Fraunhofer
CHILE

FRAUNHOFER CHILE RESEARCH - CENTER FOR SYSTEMS BIOTECHNOLOGY

APPLIED RESEARCH THAT MEETS THE NEEDS OF THE MEDICINE INDUSTRY

Fraunhofer-Gesellschaft

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 66 institutes and research units at locations throughout Germany.

The Fraunhofer-Gesellschaft employs over 24,000 scientists and engineers, who work with an annual research budget totaling more than 2 billion euros. Of this sum, around 1.7 billion euros is generated through contract research.

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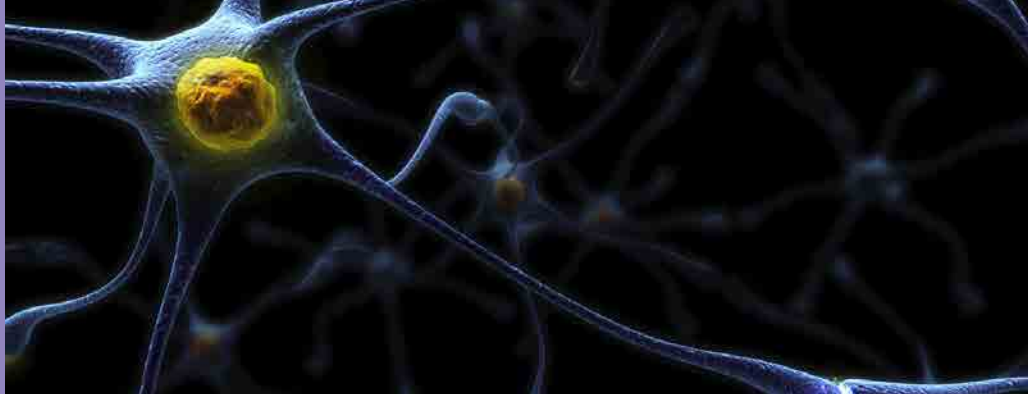
Fraunhofer Chile Research

The Fraunhofer Chile Research Foundation (FCR) aims to improve industrial competitiveness of local businesses through applied research in Chile and Latin America.

We develop new products and services for different industries, including Agricultrue, Food and Food Ingredients, Aquaculture, Health, and Renewable Energy.

Additionally, we offer consultancy services in technology transfer, intellectual property, technology commercialization, and innovation management.



Fraunhofer Chile Research - Center for Systems Biotechnology (FCR-CSB)

FCR-CSB was the first research center established by the Fraunhofer Chile Research Foundation with the support of the Program for the Attraction of International Excellence Centers in R&D of CORFO.

Its aim is to offer innovative solutions for varies industries using biotechnological platforms.

As of October 2015, FCR-CSB has:

- Over 125 researchers working in 8 Divisions, including Biomedicine, Biocomputing and Applied Genetics, Nanomedicine, Nanobiotechnology, Renewable Resources, Therapeutic Peptides, Aquaculture and Sustainable Aquaculture, and Agriculture.
- Generated over 49 new research projects from competitive public sources and over 74 industry contracts.
- 13 patent applications and 3 granted patents from work done in Chile.
- More than 60 articles in peer-reviewed journals.
- Has established collaborations with 22 local Universities, three of them as strategic collaborators.
- Its strategic collaborators are Universidad de Talca, Universidad Católica de Valparaíso, Universidad Andrés Bello and Fundación Chile.

Director of the Center
Prof. Dr. Wolfgang Schuch
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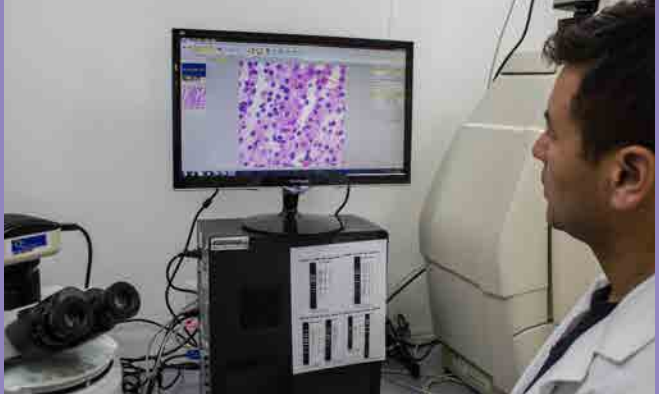


Medicine Industry

The pharmaceutical industry produces medicine to cure, protect and improve the health of people. This industry faces important challenges and must be prepared for the emerge of new technologies, the shorten in the life cicle of its products, the increase in the industry international competition, the demand of novel services and the arise of new deseases.

