

ehugroup 

Achucarro

BASQUE CENTER FOR NEUROSCIENCE

scientia ad remedium

2024

Annual Report

Contents

Foreword.....	1
1. Strategy and Management	2
2. Partnerships and Collaborations.....	6
3. People	9
4. Research	12
5. Knowledge Transfer	18
6. Infrastructure and Equipment	27
7. Main performance indicators.....	29

Foreword

Dear reader,

During 2024 we continued kept a good pace in terms of publication output (67 papers published with 92% of them in Q1), funding (5.3 M€), attracting qualified researchers with new lines of research, and consolidating our group of Principal Investigators through tenured positions.

Specific highlights include the success of our researchers in competitive calls like ERC Consolidator and Alzheimer's Association.

In line with the current strategy, two years ago we began the profound internal re-organization into three Research Programmes (Neuro-glial interactions in brain diseases, Glial modulation of brain structure and function, and Gliotheranostics) which has fostered stronger internal interactions, and has allowed us to apply to a variety of highly competitive calls with projects involving many of our Principal Investigators.

Even though we did not succeed in all of them, teamwork dynamics are consolidating into the centre's culture. We continue to design new projects with the idea of furthering this momentum, with an eye also in facilitating societal outreach, as Neuroscience is a fast-paced discipline of great social impact.

No withstanding the continued effort and ambition of our faculty, the expansion and reinforcement of our core facilities has been made possible through the support of our reference institutions, Ikerbasque and the Basque Government. Both have shown a strong commitment in encouraging our goals and scientific endeavours.

All in all, during this past year we have achieved all the milestones planned at this stage in our ongoing Strategic Research Plan. We aim to consolidate them in the coming years, with a stable work force, sustained resources, and an unrelenting ambition to improve continuously.

Ignacio Torres Alemán
Scientific Director

Elena Alberdi Alfonso
Assistant Scientific Director

ACHUCARRO is one of the BERC (Basque Excellence Research Centres) research organisations fostered by the Department of Education of the Basque Government.

There are nine organisations recognised as BERC within the Basque Science, Technology, and Innovation network.

1. Strategy and Management

In 2022, we launched our third strategic plan for the 2022-2025 period. ACHUCARRO's overall objective is to perform co-ordinated multidisciplinary research of the brain functions on all levels: from single molecules through individual cells, acutely isolated nervous tissues, to the brain networks operating in vivo; all to further advance the discoveries in physiology and pathophysiology of the nervous system.

The foundations that support our strategic view and future vision are:

- ▶ Recruit, Reintegrate and Retain **talented research personnel**, to perform excellent research and contribute to **advanced post-graduate training**.
- ▶ Develop **modern infrastructures** within the Science Park of the UPV/EHU, at the University campus in Leioa.
- ▶ Assess and incorporate the latest **technologies and equipment** to let the centre operate on the frontier of knowledge.
- ▶ To perform research projects centred in the study of glial cells to contribute to the discovery of **new therapies** for neurological diseases for the benefit and **well-being of the Society**.

By the end of 2024 we started the second part of the current strategic programme, after the successful mid-term assessment.

SCIENTIFIC PLAN 2022–2025

The key strategic direction of ACHUCARRO is the in-depth study of neuronal-glial biology in normal and pathological brains.

The new Scientific Plan has defined three programmes, with a bottom-up approach: to attain a strategy that fosters internal collaboration and maximizes its impact.

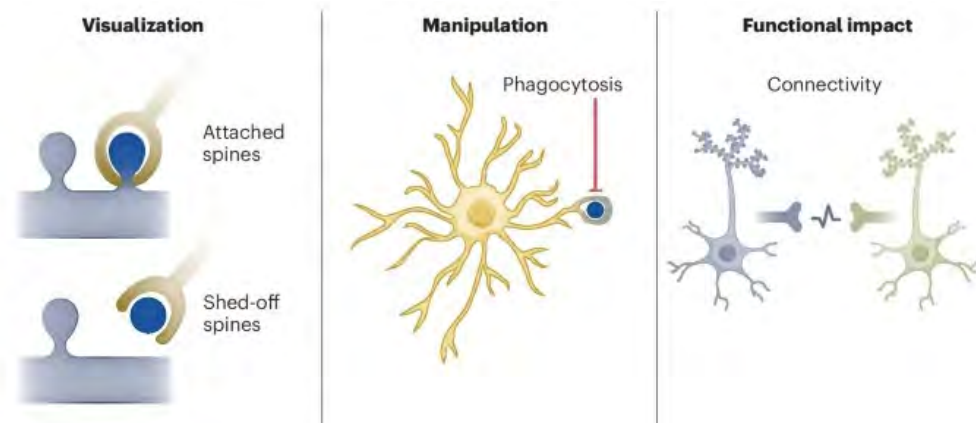
Research Programmes

- ▶ **Neuro-Glial interactions in brain diseases**
- ▶ **Glial modulation of brain structure and function**
- ▶ **Gliotheranostics**

Over a decade ago, it was discovered that microglia, the brain's immune cells, engulf synaptic material in a process named microglial pruning. This term suggests that microglia actively sculpt brain circuits by tagging and phagocytosing unwanted synapses

Microglia as hunters or gatherers of brain synapses

However, live imaging studies have yet to demonstrate how microglial synapse elimination occurs. To address this issue, we propose a new conceptual framework distinguishing between two potential mechanisms of synapse elimination, culling and scavenging. During culling, microglia may use a contractile ring to sever the neuronal plasma membrane, removing the unwanted synapse. During scavenging, synapse elimination is neuronal-driven, and the neuronal plasma membrane fission machinery sheds off synapses that are later phagocytosed by microglia. We will discuss the current limitations of studying microglial synapse elimination and evaluate evidence supporting either culling or scavenging. Discerning between these mechanisms is essential for determining the therapeutic value of phagocytosis modulators in diseases with altered brain connectivity.



While substantial progress has been achieved in comprehending the microglial regulation of neuronal function, the field of synapse elimination still faces a fundamental knowledge gap regarding the mechanisms driving it. Promoting our understanding of how microglia and neurons orchestrate this intricate membrane-remodeling process will be instrumental in unraveling the full picture, laying the foundation for future research endeavors with the potential to impact the regulation of synapse elimination through pharmacological interventions to recover brain connectivity.

“Microglia as hunters or gatherers of brain synapses”

Pereira-Iglesias, Marta; Maldonado-Teixido, Joel; Melero, Alejandro; Piriz, Joaquin; Galea, Elena; Ransohoff, Richard M.; Sierra, Amanda

Nature Neuroscience (Dec, 2024) DOI: [10.1038/s41593-024-01818-w](https://doi.org/10.1038/s41593-024-01818-w)

EQUALITY AND INCLUSION PLAN 2022-2025

ACHUCARRO initiated the development of its first Equality Plan in 2017, in collaboration with an external consultancy specialised in this domain. In 2021, we undertook a comprehensive evaluation of the preceding plan to inform the formulation and implementation of our second iteration.

The plan has yielded tangible improvements, fostering a culture of greater equity, equality, and diversity within our organization. We are gratified to observe a positive evolution in the balance and representation of individuals in leadership positions.

Our Equality Committee (EC) comprises representatives from across the organisation, spanning various roles and career stages, and maintains gender parity. Serving as both the driving force and assessor of all initiatives outlined in the plan, the EC plays a pivotal role in ensuring its efficacy and impact.

