DOCTORADO
BIOMOL

# Our PhD Programme

## Presentation

The Doctorate in Sciences, major in Applied Cellular and Molecular Biology at Universidad de La Frontera, is unique in Chile and recognized both nationally and internationally for its academic excellence and scientific productivity.

Accredited by the National Accreditation Commission (CNA), this prestige enhances its quality and makes it eligible for various scholarships in Chile, providing greater opportunities for its students.
The program's collaborations agreements with national and international entities for joint thesis development allow students to progress in their research and undertake placements at other renowned centres of excellence globally. A key highlight is the Double Degree Agreement with the University of Sao Paulo (USP), Brazil, enabling students to graduate under this scheme.

The Doctorate boasts a faculty of national and international researchers, constantly pioneering new research avenues. Many faculty members are affiliated with the Scientific-Technological Nucleus in Bioresources (BIOREN-UFRO, bioren.ufro.cl), a consortium of Universidad de La Frontera's most productive research centers, which includes an Advanced Scientific Equipment Center. This has significantly enhanced scientific productivity and the impact of their publications.

**Degree:** Doctor of Science, major in Applied Cellular and Molecular Biology
**Duration:** Four years

## Programme Director

**Dr. Luis Salazar Navarrete**

E-mail: luis.salazar@ufrontera.cl

Tel.: 56 45 2 596870

doctoradobiomol.ufro.cl

## Objectives

The Doctorate in Science, major in Applied Cellular and Molecular Biology at Universidad de La Frontera, is an academic program delivered in a full-time, in-person, daytime format. Its overarching goal is to educate high-level graduates in sciences who possess autonomous, critical, and innovative research capabilities, along with the skills to lead and integrate teams in scientific and technological research, excelling with competence and creativity in the field of applied cellular and molecular biology.

The **specific objectives** of the Program are:

- To educate researchers capable of understanding and addressing complex biological processes within the disciplines of cellular and molecular biology, to achieve original results, protect developed knowledge, and ethically and professionally disseminate it to the scientific community.

- To conduct research based on robust methodologies, focused on high-priority issues with significant applied potential in cellular and molecular biology across various knowledge areas such as bioresources, biomedicine, and biotechnology.

- To promote and develop international cooperation with centers of excellence, maintaining active academic and scientific exchanges for the creation of knowledge and solutions to global challenges in the field.

## Entry profile

The candidates for the Doctorate in Sciences with a specialization in Applied Cellular and Molecular Biology typically hold a degree in biology, biochemistry, biotechnology, pharmaceutical sciences, biomedical sciences, agricultural sciences, or related fields. These individuals should show a strong motivation and competences for research, evidenced by scientific productivity and participation in academic and scientific activities. Furthermore, they should possess the ability to understand scientific articles in English, highlighting a combination of academic background and language proficiency.

## Graduation profile

The graduate of the **Doctorate Program in Sciences major in Applied Cellular and Molecular Biology** at the Universidad de La Frontera will have the ability to:

1. Develop innovative research projects generating new scientific and/or technological knowledge.
2. Transfer knowledge in the field and research results that contribute to and impact the sustainable development and well-being of the region and society.

They are trained in biological sciences with an emphasis on biomedicine, reproduction biology, and biotechnology of bioresources. Their training enables them to:

1.1. Conduct original research in cellular and molecular biology applying cutting-edge methodologies to contribute to the creation of new knowledge, respecting ethical principles and sustainable use of bioresources.

1.2. Manage innovative solutions to priority problems within the discipline, the region, or the productive sector.

2.1. Present disciplinary knowledge and research results to specialized and non-specialized audiences orally and in writing.

2.2. Manage the publication of scientific articles based on disciplinary knowledge or research results in internationally recognized journals.

2.3. Apply strategies for the transference and protection of intellectual property to safeguard innovative research results.

The graduate demonstrates critical thinking and autonomy and has the ability to work with social responsibility, ethics, and integrate multidisciplinary research teams.

Due to their academic training, they can work in public or private higher education institutions and national and international scientific and technological research centers.

## Application documents

Within the deadlines established in the admission calls, the applicant must send to the Program Directorate the application form, accompanied by the following documentation:

a. Justified request for admission to the Program.
b. Curriculum Vitae.
c. Original certificate or notarized photocopy of the undergraduate grade transcript, signed by the corresponding authority.
d. Original certificate or legalized copy of the Bachelor's or Master's degree.
e. Proof of an average undergraduate or master's grade (or equivalent) of at least 5.0 on a scale of 1 to 7. If the 1 to 7 scale is not used, an official document issued by the Higher Education Institution of the applicant's undergraduate origin explaining the grade equivalencies will be accepted.
f. Two reference letters. At least one of the letters must be from an academic of the University where the applicant graduated, or from the University or Institution where they are currently working.
g. Certificate of no outstanding debts in Undergraduate, Postgraduate, or Graduate Programs at the Universidad de La Frontera.

All documentation issued by a foreign Institution must be presented in its original form, be legalized at the Embassy or Consulate of Chile in the country of origin or at the Ministry of Foreign Affairs in Chile and translated into Spanish when applicable. This documentation will be required for the enrollment process.

For more details, please visit: **admisionbiomol.ufro.cl**

## Curriculum

The Doctoral Program in Sciences with a specialization in Applied Cellular and Molecular Biology has a duration of 8 semesters and awards the degree of Doctor in Sciences with a specialization in Applied Cellular and Molecular Biology.

