



scientia ad remedium



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FOREWORD

Dear reader,

Welcome to the new Annual Report of the Achucarro Basque Center for Neuroscience.

The year 2018 has been the first year of our second strategic period, covering the *quadrennium* 2018 – 2021. It has been the first complete calendar year in our new facilities in the Sede Building on the Leioa Campus. This location has strengthened our tights with the academic and the student community and created new and fruitful opportunities.

Two new group leaders have joined ACHUCARRO as *Ramón y Cajal fellows* this year and started their independent laboratories on autophagy and neuroinflammation imaging. *We welcome Olatz Pampliega and Abraham Martin and wish them a successful career.*

The performance of our research groups has been outstanding, reaching the number of **53 publications**, above from the objectives set by our Trustees.

Our results so far prove that the strategic approach to scientific competitiveness we chose and the policies and operations we implemented are producing excellent results.

Even if the number is important, our main concern is the quality of the neuroscience we develop. If the relevance of the journals published our that articles mean something, 39% of our publications in 2018 are in the first decile of their areas of specialization. In turn, 70% of all the publications are in the first quartile. Moreover, our strategy to increase the publication in Open Access journals shows that we already publish 40% of our articles in this kind of media.

It has also been a very productive year for completing PhD thesis projects. Seven brilliant young colleagues got their doctorate and are now facing new challenges, at home or abroad. The Achucarro Alumni family keeps increasing.

These achievements and others accounted in this report encourage us to keep pushing this singular research initiative fostered by the Basque Government, *thanks to the continuous support of Ikerbasque - the Basque Foundation for Science and the University of the Basque Country (UPV/EHU)*, our main allies in this challenging effort.

Keep on!

Carlos Matute Scientific Director Our organisation has developed a management model based in international standards to deploy the strategic objectives set by our Board of Trustees.

ACHUCARRO uses a management model based in processes, designed according to the guidelines and recommendations of the European Foundation for Quality Management (EFQM) and the Basque Foundation for Quality (Euskalit). In coherence with this approach, the structure of this document follows that process-driven operational deployment.

1. STRATEGY AND MANAGEMENT

The Basque Government fostered the creation of the Basque Research Centre in the field of neuroscience within the network of Basque Excellence Research Centres (BERC) in 2012.

The founding partners of this new centre were Ikerbasque - the Basque Foundation for Science, the University of the Basque Country (UPV/EHU), and BIOEF – the Basque Foundation for Health Innovation and Research, which currently compose the Board of Trustees of the legal entity behind the centre, a non-profit foundation, under the Basque and Spanish laws.

In the year 2018, we launched the deployment of our second strategic plan for the period 2018-2021. In this period, our main strategic objective is to consolidate the structure and the path established in the past, looking forward and adapting to the changing environment in scientific research within a global momentum of tremendous changes.

Scientific Plan 2018–2021

The Mission of ACHUCARRO is to contribute to the development of a socially and economically sustainable society. We attain this shared challenge by performing high quality research in the field of neuron-glia biology and interactions, in the normal and pathological brain.

The foundations that support our endeavour are:

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

To meet these goals, we designed a Strategic Plan for the period 2018–2021, supervised by our International Scientific Advisory Board and approved by our Board of Trustees that contains **three high-level research programmes:**

- Characterization of the role of glial cells in the physiology of the nervous system
 - o roles of astrocytes in synaptic communication
 - \circ $\;$ neurotransmitter signalling during neurogenesis and gliogenesis
 - o mechanisms of microglia phagocytosis during neurogenesis
- Characterization of structural and functional changes of neuronal–glial networking in the aged brain
 - age-dependent remodelling of neuronal-glial signalling
 - \circ $\,$ regulation of the intrinsic properties of neural stem cells in the adult $\,$ hippocampus $\,$
- The role of neuroglia in neurodegenerative diseases and other neurological disorders
 - \circ ~ research on general mechanisms of neuron and glial cell death
 - o understanding the pathophysiology of Alzheimer's disease and epilepsy
 - o autoimmune pathogenesis of multiple sclerosis (MS) and neuroinflammation



Figure 1. Schematics of our research focus

Management Plan 2018

If we focus in the more general aspects of the year, in 2018 we had to undergo political changes and adaptations in the legal framework (in particular the new constrains of the public procurement and contracting regulations) in Spain that required additional efforts. Both, managers and researchers have faced times of more bureaucracy that affected our operations.

However, 2018 has been also a year of opportunities. In terms of management, the year 2018 was the first complete period for our organisation in the new headquarters in the Sede building of the Science Park of the UPV/EHU, within the university campus of Leioa.

Moving to this location, where most our personnel works in a close environment, has contributed to draw us all together. A consequence of this is the launching of the **Achucarro Mentoring Programme**. This new dynamic of interaction and discussion is a perfect environment to advance in the integration of all our members in participation groups, and making everyone aware of the personal leadership on the career development, with the support and training of other colleagues, in groups with open and horizontal participation rules.

Checking the indicators of achievements (see section **7**. *Achucarro in Figures*) of this year, the outcome is excellent, and the overall performance of all the activities resulted into output aligned with our policies, expectations and the evolution of our organisation and the economic and political environment of our region.



Figure 2. Map of Management Processes

Transparency and Accountability

Currently, the requirements of the social context for openness, accountability, ethic attitudes and communication to and with the Society are becoming a legal requirement and social claim for the organisations that manage public funding.

For us, the principles and activities towards openness and transparency are the foundations to strengthen the sustainability of our project, so we keep an updated section on our website to communicate about these subjects.

ACHUCARRO keeps being a reference within the research organisations in the Basque Country in terms transparency and publication of significant data and documentation. With this 2018 edition of the Annual Report, there are already 7 years of activity made public and available in our website.

https://www.achucarro.org/transparency-and-sustainability

Equality Plan 2018-2021

In 2017, we underwent an internal analysis and reflection process to improve the policies and our organisational culture towards the Equality, with the support of *Emakunde*, the Basque Institute for Women. The result of this process was the first **Achucarro Equality Plan, for the period 2018-2021**.

This first plan identifies four main areas of work to improve our commitment with equal opportunities:

- 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 the gender perspective in the policies, products and operating dynamics
- 4. Promote inclusive leadership styles

The Plan launched in January 2018, being one of the first activities to appoint an **Equality Committee**, composed by representatives of personnel on different functions or career stages, from each gender.

https://www.achucarro.org/equality https://www.achucarro.org/conciliation



Currently our overall ratio is of gender is 56% female, 44% male.

Figure 3. Evolution of gender ratio

The hallmarks of the advance of this Plan in 2018 are:

- Reviewed the Mission, Vision and Objectives statement and re-redefine them in coherence with the commitment with equality.
- Incorporated clauses that ensure equal opportunities in all the internal policies and dynamics of the centre.
- Made public and advocated about the institutional commitment with the equality.
- Communicated to the Board of Trustees and our strategic ally institutions our strategy on equality, with the aim of involving them in its development and success.
- Gathered best practices on equality from other organisations to inspire our current and future policies.
- Reviewed the labour agreements of reference institutions to draft the basic conditions of a particular labour agreement in ACHUCARRO.
- Created a section on the website to disseminate information about inequalities for women in science, and with resources for co-responsible conciliation.
- Made a diagnosis about the dynamics of internal communication and its impact on the participation of women and men.
- Ensured equal opportunities and assessment of applications to cover new vacancies.
 - Equal ratio of support to male and female candidates, with an outcome of 100% female scientist were selected in the Ikerbasque calls.
 - We also appoint two Ramón y Cajal Fellows, with 50% gender balance in this case.

Collaborating and sharing efforts with other individuals and institutions is crucial for achieving our more ambitious objectives.

The importance that we confer to institutional relationships required a process to properly manage and maintain mutually beneficial partnerships. This process classifies the different types of collaborations, attending to the framework environment or the impact of each partnership in the development and achievement of our strategic objectives.

2. PARTNERSHIPS AND COLLABORATIONS

According to the objectives and fields of activity, we classify the collaboration and partnership relationships we create and maintain in three different types: Institutional, Strategic or Operational.

