



CENTER FOR RESEARCH IN INFLAMMATORY DISEASES

# CRID





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Center for Research in Inflammatory Diseases - CRID  
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Coordination: Rita Tostes  
Organization: André Moura  
Design: Claudio Ventura



To aggregate efforts and advance scientific knowledge, with a multidisciplinary team of national and international researchers in the basic and clinical areas to carry out translational research on major inflammatory diseases and offer innovative responses to society.

These were the challenges that motivated the creation of CRID - Center for Research in Inflammatory Diseases, based at the Ribeirão Preto Medical School of the University of São Paulo in Ribeirão Preto (SP). Inaugurated in August 2013 and supported by the São Paulo Research Foundation, CRID has a team of leading scientists that develop innovative and cutting-edge research to combat inflammatory diseases, to propose new pharmacological therapies and to spread scientific knowledge.



# CRID AND INFLAMMATORY DISEASES

1

To generate innovative scientific breakthroughs in inflammation and inflammatory diseases.

## CRID MISSION AND OBJECTIVES

2

To discover biological targets that enable the development of new pharmacological therapies or markers of diagnosis and prognosis of inflammatory diseases.

3

To disseminate knowledge about inflammation and inflammatory diseases to the scientific community, patients and the general public.

# ORGANIZATIONAL STRUCTURE

CRID is divided into six different work groups, the WorkPackages, or WPs, that develop coordinated actions in complementary fields of science and knowledge.

## WP1

Studies the pathophysiology of inflammatory diseases, applying high performance genetic screening techniques [HTS] and advanced tools in Bioinformatics analysis, seeking to identify disease-associated polymorphisms and gene and microRNA expression in patients and experimental animals.

## WP2

Investigates the biological processes involved in the induction, progression and resolution of inflammation and inflammatory diseases, using various animal models to find new biological targets and to develop pharmacological therapies and diagnostic and prognostic markers.

## WP3

Develops studies using diverse cutting-edge methodologies in various animal models. It also performs *in vitro* and *in vivo* validation of potential compounds developed by WP4, targeting the biological targets identified by WP2.

## WP4

Uses samples from volunteers or patients to test potential drugs in preclinical and early clinical trials.

## WP5

Promotes actions of education and dissemination of knowledge to the scientific community, patients and the general public, aiming to increase the comprehension, in a simple and uncomplicated language, of the phenomena related to inflammatory diseases.

## WP6

Seeks to develop knowledge and technology transfer processes, in partnership with pharmaceutical companies, for the Center's main objective: the production of new anti-inflammatory agents and diagnostic markers to improve the treatment and diagnosis of inflammatory diseases.

## WP5

KNOWLEDGE EDUCATION AND DIFFUSION

Studies on the pathophysiology of inflammatory diseases.

Studies based on new biological targets.

WP1

WP2

WP3

DISCOVERY OF  
NEW TARGETS

DISCOVERY OF  
NEW DRUGS

*in vitro* and  
*in vivo* studies.