This new plan continues building on four improvement areas that were already identified in the first plan:

1. **Promoting equal opportunities in positions of responsibility.**
2. **Generate working environments and conditions that facilitate the co-responsible conciliation of personal, family, and professional life.**
3. **Incorporate a gender perspective in the policies, products, and operating dynamics.**
4. **Promote inclusive leadership styles.**

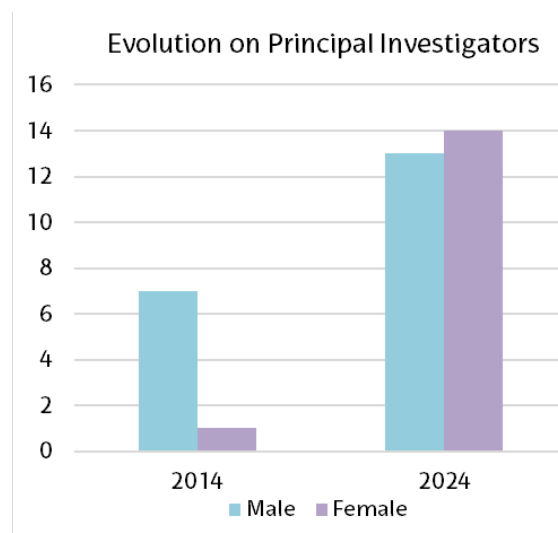


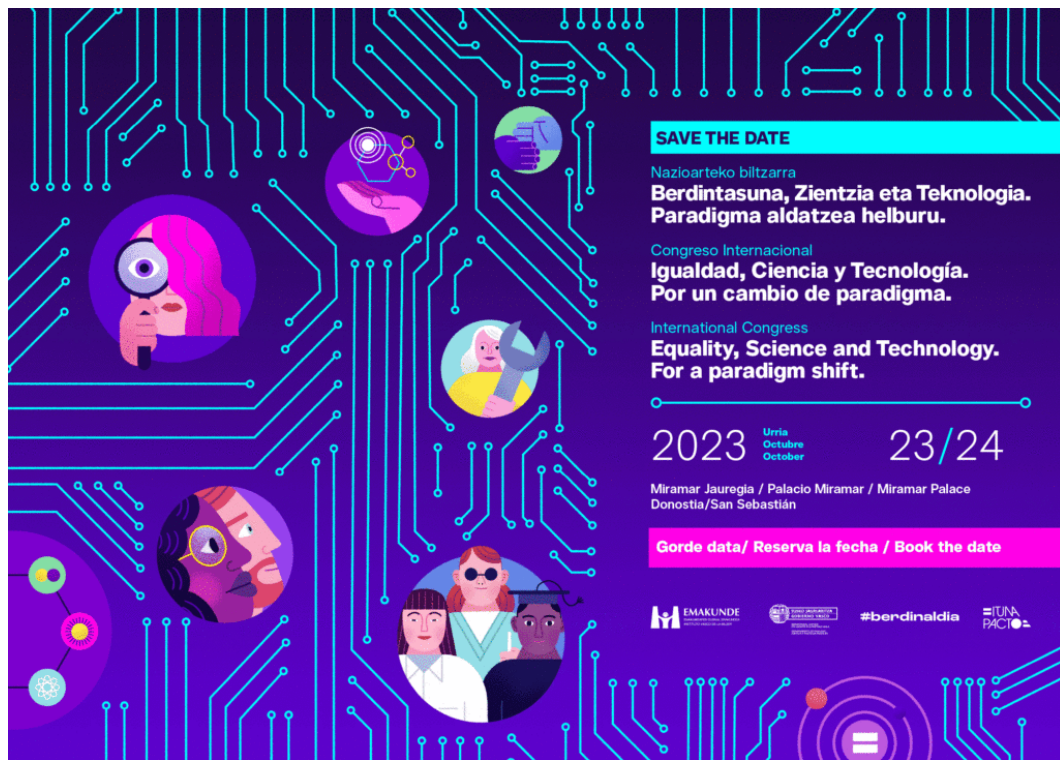
Figure 1. Evolution of number of Principal by gender, from 2014 to 2024

<https://www.achucarro.org/equality>

The General Manager represented ACHUCARRO in the Scientific Committee of the congress "International Congress on Equality, Science and Technology. For a Paradigm Shift" held in Donostia - San Sebastian, in October 23 and 24

Equality, Science and Technology. For a Paradigm Shift

In the framework of the **Basque Pact for Equality and living free of violence against women**, the Emakunde – Basque Women’s Institute (Basque Government), together with other organisations in the Basque Country, and the international support of the European Union and United Nations, organised this congress to promote a paradigm shift in the field of science and technology to systematically and fully incorporate a gender perspective and respond to the challenges of achieving a fairer and more egalitarian society where no one is left behind.



The programme included keynote lectures by experts in the field like María Ángeles Sallé, Anne Pépin, Londa Schiebinger, Silvia Rueda, Hélène Molinier, Curt Rice, Alan Greig and Emma Short among others.

The selection of ACHUCARRO to be part of the Scientific Committee is a recognition to our commitment towards Equality, Equity and Diversity in Science.

<https://www.berdintasunazientzian.eus>

Cultivating partnerships is not just about sharing resources; it's about multiplying possibilities. Together, we achieve more than we ever could alone, unlocking innovation, driving growth, and creating lasting impact.

2. Partnerships and Collaborations

Working together with other people and institutions is key to unravelling the challenges of this changing World. Weaving a solid network of collaborators takes time and effort, and selecting the best companion is strategic for any institution.

We thoroughly identify and assess the individual and collective partners in our environment and sector to properly manage the mutual relationships for a win-win outcome.

INSTITUTIONAL ALLIANCES

We formalise institutional partnerships with specific, written, long-term agreements, which cover the terms of the collaboration. To some extent, such alliances are also strategic in nature, as indicated by the agreements signed with Ikerbasque and the UPV/EHU for the appointment of personnel.

These are the institutional agreements by strategic partner during the year:

BASQUE GOVERNMENT

- ▶ BERC agreement to support the strategic deployment in 2022–2025.

BASQUE SCIENCE, TECHNOLOGY, AND INNOVATION NETWORK

- ▶ Appointment at the BSTI network and recognition in the “BERC - Basque Excellence Research Centre” category

IKERBASQUE

- ▶ Framework Agreement for the appointment of research staff: Ikerbasque Research Professors, Associates and Fellows
- ▶ Agreement to support the development of the IKUR Strategy of the Basque Government
- ▶ Agreement to support the development of the Neuronano Strategy Action of the Basque Government

UNIVERSITY OF THE BASQUE COUNTRY (UPV/EHU)

- ▶ Framework Collaboration Agreement
- ▶ Specific agreement for the appointment of teaching and research and personnel
- ▶ Specific agreement of collaboration to appoint the Deputy Scientific Director

Our strategic alliances are with those organisations or individuals that allow us to extend our capabilities or complement our services.

STRATEGIC ALLIANCES



European Commission – HRS4R Community

Following our endorsement of the European Charter for Researchers fostered by the European Commission, we underwent the process of recognition of our internal policies for managing research personnel, according to HRS4R and OTM-R initiatives of the European Commission.



CIBER

The **Center for Biomedical Research in Network** is a research organization with its own legal entity, fostered by the Spanish Government (Instituto de Salud Carlos III) and constituted by research groups without physical contiguity, belonging to different state administrations and autonomous communities, from the public and private sectors, with research lines and objectives focused on a common specific area.

In our case, two groups collaborate in the field of neurodegenerative diseases, which are coordinated to achieve scientific objectives that could hardly be considered in a specific context.



Bizkaia Talent

Established in 2005 with the support of the Provincial Council of Bizkaia, Bizkaia Talent is a non-profit organization that fosters and facilitates the attraction, connection, and retention of highly qualified professionals to the Basque Historic Territory of Bizkaia. Bizkaia Talent is a strategic partner and an ally of ACHUCARRO, which takes our name and objectives to the many international scientific events they attend, supporting our talent attraction process.

INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE (ISAC)

Our International Scientific Advisory Committee comprises esteemed researchers from various domains of neuroscience. They offer invaluable perspectives and insights on strategic and operational matters to facilitate the continued advancement of ACHUCARRO.

In 2024 we partially renewed our panel, as part of the periodic update of our advisors.



Leda Dimou

Ulm University



Teresa Gómez-Isla

Harvard Medical School & Massachusetts
General Hospital



Brahim Naïf Oumesmar

Paris Brain Institute – ICM



Joao Relvas

Universidade do Porto



Pablo Villoslada

Hospital del Mar

Figure 2. Members of the ISAC in 2024

We gather professionals from 24 different nationalities and foster equality, equity, and diversity as one of the core values of our organisational culture.

3. People

In 2024 we continued our growth and finished the year with 149 people appointed.