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 our current institutional agreements by partner:

Basque Government

Agreement to support the activities of the centre in the period 2018-2021

Basque Science, Technology, and Innovation Network

Attachment to this 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
- Specific agreements and annual protocols for the co-funding of Ikerbasque research staff

University of the Basque Country (UPV/EHU)

- Framework Collaboration Agreement
- > Specific agreement for the appointment of the Scientific Director
- > Specific agreement for the appointment of teaching and research and personnel

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

Strategic Alliances



Bizkaia

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.

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.

euskampus

Euskampus

The Foundation created by the UPV/EHU, DIPC and Tecnalia to develop the International Campus of Excellence has built a solid link with the University of Bordeaux, to consolidate cross-border collaborations in the Aquitaine – Basque Country euro-region. This environment is a reference for us, due to the huge potential of collaboration with the *Bordeaux Neurocampus*.

In 2018, we have collaborated with specific projects with Bizkaia Talent and Euskampus, to advance in ideas and activities of shared interest.



Co-creating with Euskampus



Contrasting ideas with Bizkaia Talent

The International Scientific Advisory Committee is the main strategic advisory body of ACHUCARRO. Its primary role is to advise, supervise, and assess the objectives and performance of the different groups and professionals of the centre.

International Scientific Advisory Committee (ISAC)

The BERC centres, as many other organisations, in different sectors of activity, are required to have an advisory committee.

In our case, the International Scientific Advisory Committee is a panel of distinguished researchers in different areas of neuroscience that provide us with their view and opinion on the strategic and operational subjects for the better development of ACHUCARRO.



Jesús Ávila CBM Severo Ochoa Spain



Erik Boddeke University Groningen The Netherlands



Isabel Fariñas U. Valencia Spain



Christian Giaume Ecole Normale Supérieure France



Helmut Kettenmann Max-Delbrück Centrum Deutschland



Frank Kirchhoff University Saarland Deutschland



Jose A. Obeso CINAC Spain

Anna Planas



Ransom U. Washington USA

Bruce



n V gton U



Pablo Villoslada U. Stanford USA

Figure 4. Members of the ISAC in 2018

Spain

In 2018, we started the gradual process of renewing our panel. Prof. Jorge Oksenberg left his chair to Prof. Pablo Villoslada, in a process that had the formal approval of all the related bodies: both researchers, the rest of the panel, and the Board of Trustees of ACHUCARRO. We use the term People, instead of Human Resources. Creativity and knowledge creation are human activities. Talented people are the individuals that can push the frontiers of knowledge further with efficiency.

3. PEOPLE

At the end of 2018, ACHUCARRO was an organisation of 85 people. In slightly more than 6 years, we increased our size by 79%. The 62% of our personnel are newly recruited people, attracted from outside our environment.



Figure 5. Evolution of personnel per function

The 96% of our personnel are research performing or supporting professionals that work in the 11 independent research groups and the 3 research facilities.

- 7 Senior Group Leaders
 - o 2 University Full Professors
 - o 5 Ikerbasque Research Professors
- 4 Junior Group Leaders
 - o 4 Ramón y Cajal Fellows
- 24 Senior and associate researchers
 - 4 Ikerbasque Research Fellows
 - o 1 Ramón y Cajal Fellow
 - o 1 JIN Fellow
 - 18 Professors and Associate Professors of the UPV/EHU
- 10 Postdoctoral researchers
 - 1 Marie Skłodowska Curie Fellow
 - 1 Juan de la Cierva Fellow
 - 8 project-funded postdoctoral researchers

Appointed Staff (2018/12)

Svein Achicallende (PhD Student) Elena Alberdi (Senior Researcher) Iraide Alloza (Senior Researcher) María Ardaya (PhD Student) Alazne Arrazola (PhD Student) Jimena Baleriola (Group Leader) Sol Beccari (PhD Student) Maite Blanco (PhD Student) Itziar Bonilla (PhD Student) lanire Buceta (Senior Researcher) Xabier Cáceres (Management Assistant) Estibaliz Capetillo (Senior Researcher) Sergio Castaño (Postdoctoral Fellow) Alejandro Carretero (Postdoctoral Fellow) Fabio Cavaliere (Senior Researcher) Juan Carlos Chara (Technician) Joanna Danielewicz (Postdoctoral Fellow) María Domercq (Senior Researcher) Irene Durá (PhD Student) Jon Egaña (PhD Student) Izaskun Elezgarai (Senior Researcher) Juan Manuel Encinas (Group Leader) Laura Escobar (Technician) Marian Fernández (Management Assistant) María Gamarra (PhD Student) Adhara Gaminde (PhD Student) Laura García (Project Manager) Fernando García-Moreno (Senior Researcher) Inma Gerrikagoitia (Senior Researcher) Paula Giménez (PhD Student) Sonia Gómez (Senior Researcher) Pedro Grandes (Group Leader) Mazahir T. Hasan (Group Leader) Ana Joya (PhD Student) Francisco Llavero (Postdoctoral Fellow) Celia Luchena (PhD Student) Miriam Lugue (PhD Student) Andrea Manterola (PhD Student) Saioa Marcos (Technician) Abraham Martín (Group Leader) Soraya Martín (Postdoctoral Fellow) Luis Martinez (Senior Researcher) Susana Mato (Senior Researcher) Carlos Matute (Scientific Director) Jorge Mena (PhD Student) Juan Mendizabal (Senior Researcher) Alejandro Montilla (PhD Student) Álvaro Moreno (PhD Student) Carolina Ortiz (PhD Student) Ana Palma (PhD Student) Aitor Palomino (Facility Manager) Olatz Pampliega (Group Leader) Iñaki Paris (PhD Student) Oier Pastor (PhD Student) Fernando Pérez-Cerdá (Senior Researcher) Alberto Pérez-Samartín (Senior Researcher) José Ramón Pineda (Senior Researcher) Ainhoa Plaza (Postdoctoral Fellow) Nagore Puente (Senior Researcher) Tania Quintela (Postdoctoral Fellow) Almudena Ramos (Senior Researcher) Paula Ramos (PhD Student) Leire Reguero (Senior Researcher) Irantzu Rico (Postdoctoral Fellow) Víctor Rodriguez (PhD Student) Naiara Royo (PhD Student) Eneritz Rueda (PhD Student) Asier Ruiz (Senior Researcher) Jaime Sagarduy (General Manager) María Victoria Sánchez (Senior Researcher) Rafael Sarría (Senior Researcher) Mari Paz Serrano (PhD Student) Amanda Sierra (Group Leader) Virginia Sierra (PhD Student) Edgar Soria (Senior Researcher) Federico Soria (Senior Researcher) Vanja Tepavcevic (Senior Researcher) Itziar Terradillos (PhD Student) Jan Tønnesen (Group Leader) Jorge Valero (Senior Researcher) Koen Vandenbroeck (Group Leader) Alexei Verkhratsky (Group Leader) Alazne Zabala (PhD Student) Jone Zuazo (PhD Student) Jose Luis Zugaza (Group Leader)

Colleagues departing this year

Miren Josune Canduela (Senior Researcher) Irune Díaz (PhD Student) Artur Luzgin (PhD Student) Ainara Martínez (Technician) Sara Peñasco (PhD Student) José Julio Rodríguez Arellano (Group Leader) Victor Sánchez (PhD Student) Nerea Ugidos (PhD Student) Roberto Valcárcel (PhD Student) Cristina Viera (PhD Student) Fátima Zallo (Postdoctoral Fellow)

Open, Transparent, Merit-based Recruitment

The Board of Trustees and the Direction of ACHUCARRO endorsed the **European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers** fostered by the European Commission as the first decision of the first meeting of Trustees in 2012.

This decision led to a mandate to start an internal assessment process to define and improve the policies to attract, retain and support the development of careers of the research personnel of the centre.

In September 2013, the European Commission awarded us with the HR **Excellence in Research** recognition to our commitment with the *European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers*, and the rest of the recommendations (OTM-R) set by the Human Resources Strategy for Research (HRS4R) working group.



https://www.achucarro.org/hrs4r

Research Assessment

Complementary to the policies and recommendations, we build on an assessment and evaluation process that do not merely rely on journal impact factors. We apply the policies that we would like others would apply to us.

When assessing research professional profiles, our Selection Committee follows the principles of the **San Francisco Declaration on Research Assessment** (DORA).



