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Achucarro

BASQUE CENTER FOR NEUROSCIENCE

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Annual Report 2014

Contents

FOREWORD 1
1. STRATEGY AND MANAGEMENT 2
Scientific Plan 2014-2017 2
Management Plan 2014 4
2. PARTNERSHIPS AND COLLABORATIONS 6
3. PEOPLE 10
Research Groups | Principal Investigators 10
Research Staff and Technicians 11
Management Team 12
4. RESEARCH 13
Publications 17
5. KNOWLEDGE TRANSFER 19
Training 19
Dissemination 22
7. INFRASTRUCTURE AND EQUIPMENT 28
8. ACHUCARRO IN FIGURES 30

FOREWORD

Welcome to the **Achucarro Basque Center for Neuroscience** Annual Report 2014.

The major highlight of 2014 was the approval and funding of our Strategic Plan 2014-2017 by the Basque Government. This support will allow the Achucarro centre to develop initiatives towards the establishment of modern research infrastructures, incorporate state of the art technological resources and to develop a policy of attracting young competitive scientists.

In addition, this funding will contribute to cover part of the investment derived from the much expected move to our future location in the Science Park of the University of the Basque Country at the campus in Leioa-Erandio.

In 2014 our Center has continued growing in people, scientific productivity and attraction of national and international competitive funding, as we report in this document.

Though it is being bad times for science worldwide, there is no doubt that the past year has been a strong leap forward to pave the way to make of Achucarro a reference in the research and understanding of glia.

Finally, as a guideline for the document, let us remind you that the management model of the Achucarro centre is based on the European Foundation for Quality Management (EFQM) model, so the structure of this report follows the management processes defined for the 2014 year.

Carlos Matute
Scientific Director

Jaime Sagarduy
General Manager

1. STRATEGY AND MANAGEMENT

Today, the study and advanced research in neuroscience means a deep exploration of all the aspects of brain-oriented research, from neuroanatomy and neurohistology to neurophysiology, neuropsychology and neuropathology.

Interdisciplinarity, collaboration and experimental excellence – these are the fundamental stones for successful neuroscience research. Indeed, recent advances in scientific technology, which include molecular biology, genetic modifications, *in vivo* imaging at different levels of brain organisation, modern pharmacology and electrophysiological techniques offer unprecedented possibilities for novel data acquisition. This becomes even more advanced and powerful when all these techniques are employed in combination. This can be achieved only within the framework of continuous collaboration of several research groups with distinct and yet fully complimentary expertise and technologies.

During the 2014 year, different strategic plans have been developed and published. One of the most relevant for our centre, taking into account the share of funding coming from the Basque Government is the new Strategic Plan for Science, Technology and Innovation 2020 launched by our regional administration. A plan that is aligned with the Research and Innovation Smart Specialisation Strategy (RIS3) strategy agreed among the Basque Country and the European Union, and where Biosciences are one of the pillars.

The Basque Government launched in 2014 the second call of the BERC (Basque Excellence Research Centres) Programme, a funding scheme that provides with a stable and mid-term financial framework to the research centres evaluated and appointed as BERCs. The **Achucarro Basque Center for Neuroscience** has achieved a very positive evaluation on his call and has been assigned 5.2 milion euros for its development in the next years.

Scientific Plan 2014-2017

The **Achucarro** centre has the vision of becoming one of the European references in the fundamental and translational research in the field of neuroscience. The overall objective of the centre is to perform co-ordinated multidisciplinary research of the brain functions on all levels from single molecules through individual cells and acutely isolated nervous tissues to the brain networks operating in vivo to further advance the discoveries in physiology and pathophysiology of the nervous system. In particular, the main strategic direction of the centre will be in depth study of neuronal-glial biology in normal and pathological brain.

The strategic research plan for 2014-2017 concentrates on **three main programmes** which include the next wide areas:

- Characterisation of the role of glial cells in the physiology of the nervous system
  - roles of astrocytes in synaptic communication
  - neurotransmitter signalling during neurogenesis and gliogenesis
  - mechanisms of microglia phagocytosis during neurogenesis.

- Characterisation of structural and functional changes of neuronal-glial networking in the aged brain
  - age-dependent remodelling of neuronal-glial signalling
  - regulation of the intrinsic properties of neural stem cells in the adult hippocampus.

- The role of neuroglia in neurodegenerative diseases and other neurological disorders
  - research on general mechanisms of neuron and glial cell death
  - understanding the pathophysiology of Alzheimer´s disease and Epilepsy
  - genetics of autoimmune pathogenesis of Multiple Sclerosis (MS) and neuroinflammation.

This strategic orientation is reflected in the next strategic statements:

Mission

The *Achucarro Basque Center for Neuroscience* is:

- a **research centre** supported by **Ikerbasque** and the **University of the Basque Country (UPV/EHU)**
- devoted to **fundamental and translational research in neuron-glial biology**
- focused on the discovery of new **therapies for brain diseases**
- **cooperating** with the local community and **networking** with international institutions in the field of **neuroscience**
- intended to contribute to the **training of future neuroscientists**.

Vision

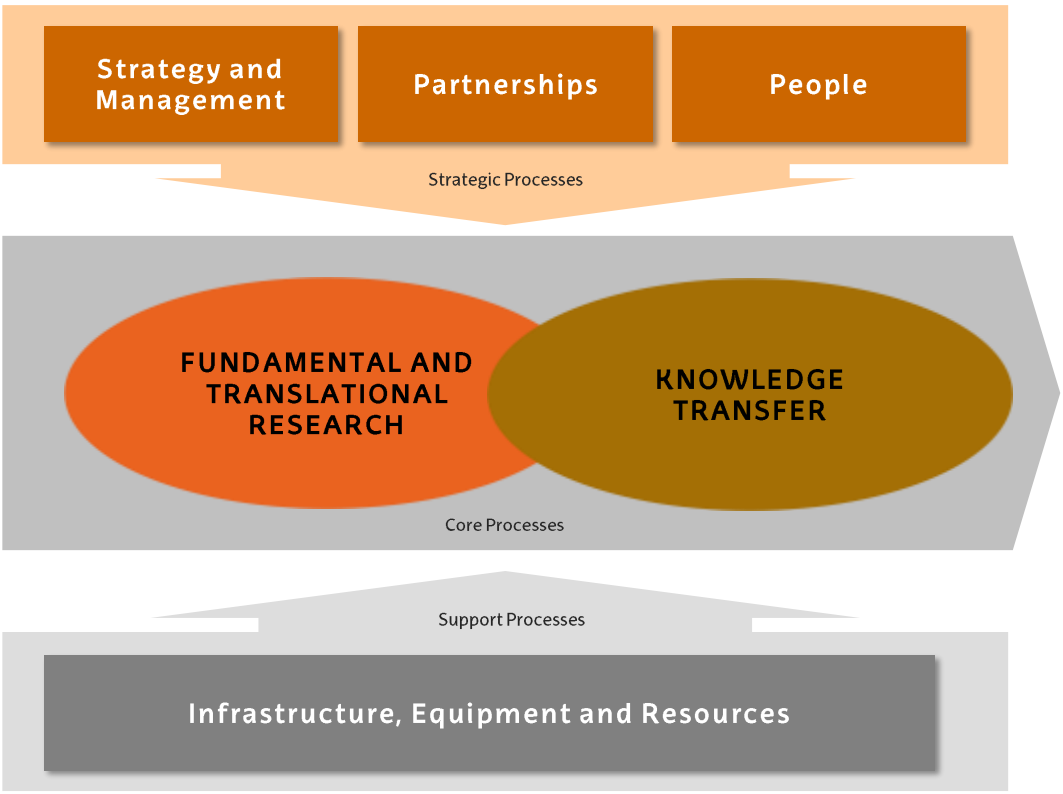
In the year 2017, *Achucarro Basque Center for Neuroscience* strives to lead and coordinate the Basque efforts to advance in neuroscience knowledge by:

- establishing a **world-class research centre**, with internationally recognised research groups and state of the art **equipment** and **facilities**
- contributing to the **understanding of the human brain in the field of neuron-glial biology**
- generating **relevant knowledge and scientific results that contribute to the well-being of society**.

Management Plan 2014

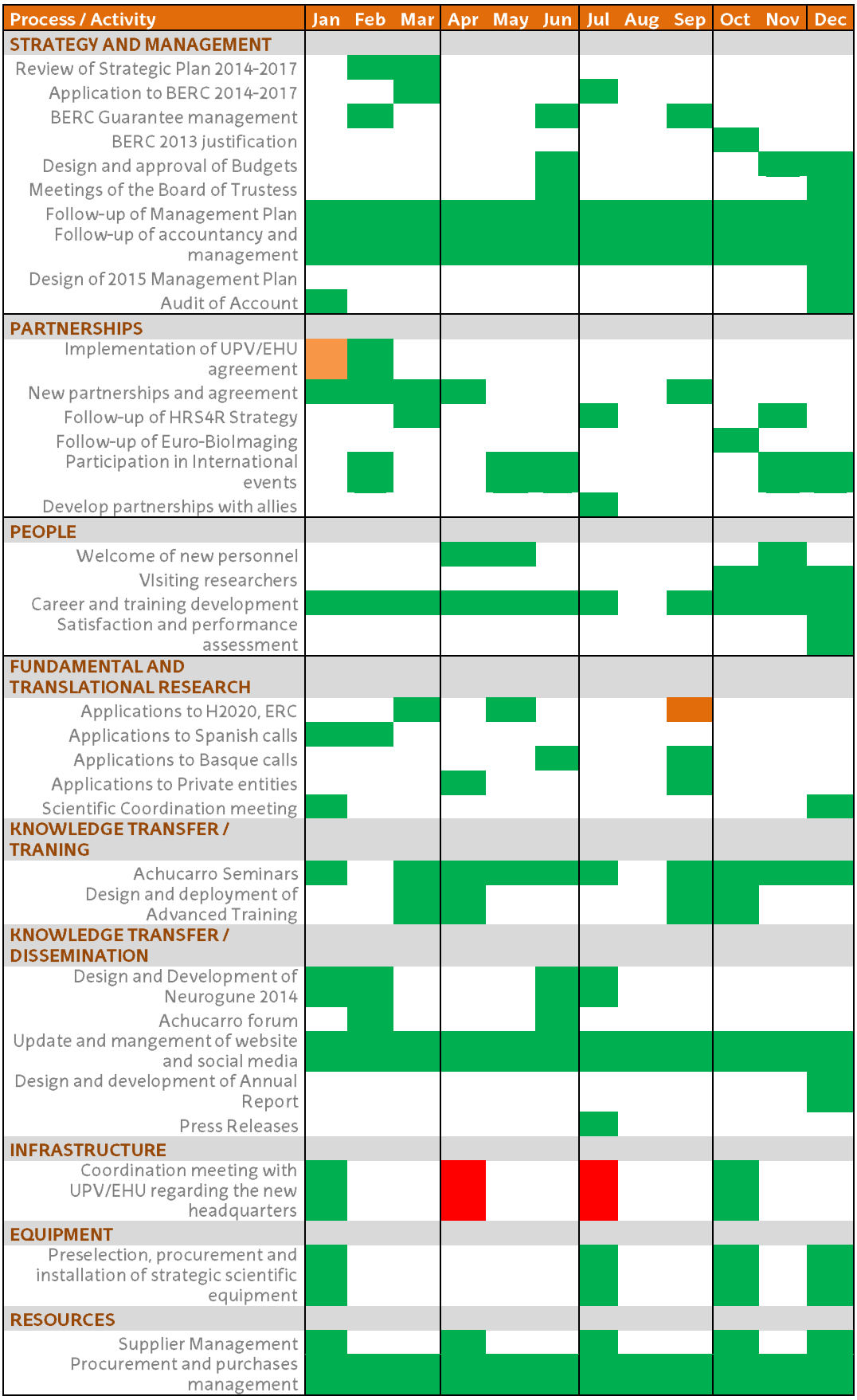
The Achucarro centre has a management model based on processes that follow the guidelines and recommendations of the **European Foundation for Quality Management (EFQM)**, which is a *de facto* standard in many organisations of all types; from private to public, from academia to industry; that are a reference in terms of high quality management and achievements in the Basque Country, and elsewhere in Europe.

The Management Plan and the management processes we have designed and implemented for this period are aligned with our Mission and Vision, and also coherent with the current condition and structure of our organisation.



So one more year, and in coherence with this management approach, all the activities and operations of the centre are managed by one or more processes that aim to achieve the objectives set in each case, and through continuous learning acquired in the development of the various activities, pursue continuous improvement in the activities and performance of the organisation.

According to this model, the Management Plan for 2014 develops the activities and objectives set by the Strategic Plan for this period.



2. PARTNERSHIPS AND COLLABORATIONS

Collaboration and partnering with other institutions and people are essential for the successful launching of a new initiative such as the Achucarro centre. Furthermore, the very conception of the institutions promoting the project, and the ties between Ikerbasque and UPV/EHU, ensure joint and shared success, not just for the stakeholders directly linked to Achucarro, but for the whole Basque science system.