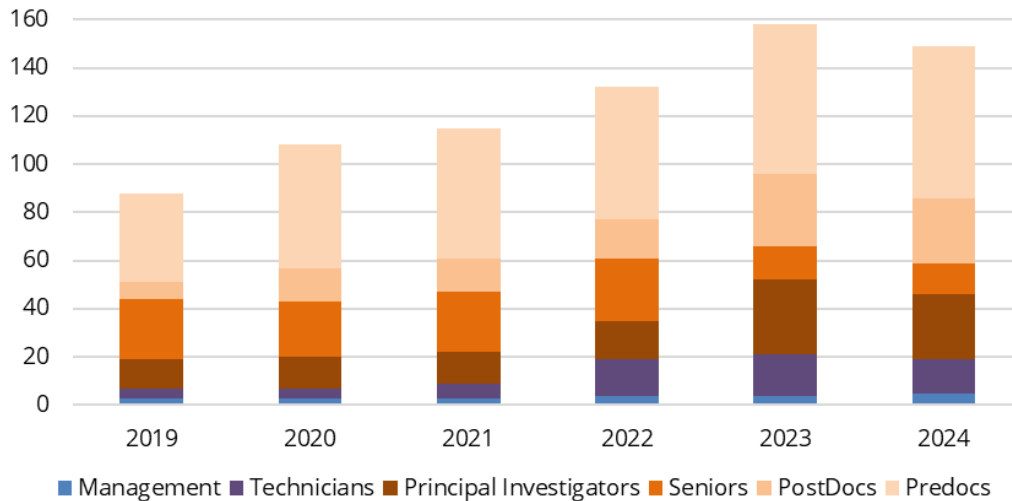


Figure 4. Evolution of personnel 2019-2024

Throughout the year there has been rotation of some personnel, especially in the categories that imply greater mobility, such as pre and postdoctoral researchers. In addition, some people have advanced in their careers, either by consolidating their employment, or by becoming principal investigators on projects.

APPOINTED STAFF (December 2024)

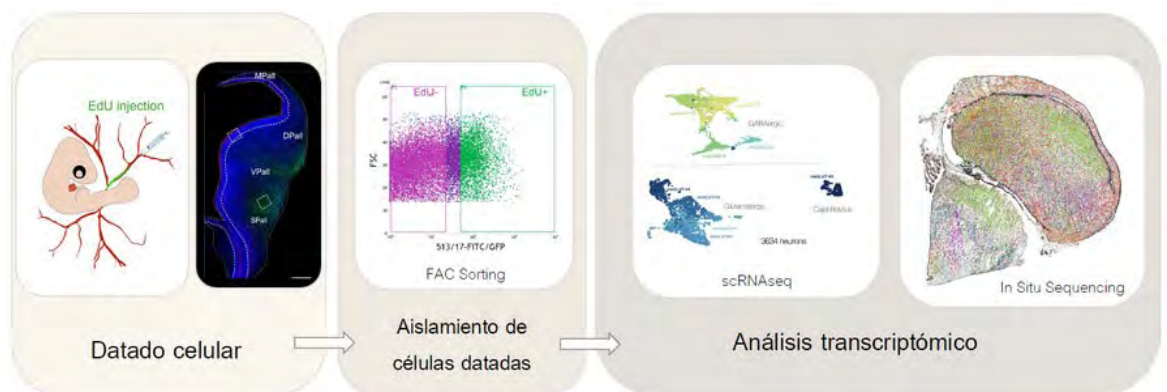
Oihane ABIEGA ETXABE · Laura AGUADO SANTOS · Elena ALBERDI ALFONSO · Óscar ALEIXOS GRAU · Francisco Javier ALFARO MOZAZ · María ALFONSO TRIGUERO · Mikel ÁLVAREZ TUEROS · María Isabel ARDAYA FRANCO · Xabier ARECHABALA RODRIGUEZ · Amaia ARRANZ MENDIGUREN · Mariana ASTIZ CADENAS · Uxue BALANTZATEGI FERNÁNDEZ DE ARROIABE · Jimena BALERIOLA GÓMEZ DE PABLOS · Andres Mateo BARAIBAR SIERRA · Laura BAYÓN CORDERO · Nora BENGOA VERGNIORY · Xabier BENGOETXEA BAUSELA · Ana BERNAL CHICO · Eva BLANCO COSTALES · Itziar BONILLA DEL RÍO · Leire BOVEDA ALTUBE · Izaskun BUENDÍA ABAITUA · Stefano CALOVI · Estibaliz CAPETILLO GONZÁLEZ DE ZARATE · Alejandro CARRETERO GUILLÉN · Fabio CAVALIERE · María CEPRIÁN COSTOSO · Jesús CESPÓN GONZÁLEZ · Juan Carlos CHARA VENTURA · Brenda Nadia CHINO VILCA · Dalila CICERI · Raffaela CIPRIANI · Teresa COLOMER MOLLA · Lorea CORTÉS MELER · Joan CRUZ SESÉ · Aída DE LA CRUZ GAMBRA · María DOMERCQ GARCÍA · Jonathan Evan DRAFFIN · Jon EGAÑA HUGUET · Izaskun ELEZGARAI GABANTXO · Iratxe ELORDUY GARCÍA · Juan Manuel ENCINAS PÉREZ · Laura ESCOBAR CASTAÑONDO · Dmitry FEDOROV · Mario FERNÁNDEZ BALLESTER · Héctor FLORES ROMERO · Nuria GALBIS GRAMAGE · María Tatiana GALLEGO FLORES · María GAMARRA GARCÍA-BERMEJO · Adhara Mikaela GAMINDE BLASCO · Maider GARBIZU ALBISU · Laura GARCÍA GASTAÑAGA · Mirta GARCÍA MARTÍNEZ · Fernando GARCÍA MORENO · Lorena GARCÍA RUIZ-CLAVIJO · Paula GIMÉNEZ MÍNGUEZ · Sonia GÓMEZ URQUIJO · Nerea GOROSTIOLA · Pedro Rolando GRANDES MORENO · María Inmaculada GUERRICAGOITIA MARINA · Mazahir Tahid HASAN · María Isabel HERNÁNDEZ CORTÉS · Tamas HORVATH · Izaskun IGEREGI ARTETXE · Leire IGLESIAS IGLESIAS · Josune IMAZ IRURETAGOYENA · Leire IZAGIRRE URIZAR · Sara JIMÉNEZ ÁLVAREZ · Isabel JIMÉNEZ RIDRUEJO · Muhammad Zahid KHAN · Gorka KORTABARRIA PÉREZ · Maria KUKLEY · Begüm KURT · Rizky Sarakhsi Ersaid LASABUDA · Nerea LLAMOSAS MUÑOZGUREN · Eneritz LÓPEZ MUGURUZA · Irene LUENGAS ESCUZA · Diana del Socorro LUNA · Joel MALDONADO TEIXIDÓ · Abraham MARTÍN MUÑOZ · Soraya MARTÍN SUAREZ · Endika MARTÍNEZ GUTIÉRREZ · Zara MARTÍNEZ PÁEZ · Maialen MARTÍNEZ PRECIADO · Gilda Paloma MATA SALGADO · Diego Martín MATEOS · Susana MATO SANTOS · Carlos José MATUTE ALMAU · Alejandro MELERO CARRILLO · Juan Luis MENDIZABAL ZUBIAGA · Amaia MIMENZA SAIZ · Fosca MIRATA · Marta MIRÓN ALCALÁ · Luna MORA HUERTA · Oscar MORENO MORENO · Teresa MURO GARCÍA · Irene NÚÑEZ GARCÍA · Blanca Isabel OCHOA BUENO · Jon OLALDE JOMETON · Jon OLANO BRINGAS · Aitor PALOMINO FERNANDEZ DE LARREA · Carla PEIRÓ MORENO · Marta PEREIRA IGLESIAS · Fernando PÉREZ CERDÁ · Lucila Maite PÉREZ GIANMARCO · Erise PÉREZ PASCUAL · Alberto PÉREZ SAMARTÍN · José Ramón PINEDA MARTÍ · Joaquín PIRIZ · Ainhoa PLAZA ZABALA · Nagore PUENTE BUSTINZA · Virginia PUENTE MUÑOZ · Aurora PUTZOLU · Paula RAMOS GONZÁLEZ · Almudena RAMOS URIARTE · Leire REGUERO ACEBAL · Pablo Alejandro REYES VELASQUEZ · Irantzu RICO BARRIO · Ane RODRÍGUEZ BODERO · Esther RUBIO LÓPEZ · Leire RUIZ BARREIRO · Asier RUIZ NUÑEZ · Jaime SAGARDUY BARRENA · Andrea SAINZ PRADO · Aitor SALAGRE PÉREZ · María Victoria SÁNCHEZ GÓMEZ · Dann SÁNCHEZ IRAOLA · Ester SANCHEZ MARTÍN · Lucía SANGRÓNIZ BELTRÁN · Ane SANTISTEBAN GARCÍA · Rafael SARRÍA AROSTEGUI · Rodrigo SENOVILLA GANZO · Maitane SERRANO MURGIA · Amanda SIERRA SAAVEDRA · Vladislav SOLDATOV · Edgar Jesús SORIA GÓMEZ · Federico Nicolas SORIA LANNES · Vanja TEPAVCEVIC MANDIC · Irene TOMÉ VELASCO · Jan TØNNESEN · Ignacio TORRES ALEMÁN · Nerea URRESTIZALA ARENAZA · Carmen Lucía UTRILLA CARRIAZO · Luis VARELA FERNÁNDEZ · Alexei VERKHRATSKY · María VILLAFRANCA FAUS · Patricia VILLEGAS ZAFRA · Jonathan Adrián ZEGARRA VALDIVIA · Jose Luis ZUGAZA GURRUCHAGA