WP4

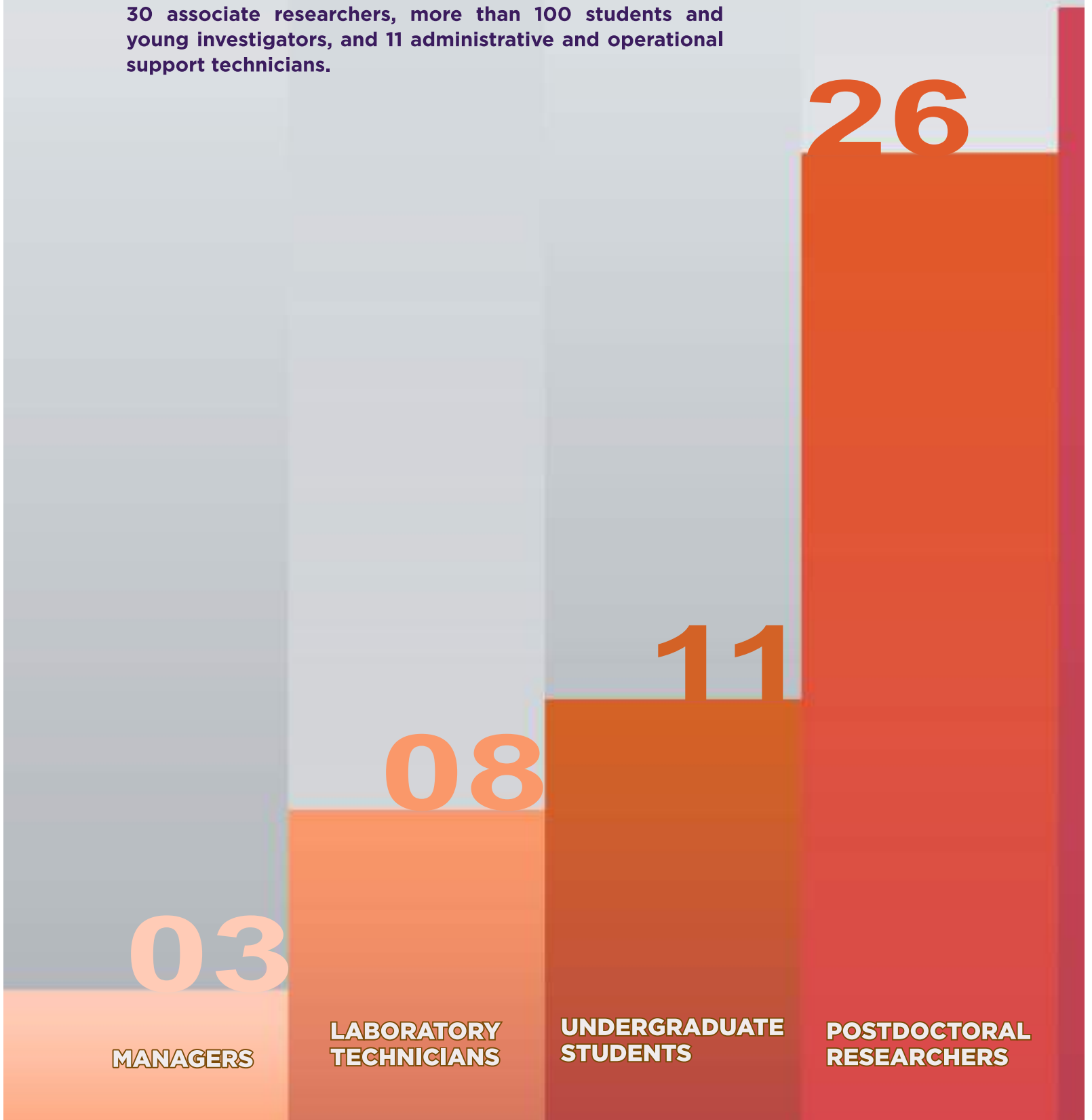
Preclinical studies and development of new drugs and therapies.

## WP6

KNOWLEDGE INNOVATION AND TRANSFER

# CRID IN NUMBERS

CRID has a highly qualified team of 8 principal researchers, 30 associate researchers, more than 100 students and young investigators, and 11 administrative and operational support technicians.



**30 30 30**

In addition to this core faculty, CRID aggregates 30 associate researchers from various Brazilian institutions, such as UNESP, UEL, UFS and USP-SP, as well as foreign institutions, including NIH (USA) and the University of Glasgow (UK).