Depending on the impact of each partnership or collaboration in the development of the centre, we have classified them as strategic, institutional or operational. This classification helps us determine different types of management for each case. In some cases, the relationship with one institution may straddle more than one of these categories.

STRATEGIC ALLIANCES

We consider strategic alliances those that we establish with all kinds of institutions operating in our area, either generally or specifically.

UE - HRS4R Community

Following the subscription to the European Charter for Researchers (see section 3. People) by the Achucarro Board of Trustees, the European Commission has invited us to participate in a community of concerned institutions and sensitised people management in scientific fields, called "Human Resources for Research Strategy (HRS4R)". This forum will allow us to have contact with such relevant entities as the Directorate General for Research and Innovation of the European Commission and other European research institutions, which will lead to the internationalisation of Achucarro.

Euro-BioImaging - Unidad de Biofísica (CSIC-UPV/EHU)

The Achucarro centre and Unidad de Biofísica (a joint research institution created by the Spanish National Research Council -CSIC- and the University of the Basque Country -UPV/EHU-) have agreed to join forces to apply to be a node within the Euro-BioImaging, a largescale panEuropean research infrastructure project on the European Strategy Forum on Research Infrastructures (ESFRI) Roadmap, to build a distributed imaging infrastructure across Europe that will provide open access to innovative biological and medical imaging technologies for European researchers.

Bizkaia Talent

Established in 2005 with the support of the Provincial Council of Bizkaia, Bizkaia Talent is as a non-profit organisation that fosters and facilitates the attraction, connection and retention of highly qualified professional to the Basque Historic Territory of Bizkaia. For Achucarro, Bizkaia Talent is a strategic partner and an ally, which takes our name and objectives to the many international scientific events they attend. Thanks to them, in 2014 we have been present in Amsterdam BCF Careerevent, ESOF 2014 in Copenhague and in the NatureJobs Fair in London.

Associations of patients and families affected by neurodegenerative diseases

Although the path of fundamental research is often far from clinical trials, we believe in the importance of an honest approach, without creating false expectations, to social groups affected by the diseases studied in the laboratory. To that end, we have maintained direct contact with, or reported the activities of the centre to, a number of these organisations.

Forums and professional associations

Through our researchers we participate in all the relevant forums in our area, and strive to expand our institutional presence. Among our contact groups are the Alzheimer's Association, the British Neuroscience Association, the Centres of Excellence in Neurodegeneration Research, the European Brain Council, the Federation of European Neuroscience, the International Brain Research Organization, the Japan Neuroscience Society, the EU Joint Programme - Neurodegenerative Disease Research (JPND), the ERA-NET Nanostroke, the U.S. National Institute of Mental Health, the Society for Neuroscience, and, of course, the Spanish Society of Neuroscience and the Spanish Society of Neurology.

INSTITUTIONAL ALLIANCES

Institutional partnerships and collaborations are those based on a partnership agreement or similar document, which enables us to maintain a close collaborative relationship in specific areas.

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.

The following institutional alliances/agreements are currently in force:

Basque Government
- Agreement to support the activities of the centre in the period 2014-2017

Ikerbasque
- Framework Agreement for the appointment of research staff: Ikerbasque Research Professors and Ikerbasque Research Fellows.

University of the Basque Country
- Framework Agreement
- Specific Agreement for the appointment of the Scientific Director
- Specific Agreement for the appointment of Teaching and Research and Personnel
- Specific Agreement for the appointment of Academic and Research Collaborators
- Specific Agreement for to maange the application to European projects

BIOEF – Basque Foundation for Health Innovation and Research
- BIOEF is one of the member organisations of the Board of Trustees of Achucarro, where they are represented by Alfredo Rodríguez-Antigüedad, MD the Head of Neurology service in the Basurto University Hospital (Bilbao).

Basque Science, Technology and Innovation Network
- Attachment to this network and be recognised as a BERC – Basque Excellence Research Centre.

Euskampus
- Euskampus is the inter-institutional alliance fostered by the University of the Basque Country (UPV/EHU), together with the Donostia International Physics Center (DIPC) and Tecnalia Technological Corporation to impulse the project of a "Campus of International Excellence". Euskampus has identified neurosciences as a key research area to develop its activities, and Achucarro is an active agent in the Knowledge Hub on Neuroscience, named "*Mens Sana*".

Innobasque (Membership)
- The Basque Agency for Innovation if the entity in charge of turning the Basque Country in "THE" European innovation benchmark.

Euskalit (Membership)
- The Basque Foundation for Excellence, Euskalit, promotes the improvement and innovation in management throughout Basque society, with the end goal of contributing to the competitiveness and sustainable development of the Basque Country.

OPERATIONAL ALLIES AND PARTNERS

The Achucarro centre has a number of different providers who we could consider as allies for operational issues, because of either the nature of the goods or services they provide or their contribution to the development of the mission and vision of the school, involving close collaboration.

Bizkaia Science and Technology Park

This is the case of the Science and Technology Park of Bizkaia, which has provided a local basic – though appropriate – site, on a rental basis, for the centre of operations and the physical image of the new centre.

i2Basque

The Basque Academic Network provides telecommunication and ICT support services and infrastructures to the member organisations of the Basque Science, Technology and Innovation Network. The Achucarro centre, as a member of that network, has access to the infrastructures and resources within this network.

In line with the Vision and Mission of Achucarro, which aims to assist in the development of local talent, primarily (but not exclusively) in sciences, we hosted a grantee to be trained and support the management processes of the centre.

Jesuitas Indautxu – Professional Training School

The Chemistry and Electronics department of the Jesuitas Indautxu School delivers a degree for Laboratory Technicians, and due to the syllabus of these studies, trainees need to achieve a certain professional experience before getting the diploma. The Achucarro centre has hosted one of these trainees this year.

Novia Salcedo Foundation

The Novia Salcedo Foundation (NSF) aims to support young people in the process of professional and social integration in a changing world. NSF launches and manages grants for young people to have their first professional experience in organisations in the Basque Country. We have hosted one of these trainees this year, and also participated in another short programme "Lanaldi", which consisted in a one-day mentoring of a high school student by Amanda Sierra.

International Scientific Advisory Committee (ISAC)

Scientific advisory committees have, in general, multiple objectives. However, in the particular case of the Achucarro centre, in addition to providing advice and objective assessment of the centre's approaches and activities, we are confident that our relationship with the Committee will help us to strengthen ties with the institutions of the internationally well-known researchers listed below.

The ISAC is currently composed of distinguished professionals in different geographical areas and with expertise in neuroscience. Their appointments took into account their professional background, expertise and geographical location, with the aim of covering most of the international views of the different subareas of neuroscience.