**MALLA CURRICULAR DOCTORADO EN CIENCIAS MENCIÓN BIOLOGÍA CELULAR Y MOLECULAR APLICADA (PLAN 3)**

| Nivel 1<br>30 SCT | Nivel 2<br>33 SCT | Nivel 3<br>30 SCT | Nivel 4<br>30 SCT | Nivel 5<br>30 SCT | Nivel 6<br>30 SCT | Nivel 7<br>30 SCT | Nivel 8<br>30 SCT |
|---|---|---|---|---|---|---|---|
| **PBM301**<br>Biología Celular y Molecular<br>**15 SCT** | **PBM303**<br>Curso de Especialidad<br>**10 SCT** | **PBM306**<br>Bioética e Integridad Científica<br>**8 SCT** | **PBM309**<br>Inglés Científico<br>**5 SCT** | **PBM312**<br>Electivo II<br>**8 SCT** | **PBM314**<br>Avance Tesis Doctoral III<br>**30 SCT** | **PBM315**<br>Avance Tesis Doctoral IV<br>**30 SCT** | **PBM316**<br>Tesis Doctoral<br>**20 SCT** |
| **PBM302**<br>Biología Celular y Molecular Aplicada<br>**15 SCT** | **PBM304**<br>Gestión de Tecnologías Emergentes<br>**10 SCT** | **PBM307**<br>Formulación Proyecto de Tesis Tipo Fondecyt<br>**14 SCT** | **PBM310**<br>Electivo I<br>**8 SCT** | **PBM313**<br>Avance Tesis Doctoral II<br>**22 SCT** | | | **PBM317**<br>Examen de Grado<br>**10 SCT** |
| | **PBM305**<br>Unidad de Investigación<br>**13 SCT** | **PBM308**<br>Examen de Calificaciones<br>**8 SCT** | **PBM311**<br>Avance Tesis Doctoral I<br>**17 SCT** | | | | |

# Research Areas

## 1. Biology and biotechnology of bioresources

Academic Coordinator: Dr. Pía Loren Reyes

| Advisors | |
|---|---|
| Francisca Acevedo | Biotechnology of bioactive principles |
| Jacquelinne Acuña | Microbiology in constructed environments |
| César Arriagada | Bioremediation |
| Leon Bravo | Plant physiology |
| Alejandra Fuentes | Microbial biotechnology |
| Hector Herrera | Molecular ecology |
| Milko Jorquera | Microbiology in constructed environments |
| Cristian Paz | Chemistry of natural products |
| Marjorie Reyes | Plant biochemistry, molecular biology, and physiology |
| Patricia Sáez | Plant ecophysiology |
| Luis Salazar | Biotechnology of bioactive principles |
| Cledir Santos | Bioremediation |
| **Adjunct professors** | |
| Paola Durán | Microbial biotechnology |
| Pia Loren | Biotechnology of bioactive principles |
| Eulàlia Sanz | Nanoencapsulation |
| Stefanía Short | Nanotechnology applied to agriculture |
| Traudy Wandersleben | Biotechnology of bioactive principles |

## 2. Cellular and Molecular Biology of Reproduction

Academic Coordinator: Dr Pamela Uribe Catalán

| Advisors | |
|---|---|
| Maria Elena Arias | Animal reproduction |
| Rommy Díaz | Animal production |
| Jorge Farías | Aquaculture biotechnology |
| Ricardo Felmer | Animal reproduction |
| John Quiñones | Animal production |
| Jennie Risopatrón | Animal reproduction |
| Néstor Sepúlveda | Animal production |
| Pamela Uribe | Cellular and molecular andrology |
| **Adjunct professors** | |
| Fabiola Zambrano | Reproduction biology |

## 3. Cellular and molecular biology of priority diseases

Academic coordinator: Dr. Carmen Gloria Ili Gangas

| Advisors | |
|---|---|
| Michel Abanto | Microbial genomics |
| Priscilla Brebi | Cellular biology and cancer |
| Cristina Bucchi | Tissue engineering |
| Alejandro Castro | Computer-aided drug design |
| Álvaro Cerda | Molecular biomarkers in obesity |
| Jorge Farías | Pharmaceutical biotechnology |
| Flery Fonseca | Parasites molecular taxonomy |
| Carmen Ili | Molecular biology and cancer |
| Patricio Iturriaga | Molecular pharmacology of addictive processes |
| Fernando Lanas | Personalised medicine and cardiovascular disease |
| Pamela Leal | Molecular biology and cancer |
| Gabriel Marzuca | Skeletal muscle atrophy |
| Mónica Pavez | Molecular biology of infectious diseases |
| Nicolás Saavedra | Microbiome and cardiovascular health |
| Luis Salazar | Personalised medicine and cardiovascular diseases |
| Pamela Serón | Personalised medicine and cardiovascular diseases |
| Helga Weber | Cellular biology and cancer |
| **Adjunct professors** | |
| Kurt Buchegger | Cellular biology and cancer |
| Carola Matus | Molecular pathology |
| Kathleen Saavedra | Personalised medicine and cardiovascular diseases |
| Mauricio Zamorano | Pharmaceutical biotechnology |

## Cross-disciplinary Support Academics

| | |
|---|---|
| Nathalia B. Dias | Mass spectrometry |
| Karina Godoy | Microscopy |
| Manuel González | Biostatistics |
| Samuel Herrera | Epistemology |
| Carlos Isaacs | Management of emerging technologies |

For more details, please visit: **doctoradobiomol.ufro.cl/cuerpo-academico**