This versatile technique allows marking and isolating living cells from any tissue based on their origin, thus becoming an advantageous tool for research into developmental biology.

BirthSeq: an innovative method for analyzing dated cells in any vertebrate species

BirthSeq consists of the combination of traditional cell dating techniques with flow cytometry to isolate living dated cells whose gene expression is subsequently analyzed by single cell sequencing (scRNA-Seq). In the same work, the authors present NeurogenesISS, a BirthSeq variant with spatial resolution that combines traditional cell dating with in situ sequencing (ISS), making it possible to identify in situ different cell types generated at the same time of development.

Eneritz Rueda-Alaña, Rodrigo Senovilla-Ganzo, Laura Escobar, Nora Bengoa-Vergniory and Juan Manuel Encinas de Achucarro are co-authors of this work, which has been led by Fernando García-Moreno and carried out in collaboration with the Genome Analysis Platform of the CIC bioGUNE (Derio), the Genomics Unit of the CNIC (Madrid) and the Molecular Diagnostics group of the Science for Life Laboratory (Stockholm).



“BirthSeq, a new method to isolate and analyze dated cells in different vertebrates”

Eneritz Rueda-Alaña, Marco Grillo, Enrique Vázquez, Sergio Marco Salas, Rodrigo Senovilla-Ganzo, Laura Escobar, Ana Quintas, Alberto Benguría, Ana María Aransay, Nora Bengoa-Vergniory, Ana Dopazo, Juan Manuel Encinas, Mats Nilsson, Fernando García-Moreno (2024)

Development July 2024; 151 (13): dev202429. doi: <https://doi.org/10.1242/dev.202429>

**We authored 67 new scientific publications in 2024.
92% of them in the first quartiles of their research fields
85% of the publications are Open Access**

4. Research

PROGRAMME 1: NEURO-GLIAL INTERACTIONS IN BRAIN DISEASES

Coordinator: Abraham Martín Muñoz

This programme integrates 6 Principal Investigators from 4 different laboratories.

Glial cells, including astrocytes, microglia, and oligodendrocytes, work in coordination with neurons to support the structural and functional integrity of the nervous system.

The members of this program are experts in different areas of cellular biology and neuroscience, and we set the goal of creating a project in which all members collaborate to understand neural-glia interactions both in health and disease.

Modulating these interactions could offer new avenues for treating or slowing the progression of various brain disorders, such as neurodegenerative diseases.



Elena
Alberdi



Nora
Bengoa-
Vergniory



Estibaliz
Capetillo



Abraham
Martín Muñoz



Vicky
Sánchez
Gómez



Jose Luis
Zugaza

PROGRAMME 2: GLIAL MODULATION OF BRAIN STRUCTURE AND FUNCTION

Coordinator: **Edgar Soria Gómez**

This programme integrates 12 Principal Investigators from 10 different laboratories.

This programme was designed to bring together investigators studying brain function at different levels.

Under the premise that function follows structure, synapses and networks are investigated morphologically, anatomically, and functionally. With an integrative mindset, glial cells and neurons are considered together.

The study of the glio-neuronal dynamic interaction is of special interest in neurological and neurodegenerative disorders in which the role of glia, via neuroinflammation for instance, is an essential modulator of neuronal survival and activity. In the program's regular meetings, the groups discuss several issues in common: 1) Scientific discussion of new projects and lines of research; 2) Fine-tuning of projects for funding application; 3) how to synergistically optimize and share the available techniques in the program (confocal microscopy-based quantitative image analysis, two-photon imaging and wearable miniscope in vivo imaging, patch-clamp electrophysiology; intracranial local field recordings and behaviour).

Finally, special care is placed on the mentoring of newly joined scientists.



Juan Manuel
Encinas



María
Domercq



Fernando
García-Moreno



Pedro
Grandes



Mazahir T.
Hasan



María
Kukley



Nerea
Llamosas



Soraya
Martín-Suárez



Joaquin
Piriz



Edgar
Soria-Gómez



Sandra
Soukup



Ignacio
Torres-Alemán

PROGRAMME 3: GLIOTHERANOSTICS

Coordinator: Federico N. Soria Lannes

This programme integrates 11 Principal Investigators from 9 different laboratories.

Our programme is focused on understanding the properties and capabilities of glial cells in physiological conditions to then exploit them in brain pathologies.

Our research combines our expertise in astrocyte, oligodendrocyte and microglial development, their interaction with other elements of the brain parenchyma (matrix, neurons), and their phagocytic and regenerative potential to identify novel therapeutical targets using mouse models, iPSCs, and xenotransplants. In addition, our goal is to create a collaborative environment and for this purpose we foster monthly "chalk talk" meetings to discuss specific aspects of ongoing projects or papers.



Amaia
Arranz



Mariana
Astiz



Jimena
Baleriola



Izaskun
Buendia



Fabio
Cavaliere



Héctor
Flores-Romero



Susana
Mato



José Ramón
Pineda-Martí



Ainhoa
Plaza-Zabala



Amanda
Sierra

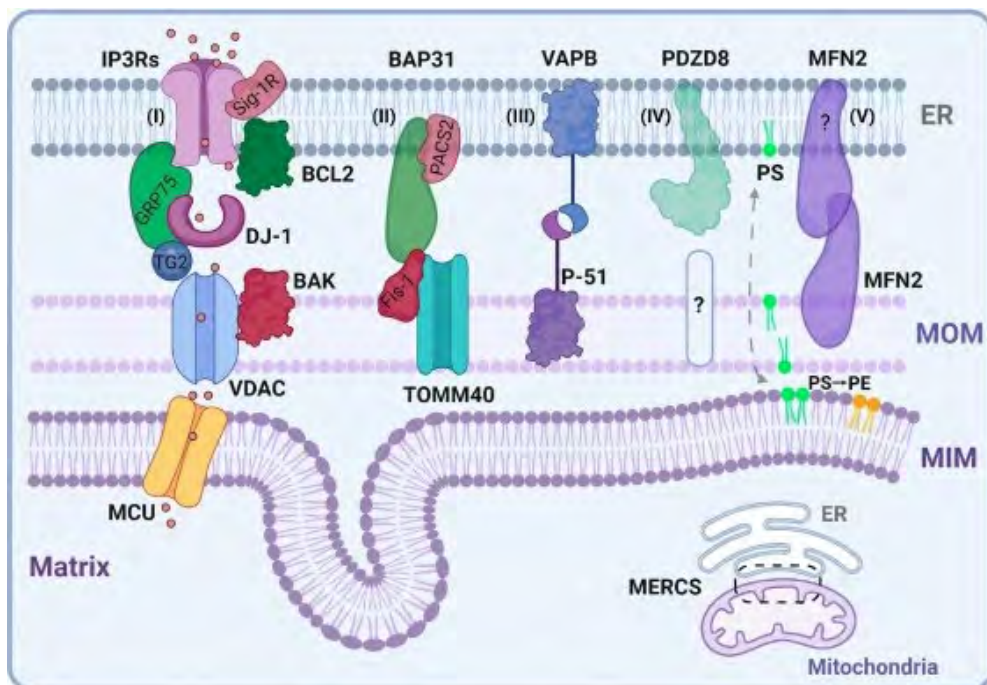


Federico N.
Soria

Mitochondria–endoplasmic reticulum (ER) contact sites (MERCs) are signaling hubs that are involved in vital cellular processes such as calcium signaling, lipid metabolism, autophagy, and apoptosis.