Jesús **Ávila**
CBM Severo Ochoa
Spain

Geoffrey **Burnstock**
University College London
United Kingdom

Isabel **Fariñas**
University of Valencia
Spain

Christian **Giaume**
Ecole Normale Supérieure
France

Helmut **Kettenmann**
Max-Delbrück Centrum
Germany

Frank **Kirchhoff**
Saarland University
Germany

Jose A. **Obeso**
CIMA, University of Navarra
Spain

Jorge **Oksenberg**
University of California in San Francisco
USA

Anna **Planas**
IDIBAPS, Barcelona
Spain

Bruce **Ransom**
University of Washington
USA

3. PEOPLE

The Mission and the Strategic Objectives set by the Board of Trustees of this research centre put a special emphasis in the central role of the Achucarro centre with the compromise of collaborating with the raise of the new generations of neuroscientist, thus being an active actor in the career development of the future neuroscientist.

According to this will, the Board of Trustees, in the first meeting for establishing the centre (June 2012), decided to endorse the **European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers**, fostered by the European Commission. During the first semester of 2013, Achucarro underwent the Internal Analysis process of the "HR Strategy for Researchers" (HRS4R) which is a method to implement the commitment with the Charter and the Code.

At the end of 2014, 68 persons composed the total staff of the centre, working for 8 research groups, research support facilities and the management.

Research Groups | Principal Investigators

Laboratory of Neural Stem Cells and Neurogenesis

Juan Manuel Encinas
Group Leader

Ramon y Cajal Fellow

PhD Universidad Complutense de Madrid – Instituto Cajal (Spain), 2003

Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse

Pedro Grandes
Group Leader

Full Professor in Anatomy and Human Embryology
Department of Neurosciences (UPV/EHU)

PhD University of the Basque Country (UPV/EHU), 1986

Laboratory of Neurobiology

Carlos Matute
Scientific Director and Group Leader

Full Professor in Anatomy and Human Embryology
Department of Neurosciences (UPV/EHU)

PhD University of Zaragoza (Spain), 1982

Laboratory of Functional Neuroanatomy

Jose Julio Rodríguez Arellano
Group Leader

Ikerbasque Research Professor (UPV/EHU)

PhD Universidad Complutense de Madrid (Spain), 1995

Laboratory of Glial Cell Biology

Amanda Sierra
Group Leader

Ikerbasque Research Professor (UPV/EHU)

PhD Universidad Complutense de Madrid (Spain), 2003

Laboratory of Neurogenomics

Koen Vandenbroeck
Group Leader

Ikerbasque Research Professor (UPV/EHU)

PhD University of Leuven (Belgium), 1993

Laboratory of Pathophysiology

Alexej Verkhratsky
Adjunct Scientific Director and Group Leader

Ikerbasque Research Professor (UPV/EHU)

PhD Bogomoletz Institute of Physiology (Kiev, Ukraine), 1986
Full Professor in Neurophysiology (University of Manchester)

Laboratory of GTPases and Neurosignalling

Jose Luis Zugaza
Group Leader

Ikerbasque Research Professor (UPV/EHU)

PhD Universidad de Santiago de Compostela (Spain), 1993

Research Staff and Technicians

Oihane **Abiega** *(PhD Student)* · Elena **Alberdi** *(Senior Reseacher)* · Iraide **Alloza** *(Senior Reseacher)* · Alain **Artaso** (Intern) · Ianire **Astobiza** (Postdoctoral Fellow) · Sol **Beccari** *(PhD Student)* · Mónica **Benito** *(PhD Student)* · Ana **Bernal** (Postdoctoral Fellow) · Itziar **Bonilla** *(PhD Student)* · Ianire **Buceta** *(PhD Student)* · Josune **Canduela** (Postdoctoral Fellow) · Manuel **Canedo** *(PhD Student)* · Estibaliz **Capetillo** *(Senior Reseacher)* · Fabio **Cavaliere** *(Senior Reseacher)* · Juan Carlos **Chara** (Technician) · Raffaela **Cipriani** (Postdoctoral Fellow) · Abraham **Cisneros** (Postdoctoral Fellow) · Irune **Díaz** *(PhD Student)* · María **Domercq** *(Senior Reseacher)* · Susana **Eguskiaguirre** (Intern) · Izaskun **Elezgarai** *(Senior Reseacher)* · Laura **Escobar** (Facility Technician) · Enmanuela **Gardena** *(PhD Student)* · Jon **Gejo** (Intern) · Haize **Goikuria** *(PhD Student)* · Paloma **Gomez** *(PhD Student)* · Sonia **Gómez** *(Senior Reseacher)* · Hazel **Gómez** (Technician) · Ana **Gutiérrez** *(PhD Student)* · Francisco **Llavero** (Postdoctoral Fellow) · Aitzkoa **Lopez de Lapuente** (Postdoctoral Fellow) · Andrea **Manterola** *(PhD Student)* · Saioa **Marcos** (Technician) · Soraya **Martín** *(PhD Student)* · Luis **Martínez** *(Senior Reseacher)* · Susana **Mato** *(Senior Reseacher)* · Juan **Mendizabal** *(Senior Reseacher)* · Carolina **Ortiz** *(PhD Student)* · Aitor **Palomino** (Postdoctoral Fellow) · Iñaki **Paris** (Intern) · Oier **Pastor** (Intern) · Sara **Peñasco** *(PhD Student)* · Fernando **Pérez-Cerdá** *(Senior Reseacher)* · Alberto **Pérez-Samartín** *(Senior Reseacher)* · Nagore **Puente** *(Senior Reseacher)* · Tania **Quintela** *(PhD Student)* · Almudena **Ramos** *(Senior Reseacher)* · Leire Reguero *(Senior Reseacher)* · Jose **Riera** (Postdoctoral Fellow) · Naiara **Royo** *(PhD Student)* · Asier **Ruiz** (Postdoctoral Fellow) · María Victoria **Sánchez** *(Senior Reseacher)* · Victor **Sánchez** *(PhD Student)* · Nerea **Ugidos** *(PhD Student)* · Andoni **Urtasun** *(PhD Student)* · Bakarne **Urzelai** *(PhD Student)* · Roberto **Valcárcel** *(PhD Student)* · Ane **Wissenbach** *(PhD Student)* · Alazne **Zabala** *(PhD Student)*

Management Team

The Achucarro centre has the vocation of having a reduced, yet multifunctional and interconnected management team that contributes to the adaptation of our management processes to the evolving activity and development process of the centre.

Carlos Matute
Scientific Director

Main and overall responsible for Strategy and Management, Partnerships, Research and Knowledge Transfer processes.

Jaime Sagarduy
General Manager

Co-responsible for Strategy and Management, Partnerships, Knowledge Transfer, and responsible for People and Infrastructure, Equipment and Resources processes.