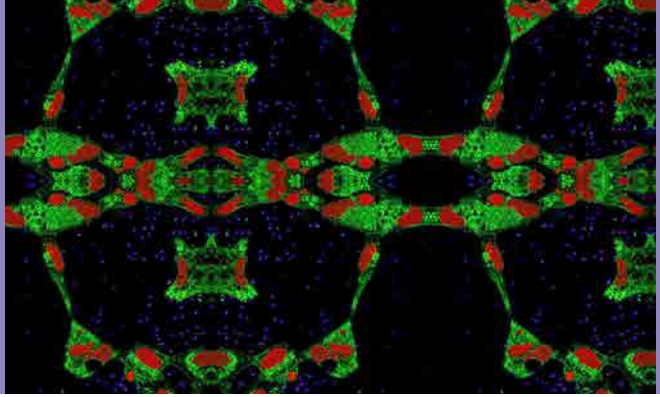
Research focus:

Biomedicine

- Discovery and validation of diagnostic tools and therapeutics for neurological diseases, preclinical trials *in vitro* and *in vivo*.
- Validation and behavioral characterization of the *O.degus* as a key animal model for Alzheimer's disease.
- Characterization of molecular and protein biomarkers related to Alzheimer's disease in *O. degus*.
- Drug testing and development in the *O degus*.
- Characterization of biomarkers of Fragile X syndrome and autism.
- Interaction between the brain-gut microbiome as a new way of generating probiotics.

Biocomputing and applied genetics

- Development and implementation of high-performance technologies in structural bioinformatics, data mining, and molecular modeling and simulation, pharmacogenomics, and others.
- Analysis and interpretation of genetic data of any kind through a modern bioinformatics platform.



- Sequencing of DNA from viruses, bacteria and fungi, with the purpose of detecting and genotyping pathogens and improving their bioprocesses.
- Sequencing of human DNA, in order to detect hereditary diseases, perform genetic association studies and population analysis.

Nanobiotechnology

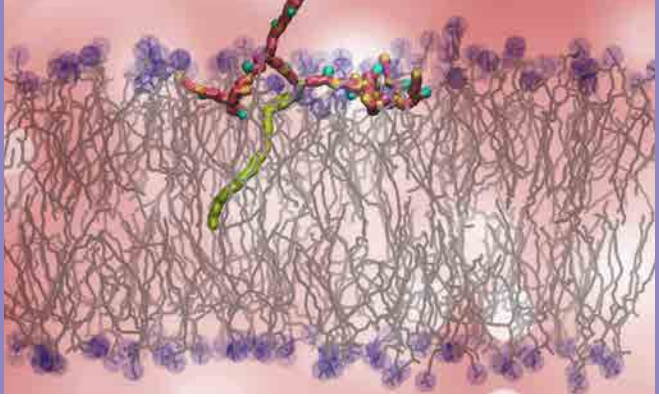
- Development of toxicology tests to determine the toxicity of nanoparticles to the environment or people.
- Development of selective compounds for the capture of contaminants, such as uranium and other heavy metals which may be present in human beings.
- Development of nanochips to determine levels of concentration of metals present in the blood and saliva.
- Development of biomarkers to detect diseases in humans such as Alzheimer´s disease, autism.

Nanomedicine

- Design, synthesis and testing of dendrimers for the controlled release of drugs and/or molecules of biomedical use.
- Testing of new nanomaterials in animal models.
- Development of new delivery systems which are biocompatible for application in clinical trials.
- Design and synthesis of other drug delivery systems based on glycosylated liposomes. Identification of novel pain inhibitors.

Therapeutic Peptides

- Strategy for the generation of interfering peptides that can be used for the control broad groups of viruses.
- Generation of peptide molecules with antimicrobial activity able to inhibit bacteria and fungi.



Services:

Biomedicine

- Management of animal models of neurodegenerative and neurodevelopmental diseases.
- Gene expression profiling and analysis using microarrays.
- Global gene expression analysis and taxonomic distribution of bacterial consortia (microbiomes associated with human diseases).
- Generation of primary cultures of animal models of neurodegenerative and neurodevelopmental diseases.
- Use of cell cultures for screening new drugs (toxicological analysis, cell viability, oxidative stress).
- Behavioral tests in model animal for disease for preclinical testing.

Biocomputing and applied genetics

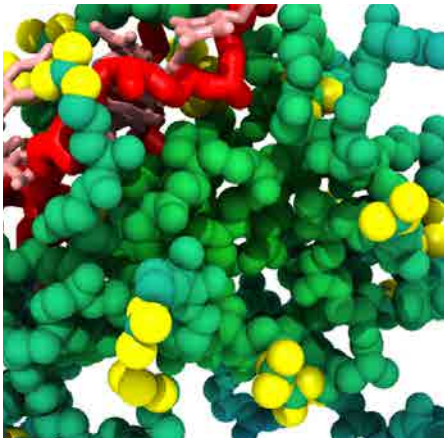
- Generation and analysis of genetic data from different species.
- DNA sequencing, construction of genetic databases and comparison with existing databases worldwide.
- Data analysis by massive high-throughput sequencing "next generation" (full genome, RNA seq, microRNA seq, CHIP seq.).
- Identification of biomarkers.
- Sequencing and development of genetic tests for humans.

Nanobiotechnology

- Synthesis and rational design of smart polymers. Development of biomarkers using chemical approaches.
- Toxicology studies and determination of toxic compounds.
- Mass spectrometry services to measure chemicals.

Nanomedicine

- In silico design of dendrimers for medical applications.
- Drug design.
- Drug synthesis.



Therapeutic Peptides

- Design of pathogen control strategies.
- Molecular analysis of pathogens.
- Bioinformatic modeling and definition of target sequences.
- Assays for testing biological activity both *in vitro* and *in vivo*.

Fraunhofer Chile Research Foundation
Center for Systems Biotechnology (FCR-CSB)

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With the support of:

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Gobierno de Chile