**08**

**MASTERS**

**DOCTORS**

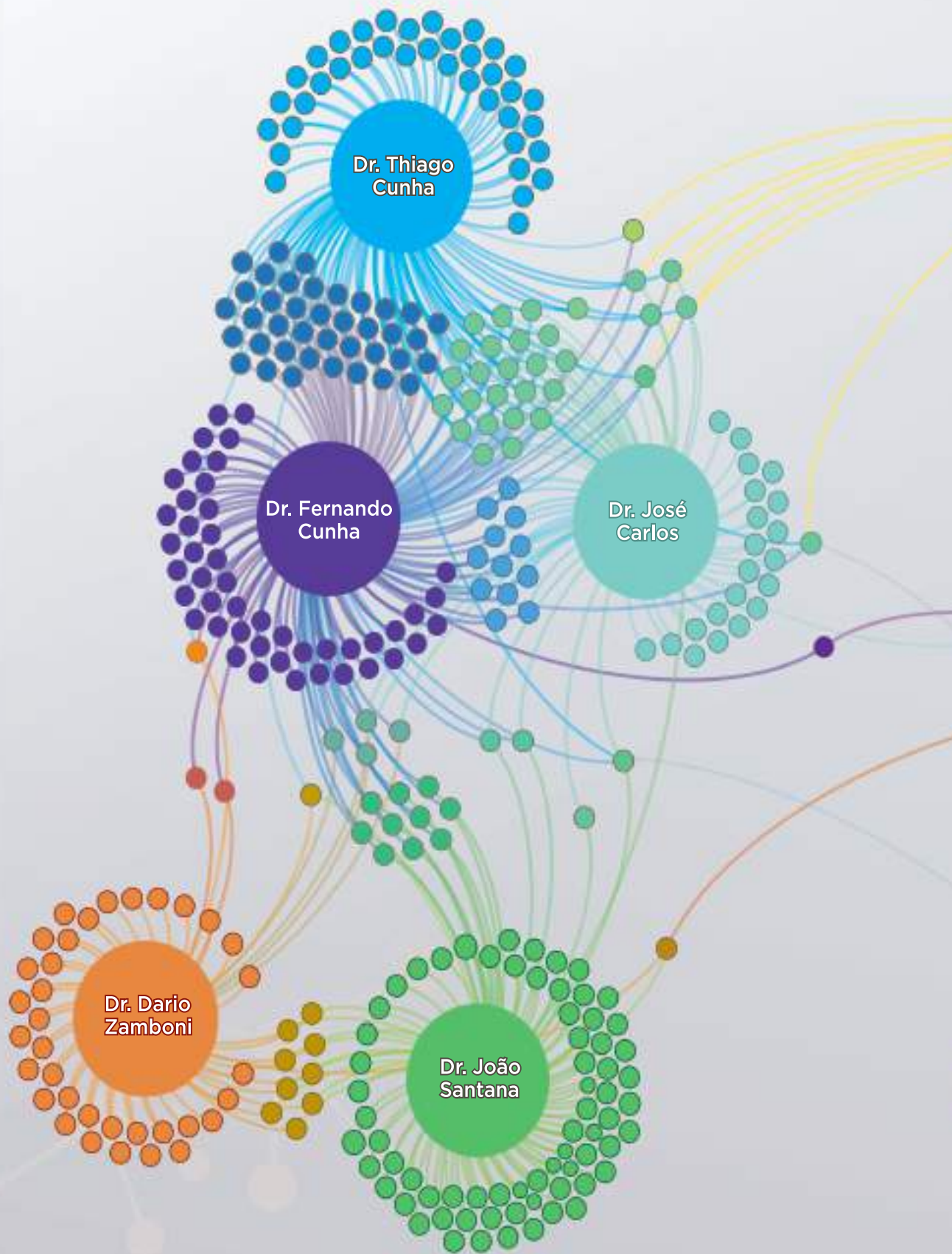
**ASSOCIATED  
RESEARCHERS**

**MAIN  
RESEARCHERS**



# RESEARCH LINES

CRID conducts research in different areas of knowledge, linking medicine, biology and chemistry disciplines to understand inflammatory diseases and to discover new drugs and therapies.







Dr. Paulo Louzada

Dr. Fernando Cunha: Mechanisms involved in leukocyte migration in inflammatory disease models; Pathophysiological mechanisms involved in the genesis of sepsis; Peripheral mechanisms involved in the genesis of inflammatory pain.

Dr. Thiago Cunha: Pharmacology of Inflammation and Pain, acting in the following subjects: Mechanisms involved in the genesis of inflammatory and neuropathic pain. Molecular mechanisms involved in the effects of analgesics.

Dr. Paulo Louzada: Rheumatology, acting in the following subjects: Rheumatoid Arthritis and Lupus.

Dr. José Carlos: Pharmacology of Inflammation; Immunopharmacology; Immunoregulation.

Dr. Rita Tostes: Cellular and molecular mechanisms involved in the regulation of cardiovascular function in physiological conditions and in diseases such as high blood pressure, diabetes and obesity.