Crosstalk between mitochondria–ER contact sites and the apoptotic machinery as a novel health meter

Mitochondria–endoplasmic reticulum (ER) contact sites (MERCs) function as transient signaling platforms that regulate essential cellular functions. MERCs are enriched in specific proteins and lipids that connect mitochondria and the ER together and modulate their activities. Dysregulation of MERCs is associated with several human pathologies including Alzheimer's disease (AD), Parkinson's disease (PD), and cancer.



Alterations in these structures are linked to pathologies such as cancer, PD, and AD, and affect crucial cellular functions such as Ca^{2+} signaling and mitophagy. Dysregulation of MERCs could even drive disease progression, with recent evidence suggesting a novel role for MERCs in neurodegeneration by activating inflammatory pathways such as cGAS–STING and contributing to genomic instability. Therefore, therapeutic strategies targeting MERCs and BCL-2 family proteins could offer new approaches to treat these diseases

“Crosstalk between mitochondria–ER contact sites and the apoptotic machinery as a novel health meter”

Larrañaga-San Miguel, Alvaro; Bengoa-Vergniory, Nora; Flores-Romero, Hector
[Trends in Cell Biology \(Oct, 2024\) DOI: 10.1016/j.tcb.2024.08.007](https://doi.org/10.1016/j.tcb.2024.08.007)

PUBLICATIONS

Check our website: <https://www.achucarro.org/publications/?paged=1&y=2024>

Amaia Arranz was awarded with an ERC Consolidator Grant 2024. The project hASTROCURE is funded with 2 million euros and will be developed during 5 years.

The European Research Council has awarded one of its prestigious ERC Consolidator Grants 2024 to a project aiming to understand the contribution of human astrocytes to Alzheimer's disease



Consolidator
Grant



The pathogenesis of Alzheimer's disease is not fully understood, and no cure is available so far. Current therapeutic targets are insufficient and there is an urgent need for finding new pathways and mechanisms and novel targets to treat this terrible disease. Rodent models of Alzheimer's disease are widely used in research and have provided essential information about specific aspects of the disease. But due to critical differences between humans and mice and the limitations of these rodent models, human-based models are necessary to capture the complexity of the disease process. *hASTROCURE* proposes to investigate with a multidisciplinary approach human astrocyte, integral components of the brain and understudied in Alzheimer's disease. This project will go beyond the state-of-the-art providing groundbreaking information about human astrocytes and their contribution to Alzheimer's disease and will help to define new therapeutic strategies for the disease.

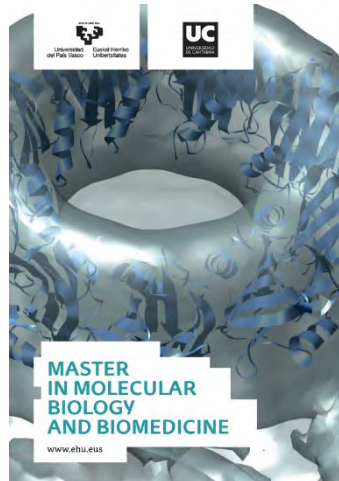
Knowledge sharing is an important support for the continuous innovation and sustainable development of scientific research, and essential for positively impacting Society and global challenges.

5. Knowledge Transfer

POSTGRADUATE EDUCATION

The staff of ACHUCARRO collaborates with three Masters' programmes coordinated by the University of the Basque Country (UPV/EHU):

- Neuroscience
- Molecular Biology and Biomedicine
- Pharmacology, Development, Assessment, and Rational Use of Medicines



We also collaborate with the UPV/EHU's Doctoral Programme in Neuroscience.

UPV/EHU > Ikasi > Doctorate > Offer > Doctoral Programme in Neuroscience

Doctoral Programme in Neuroscience

Programme

- Organisation
- Competencies
- Training Activities Programme
- Evaluation
- Mobility and stays
- Submission of Doctoral Theses
- Procedures
- Teaching staff

Doctoral Programme in Neuroscience

The Interuniversity PhD Programme in Neurosciences (IPN) hosted by the Department of Neurosciences features the combination of faculty who have international reputations for excellence in both research and teaching and highly motivated students in a scientific environment that shares a strong commitment to understanding the function and

PART-TIME STUDIES
Duration: **5 - 8 courses**
Places available: **5**
Approximate fees: **219 €/academic year**

FULL-TIME STUDIES
Duration: **3 - 5 courses**
Places available: **25**
Approximate fees: **301 €/academic year**

CONTACT

Congratulations

PHD THESES COMPLETED IN 2024

- ▶ **Dr. Koldo Berganzo**
Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse
Dysautonomic disorders in Parkinson's disease
- ▶ **Dr. Irene Durá Esteve**
Laboratory of Neurogenesis and Neural Stem Cells
Traumatic Brain Injury-induced alterations in Adult Hippocampal Neurogenesis
- ▶ **Dr. Adhara M. Gaminde Blasco**
Laboratory of Glia and Matrix Biology
Identifying alterations in RNA metabolism and translation dynamics of oligodendrocytes in Alzheimer's disease
- ▶ **Dr. Paula Giménez Mínguez**
Laboratory of Neuronal Excitability
The role of the brain extracellular space in diffusion and cell signalling
- ▶ **Dr. Aitor Medrano Peras**
Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse
Topographic relationship between the subcellular localization of group II metabotropic glutamate receptors (mGlu2/3) and the cannabinoid CB1 receptor in the hilus region of the mouse dentate gyrus
- ▶ **Dr. Ana Joya Villanúa**
Laboratory of Neuroimaging and Biomarkers of Inflammation
Blood brain barrier disruption after subarachnoid hemorrhage: Role of hyperglycemia and effect of potentiating endogenous antioxidant mechanisms using molecular imaging.



ACHUCARRO SEMINARS

JANUARY

- 20** • **Is there any therapy for Alzheimer's disease?**
Jesús Ávila de Grado
 Centro de Biología Molecular "Severo Ochoa" CSIC/UAM (Madrid, Spain)
- 27** • **Deciphering synaptic autophagy to empower brain health**
Sandra Soukup
 Université de Bordeaux (France)

FEBRUARY

- 01** • **Brain Organoids as Avatars to understand Human brain Development and Disease**
Paola Arlotta
 Harvard Stem Cell Institute [HSCI] (USA)
- 03** • **Virus delivered, brain circuit targetable, tightly-controlled inducible gene expression system**
Gorka Kortabarria Pérez
 Laboratory of Brain Circuits Therapeutics, ACHUCARRO
- **A β oligomers cause dysregulation of RNA dynamics and translational activity in oligodendrocytes**
Adhara Gaminde Blasco
 Laboratory of Neurobiology, ACHUCARRO
- 06** • **Plasma biomarkers for the diagnosis of Alzheimer's disease (AD). A game changer.**
Pascual Sánchez Juan
 Fundación Centro de Investigación de Enfermedades Neurológicas (CIEN, Madrid)
- 17** • **Learning as a functional state of the brain**
José María Delgado García
 Universidad Pablo de Olavide (Seville)
- 24** • **Targeting Microglia via Engineered Adeno-associated Virus**
Rui Lin
 National Institute of Biological Sciences (China)