Laura Escobar
Facility Technician

In charge of the Imaging and Cell Analysis Research Facilities and co-responsible of the Equipment subprocess of the centre, which includes supporting and managing the best and most of their use.

HR EXCELLENCE IN RESEARCH

In September 2013, the European Commission awarded Achucarro with the "**HR Excellence in Research**" in recognition to the commitment with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

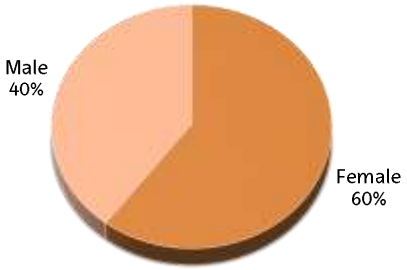
4. RESEARCH

At the end of 2014, the Achucarro centre involves eight research groups, comprising 34 doctors, 24 PhD students, 4 technicians and 5 interns (Master student). The gender ratio is 60%of the Achucarro personnel are women and the other 40% men.

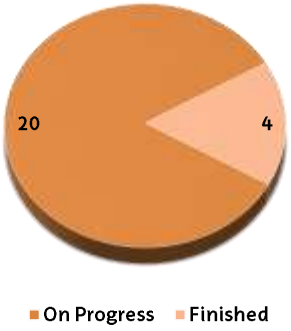
In 2014 four PhD theses have been successfully completed and defended.

Scientific output consisted of 45 publications, of which the 84% of them have appeared in journals in the first quartile of their areas. In addition, there were 16 contributions as books or book chapters. Attendance at conferences and participation in scientific forums has involved invited lectures (33) and plenary lectures (2), as well as posters (30) and the direct organization of meetings (4).

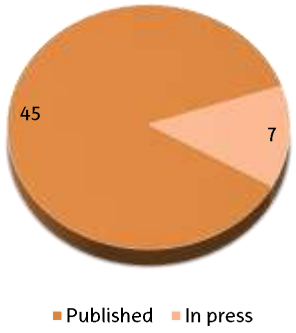
Staff



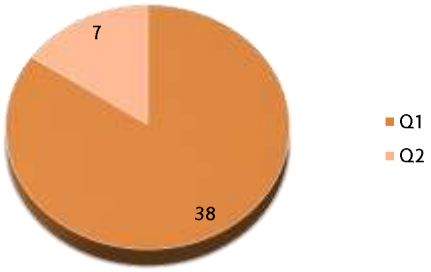
Training | PhD Dissertations



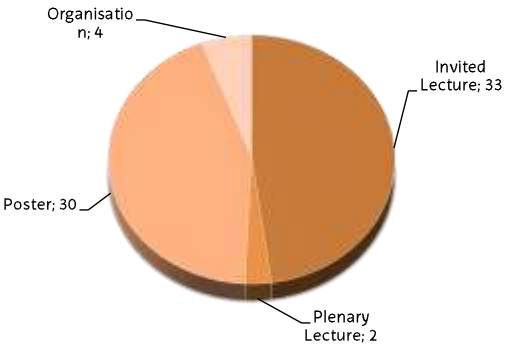
Research outcome



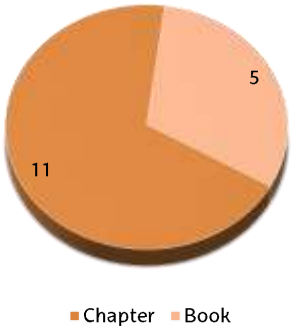
Published and In press articles



Articles according to their impact classification (quartiles)



Participations in Congresses



Books and Chapters

REMARKABLE ACHIEVEMENTS

Amanda Sierra and **Jose Ramón Pineda Martí** were awarded with two of the **Ramon y Cajal Fellows** of the Spanish Government and will join the centre as so in early 2015. **Jorge Valero** was awarded one of the Ikerbasque Research Fellow position will also join in 2015.

María Domercg and **Carlos Matute** obtained one Merck Serono Grants for Multiple Sclerosis Innovation in the 2014 call, ranked with the first position, with a financial support of 250.000 euros to develop a 5 years project.

3 Bizkaia Talent Visiting Professor projects were achieved for supporting the short stays of three prominent colleagues: Rogelio Arellano (UNAM, Mexico), Miroslav Gottlieb (Saske, Slovak Republic) and Mitradas Panicker (NCBS, India)

GLIA
Special Issue
The Role of GLIA in CNS White Matter Injury
November 2014
Volume 62, Issue 11

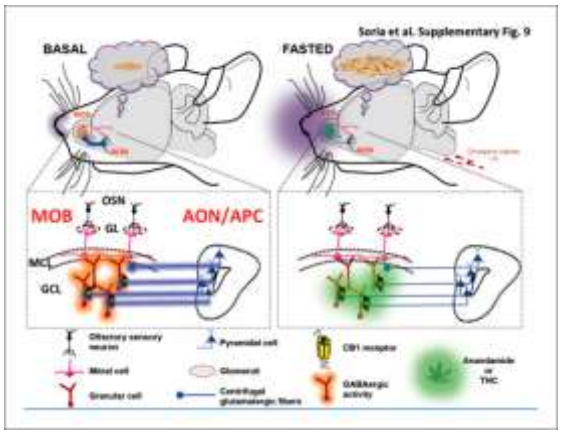
Carlos Matute was the **editor** of an Special Issue about the role of Glia in CNS White Matter Injury of the **Glia** journal

Highlights in research outcomes

"A cannabinoid connection between smell and appetite"

The increase in food intake that occurs after smelling food relies on the presence of the cannabinoid type-1 (CB1) receptor in the olfactory bulb, reports a study published online this week in **Nature Neuroscience**. The work also shows that CB1 receptor activation enhances odor detection leading to food intake, and suggests that these receptors could be a potential pharmacological target for altering feeding behavior that contributes to obesity.

"It is known that abstinence from food, or fasting, the level of endogenous cannabinoids in the brain of mammals, and that the cannabinode system is important in the regulation of energy balance component," commented Pedro Grandes, the Director of the Department of Neurosciences at the UPV/EHU and appointed as Group Leader at the Achucarro centre, who has been the coleader of the study together with Giovanni Marsicano (University of Bordeaux).



Brief abstinence from food is known to increase the level of endogenous cannabinoids in the mammalian brain. Hunger is also known to enhance our sense of smell and promote ingestion of food. Giovanni Marsicano and colleagues report that the main olfactory bulb of mice contains cannabinoid (CB1) receptors whose activation by endogenous cannabinoids or exogenous cannabinoids (such as those in marijuana) increase fasting-induced food intake. Indeed, an increase in appetite when mice are given exogenous cannabinoids (such as THC, the active ingredient in marijuana) is commonly seen.