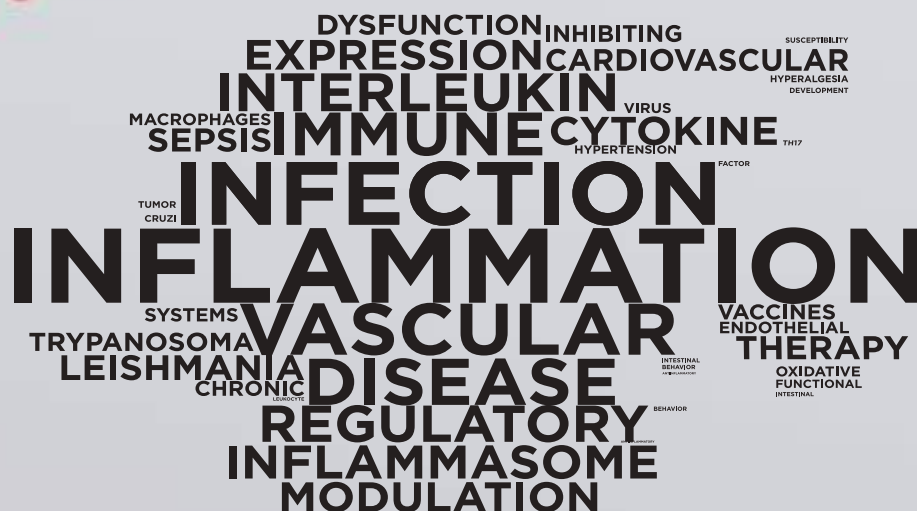
Dr. Helder Nakaya: Network Medicine and Immunology of Inflammatory and Infectious Diseases and Vaccine Systems.

Dr. João Santana: Control of immune response in parasite infections; innate and adaptive immunity and immunopathology: control by lymphocytes, cytokines and chemokines.

Dr. Dario Zamboni: Recognition of intracellular pathogens by cytoplasmic receptors and their importance in controlling microbial infection.

Dra. Rita Tostes

Dr. Helder Nakaya



DYSFUNCTION INHIBITING  
EXPRESSION CARDIOVASCULAR  
INTERLEUKIN VIRUS  
MACROPHAGES SEPSIS IMMUNE CYTOKINE  
INFECTION HYPERTENSION  
INFLAMMATION  
VASCULAR VACCINES  
DISEASE ENDOTHELIAL  
REGULATORY THERAPY  
INFLAMMASOME OXIDATIVE  
MODULATION BEHAVIOR

TOTAL NUMBER OF  
ARTICLES PUBLISHED BY

# CRID KEY RESEARCHERS

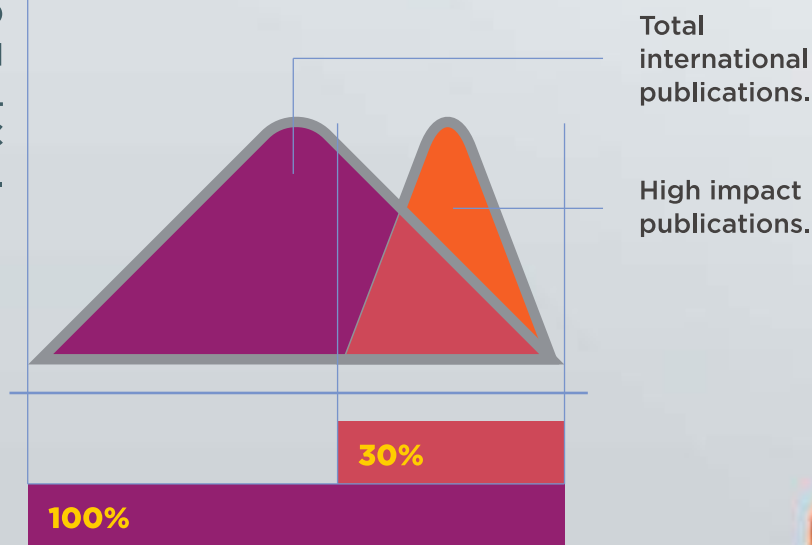
[2010 - 2017]

Leading CRID researchers have published, on average, nearly 100 articles per year in international journals. Of these, approximately 30% were published in high-impact journals, including Nature Medicine, Nature Communications, PNAS, The Journal of Experimental Medicine, Cancer Research, Nature Immunology, Arthritis and Rheumatology, Circulation, and Journal of Neuroscience.

## CRID CREATION



ARTICLES  
PUBLISHED  
ANNUALLY IN  
INTERNATIONAL  
SCIENTIFIC  
JOURNALS.



These numbers are approximately double those published by the same authors in the years prior to the creation of the CRID, reinforcing the importance of CEPID funding to improve the quality of scientific publications in the state of São Paulo and Brazil.

The articles published by CRID have co-authors from most Brazilian states (over 90%) and also from all continents, confirming that the center has high national and international scientific visibility. In addition, more than a dozen highly recognized foreign professors have developed activities as visiting professors in the center's laboratories in the first five years. In addition, several CRID doctoral and postdoctoral researchers have carried out part of their projects in the labs of these visiting professors.