MARCH

- 03** • **Astrocytes in neurodegenerative diseases**
Laura Civiero
 Università di Padova (Italy)
- 10** • **The matrix and the vision: new perspectives for imaging neuroinflammation**
Carmen Infante Duarte
 Charité - Universitätsmedizin Berlin (Germany)
- 17** • **Hypothalamic circuits regulating energy balance: the role of astrocytes**
Luis Varela Fernández
 Laboratory of Glia-Neuron Interactions in the Control of Hunger, ACHUCARRO

MARCH

-
- 24** • **The PIWI Pathway in Lifelong neurogenesis and neuroinflammation**
Davide De Pietri Tonelli
Istituto Italiano di Tecnologia (Italy)
- 31** • **What makes us human: a neuro-physiologist perspective**
Albert Gidon
NeuroCure, Charite - Universitatmedizin Berlin (Germany)

APRIL

- 14** • **Voltage mapping of dendritic spikes in Purkinje neurons of awake mice**
Christopher Roome
Okinawa Institute of Science and Technology (Japan)
- 21** • **Microglial brainization: intrinsic and environmental cues controlling developmental microglial maturation**
Marta Pereira Iglesias
Laboratory of Glial Cell Biology, ACHUCARRO
- 28** • **New Horizons: Gonadotropin-releasing hormone and cognition**
Vincent Prévot
Université de Lille (France)

MAY

- 05** • **Angelman Syndrome causing UBE3A ligase displays predominantly synaptic ubiquitination activity in the mouse brain**
Ugo Mayor
Ikerbasque - UPV/EHU (Leioa)
- 12** • **Traveling Through Uncharted Territory: Spatial Lipidomics of the Brain**
José A. Fernández
UPV/EHU (Leioa)
- 15** • **Circulating myeloid suppressor cells as a translational tool for biomarker discovery in multiple sclerosis**
Diego Clemente
National Hospital of Paraplegics & CIBERNED (Toledo, Spain)
- 19** • **Circulating insulin peptides and interoception**
Ignacio Torres Aleman
Laboratory of Neurobiology of Insulin Peptides, ACHUCARRO
- 26** • **Cell Therapy for Parkinson's disease using Carotid Body as a source of GDNF: pros and cons of the coronavirus pandemic**
Juan José Toledo Aral
Universidad de Sevilla (Spain)
-

JUNE

- 02** • **Whole brain perineuronal net and parvalbumin expression analysis in Fragile X mice**
 Ilaria Bertocchi
 University of Torino (Italy)
- 09** • **Non-invasive brain stimulation: an old tool into the hands of modern translational research**
 Marco Cambiaghi
 University of Verona (Italy)
- 16** • **Exercise on cognition**
 Jose Luis Trejo
 Instituto Cajal - CSIC (Madrid, Spain)
- 23** • **Junior symposium organized by the Laboratory of Neurobiology**
 Naroa Ibarra Aizpurua, Chao Zheng, Isabel Chato Astrain & Veronica Giusti
 Oxford, Karolinska, Nice - Sofia Antipolis & Padova
- 30** • **Disruption in the light/dark cycle alters the circadian regulation of female fertility**
 Valérie Simonneaux
 Institut des Neurosciences Cellulaires et Intégratives [INCI] (Strasbourg, France)

JULY

- 14** • **Modulation of synaptic translation by astrocytic extracellular vesicles in 5xFAD mice**
 Aída de la Cruz Gamba
 Laboratory of Local Translation in Neurons and Glia, ACHUCARRO

SEPTEMBER

- 15** • **Subcellular architecture studied by correlative light and electron microscopy**
 Alejandro Melero Carrillo
 Laboratory of GTPases and Neurosignalling, ACHUCARRO
- 22** • **Mechanisms of neuronal diversification and evolution**
 Nuria Flames Bonilla
 Instituto de Biomedicina de Valencia [CSIC] (Spain)
- 29** • **Genetic features controlling the specific expression of developmental genes**
 Álvaro Rada-Iglesias
 IBBTEC [CSIC/University of Cantabria] (Santander)
-

OCTOBER

- 06** • **Exploring Neurogenesis through the Olfactory System**
María Figueres Oñate
Instituto Cajal - CSIC (Spain)
- 11** • **In Vivo Multimodal Imaging of Adenosine A2A Receptors in Neuroinflammation after Experimental Stroke**
Maider Garbizu Albisu
Laboratory of Neuroimaging and Biomarkers of Inflammation, ACHUCARRO
- 18** • **The future of EEG and non-invasive neuromodulation in neuroscience and mental health applications**
Frank Zanow
Neuromotion BV (The Netherlands)
- 20** • **Gender specific differences in endocannabinoid regulation of obesogenic diet-induced memory deficits**
Guillaume Ferreira
University of Bordeaux (France)
- 27** • **Extracellular fluid circulation in the brain parenchyma and its role in Alzheimer's disease**
Juan A. Varela
University of St Andrews (UK)

NOVEMBER

- 03** • **Astrocytes as key elements in the efficiency of sensory information processing by cortical networks**
Juliana M Rosa
Hospital Nacional de Paraplégicos, IDISCAM (Toledo, Spain)
- 11** • **From synchronous to asynchronous: multiscale exploration of cortical state transitions**
María Victoria Sánchez-Vives
Clínica Barcelona - IDIBAPS (Barcelona)
- 13** • **Calcium regulation of neuronal energy metabolism. Mitochondrial calcium uniporter and Aralar/malate-aspartate shuttle**
Jorgina Satrústegui
CBMSO [UAM-CSIC] (Madrid, Spain)
- 24** • **Cortical interneurons in health and disease**
Oscar Marín
King's College London (UK)

DECEMBER

- 05** • **Neuroglia basis of behavior**
Edgar Soria-Gomez
Laboratory of Cellular Basis of Behavior and Disease, ACHUCARRO

Among our objectives we list the promotion of scientific knowledge and the dissemination a culture based on facts and critical thinking. This is also a personal and collective commitment of contributing to a well-informed Society.

Dissemination and advocacy

We deploy our commitment to Outreach; Equality, Equity and Diversity; Talent Development; and fostering a culture of scientific literacy through various activities during the year.

February 11th and the commitment with Equality is present in many of our activities. In 2023 we joined forces with the ongoing initiative “Emakumeak Zientzian”, currently the reference movement towards equality in the field of science and technology in the Basque Country.



Elena Alberdi at “Parekoen Topaketa” organised by BilbaoEkintza and Elhuyar

Collaborations with Pint of Science Bilbao



Talks at High Schools



Neuroscience Day 2023



Hosting the visit of Wake Forest College

Many times, these activities require not only the commitment but the personal effort of our staff and volunteers.

Many thanks to all of you.
Eskerrik asko.

You can check all the information on our website: <https://www.achucarro.org>

The Science Park of the UPV/EHU in Leioa, hosts the headquarters of ACHUCARRO.

In 2023 we increased our premises by 50% with the support of IKERBASQUE.

6. Infrastructure and Equipment

In the one hand, the proximity with Bilbao, and communications hub, and in the other hand, our location in the campus of the University provide us a perfect environment to develop our mission.

The settlement within the campus, close to the general research facilities to support research provided by the UPV/EHU (i.e., optical and electronic microscopy, genomics, proteomics, etc.); also the potential to partnering with other neighbouring R&D agents in the area allow us to jointly develop investment strategies to complement the existing and to complement those specific scientific resources of each sector and research field.

ACHUCARRO currently occupies the third floor of the Sede building, a space of 3000 m² in a privileged location within the campus of the UPV/EHU.



Some of the research groups also have laboratories and offices in the School of Medicine and Nursing, only 400 metres from the main location.

<https://www.achucarro.org/facilities>

New challenges deriving from the scientific progress in biomedicine and the new European strategy directed to develop more relevant biomodels to study the human physiology, pushed us to find new human biomodels to study the human brain physiology.

The Basque Biomodels Platform for Human Research

The Basque Biomodels Platform for Human Research (BBioH) is a collaborative initiative of Achucarro Basque Center for Neuroscience and the Instituto Biofisika (UPV/EHU-CSIC) in partnership with the Fundación Biofisica Bizkaia.