The authors found that this population of cannabinoid receptors in the olfactory bulb was also necessary to see this increase in feeding behavior.

Because this population of cannabinoid receptors only seems to modulate an increase in food intake when the animal is fasting or hungry, CB1 receptors in the olfactory bulb may represent a potential pharmacological target for altering feeding behavior.

Bibliographical Reference

"The endocannabinoid system controls food intake via olfactory processes" Edgar Soria-Gómez, Luigi Bellocchio, Leire Reguero, Gabriel Lepousez, Claire Martin, Mounir Bendahmane, Sabine Ruehle, Floor Remmers, Tifany Desprez, Isabelle Matias, Theresa Wiesner, Astrid Cannich, Antoine Nissant, Aya Wadleigh, Hans-Christian Pape, Anna Paola Chiarlone, Carmelo Quarta, Daniéle Verrier, Peggy Vincent, Federico Massa, Beat Lutz, Manuel Guzmán, Hirac Gurden, Guillaume Ferreira, Pierre-Marie Lledo, Pedro Grandes, Giovanni Marsicano. Nature Neuroscience, Mar 2014

Highlights in research outcomes

"New therapeutic target for brain damage resulting from Stroke"

The collaboration among Basque researchers of the **Achucarro Basque Center for Neuroscience**, the **University of the Basque Country (UPV/EHU)** and **CIC biomaGUNE,** has facilitated the discovery of a new mechanism that contributes towards providing us with a better insight into the neuronal damage that occurs during cerebral ischaemic attacks or strokes.

Cerebral ischaemia is the third cause of death and the first cause of disability in industrialised countries. It occurs as a result of the transient or permanent reduction in cerebral blood flow and causes irreversible neuronal damage that leads to neurological changes.

A considerable part of this deterioration is due to the change in the levels of glutamate, the most abundant excitatory neurotransmitter in the brain that, in turn, acts as a powerful neurotoxin when its concentration is raised, as occurs during ischaemia.

This new finding underscores the importance of a molecule, the cystine-glutamate exchanger (xCT), in the increase in the concentration of glutamate to toxic levels in experimental models that reproduce the main characteristics of stroke in patients.

The results of this study, carried out between the Basque provinces of Bizkaia and Gipuzkoa, have been published by the prestigious *Journal of Clinical Investigation*.

In Bizkaia it has been led by the researchers **María Domercq** and **Carlos Matute**, of the Achucarro Center and the UPV/EHU, and in Gipuzkoa by **Abraham Martín**, a CIC biomaGUNE researcher in Donostia-San Sebastian.

The work carried out by the Achucarro and UPV/EHU researchers (**Federico Soria, Alberto Perez-Samartín, Carlos Matute** and **María Domercq**) shows that during ischaemia the glutamate is transported outside the cell via the xCT exchanger, and is accumulated up to levels that are lethal for the neurons.

In turn, the CIC biomaGUNE researchers (**Abraham Martín** and **Jordi Llop**) have observed by means of functional cerebral imaging techniques like PET (Positron Emission Tomography) that xCT levels are high in rats subjected to ischaemia, which underlines its importance in the stroke process.

As a conclusion, it follows that this research carried out on experimental animals will open up the door for the development of new neuroprotective treatments by means of drugs that are directed against the xCT exchanger in order to mitigate the cerebral damage and neurological disorders caused by cerebral ischaemia.

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5. KNOWLEDGE TRANSFER

Training

During 2014 **23 Achucarro Seminars** have been organised and also collaborated in the organisation of **2 BioMed Foro lectures** in collaboration with colleagues in the UPV/EHU.

January 30
"Neuroprotective function for ramified microglia in hippocampal excitotoxicity"
Knut Biber
University of Freiburg (Germany) & University Medical Center Groningen (The Netherlands)

March 14
"Neuronal and Glial migration in normal and pathological brains"
Hitoshi Komuro
Lerner Research Institute | The Cleveland Clinic Foundation (USA)

March 17
"Innate immune regulation by the inflammasome"
Pablo Pelegrín
Murcia Biomedical Research Institute (Spain)

April 04
"Impact of mitochondrial function on adult neurogenesis"
Chichung Lie
Institut für Biochemie | Universität Erlangen (Germany)

April 8
"Primary and iPS derived neural cells: characterization, sorting and fate modulation"
Andreas Bosio
R&D Miltenyi Biotec GmbH (Germany)

May 6
"Gene expression in the CNS is organized by 5-Hydroxymethylcytosine and 5-Methylcytosine in a cell-specific manner"
Marian Mellén
The Rockefeller University (NY, USA)

May 9
"Temporal Lobe Epilepsy with Hippocampal Sclerosis in Humans: from Clinics to Translational Research"
Ainhoa Marinas
Head of the Epilepsy Unit (Dep. of Neurology), Cruces University Hospital (Barakaldo, Spain)

May 21
"Purinergic signalling in microglia biology"
Francesco Di Virgilio
Department of Morphology, Surgery and Experimental Medicine, University of Ferrara (Italy)





June 4
"Neural Stem Cells and their niche: Life at home"
Isabel Fariñas
Universidad de Valencia & ciberNed (Spain)

June 6
"Studying live dendritic spines by superresolution STED microscopy"
Jan Tønnesen
Institut Interdisciplinaire de NeuroSciences / Université Bordeaux (France)

July 18
"Vascular-derived TGF- increases in stem cell neurogenic niches after irradiation and during aging perturbing neurogenesis in adult mouse"
Jose R Pineda
Commissariat à l'Energie Atomique [CEA – FAR] (France)

July 24
"Sinapses, Spines and PI3K"
Miguel Morales
SpineUp (Spain)

September 5
"Modeling SPG11-linked HSP disease by neurodevelopmental and hiPSC strategies"
Francesc Pérez Brangulí
University Hospital Erlangen (Germany)

September 19
"fProbe: Fluidic probes for local drug and simultaneous recording delivery in the brain"
Juan Berganza
microLIQUID SL (Arrasate, Gipuzkoa)

September 30
"Advancing Neuroscience with the Allen Brain Atlas"
Terri Gilbert
Allen Institute for Brain Science (USA)

October 3
"CB1 and CB2 heteromers in the basal ganglia in monkeys with Parkinson´s disease"
José Luis Lanciego
CIMA, University of Navarra (Pamplona, Spain)

October 10
"Shining light on memory"
Mazahir T. Hasan
Neurocure Cluster of Excellence Charité-Universitätsmedizin (Berlin, Germany)

October 17
"Microglial remodeling of neuronal circuits in health and neurodegenerative disease"
Marie-Ève Tremblay
Centre Hospitalier de l'Université Laval (Quebec, Canada)