The Declaration on Research Assessment recognizes the need to improve evaluation processes and procedures of scholarly research. It is a worldwide initiative covering all scholarly disciplines and all key stakeholders including funders, publishers, professional societies, institutions, and researchers.

ACHUCARRO contributed with 53 new publications in 2018, 70% of them in first quartile and 39% of the in first decile journals.

4. RESEARCH

Our research groups develop their research lines within the framework of our Strategic Research Programme for the period 2018-2021. In particular, they perform co-ordinated and collaborative multidisciplinary research projects to increase our knowledge and understating 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.

These are the laboratories and their group leaders at the end of 2018:

Research Groups

Laboratory of **Axon–Glia** Interactions



Jimena Baleriola Group Leader Ramón y Cajal Fellow

Laboratory of **Neural Stem Cells** and Neurogenesis



Juan Manuel Encinas Group Leader Ramón y Cajal Fellow

Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse



Pedro Grandes Group Leader Full Professor at the Department of Neurosciences (UPV/EHU)

.....

.....

Laboratory of **Memory Circuits**



Mazahir T. Hasan Group Leader Ikerbasque Research Professor

Laboratory of **Neurobiology**



Carlos Matute Scientific Director and Group Leader Full Professor at the Department of Neurosciences (UPV/EHU)

.....

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Laboratory of Neuroimaging and biomarkers of inflammation



Abraham Martín Group Leader Ramón y Cajal Fellow

Laboratory of Glial and Neuronal Autophagy



Olatz Pampliega Group Leader Ramón y Cajal Fellow

Laboratory of **Glial Cell Biology**



Amanda Sierra Group Leader Ramón y Cajal Fellow

Laboratory of **Neuronal Excitability**



Jan Tønnesen Group Leader Ramón y Cajal Fellow

Laboratory of **Neurogenomiks**

.....



Koen Vandenbroeck Group Leader Ikerbasque Research Professor

Laboratory of GTPases and Neurosignalling



Jose Luis Zugaza Group Leader Ikerbasque Research Professor



Some output indicators



Publications

In the year 2018, we published a total of 53 research articles.

70% of them were published in journals of the first cuartile of their areas, and **39% of the papers in the first decile**.

Citation

Our publications have received nearly 4.000 cites (excluding selfcites), which represents **a mean of 17 cites per paper**, in the period 2013-2018.



Congresses 2018

We participated and presented latest results in national and international conferences and meetings, with posters, oral presentations and being invited to deliver 3 plenary lectures. This year we established a new dynamics to contribute to follow up the advance in our research lines. The Achucarro Day is the gathering of all the researchers within the groups appointed in ACHUCARRO to share with other colleagues, the progress in each other's projects.

ACHUCARRO DAY 2018

After completing the first Strategic Plan period in 2014 – 2017, and the corresponding assessment plenary visit of our International Scientific Advisory Committee (ISAC) in June 2017, we decided to create an internal forum to gather and discuss the challenges of our research topics.

Nicolás Achucarro Lund, the neuroscientist of Basque origin that gives the name to our centre was born on June 14th 1880. Therefore, June each year will be time to take this moment of reflection. Additionally, we believe that having a representation of the ISAC participating in this activity is an asset, so two members will be present in each edition.

For the first edition, we moved to downtown Bilbao, and invited Professors Frank Kirchhoff and Anna Planas.



Highlights in research outcomes

An interdisciplinary group of physicists and biologists working on research into brain cells have come up with a new, revolutionary microscopy technique that allows nanoscale images to be obtained of all the cells within a specified area of living brain tissue.

SUSHI, A REVOLUTIONARY NEW MICROSCOPY TECHNIQUE

Its main value lies in the fact that it allows images of all the unlabelled living cells in a specific region of the brain to be obtained, something that has been impossible until now. Jan Tønnesen, head of the laboratory of Neuronal Excitability, was an active part of this finding during his previous position in Bordeaux. Microscopy is one of the most used methods in neuroscience. This new technique will allow the information we obtain to be substantially improved and will thus allow knowledge about the biology of the brain to be expanded.



Microscopy is a basic tool in research into the biology of any organism given that the elements studied, the cells, are of microscopic and frequently nanoscopic size. Until now, existing microscopy methods to explore living brain tissue have been limited to imaging previously labelled cells only. Yet, owing to technical limitations, not all the cells in a specific region of the brain can be labelled simultaneously; this has restricted the way we see and therefore understand how brain cells, which are highly interconnected, are organised and interact with each other.

"Super-Resolution Imaging of the Extracellular Space in Living Brain Tissue" Tønnesen, Jan; Inavalli, V. V. G. Krishna; Nägerl, U. Valentin Cell, DOI: 10.1016/j.cell.2018.02.007

Highlights in research outcomes

Research personnel of ACHUCARRO and the University of the Basque Country (UPV/EHU) participated in the promising discovery published by the prestigious scientific journal EMBO Molecular Medicine

A MOLECULAR KEY FOR DELAYING THE PROGRESSION OF MULTIPLE SCLEROSIS IS FOUND

Multiple Sclerosis (MS) is an autoimmune disease that attacks and destroys a structure known as the "myelin sheath", whose integrity is indispensable for the brain and spinal cord to function properly. Current treatment of MS is based on modulating the activity of the immune system or preventing its cells from accessing the central nervous system and damaging it. These therapies are effective in the early phases of the disease, but they do not prevent its advance and the progressive functional deterioration.

During the progressive phase of the disease it is the microglial cells in the brain that are the main cause of the chronic inflammation responsible for the neurological deterioration. These microglial cells are the brain's sentries and react when faced with any damage or infection in it. This reaction, which is in principle beneficial, becomes harmful when it is prolonged over time, leading to chronic inflammation, and aggravates the disease and encourages its progression.

In the work just published it was possible to identify a receptor known as P2X4 present in the microglial cells that increases their anti-inflammatory potential in order to reduce the damage in Multiple Sclerosis and, above all, encourage the body's own repair responses.

This experimental development was conducted using animal models of this disease, thanks to which it was possible to discover that the drugs that activate this receptor improve the symptoms during the chronic phase of the disease when furthering the repair of the nervous tissue.

This ambitious study was developed by an international research group coordinated from the Basque Autonomous Community, specifically from Leioa, with research personnel from the ACHUCARRO research centre, the UPV/EHU, ciberNed and CICbiomaGUNE in collaboration with the technical contribution of professionals from the University of Hamburg in Germany, and the Institut de Génomique Fonctionnelle in Montpellier, France.

"P2X4 receptor controls microglia activation and favors remyelination in autoimmune encephalitis"

Zabala, Alazne; Vazquez-Villoldo, Nuria; Rissiek, Björn; Gejo, Jon; Martin, Abraham; Palomino, Aitor; Perez-Samartín, Alberto; Pulagam, Krishna R.; Lukowiak, Marco; Capetillo-Zarate, Estibaliz; Llop, Jordi; Magnus, Tim; Koch-Nolte, Friedrich; Rassendren, Francois; Matute, Carlos; Domercq, María

EMBO Molecular Medicine, DOI: 10.15252/emmm.201708743

Publications

- 1. Neuroglia in the autistic brain: evidence from a preclinical model Bronzuoli, Maria Rosanna; Facchinetti, Roberta; Ingrassia, Davide; Sarvadio, Michela; Schiavi, Sara; Steardo, Luca; Verkhratsky, Alexei; Trezza, Viviana; Scuderi, Caterina Molecular Autism (Dec-18) DOI: 10.1186/s13229-018-0254-0
- Exercise benefits in cardiovascular disease: beyond attenuation of traditional risk factors
 Fiuza-Luces, Carmen; Santos-Lozano, Alejandro; Joyner, Michael; Carrera-Bastos, Pedro; Picazo, Oscar; Zugaza, José L.; Izquierdo, Mikel; Ruilope, Luis M.; Lucia, Alejandro

Nature Reviews. Cardiology (Dec-18) DOI: 10.1038/s41569-018-0065-1

3. Long Interleukin-22 Binding Protein Isoform-1 Is an Intracellular Activator of the Unfolded Protein Response Gómez-Fernández, P.; Urtasun, A.; Paton, A.W.; Paton, J.C.; Borrego, F.; Dersh, D.;

Gómez-Fernández, P.; Urtasun, A.; Paton, A.W.; Paton, J.C.; Borrego, F.; Dersh, D., Argon, Y.; Alloza, I.; Vandenbroeck, K.