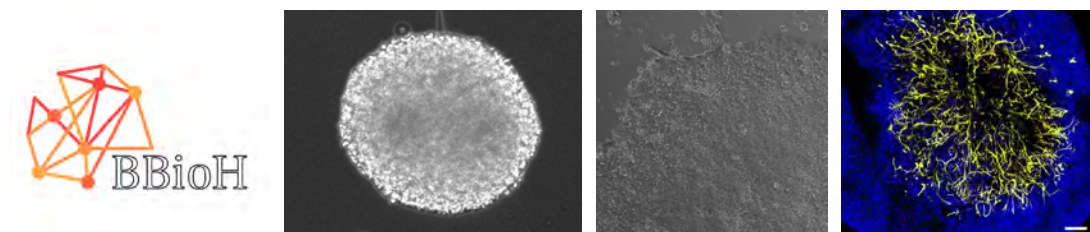
BBioH is funded in part by the Department of Education of the Basque Government under the IKUR Strategy, with additional support from the Spanish Ministry of Science and Innovation with funding from European Union NextGenerationEU.

Main objectives

BBioH is the first public-based human biomodels platform in Basque Country and the second in Spain, specialized in human brain organoids. We foster the use of human 2D and organoid models in basic and applied research. The main scientific objective is to reproduce the human brain development in normal and pathological conditions, whereas the three strategic objectives are: 1. to promote collaborations between BERCS; 2. to create links between basic, clinic and applied research; 3. to elevate Euskadi as a referent in the field of personalized medicine.

A multidisciplinary approach to the clinics, industry, and academic research. BBioH proposes a multidisciplinary approach with the support of other associated units in Achucarro like the platform of biomarkers, molecular biology, imaging, and the collaboration of the Basque Resource for Electron Microscopy (BREM). Moreover, we collaborate with the Basque Institutes of Health Research (Biobizkaia and Biogipuzkoa) for the use and recruitment of human samples, the Research Institutes in biomaterials like BCMaterials and Tecnalia and the University of Basque Center.

In 2023 we already offered our services abroad to the University of Piemonte Orientale (Italy), University of Padova (Italy) and University of Bologna (Italy).



More information: <https://www.achucarro.org/facilities/human-biomodels/>

The Basque Government sets scientific and management objectives for research organisations with the BERC accreditation.

7. Main performance indicators

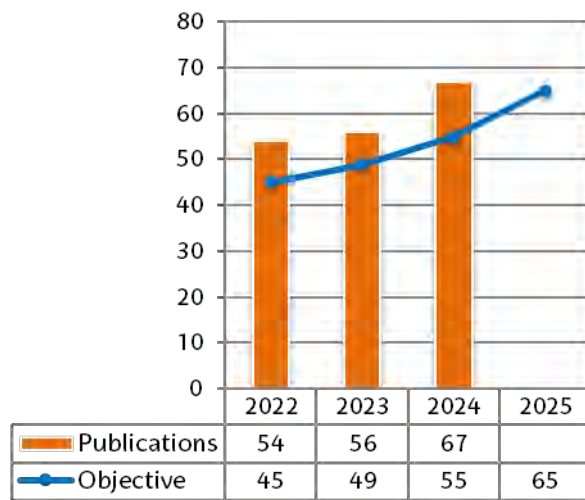
The following indicators reflect the evolution on the performance of ACHUCARRO, with this panel agreed by the Basque Government and ACHUCARRO for the current strategic period.

The following indicators strive to show the development of our organization, according to some external (partners and funders) and internally defined parameters.

Our overall assessment is very positive. Some indicators have reflected the effects of the global pandemic (in the years 2022 and 2021), and others clearly reflect the degree of maturity and consolidation of ACHUCARRO.

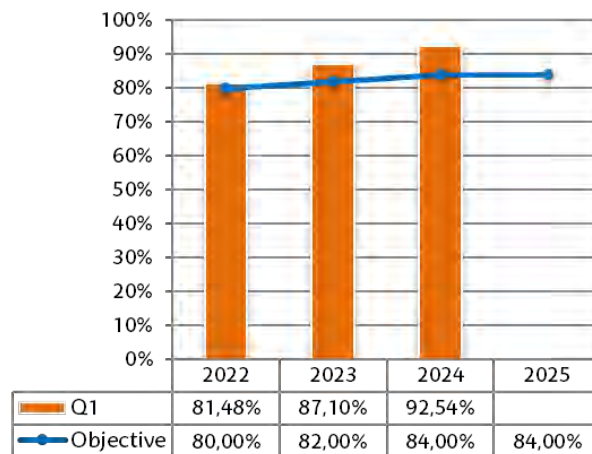
Total number of indexed publications

Sources:
Scopus & Web of Science



% of publications in quartile 1 of their research areas

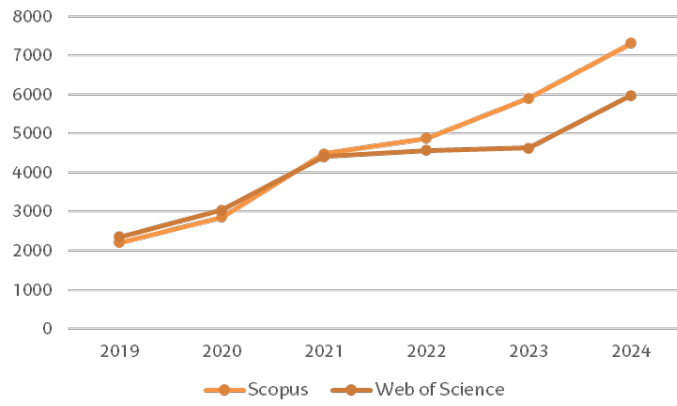
Source:
Scimago Journal Ranking



Total citations

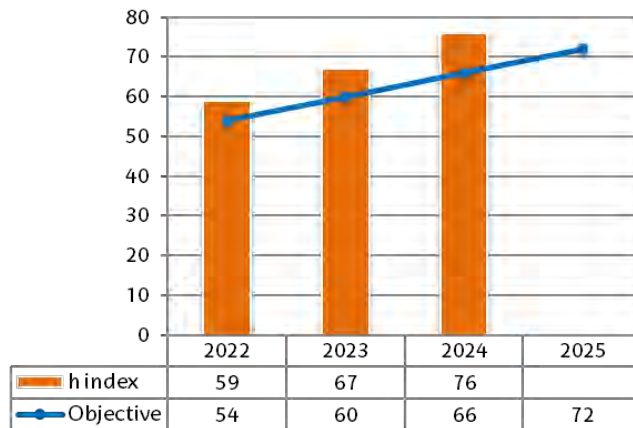
Source:
Scopus & Web of
Science

*This total amount
produce a mean of 9
citations per document*



*h-index of
ACHUCARRO*

Source:
Scopus



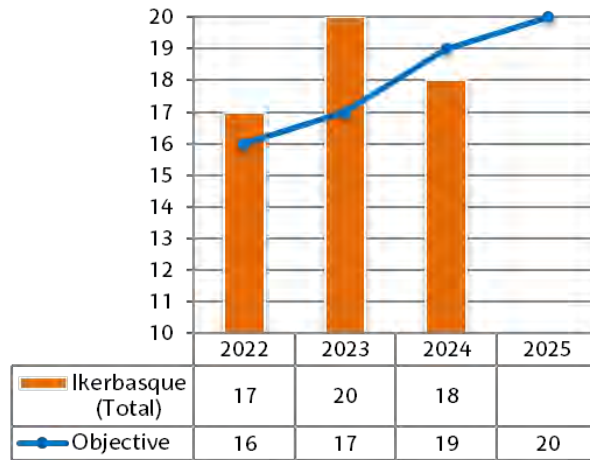
Scopus and Web of Science produce similar numbers for the h-index indicator, while Google Scholar reflects 108 for the same indicator.

<https://scholar.google.es/user=h01jBxYAAAAJ>

In terms of talent attraction and collaboration with the strategic objectives of IKERBASQUE, we keep hosting a good number of their researchers, and contributing to their career development and retention.