CRID'S WORK HAS BEEN HIGHLIGHTED AND  
RECOGNIZED IN THE SCIENTIFIC COMMUNITY.

# AWARDS

Here are some important awards received by CRID  
since 2013 from leading institutions:



## 1 CAPES THESIS AWARD - 2013

DOCTORAL  
CANDIDATE:  
Victor V Lima

SUPERVISOR:  
Rita C. Tostes

## 2 BIOTECH SPACE RESEARCHER OF THE YEAR - 2014

RESEARCHER:  
Thiago Mattar Cunha

## 3 CAPES THESIS AWARD - 2014

DOCTORAL CANDIDATE:  
Djalma Lima Jr

SUPERVISOR:  
Dario S. Zamboni

## 4 CAPES-ELSEVIER AWARD - 2015

RESEARCHER:  
João Santana da Silva



**SCIENCE AND TECHNOLOGY INCENTIVE AWARD FOR SUS - 2015**

DOCTORAL CANDIDATE:  
Raphael S. Peres

SUPERVISORS:  
Fernando Queiroz Cunha;  
Paulo Louzada Junior;  
José Carlos Alves Filho;  
Thiago Mattar Cunha



**YOUNG INVESTIGATORS COMPETITION - 2016**

POSTDOCTORAL RESEARCHER:  
Thiago B. Nascimento

SUPERVISOR: Rita Tostes

**TWAS-LACREP PRIZE FOR YOUNG SCIENTISTS - 2018**

Thiago Mattar Cunha



**NANOCELL INSTITUTE SCIENTIST AND ENTREPRENEUR OF THE YEAR AWARD - 2018**

Fernando de Queiroz Cunha



**NANOCELL INSTITUTE SCIENTIST OF THE YEAR AWARD - 2016**

AREA: Biotecnologia aplicada à saúde

DOCTORAL CANDIDATE: Raphael S. Peres

SUPERVISORS:  
Fernando Queiroz Cunha e Paulo Louzada Junior





# PATENTS

DRIVER  
C

**WITH THE SUPPORT OF THE USP INNOVATION AGENCY, SIX TECHNOLOGY TRANSFER ACTIONS AND PATENTS ARE ALREADY IN PROGRESS, DEMONSTRATING THE EFFECTIVENESS OF CRID RESEARCH.**

# DEPOSITED



Method for predicting therapeutic response to methotrexate: development of a diagnostic kit.



Benzimidazole Analogs and Synthesis Processes.



Antiparasitic compound and its production process and use.

# IN PREPARATION

Phytotherapy for the treatment of inflammation and neuropathic pain.

Lapachol as an immunosuppressive drug for the treatment of autoimmune diseases.

Fructose-1,6-bisphosphate for the treatment of inflammatory diseases.



FERNANDO DE  
QUEIROZ CUNHA  
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Fernando de Queiroz Cunha is Professor of Pharmacology at Ribeirão Preto Medical School, University of São Paulo (FMRP/USP). He is a member of the World Academy of Sciences (TWAS), Brazilian Academy of Sciences (ABC), São Paulo State Academy of Sciences, and the Ribeirão Preto Academy of Sciences (ACieRP). He is currently coordinator of CRID - Center for Research in Inflammatory Diseases (CEPID-FAPESP) and Coordinator of the Institute of Advanced Studies at USP - Polo Ribeirão Preto (IEA / USP). He acts as an ad hoc Consultant to the National Council for Scientific and Technological Development (CNPq), the São Paulo Research Foundation (FAPESP), Financier of Studies and Projects (FINEP) and Coordination for the Improvement of Higher Education Personnel (CAPES). He represents the University of São Paulo on the Ribeirão Preto Innovation and Technology Park Council. He has published more than 500 scientific articles in international journals, which have received more than 20,000 citations, with an H index of 70 (Scopus).

#### MOTIVATIONS:

Dr. Cunha develops translational research in inflammatory diseases, integrating the scientific results of basic and clinical studies, aiming to elucidate the pathophysiological mechanisms of these diseases, the development of efficient diagnostic methods and the identification of new therapeutic targets for the design of new drugs.

#### RESEARCH LINES:

Immunopharmacology, with emphasis on Inflammatory Diseases - sepsis, rheumatoid arthritis, mechanisms involved in tissue damage, leukocyte migration, innate immune response and cytokines.