Frontiers in immunology (Dec-18) DOI: 10.3389/fimmu.2018.02934

- Neuroglia: Realising their true potential Butt, Arthur; Verkhratsky, Alexei
 Brain and Neuroscience Advances (Dec-18) DOI: 10.1177/2398212818817495
- 5. PET Imaging of Crossed Cerebellar Diaschisis after Long-Term Cerebral Ischemia in Rats

Joya, Ana; Padro, Daniel; Gómez-Vallejo, Vanessa; Plaza-García, Sandra; Llop, Jordi; Martín, Abraham

Contrast Media & Molecular Imaging (Dec-18) DOI: 10.1155/2018/2483078

 Contribution of Neurons and Glial Cells to Complement-Mediated Synapse Removal during Development, Aging and in Alzheimer's Disease Luchena, Celia; Zuazo-Ibarra, Jone; Alberdi, Elena; Matute, Carlos; Capetillo-Zarate, Estibaliz

Mediators of Inflammation (Nov-18) DOI: 10.1155/2018/2530414

 Role of the endocannabinoid system in drug addiction Manzanares, J.; Cabañero, D.; Puente, N.; García-Gutiérrez, M.S.; Grandes, P.; Maldonado, R.

Biochemical Pharmacology (Nov-18) DOI: 10.1016/j.bcp.2018.09.013

- Deregulation of the endocannabinoid system and therapeutic potential of ABHD6 blockade in the cuprizone model of demyelination Manterola, Andrea; Bernal-Chico, Ana; Cipriani, Raffaela; Canedo-Antelo, Manuel; Moreno-García, Álvaro; Martín-Fontecha, Mar; Pérez-Cerdá, Fernando; Sánchez-Gómez, María Victoria; Ortega-Gutiérrez, Silvia; Brown, J. Mark; Hsu, Ku-Lung; Cravatt, Benjamin; Matute, Carlos; Mato, Susana Biochemical Pharmacology (Nov-18) DOI: 10.1016/j.bcp.2018.07.042
- 9. Dbx1-derived pyramidal neurons are generated locally in the developing murine neocortex

Rueda-Alaña, Eneritz; Martínez-Garay, Isabel; Encinas, Juan Manuel; Molnar, Zoltan; García-Moreno, Fernando

Frontiers in Neuroscience (Oct-18) DOI: 10.3389/fnins.2018.00792

- 10. **Clonal Glial Response in a multiple sclerosis mouse model** Bribian, Ana; Pérez-Cerdá, Fernando; Matute, Carlos; López-Mascaraque, Laura **Frontiers in Cellular Neuroscience** (Oct-18) DOI: 10.3389/fncel.2018.00375
- 11. The Lateral Habenula Directs Coping Styles Under Conditions of Stress via Recruitment of the Endocannabinoid System Berger, Anthony L.; Henricks, Angela M.; Lugo, Janelle M.; Wright, Hayden R.; Warrick, Collin R.; Sticht, Martin A.; Morena, Maria; Bonilla, Itziar; Laredo, Sarah A.; Craft, Rebecca M.; Parsons, Loren H.; Grandes, Pedro R.; Hillard, Cecilia J.; Hill, Matthew N.; McLaughlin, Ryan J.

Biological Psychiatry (Oct-18) DOI: 10.1016/j.biopsych.2018.04.018

12. Re-examining the potential of targeting ABHD6 in multiple sclerosis: Efficacy of systemic and peripherally restricted inhibitors in experimental autoimmune encephalomyelitis

Manterola, A.; Bernal-Chico, A.; Cipriani, R.; Ruiz, A.; Pérez-Samartín, A.; Moreno-Rodríguez, M.; Hsu, K.-L.; Cravatt, B.F.; Brown, J.M.; Rodríguez-Puertas, R.; Matute, C.; Mato, S.

Neuropharmacology (Oct-18) DOI: 10.1016/j.neuropharm.2018.08.038

- Preventing neurodegeneration by adrenergic astroglial excitation Zorec, Robert; Parpura, Vladimir; Verkhratsky, Alexei The FEBS Journal (Oct-18) DOI: 10.1111/febs.14456
- 14. Inhibition of Casein Kinase 2 Protects Oligodendrocytes From Excitotoxicity by Attenuating JNK/p53 Signaling Cascade Canedo-Antelo, Manuel; Serrano, Mari Paz; Manterola, Andrea; Ruiz, Asier; Llavero, Francisco; Mato, Susana; Zugaza, José Luis; Pérez-Cerdá, Fernando; Matute, Carlos; Sánchez-Gómez, María Victoria

Frontiers in Molecular Neuroscience (Sep-18) DOI: 10.3389/fnmol.2018.00333

Hippocampal CB1 Receptors Control Incidental Associations
 Busquets-Garcia A, Oliveira da Cruz JF, Terral G, Pagano Zottola AC, Soria-Gómez E,
 Contini A, Martin H, Redon B, Varilh M, Ioannidou C, Drago F, Massa F, Fioramonti X,
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- Interstitial ion homeostasis and acid-base balance are maintained in oedematous brain of mice with acute toxic liver failure
 Obara-Michlewska, Marta; Ding, Fengfei; Popek, Mariusz; Verkhratsky, Alexei; Nedergaard, Maiken; Zielinska, Magdalena; Albrecht, Jan
 Neurochemistry International (Sep-18) DOI: 10.1016/j.neuint.2018.05.007
- 17. **Vasopressin and oxytocin in sensory neurones: expression, exocytotic release and regulation by lactation** Dayanithi, Govindan; Forostyak, Oksana; Forostyak, Serhiy; Kayano, Tomohiko; Ueta, Yoichi; Verkhratsky, Alexei

Scientific Reports (Aug-18) DOI: 10.1038/s41598-018-31361-1

- An Early History of Neuroglial Research: Personalities Chvátal, Alexandr; Verkhratsky, Alexei; Chvátal, Alexandr; Verkhratsky, Alexei Neuroglia (Aug-18) DOI: 10.3390/neuroglia1010016
- PLAGL1 gene function during hepatoma cells proliferation
 Vega-Benedetti, Ana F.; Saucedo, Cinthia N.; Zavattari, Patrizia; Vanni, Roberta; Royo, Felix; Llavero, Francisco; Zugaza, José L.; Parada, Luis A.; Vega-Benedetti, Ana F.; Saucedo, Cinthia N.; Zavattari, Patrizia; Vanni, Roberta; Royo, Felix; Llavero, Francisco; Zugaza, José L.; Parada, Luis A.

Oncotarget (Aug-18) DOI: 10.18632/oncotarget.25996

20. Loss of calretinin and parvalbumin positive interneurones in the hippocampal CA1 of aged Alzheimer's disease mice Zallo, F.; Gardenal, E.; Verkhratsky, A.; Rodríguez, J.J.

Neuroscience Letters (Aug-18) DOI: 10.1016/j.neulet.2018.05.027

21. **Coriolus versicolor biomass increases dendritic arborization of newly-generated neurons in mouse hippocampal dentate gyrus** Ferreiro, Elisabete; Pita, Inês R.; Mota, Sandra I.; Valero, Jorge; Ferreira, Nuno R.; Fernandes, Tito; Calabrese, Vittorio; Fontes-Ribeiro, Carlos A.; Pereira, Frederico C.; Rego, Ana Cristina; Ferreiro, Elisabete; Pita, Inês R.; Mota, Sandra I.; Valero, Jorge; Ferreira, Nuno R.; Fernandes, Tito; Calabrese, Vittorio; Fontes-Ribeiro, Carlos A.; Pereira, Frederico C.; Rego, Ana Cristina

Oncotarget (Aug-18) DOI: 10.18632/oncotarget.25978

22. Microglial immune response is impaired against the neurotropic fungus Lomentospora prolificans

Pellon, Aize; Ramirez-Garcia, Andoni; Guruceaga, Xabier; Zabala, Alazne; Buldain, Idoia; Antoran, Aitziber; Anguita, Juan; Rementeria, Aitor; Matute, Carlos; Hernando, Fernando L.

