity are student development and the evaluation of innovations in teaching and learning in health sciences education. The research is developed in collaboration with students and faculty from the School of Medicine, national researchers in educational and social sciences and international research groups in medical education.

## **Public Health**

The pilot research line on Public Health was established in 2014, with the goal to develop research on the prevention, diagnosis and management of chronic diseases in the community. This research field was chosen as a natural evolution of previous successful projects involving Teachers and Researchers from the Community Health area of the ICVS and the School of Medicine, in collaboration with the Primary Care Respiratory Group of the Portuguese Association of General and Family Medicine and the International Primary Care Respiratory Group.

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# **Clinical Academic Centre**

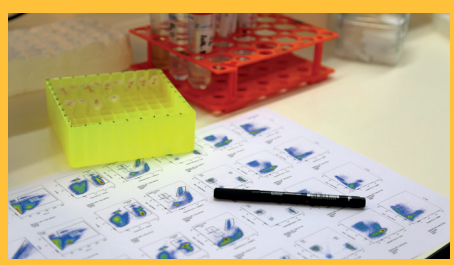
[www.ccabraga.org](http://www.ccabraga.org)

# 6.





## **Clinical Academic Centre**



2CA-Braga is a non-profit partnership, between the University of Minho (UM), through the School of Medicine (EM) and the Life and Health Sciences Research Institute (ICVS), the José de Mello Saúde Group, represented by Hospital of Braga and CUF-Porto, and Eurotrials – Scientific Consultants. The 2CA-BRAGA is in a unique and privileged position to ally research with clinical aspects, maximizing the development of innovative biomaterials, diagnostic strategies, regenerative approaches

and therapeutic products. With basis on this health ecosystem infrastructure, the 2CA-BRAGA, thus, seeks to strengthen University of Minho's position as a leader in bioscience innovation and translational research, promoting in unison with the Hospital de Braga, the maintenance of health during the lifespan and, most importantly, contributing to add quality to life through innovative breakthroughs.

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