Total number of Ikerbasque Researchers (Professors, Associated and Fellows)

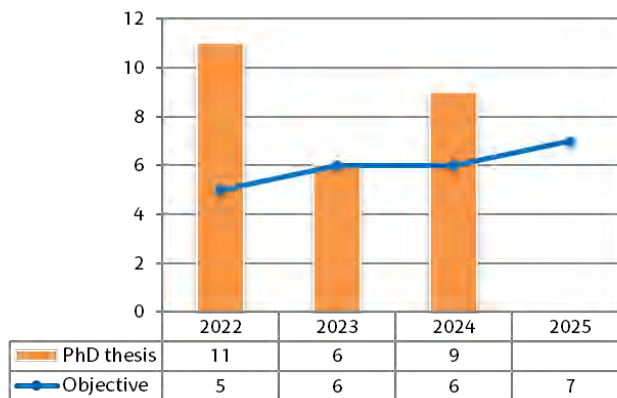
Source: Internal



In 2024 our predoctoral researchers completed 9 of their projects.

Completed PhD Thesis

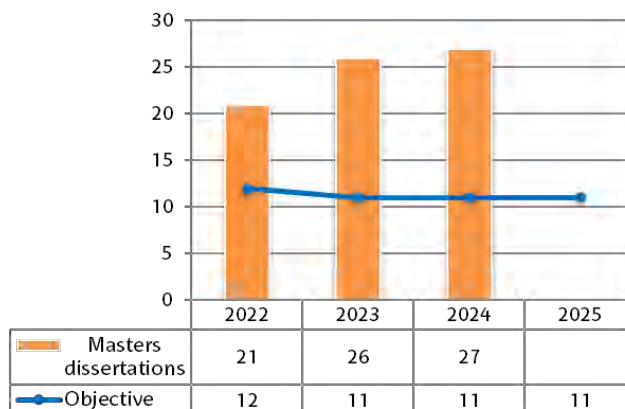
Source: Internal



In addition, our commitment with postgraduate education and contribution to the supervision of Masters' dissertation continues to increase, as the number of students taking these degrees is also increasing in our environment.

Completed Masters' Dissertations

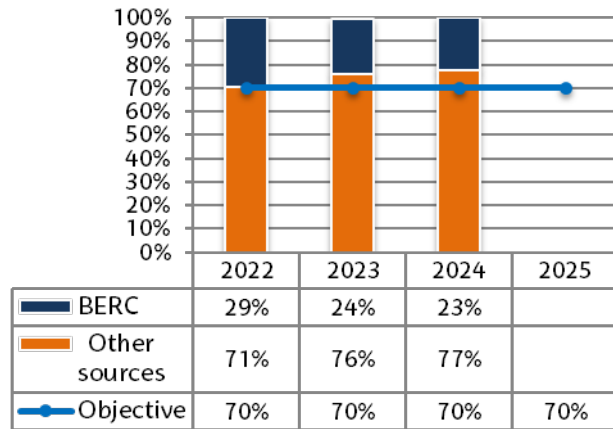
Source: Internal



The financial stability and sustainability of ACHUCARRO keeps consolidating, derived from the increase in the attraction of funding, both nationally and internationally, public and private.

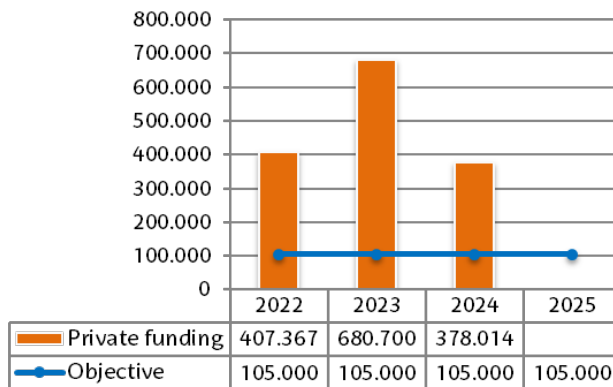
% of funding different from BERC

Source: Internal



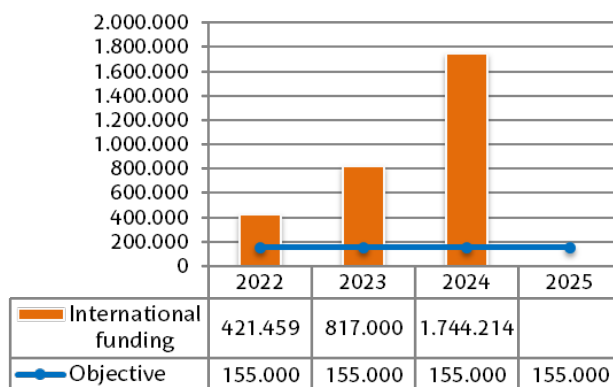
Private funding (EUR)

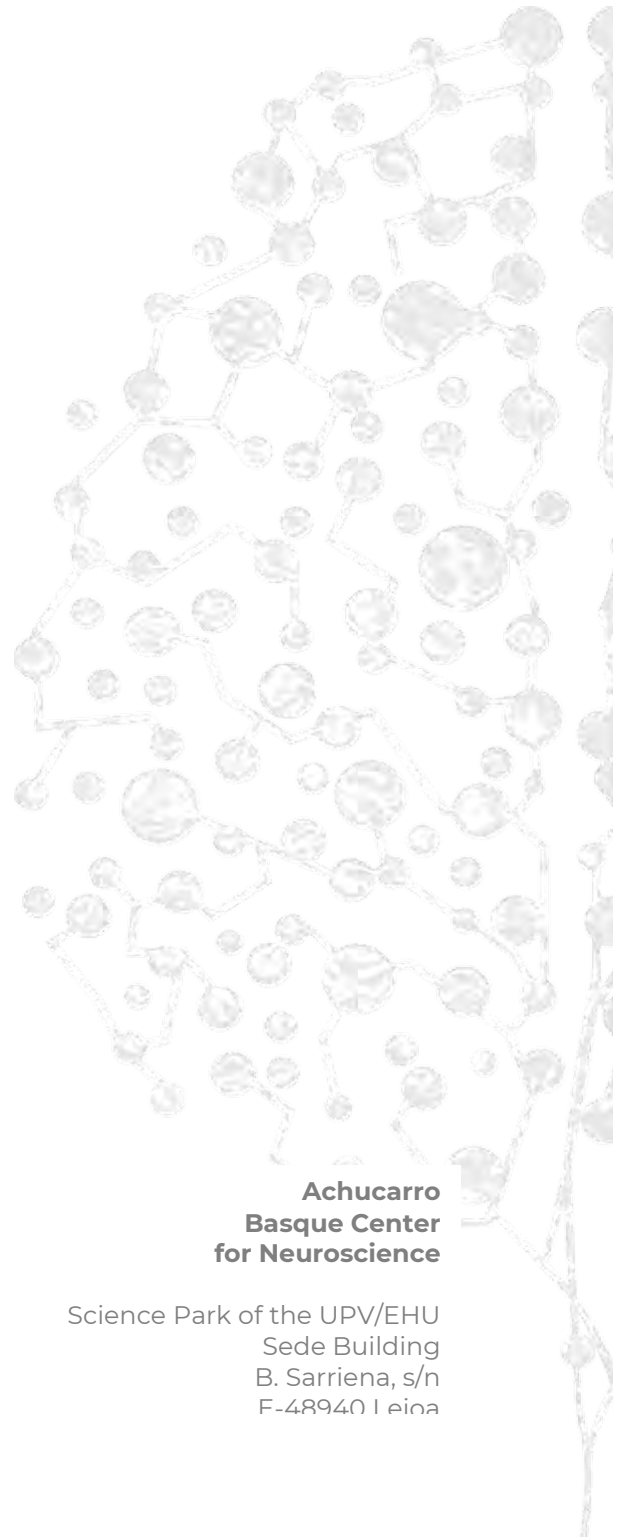
Source: Internal



International funding (EUR)

Source: Internal





**Achucarro
Basque Center
for Neuroscience**

Science Park of the UPV/EHU
Sede Building
B. Sarriena, s/n
E-48940 Leioa