PAULO LOUZADA JUNIOR  
plouzada@fmrp.usp.br

Paulo Louzada Junior graduated in Medicine, has a Master's degree in Biochemistry and a Doctorate in Medicine (Clinical Medicine) from FMRP / USP and has trained at the Fred Hutchinson Cancer Research Center, Seattle, USA. He is Professor and Chair of the Medical Clinic Department at FMRP / USP, Coordinator of the Support Center for Research on Inflammatory Diseases and Vice Coordinator of Graduate Studies at FMRP / USP. He acts as an Assistant Coordinator of CAPES Medicine I, is the Principal Researcher and Vice Coordinator of CRID and the Coordinator of the Rheumatology Discipline of HC-FMRP-USP.

#### MOTIVATIONS:

Dr. Louzada Junior integrates basic and clinical research in the field of inflammatory diseases using results obtained from in vitro tests and animal models for preclinical studies and initial and phase two clinical trials.

#### RESEARCH LINES:

Medicine, with emphasis on the area of Rheumatology, acting in the following subjects: rheumatoid arthritis and lupus.



JOÃO SANTANA DA SILVA  
jsdsilva@fmrp.usp.br

João Santana da Silva graduated in Biological Sciences, with a Master's degree and Doctorate in Biochemistry from USP and has performed Postdoctoral research in the United States. He is a senior Professor at FMRP / USP, Fiocruz Specialist, CNPq Researcher 1A, Member of the Brazilian Academy of Sciences and is on the editorial board of the Brazilian Journal of Medical and Biological Research, Bio Med Research International and Frontiers in Microbiology. He was president of the Brazilian Society of Immunology (SBI), coordinator of CAPES Biological Sciences Area III, coordinator of the Basic and Applied Immunology Program of FMRP / USP, President of the Graduate Commission, President of the Advanced Institute of Health Foundation (FIPASE) and Capes-Elsevier Award winner in 2015.

#### MOTIVATIONS:

Immunoparasitology and Immunopathology, with emphasis on deregulated inflammatory responses in order to understand the pathophysiological mechanisms and identify potential new drug targets for the effective treatment of inflammatory diseases.

#### RESEARCH LINES:

Dr. Silva works in the areas of Immunoparasitology and Immunopathology, with emphasis on controlling the immune response in parasitic infections and deepening the understanding of the processes of innate and adaptive immunity.



RITA DE CASSIA A.  
TOSTES PASSAGLIA  
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Rita de Cassia A. Tostes Passaglia is Professor and Chair of the Pharmacology Department at FMRP / USP. She graduated in Pharmacy at the Faculty of Pharmaceutical Sciences of Ribeirão Preto, University of São Paulo (FCFRP / USP) and has a Master's degree and Doctorate in Biological Sciences (Pharmacology) from FMRP / USP. She did internships at the Albert Einstein College of Medicine, NY - USA, the University of Montreal - Clinical Research Institute of Montreal - Canada and Augusta University (Medical College of Georgia), GA - USA. She is a member of the Brazilian Academy of Sciences, a CNPq Researcher 1A and a member of the Area Panel at the Sao Paulo Research Foundation (FAPESP).

#### MOTIVATIONS:

Dr. Tostes' research focuses on understanding the mechanisms involved in vascular changes that occur in cardiovascular and metabolic diseases and how sex hormones and the immune system modulate vascular function.

#### RESEARCH LINES:

Cardiovascular pharmacology and physiology; signaling pathways that control vascular function and its changes in hypertension, diabetes mellitus and obesity.



**DARIO SIMÕES ZAMBONI**  
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Dario Simões Zamboni is Professor of Cellular Biology at FMRP / USP. He graduated in Biological Sciences from the University of Brasilia (UnB), has a Doctorate in Microbiology, Immunology and Parasitology from the Federal University of São Paulo (UNIFESP) and performed Postdoctoral research in Microbial Pathogenicity at Yale University, USA. He was an Affiliate Member of the Brazilian Academy of Sciences and is an Affiliate Member of The World Academy of Sciences (TWAS / UNESCO).

#### MOTIVATIONS:

Dr. Zamboni's research focuses on understanding the relationships between pathogens and host cells. He uses cellular, molecular and biochemistry techniques to understand this multidisciplinary area encompassing Cell Biology, Microbiology and Immunology.