Cellular Microbiology (Aug-18) DOI: 10.1111/cmi.12847

23. **Mathematical Modeling of Cortical Neurogenesis Reveals that the Founder Population does not Necessarily Scale with Neurogenic Output** Picco, Noemi; García-Moreno, Fernando; Maini, Philip K; Woolley, Thomas E; Molnár, Zoltán

Cerebral Cortex (Jul-18) DOI: 10.1093/cercor/bhy068

24. **P2X4** receptor controls microglia activation and favors remyelination in autoimmune encephalitis

Zabala, Alazne; Vazquez-Villoldo, Nuria; Rissiek, Björn; Gejo, Jon; Martin, Abraham; Palomino, Aitor; Perez-Samartín, Alberto; Pulagam, Krishna R.; Lukowiak, Marco; Capetillo-Zarate, Estibaliz; Llop, Jordi; Magnus, Tim; Koch-Nolte, Friedrich; Rassendren, Francois; Matute, Carlos; Domercq, María

EMBO Molecular Medicine (Jul-18) DOI: 10.15252/emmm.201708743

25. Regulation of Glycogen Content in Astrocytes via Cav-1/PTEN/AKT/GSK-3β Pathway by Three Anti-bipolar Drugs

Jia, Shu; Li, Baoman; Huang, Jingyang; Verkhratsky, Alexei; Peng, Liang **Neurochemical Research** (Jul-18) DOI: 10.1007/s11064-018-2585-9

26. The Ameliorative Effect of Fluoxetine on Neuroinflammation Induced by Sleep Deprivation.

Xia, M.; Li, X.; Yang, L.; Ren, J.; Sun, G.; Qi, S.; Verkhratsky, A.; Li, B. Journal of neurochemistry (Jul-18) DOI: 10.1111/jnc.14272

27. Mangiferin and Morin Attenuate Oxidative Stress, Mitochondrial Dysfunction, and Neurocytotoxicity, Induced by Amyloid Beta Oligomers Alberdi, Elena; Sánchez-Gómez, María Victoria; Ruiz, Asier; Cavaliere, Fabio; Ortiz-Sanz, Carolina; Quintela-López, Tania; Capetillo-Zarate, Estibaliz; Solé-Domènech, Santiago; Matute, Carlos

Oxidative Medicine and Cellular Longevity (Jun-18) DOI: 10.1155/2018/2856063

28. Blockade and knock-out of CALHM1 channels attenuate ischemic brain damage Cisneros-Mejorado, Abraham; Gottlieb, Miroslav; Ruiz, Asier; Chara, Juan C; Pérez-Samartín, Alberto; Marambaud, Philippe; Matute, Carlos

Journal of Cerebral Blood Flow & Metabolism (Jun-18) DOI:

10.1177/0271678X17713587

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| | Iysosomal degradation |
| | Akwa, Y.; Gondard, E.; Mann, A.; Capetillo-Zarate, E.; Alberdi, E.; Matute, C.; Marty, S.; |
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| 20 | Molecular Psychiatry (jun-18) DOI: 10.1038/mp.2017.142 |
| 30 | . Development and maintenance of the brain's immune tooikit: Microglia and |
| | non-parenchymai brain macrophages |
| | Lopez-Alalaya, Jose P.; Askew K, Kalharine E.; Sierra, Amanua; Gomez-Nicola, Diego |
| 21 | Developmental Neurobiology (jun-18) DOI: 10.1002/dileu.22345 |
| 51 | computational model study |
| | Computational model study Proclin K : Wada LL: Wang Lin K E : Harkin L: Flanagan B : Van Zalingo: Hall S : |
| | Malkar, M. Wale, J.J., Wollg-Lill, K.F., Harkin, J., Flandgan, D., Van, Zannge, Han, S., |
| | Walker, M.; Verkfiralsky, A.; McDalu, L. |
| 22 | PLOS Computational Biology (May-18) DOI: 10.1371/journal.pcbi.1006151 |
| 52 | mpNAs in evens |
| | Malkar Chandler A · Pandelph Lisa K · Matute Carles: Alberdi Elena: Paleriela |
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| | EMBO reports (May 19) DOI: 10.15252/ombr.2017/5/25 |
| 22 | Inflammation in stroke: the role of cholinergic, puripergic and glutamatergic |
| 55 | cignaling |
| | Martín Abraham: Domerco María: Matute Carlos |
| | Theraneutic Advances in Neurological Disorders (May-18) DOI: |
| | 10 1177/1756286418774267 |
| 34 | Astroglial 5-HT2B receptor in mood disorders |
| | Peng. L.: Song. D.: Li. B.: Verkhratsky. A. |
| | Expert Review of Neurotherapeutics (May-18) DOI: |
| | 10.1080/14737175.2018.1458612 |
| 35 | . Quantifying Microglial Phagocytosis of Apoptotic Cells in the Brain in Health and |
| | Disease |
| | Beccari, Sol; Diaz-Aparicio, Irune; Sierra, Amanda |
| | Current Protocols in Immunology (May-18) DOI: 10.1002/cpim.49 |
| 36 | . I-Dopa and Fluoxetine Upregulate Astroglial 5-HT2B Receptors and Ameliorate |
| | Depression in Parkinson's Disease Mice |
| | Song, Dan; Ma, Kangli; Verkhratsky, Alexei; Peng, Liang |
| | Neuroglia (Apr-18) DOI: 10.3390/neuroglia1010006 |
| 37 | . Targeting beta-amyloid at the CSF: A new therapeutic strategy in Alzheimer's |
| | disease |
| | Menendez-Gonzalez, M.; Padilla-Zambrano, H.S.; Alvarez, G.; Capetillo-Zarate, E.; |
| | Tomas-Zapico, C.; Costa, A. |
| | Frontiers in Aging Neuroscience (Apr-18) DOI: 10.3389/fnagi.2018.00100 |
| 38 | Refined protocols of tamoxifen injection for inducible DNA recombination in |
| | mouse astroglia |
| | Jahn, Hannah M.; Kasakow, Carmen V.; Helfer, Andreas; Michely, Julian; Verkhratsky, |
| | Alexei; Maurer, Hans H.; Scheller, Anja; Kirchhoff, Frank |
| | Scientific Reports (Apr-18) DOI: 10.1038/s41598-018-24085-9 |
| 39 | Update on forebrain evolution: From neurogenesis to thermogenesis |
| | Martinez-Cerdeño, Verónica; García-Moreno, Fernando; Tosches, Maria Antonietta; |
| | Csillag, Andras; Manger, Paul R.; Molnar, Zoltan |

Seminars in Cell & Developmental Biology (Apr-18) DOI: 10.1016/j.semcdb.2017.09.034

40. **ProMoIJ: A new tool for automatic three-dimensional analysis of microglial process motility**

Paris, Iñaki; Savage, Julie C.; Escobar, Laura; Abiega, Oihane; Gagnon, Steven; Hui, Chin-Wai; Tremblay, Marie-Ève; Sierra, Amanda; Valero, Jorge **Glia** (Apr-18) DOI: 10.1002/glia.23287

41. Singular Location and Signaling Profile of Adenosine A2A-Cannabinoid CB1 Receptor Heteromers in the Dorsal Striatum

Moreno, Estefanía; Chiarlone, Anna; Medrano, Mireia; Puigdellívol, Mar; Bibic, Lucka; Howell, Lesley A.; Resel, Eva; Puente, Nagore; Casarejos, María J.; Perucho, Juan; Botta, Joaquín; Suelves, Nuria; Ciruela, Francisco; Ginés, Silvia; Galve-Roperh, Ismael; Casadó, Vicent; Grandes, Pedro; Lutz, Beat; Monory, Krisztina; Canela, Enric I.; Lluís, Carmen; McCormick, Peter J.; Guzmán, Manuel