October 24
"Huntington's Disease as a tauopathy"
José Lucas
Centro de Biología Molecular "Severo Ochoa" CSIC/UAM &ciberNed (Madrid, Spain)

November 4
"Perinatal nutrition alters microglia-neuron interactions during brain development"
Agnès Nadjar
Université Bordeaux 2 (France)

November 14
"Adult neurogenesis in the 3xTg-AD mouse model of Alzheimer's disease"
Elisabete Ferreiro
Center for Neuroscience and Cell Biology, University of Coimbra (Portugal)

November 14
"Characterization of stem and progenitor properties in the dentate gyrus of an animal model of Alzheimer's disease"
Jorge Valero
Center for Neuroscience and Cell Biology, University of Coimbra (Portugal)

November 21
"Neurotrophism and metabolism in Alzheimer's disease"
Ignacio Torres Alemán
Cajal Institute (Madrid, Spain)

December 12
"Cell fate and axon navigation in neocortex: intrinsic and extrinsic factors"
Victor Tarabykin
Institute of Cell Biology and Neurobiology Charité - Universitätsmedizin Berlin (Germany)

December 18
"Using Induced Pluripotent Stem Cell technology to model Parkinson's disease"
Ángel Raya
Institute for Bioengineering of Catalonia (IBEC) & Center for Regenerative Medicine in Barcelona (CMRB)





Dissemination

The dissemination and public outreach process of **Achucarro** is in charge of spreading the brand and of communicating the relevant outcomes of centre, including the contribution to the communication and social awareness about the importance of the research on the brain and its inner misteries.

Internet and Web platforms, as social media are becoming more and more important also in the science and research world.

One of the main tools to support our dissemination activities is our Website, a self-managed and multilingual Web space, continuously updated with information and neuroscience related data. On 2014, a new domain name was established for website on or about the Basque language the "**EUS**". As from 2014, the Achucarro website in Basque language can be accesed in **Achucarro.eus**.

The Achucarro centre is also quite active in different social media (networks, platforms) to reach its different target audiences, and also as a way of increase our international visibility.

According to the statistics 7.002 different people visited our website during 2014, which nearly 22% more visitors than in 2013.

General indicators about the use of our website during 2014

Blog (Neurozientzian)

Our blog about neurosciences in Basque was launched back in 2013 together with the annual "*Week of Science, Technology and Innovation*". We managed to produce and publish 13 articles in 2013, and **17 in 2014**. Some of them participated in a virtual festival to foster science culture in Basque (the so called "**#KulturaZientifikoa Jaialdia**"), an initiative of a group of people and organisations which reached to become a "trending topic" in the social networks.

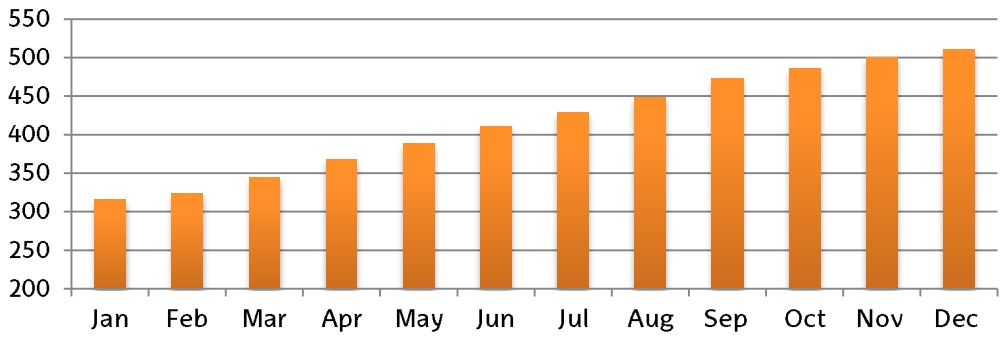
neurozientzian.blogspot.com

Twitter, Facebook, Instagram

As we mentioned before, Science and researchers are finding we ways, or maybe better, making the most of the current technologies to support all their activities, mainly those related to outreach and dissemination.

The **Achucarro** centre strives to be a very active agent in this framework, and works for increasing our presence in the virtual world.

At the end of 2014, our twitter has 505 followers, 63% more than the previous year, and we tweeted 2.432 times so far.



We also have a page in **Facebook**, and recently opened an **Instagram** account to support our strategy on communication related issues. **Social media generate already de 10% of the visitors of our website.**

Achucarro Forum

A new Achucarro Forum conference was organised in 2014. The objective and definition of this to implement a series of public lectures to make the society aware about the importance of research in neuroscience, and increase the awareness on the imporatant advances neuroscientists are achieving, from the very professional working in the field, in a language accessible for (almost) anyone.

The speaker for this edition was Professor **Isabel Fariñas**, a Full Professor at the University of Valencia in Spain, and a member of CiberNed, the network of excellent research groups in neurodegeneration in Spain.

Prof. Fariñas spoke about the still future possibility of repairing the brain from the inside, by using stem cells, her area of expertise. The lecture was held at the Bizkaia Aretoa, the Main Hall of the University of the Basque Country (UPV/EHU) en Bilbao, to an audience of **168 people** that fully booked the auditorium. The lecture was also streamed via Internet, thanks to our collaboration with the **Chair of Science Culture of the University of the Basque Country** and its agreement with ETB, our regional TV channel.

http://www.achucarro.org/achucarro-forum/isabel-farinas

Neurogune 2014

The BCBL - Basque Center for Cognition, Brain and Language was the local organiser of the second edition of Neurogune ("gune" means "place" and "nucleus/core" in Basque), the network and meeting point of the Basque research community working for the advance of neurosciences.

After the success of the first edition in Bilbao, this second edition supposed a consolidation for this event. As in the previous one, the structure of the meeting was a one-day congress held at the Main Auditorium of the Gipuzkoa Science and Technology Park, in San Sebastian, on July 9th.

Nearly 200 people attended this meeting that had 3 blocks of 4 oral presentation that sum up a total of 12 oral communications mainly for younger researchers, combining all the areas of neurosciences and institutions; 2 posters sessions with 68 posters; and a keynote lecture by Professor **Javier de Felipe** (UPM – Madrid, Spain) leader of the *Cajal Blue Brain* project and also involved in the *Human Brain Project*.

Allen Brain Atlas

On September 30th at the Bizkaia Aretoa in Bilbao, we hosted of charge lecture and training workshop about the public research resources of the **Allen Institute for Brain Science.** 50 researchers from different Basque research centres attended.

This two-part sessionallowed us to learn more about the resources provided by the **Allen Institute** and publicly available for all scientists around the wold – including an exploration of gene expression **and** connectivity of the brain.