#### RESEARCH LINES:

Cell Biology, Microbiology and Immunology, with emphasis on Pathogen-Host Cell Interaction and aspects of Microbial Pathogenicity and Innate Immunity.



**JOSÉ CARLOS FARIAS  
ALVES FILHO**  
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José Carlos Farias Alves Filho graduated in Pharmacy and Biochemistry from the Pontifical Catholic University of Rio Grande do Sul (PUCRS), has a Master's degree and Doctorate in Pharmacology from FMRP / USP and performed Postdoctoral research at the Division of Immunology, Infection and Inflammation - University of Glasgow. He is currently an Associate Professor at FMRP / USP and a Member of the Brazilian Society of Experimental Pharmacology and Therapeutics and the Brazilian Society of Immunology. He was an Affiliate Member of the Brazilian Academy of Sciences.

#### MOTIVATIONS:

Dr. Alves Filho works toward a better understanding of the mechanisms involved in regulating the immune response and the possibility of identifying new therapeutic targets for the treatment of chronic inflammatory diseases.

#### RESEARCH LINES:

Mechanisms regulating the plasticity and activity of immune cells, mainly T lymphocytes and macrophages, and their functions in chronic inflammatory diseases, with the aim of developing new immune modulating strategies.





## THIAGO MATTAR CUNHA

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Thiago Mattar Cunha graduated in Pharmacy-Biochemistry from the Faculty of Pharmaceutical Sciences of Ribeirão Preto, University of São Paulo (FCFRP / USP), has a Master's degree and Doctorate, and has performed Postdoctoral research in Pharmacology at FMRP / USP. He is an associate Professor at FMRP / USP and an Affiliate Member of the Brazilian Academy of Sciences. He is a member of the Brazilian Society of Experimental Pharmacology and Therapeutics and the International Association for the Study of Pain. He is also an academic editor of international journals such as PLOS One, Frontiers in Pharmacology and Inflammation Research.

### MOTIVATIONS:

Dr. Cunha contributes to the understanding of the biological processes that lead the transition from acute pain to chronic pain. Understanding these biological processes may enable the development of more selective and effective drugs for the treatment of chronic pain, a condition that affects millions of people worldwide.

### RESEARCH LINES:

Pharmacology of inflammation and pain, acting in the following subjects: Mechanisms involved in the genesis of inflammatory and neuropathic pain and molecular mechanisms involved in the effects of analgesics.



## HELDER TAKASHI

## IMOTO NAKAYA

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<http://csbiology.com/>

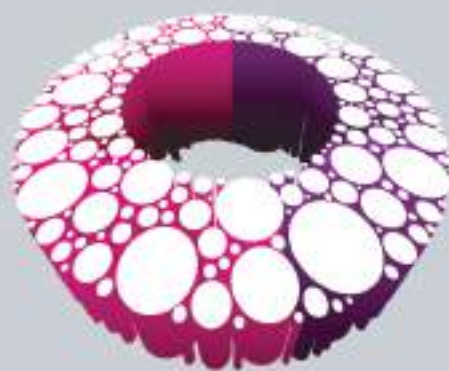
Helder Takashi Imoto Nakaya is pioneering the use of biological systems approaches to define molecular signatures that help predict vaccine-induced immunity in humans, including the mechanisms responsible for T and B cell responses to yellow fever, meningococcal and influenza vaccines. He has played important roles in various systems biology projects related to infectious diseases that affect the Brazilian population, such as Dengue, Chikungunya, Zika, Schistosomiasis and Chagas disease. He is an assistant professor at the University of São Paulo and an adjunct professor at Emory University, USA.

### MOTIVATIONS:

Dr. Nakaya focuses on solving biological problems through the development and use of high productivity computational tools and data analysis. He aims to develop the area of systems biology, which is the analysis of behavior and interaction between components of a biological system, viewed as a whole and under different perturbations. He is also involved in the development of user-friendly tools that allow scientists with no bioinformatics experience to perform their own systems biology analysis.

### RESEARCH LINES:

Systems biology approaches to study a wide range of inflammatory conditions as well as infectious diseases and vaccine-induced immunity. With multidisciplinary projects, including the participation of excellent external contributors, this provides important insights and knowledge and allows experimental validations of scientific findings to be performed.



# CRID

CENTER FOR RESEARCH IN  
INFLAMMATORY DISEASES



SUPPORT



Fundação de Amparo à Pesquisa do Estado de São Paulo