Neuropsychopharmacology (Apr-18) DOI: 10.1038/npp.2017.12

- Characterization of Carotid Smooth Muscle Cells during Phenotypic Transition Goikuria, Haize; Freijo, Maria del Mar; Vega Manrique, Reyes; Sastre, María; Elizagaray, Elena; Lorenzo, Ana; Vandenbroeck, Koen; Alloza, Iraide Cells (Mar-18) DOI: 10.3390/cells7030023
- 43. Muscle molecular adaptations to endurance exercise training are conditioned by glycogen availability: a proteomics-based analysis in the McArdle mouse model Fiuza-Luces Carmen; Santos-Lozano Alejandro; Llavero Francisco; Campo Rocío; Nogales-Gadea Gisela; Díez-Bermejo Jorge; Baladrón Carlos; González-Murillo África; Arenas Joaquín; Martín Miguel A.; Andreu Antoni L.; Pinós Tomàs; Gálvez Beatriz G.; López Juan A.; Vázquez Jesús; Zugaza José L.; Lucia Alejandro The Journal of Physiology (Mar-18) DOI: 10.1113/JP275292
- 44. In vivo imaging of A7 nicotinic receptors as a novel method to monitor neuroinflammation after cerebral ischemia Colás Lorena; Domercq Maria; Ramos-Cabrer Pedro; Palma Ana; Gómez-Vallejo Vanessa; Padro Daniel; Plaza-García Sandra; Pulagam Krishna R.; Higuchi Makoto; Matute Carlos; Llop Jordi; Martín Abraham Glia (Mar-18) DOI: 10.1002/glia.23326
- 45. **The Special Case of Human Astrocytes** Verkhratsky, Alexei; Bush, Nancy Ann Oberheim; Nedergaard, Maiken; Butt, Arthur **Neuroglia** (Mar-18) DOI: 10.3390/neuroglia1010004
- 46. The era of GWAS is over Yes Vandenbroeck, K.

Multiple Sclerosis Journal (Mar-18) DOI: 10.1177/1352458517738059

 Localization of the cannabinoid type-1 receptor in subcellular astrocyte compartments of mutant mouse hippocampus
 Gutiérrez-Rodríguez, Ana; Bonilla-Del Río, Itziar; Puente, Nagore; Gómez-Urquijo, Sonia M.; Fontaine, Christine J.; Egaña-Huguet, Jon; Elezgarai, Izaskun; Ruehle, Sabine; Lutz, Beat; Robin, Laurie M.; Soria-Gómez, Edgar; Bellocchio, Luigi; Padwal, Jalindar D.; van der Stelt, Mario; Mendizabal-Zubiaga, Juan; Reguero, Leire; Ramos, Almudena; Gerrikagoitia, Inmaculada; Marsicano, Giovanni; Grandes, Pedro Glia (Feb-18) DOI: 10.1002/glia.23314

 Super-Resolution Imaging of the Extracellular Space in Living Brain Tissue Tønnesen, Jan; Inavalli, V. V. G. Krishna; Nägerl, U. Valentin Cell (Feb-18) DOI: 10.1016/j.cell.2018.02.007 49. Maristem - stem cells of marine/aquatic invertebrates: From basic research to innovative applications

Ballarin, L.; Rinkevich, B.; Bartscherer, K.; Burzynski, A.; Cambier, S.; Cammarata, M.; Domart-Coulon, I.; Drobne, D.; Encinas, J.; Frank, U.; Geneviere, A.-M.; Hobmayer, B.; Löhelaid, H.; Lyons, D.; Martinez, P.; Oliveri, P.; Peric, L.; Piraino, S.; Ramšak, A.; Rakers, S.; Rentzsch, F.; Rosner, A.; Silva, T.H.; Somorjai, I.; Suleiman, S.; Coelho, A.V. **Sustainability (Switzerland)** (Feb-18) DOI: 10.3390/su10020526

50. Astroglial vesicular network: Evolutionary trends, physiology and pathophysiology Zorec, Robert; Parpura, Vladimir; Verkhratsky, Alexei

Acta Physiologica (Feb-18) DOI: 10.1111/apha.12915

51. **Crosslink of calcium and sodium signalling in health and disease** Verkhratsky, Alexei; Trebak, Mohamed; Perocchi, Fabiana; Khananishvili, Daniel; Sekler, Israel

Experimental Physiology (Feb-18) DOI: 10.1113/EP086534

- Inflammation in human carotid atheroma plaques
 Goikuria, Haize; Vandenbroeck, Koen; Alloza, Iraide
 Cytokine & Growth Factor Reviews (Feb-18) DOI: 10.1016/j.cytogfr.2018.01.006
- 53. Mitochondrial Division Inhibitor 1 (mdivi-1) Protects Neurons against Excitotoxicity through the Modulation of Mitochondrial Function and Intracellular Ca2+ Signaling Ruiz, Asier; Alberdi, Elena; Matute, Carlos

Frontiers in Molecular Neuroscience (Jan-18) DOI: 10.3389/fnmol.2018.00003

54. Enteric glia regulate gut motility in health and disease Grubišić, Vladimir; Verkhratsky, Alexei; Zorec, Robert; Parpura, Vladimir Brain Research Bulletin (Jan-18) DOI: 10.1016/j.brainresbull.2017.03.011

55. Absence of Tangentially Migrating Glutamatergic Neurons in the Developing Avian Brain

García-Moreno, Fernando; Anderton, Edward; Jankowska, Marta; Begbie, Jo; Encinas, Juan Manuel; Irimia, Manuel; Molnár, Zoltán

Cell Reports (Jan-18) DOI: 10.1016/j.celrep.2017.12.032

56. Physiology of Astroglia

Alexei Verkhratsky; Maiken Nedergaard **Physiological Reviews** (Jan-18) DOI: 10.1152/physrev.00042.2016 One of the establishment objectives defined by the Board of Trustees when launched ACHUCARRO was that the centre had to contribute to disseminate and transfer human knowledge, and to spread the scientific culture and literacy. We implement this strategic activity in many different ways, to adapt to the needs and requirements of the different audiences.

5. KNOWLEDGE TRANSFER

Postgraduate education

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

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

Our personnel also coordinate the Doctorate Programme on Neurosciences, organized together with the Universities of Coruña (Galicia), Castilla – La Mancha, Pablo de Olavide (Seville), and Rovira I Virgili (Catalonia).



PhD theses

In 2018 has been a fruitful year for defending PhD projects.

Seven of our younger colleagues successfully completed their doctoral training; all of them in the *International mention*, as they completed research stays abroad during their doctorate period.

Other 33 are in different stages of that process.



- Irune Díaz | Laboratory of Glial Cell Biology "Regulation of adult neurogenesis by phagocytic microglia"
- Haize Goikuria | Laboratory of Neurogenomiks
 "Smooth muscle cell characterization and transcriptomic analysis in human carotid atherosclerotic plaques"
- Soraya Martín | Laboratory of Neural Stem Cells and Neurogenesis
 "How aging, seizures and ATP change the intrinsic properties of adult hippocampal neural stem cells"
- Sara Peñasco | Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse

"Study of the long-lasting effects of ethanol consumption during adolescence on cannabinoid type 1 receptor-dependent synaptic transmission and plasticity in dentate gyrus synapses"

- Tania Quintela | Laboratory of Neurobiology "Role of beta-amyloid in the oligodendrocyte lineage"
- Nerea Ugidos | Laboratory of Neurogenomiks "Functional analysis of ANKRD55, a multiple sclerosis risk gene with unknown function"
- Roberto Valcárcel | Laboratory of Neural Stem Cells and Neurogenesis
 "Lysophosphatidic acid receptor 1 labels seizure-induced hippocampal reactive neural stem cells and controls their activation"

Congratulations Irune, Haize, Soraya, Sara, Tania, Nerea and Roberto!

Highlights in advanced training

The objective of this School is to combine innovative neurobiology approaches in an informal environment to foster close interaction, mentoring and networking with leading researchers in the field of glial biology.

ACHUCARRO INTERNATIONAL GLIA SCHOOL 2018

The idea behind this School is to foster close interactions between the speakers and the students, and inspire the creation of new collaborations and projects during the threeday course consisting of practical demonstrations of techniques, and brainstorming sessions in groups for designing an innovative research project.

From the total 22 participants, six people came from Asia (Australia, Iran and India), five from America (Chile, Colombia and Mexico) and the other 11 were European (Italy, Portugal, Spain and Ukraine). 68% of them were women.



This training activity has also a commitment with our institutional will of supporting minorities and people in countries in development. We had the support of organisations that share this will.