The attendance to the event was free of charge thanks to the generosity of the **Allen Institute** and the support of the **Spanish Society for Neurosciences (SENC).**

▸ http://www.achucarro.org/training/allen-brain-atlas

Advanced Course on Microscopy in Biosciences

As it was already mention in the Partnerships section of this document that **Achucarro** and the Biophysics Unit (CSIC-UPV/EHU) are partnering in a node proposal for the future Euro-BioImaging network. Aligned with this strategy, both institutions launched the first edition of a course on advanced microscopy en biosciences.

The course had a two-days duration, with different lectures about the most recent techniques in optical/light and electron microscopy. Experts from Achucarro, Biophysics Unit, CIC bioGUNE, and the technological partners Leica Microsystems and Zeiss outlined the capabilities of the super-resolution technologies installed in both centres, and the most recent technologies available for bioscience and biomedicine research.

▸ http://www.achucarro.org/training/jornadas-microscopia-avanzada-biociencias

Zientziateka Lecture

Invited by the Chair of Scientific Culture of the University of the Basque Country and hosted by the AlhondigaBilbao cultural centre, Carlos Matute delivered a public lecture about the findings and merits after the Nobel Prize on Medicine and Physiology 2014 to John O'Keefe, and to May-Britt Moser and Edvard I. Moser for their discoveries of cells that constitute a positioning system in the brain, what the media called the "GPS of the brain".

The objective of Zientziateka lectures is to take science and its discoveries to the general public and the society, and according to this, the annualy organise difference conferences to share and debate around scientific subjects.

▸ http://www.alhondigabilbao.com/detalle-evento/-/journal_content/56_INSTANCE_aJV5/10140/5674995

Second Basque-Chilean Meeting on Biomedical research

Following the first edition of the Basque-Chilean Meeting on Biomedical research held in Santiago de Chile on December 2013, the second edition of this meeting was held in Bilbao, being the University of the Basque Country (UPV/EHU) the host and organiser. The Chilean representatives come from the Pontifical Catholic University of Chile (PUC), which is a reference academic and research institution in Chile.

This meeting contributed to the establishment of formal collaboration agreements between both universities and also between the Interdisciplinary Center for Neuroscience (neuroUC) and Achucarro.

7. INFRASTRUCTURE AND EQUIPMENT

Current Location

The centre's headquarters are located in Building #205 of the Bizkaia Science and Technology Park, in the town of Zamudio, close to Bilbao and Leioa, where the university campus is.

The research groups of the centre are located both, in the Science and Technology Park of Bizkaia, Zamudio and at the university campus.

Some of the equipment and techniques that we can develop are cellular and molecular neurobiology; primary and organotypic cultures; *in vitro* models; classical morphometry and stereology; immunofluorescence; immunochemistry and immunohistochemistry; electrophysiology; calcium imaging; light (epifluorescence and confocal) and electron microscopy, super-resolution microscopy; genotyping and functional genomics; sequencing; qPCR and qRT-PCR; flow cytometry and fluorescence-activated cell sorting; cerebellar organotypic culture for neuroinflammation; reporter constructs & recombinant expression; stereotaxic surgery and stereology-based quantification; among others.

The **Core Research Support Facilities** of Achucarro already include:

- "Leica TCS g-STED CW SP8" Super-resolution confocal microscope
- "BD FACSJazz (2B/4YG)" Fluorescence-Activated Cell Sorter and Analyser
- "Seahorse XFe96" Extracellular Flux Analyzer.
- "Bio-Rad QX200" Droplet Digital PCR System

Future Headquarters

The construction of future location of the centre was completed in December 2014. The "*Maria Goyri*" Building will host University research group and research support services on biosciences and biomedicine, and it is supposed to be operational during the seconf part of 2015.

8. ACHUCARRO IN FIGURES

STRATEGY AND MANAGEMENT	2012	2013	2014
% of publications in neurosciences over the total in the Basque Country (previous year)	3%	4%	3%
% of publications from Achucarro over the total neurosciences in the Basque Country	61%	38%	38%
H-index of Achucarro		4	8
% compliance of Management Plan	100%	99%	95%
Number of meetings of the Board of Trustees	2	3	2
Annual Budget	1.061.400	670.000	1.218.140
Rate of funding different from Basque Government	6%	3%	25%

PARTNERSHIPS	2012	2013	2014
Number of strategic agreements	2	1	2
Number of institutional agreements	5	6	2
Number of operational agreements	4	2	2

PEOPLE	2012	2013	2014
Number of persons involved in Achucarro	51	50	68
Number of directly contracted staff	1	2	6,5
Number of persons in practice work	1	1	0
Number of researchers	46	45	63
Number of principal investigators	8	7	8
Number of senior researchers	7	8	16
Number of postdoctoral researchers	10	10	10
Number of PhD students	16	16	24
Number of Master students	2	1	5
Number of technicians	4	4	4
Number of staff	1	1	1
Number of Ikerbasque Research Professors	7	6	6
Number of Ikerbasque Research Fellows	1	1	2
Number of Ramon y Cajal Fellows	1	0	1

RESEARCH	2012	2013	2014
Number of research groups	8	7	8
Number of publications by groups	59	53	45
Number of publications by groups (Q1)	31	46	38
Number of publications with Achucarro affiliation	1	23	45
Number of publications with Achucarro affiliation (Q1)	1	19	38
Number of participations in congresses	51	66	69
Number of books and chapters	12	6	16
Number of patents (applications)	3	0	0
Number of patents (accepted)	0	2	0
Attracted Funding (Milions of Euros)	2,6	2,4	2,2
Number of PhD theses (in progress)	13	16	20
Number of PhD theses (completed)	5	4	4

KNOWLEDGE TRANSFER | TRAINING	2012	2013	2014
Number of Achucarro seminars	11	25	23
Number of Congresses, Conferences	1	1	2
Number of Training events	1	1	2
Number of Dissemination events	1	1	2
Number of attendees per event (mean)	170	285	190

KNOWLEDGE TRANSFER | DISSEMINATION	2012	2013	2014
Press releases	4	3	5
Press conferences	1	0	0
Followers in Twitter	94	309	505
Tweets in Twitter	432	974	2.432
Number of news published on the website	34	42	28
Total visits to the website	3.285	10.277	11.849
Visits from Spain	2.712	7.497	7.897
% visits from Spain	83%	73%	67%
% visitas from abroad	17%	27%	33%
Returning visitors to website	50%	40%	43%
Ratio of new visitors to website	50%	60%	57%

INFRASTRUCTURE AND EQUIPMENT	2012	2013	2014
Number of strategic singular equipment	1	2	4

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