The commitment of the external speakers of this edition was outstanding, so we thank so much the participation of Maria Cecilia Angulo (INSERM, France), Juan Pedro Bolaños (IBFG, Spain), Anne Baron Evercooren (ICM - Brain and Spine Institute, France), Ádam Dénes (Institute of Experimental Medicine, Hungary), Diego Gómez-Nicola (University of Southampton, UK), Helena Mira (IBV-CSIC, Spain) and Noelia Urban (IMBA, Austria)

https://www.achucarro.org/glia-school

Achucarro Seminars



January 12 Novel therapeutical targets for ALS: neuregulin and sigma receptor complex Xavier Navarro Institute of Neurosciences (INc), UA Barcelona (Spain)



January 19 **Delivering on GWAS: how to translate genetic findings in complex disease Stephen Eyre** University of Manchester (UK)



February 16 *New techniques for modulating memory in humans* Bryan A. Strange Centre for Biomedical Technology, UPM – Madrid (Spain)



February 23 **Protective effects of synaptic stimulation against tauopathies Davide Tampellini** Inserm - French Institute of Health and Medical Research (France)



March 1 *Targeting CNS remyelination* Alerie Guzmán de la Fuente University of Cambridge (UK)



April 12 *Cannabinoids reshape astrocyte glucose metabolism* Arnau Busquets Garcia NeuroCentre Magendie Bordeaux (France)



April 20 *Endosomal trafficking defects and Alzheimer's Disease* Claudia Almeida NOVA Medical School, Lisbon (Portugal)



April 27 *Autophagy and Neurodegeneration* **David Rubinsztein** University of Cambridge (UK)



May 25 *The transcription factor NRF2: a new brain protective strategy in Alzheimer's disease* Antonio Cuadrado Autonomous University of Madrid (Spain)



May 31

August 3

Maria Kukley

A disease-specific transcription factor complex regulates endosomal trafficking in Alzheimer´s Disease Ulrich Hengst

Columbia University Medical Center (NY, USA)



June 1 **Prefrontal cortex is involved in the acquisition of instrumental learning tasks Agnès Gruart i Massó** Pablo de Olavide University of Seville (Spain)



June 22 Cellular and Molecular bases of DNA damage response in neurons and its links to neurodegeneration Miguel Angel Lafarga University of Cantabria (Spain)



July 6 *The lamarckian brain: How your life experience can impact your brain (and that of your children)* **Eva Benito**

EMBO - European Molecular Biology Organization (Germany)



July 20 *Time series models to assess spontaneous activity of somatosensory cortex astrocytes* **Rubén Armañanzas** George Mason University, Virginia (USA)







September 6 *The search for autoantigens and molecular mimics in Multiple Sclerosis* Mireia Sospedra Ramos

Neurotransmitter-mediated axon-glia communication in the

CRPP Multiple Sclerosis, U. Zurich (Switzerland)

central and peripheral nervous system

University of Tübingen (Germany)

October 4 Beyond the Flow: Epithelial Sodium Channel and Mechanical Forces Regulate Adult Neural Stem and Glial Cells David Petrik Ludwig-Maximilian University Munich (Germany) October 19 Functional heterogeneity and dynamic of astrocytes in the adult mouse hippocampus Ruth Beckervordersandforth-Bonk Institute of Biochemistry, Friedrich-Alexander-University of

Erlangen-Nuremberg, Germany













October 25 *Mobilizing Cholesterol in the Brain to Treat Niemann-Pick Type C Disease and Alzheimer's Disease* Dr. T.Y. Chang and Dr. Catherine Chang

Dartmouth College (Hanover, USA) November 6

Monitoring the dynamics of axonal damage and brain atrophy in Multiple Sclerosis: how to measure the efficacy of remyelinating and neuroprotective drugs in humans Pablo Villoslada

UCSF (USA) & IDIBAPS (Barcelona) November 16 *Activation of damage-responsive Stem Cells in the adult fly brain*

Christa Rhiner

Stem cells and regenration laboratory of Champalimaud Center, Lisbon

November 23 Mitochondrial function on the link betwee

Mitochondrial function on the link between stress and anxiety with coping behaviors

Carmen Sandi

Brain Mind Institute; Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland November 30

Single-cell Systems Biology Approaches to Stem Cell Research and Regenerative Medicine

Antonio del Sol Mesa Computational Biology Group of LCSB University, Luxembourg December 21

Neuromelanin, aging and neuronal vulnerability in Parkinson's disease

Miquel Vila

Department of Biochemistry and Molecular Biology of the Autonomous University of Barcelona (UAB)



Achucarro Internal Seminars

Our researchers delivered these internal seminars:



January 25 *Studying the endocannabinoid system in the hippocampus of adult mice and its alteration under the exposure to ethanol during adolescence*

Nagore Puente, Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse



February 9 *Expression study of multiple sclerosis risk gene ANKRD55 and its neighbors in immune cells* Jorge Mena, Laboratory of Neurogenomiks



February 9 **P2X4 receptor controls microglia activation and favours remyelination in autoimmune encephalitis Alazne Zabala**, Laboratory of Neurobiology



March 9 *Mechanisms of neuronal and glial cell response in Alzheimer's disease* Elena Alberdi, Laboratory of Neurobiology



April 13 *Traumatic brain injury-induced alterations in the adult dentate gyrus* Irene Durá, Laboratory of Neural Stem Cells and Neurogenesis



April 13

Phagocytosis of apoptotic newborn cells triggers a proneurogenic program in microglia Irune Diaz, Laboratory of Glial Cell Biology



May 4 **Dissecting the cannabinergic control of behavior: The where matters Edgar Soria-Gómez,** Laboratory of Ultrastructural and Functional Neuroanatomy of the Synapse June 8 **LPA1 labels reactive neural stem cells and regulates their activation**

Roberto Valcárcel, Laboratory of Neural Stem Cells and Neurogenesis



July 11 Small GTPases regulate glycogen phosphorylase in health and disease Francisco Llavero, Laboratory of GTPases cells and Neurosignalling



September 14 Stem cells between the apex of the therapy and the disease

José R. Pineda Martí, Laboratory of Neural Stem Cells and Neurogenesis



October 11

GABA signaling modulates myelination and remyelination Mari Paz Serrano, Laboratory of Neurobiology



November 9 *The role of astrocytes in Parkinson's disease* **Fabio Cavaliere,** Laboratory of Neurobiology



December 18 Analyzing the therapeutic potential of the 2-AG hydrolase ABHD6 in demyelination Andrea Manterola, Laboratory of Neurobiology



December 18 *Amyloid -peptide leads to Rac1/PYGM pathway activation in astrocytes: relevance on cell biology* Miriam Luque Laboratory of GTPases and Neurosignalling



Congresses and Scientific Meetings

The two main scientific meetings we organised in 2018 have been:

NEUROGUNE 2018

The fourth edition of the congress of the Basque research and innovation community in neurosciences took place in Vitoria-Gasteiz in September 7th.

Another great edition, with a record in participation and work presented in posters and oral communications.



https://www.achucarro.org/neurogune

DRAVET SYNDROME AND EPILEPSY REFRACTORY MEETING

Together with ApoyoDravet, a regional association of Dravet Syndrome we organised the first edition of the *"International Congress on Dravet Syndrome and Refractory Epilepsy"*, held in Bilbao, on October 4 and 5.

Our main objective of this meeting, and specifically of this edition was to contribute to the dissemination and transfer of knowledge and technologies related to Dravet syndrome and refractory epilepsy diseases.



http://www.epibilbao2018.com

Achucarro Forum

The Achucarro Forum conference series is an initiative aimed at communicating, disseminating and fostering social awareness about the importance of research about the brain and its diseases.

These conferences are broadcasted via streaming by the Basque Public Television Corporation (EiTB), thanks to our partnerships with the Chair of Scientific Culture of the UPV/EHU.

In 2018, we hosted these talks:



April 23rd Bizkaia Aretoa

Javier de Felipe Cajal Institute (CSIC) Madrid, Spain

New technologies for the study of the brain: From Cajal to our days



November 22nd Bizkaia Aretoa

Carmen Sandi Brain Mind Institute Ecole Polytechnique Federale (EPFL) Lausanne, Switzerland

How does stress affect to our social behavior and brain?

https://www.achucarro.org/achucarro-forum/

Highlights in dissemination and advocacy

Outreach and advocacy

ACHUCARRO is a socially responsible and committed organisation. We are aware of the fact that our main activity has a direct social impact, but we want to go beyond, and make the most of our capabilities and our collaboration networks for contributing to develop a more sustainable and advanced Society.

Therefore, we deploy our commitment with Equality, Talent development, Awareness about the importance of Science and advancing in an informed society, both with internal policies and external actions.

INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE

The United National (UN) organisation declared (resolution A/RES/70/212; 2016) February 11 as the **International day of women and girls in science.** ACHUCARRO caught up the idea and pioneered organising the first awareness event in Bilbao en 2017.

In 2018 we supported the approach and initiative promoted by the Spanish Society of Neuroscience (SENC) to organise conferences with women scientists, spreading their research work.



http://www.un.org/en/events/women-and-girls-in-science-day

Different studies have established that a reason for the lack of more women in research related jobs in our Society is due to the lack of role models and references. Working at the high school and pre-university education level, advocating about the researcher career is also another activity that our researchers develop systematically.



Talk by Amanda Sierra at the El Regato School (February 8th)

SOCIAL MEDIA

Social media and the presence in the Internet platforms gives a powerful channel to increase the echo of our messages. Even if we have not a specific and professional communication cabinet or community manager, we manage to extend our followers and messages year by year.

| Website www.achucarro.org | 18 news updates 23,531 visits 78.255 page views 82% new visitors, 18% returning visitors 67% visits from Spain; 33% international 28% of visits from mobile devices |
|------------------------------|--|
| Twitter | 1148 followers |
| @AchucarroGlia | 6602 tweets and retweets (2012-2018) |
| Facebook | 552 followers |
| Achucarro.org | 219 posts (2018) |

Our research organisation is located in Leioa, in the metropolitan area of Bilbao. The "Sede Building" was design in 2010 and built between 2011 and 2013. In June 2017, we inaugurated these new premises, within the Science Park of the University of the Basque Country (UPV/EHU), in the main campus of the university.

6. INFRASTRUCTURE AND EQUIPMENT

The proximity with Bilbao, and its airport, and the faculties of the university with the degrees (Biology, Biochemistry, Medicine,...) that give access to research work in neurobiology is an asset that allowed us to expand our potential exponentially since 2017.

ACHUCARRO currently occupies the third floor of the Sede building, a space of 2000 m² in a privileged location within the campus of the UPV/EHU. Additionally, some of the research groups have laboratories and office spaces in the Faculty of Medicine and Nursing, at 400 metres from the main location.



With the advantage of this location in the campus, where the general facilities (microscopy, genomics, proteomics, etc.) for research support of the university are located, our strategy was to complement the existing resources with the specific ones of our field and those that provide an added value or competitive advantage, like the resources for performing:

- Cellular and molecular neurobiology, primary and organotypic cultures, in vitro models, classical morphometry and stereology, reporter constructs and recombinant expression
- *Immunofluorescence, Immunochemistry and Immunohistochemistry*
- Electrophysiology
- Optical Microscopy, like Epifluorescence, Calcium Imaging, confocal, STED superresolution and Slide scanning
- Genotyping and Functional Genomics
- Sequencing
- *qPCR and qRT-PCR*
- Flow Cytometry and Fluorescence-activated Cell Sorting
- Stereotaxic Surgery and Stereology-based Quantification
- High-content Screening Platform;

https://www.achucarro.org/facilities

7. ACHUCARRO IN NUMBERS

| STRATEGY AND MANAGEMENT | 2015 | 2016 | 2017 | 2018 |
|--|------|------|------|------|
| % of publications in neurosciences over the total in the Basque Country (previous year) | 5% | 3% | 5% | 3.5% |
| % of publications from Achucarro over the total neurosciences in the Basque Country | 22% | 36% | 20% | 25% |
| H-index of Achucarro | 10 | 20 | 27 | 32 |
| % compliance of Management Plan | 97% | 98% | 98% | 100% |
| Number of meetings of the Board of Trustees | 4 | 2 | 3 | 2 |
| Annual Budget (million Euros) | 2.20 | 2.01 | 1.86 | 1.75 |
| Rate of funding change from Basque Government | 20% | 24% | 24% | 45% |

| PARTNERSHIPS | 2015 | 2016 | 2017 | 2018 |
|--|------|------|------|------|
| Number of strategic agreements (accumulated) | 6 | 8 | 8 | 9 |
| Number of institutional agreements (accumulated) | 7 | 13 | 18 | 19 |
| Number of operational agreements (new) | 5 | 1 | 1 | 2 |

| PEOPLE | 2015 | 2016 | 2017 | 2018 |
|---|------|------|-------|------|
| Number of persons involved in Achucarro | 73 | 77 | 83 | 85 |
| Number of directly contracted staff (FDE) | 11.4 | 16.0 | 17.49 | 25.1 |
| Number of researchers | 67 | 70 | 75 | 77 |
| Number of principal investigators | 8 | 11 | 11 | 11 |
| Number of senior researchers | 20 | 22 | 24 | 27 |
| Number of postdoctoral researchers | 10 | 7 | 6 | 7 |
| Number of PhD students | 29 | 30 | 35 | 32 |
| Number of master's students | 7 | 14 | 17 | 12 |
| Number of technicians | 4 | 4 | 4 | 3 |
| Number of staff | 2 | 3 | 4 | 5 |
| Number of Ikerbasque Research Professors | 6 | 7 | 7 | 6 |
| Number of Ikerbasque Research Fellows | 3 | 5 | 5 | 4 |
| Number of Ramón y Cajal Fellows | 3 | 4 | 4 | 7 |

| RESEARCH | 2015 | 2016 | 2017 | 2018 |
|--|------|------|------|------|
| Number of research groups | 8 | 11 | 11 | 11 |
| Number of publications | 36 | 53 | 41 | 53 |
| Number of publications (Q1) | 20 | 40 | 31 | 39 |
| Number of participations in congresses | 96 | 75 | 80 | 80 |
| Number of books and chapters | 5 | 6 | 9 | 1 |
| Number of patents (applications) | 0 | 0 | 0 | 1 |
| Number of patents (accepted) | 0 | 0 | 0 | 0 |
| Attracted funding (million Euros) | 0.9 | 1.0 | 1.8 | 1.8 |
| Number of PhD theses (in progress) | 29 | 29 | 37 | 33 |
| Number of PhD theses (completed) | 4 | 4 | 2 | 7 |

| KNOWLEDGE TRANSFER/TRAINING | 2015 | 2016 | 2017 | 2018 |
|--------------------------------------|------|------|------|------|
| Number of Achucarro seminars | 22 | 30 | 32 | 35 |
| Number of congresses, conferences | 3 | 2 | 3 | 3 |
| Number of training events | 1 | 1 | 2 | 2 |
| Number of dissemination events | 2 | 1 | 3 | 3 |
| Number of attendees per event (mean) | 200 | 130 | 170 | 175 |

| KNOWLEDGE TRANSFER/DISSEMINATION | 2015 | 2016 | 2017 | 2018 |
|---|--------|--------|--------|--------|
| Press releases | 7 | 5 | 4 | 11 |
| Followers on Twitter | 793 | 985 | 1,100 | 1,428 |
| Tweets on Twitter | 4,134 | 5,201 | 6,000 | 6,602 |
| Number of news updates published on the website | 30 | 25 | 15 | 18 |
| Total visits to the website | 17,380 | 21,157 | 21,948 | 23,531 |
| Visits from Spain | 11,511 | 13,926 | 15,228 | 13,489 |
| % visits from Spain | 67% | 66% | 69% | 57% |
| % visits from abroad | 33% | 34% | 31% | 43% |
| Returning visitors to website | 40% | 42% | 20% | 18% |
| Ratio of new visitors to website | 60% | 58% | 80% | 82% |

| INFRASTRUCTURE AND EQUIPMENT | 2015 | 2016 | 2017 | 2018 |
|--|------|------|------|------|
| Number of strategic and singular equipment | 12 | 18 | 20 | 22 |



Achucarro Basque Center for Neuroscience Sede Building Science Park of the UPV/EHU B. Sarriena, s/n E-48940 Leioa