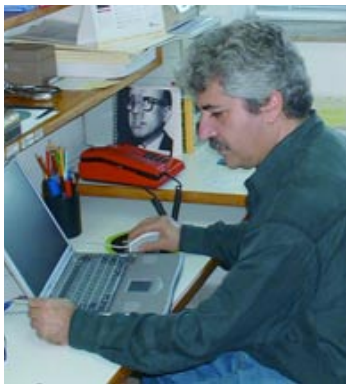
Recollections from Tenerife 2003: a truly first joint meeting



Rafael Alonso, Congress Chairman

In 1996 a representative group of British physiologists travelled to Salamanca to actively participate in the XXVII Annual Congress of the Spanish Society of Physiological Sciences (SECF). Two years later, a substantial delegation of Spanish physiologists held their XXIX Congress in Liverpool coinciding with a British meeting. The agreeable and stimulating experience on both these occasions gave rise to the idea of organising a truly joint meeting. To meet the British requirement of a 'sunny place', Tenerife was chosen and the University of La Laguna designated the role of the host institution. Finally, the first joint meeting between the British and the Spanish societies took place in Puerto de la Cruz from February 13 to 17. On behalf of the Local Organising Committee, I would like to thank the active participation of all attendants and to express my gratitude to those British friends who contributed with us in the organisation of the scientific programme. As it has been a successful and enjoyable experience for everybody, I believe that it is time to start organising the next one.

A view of the north coast of Tenerife and the Teide volcano

About 400 participants, including 67 invited speakers, with roughly the same number from each society attended the meeting. It included seven mini-symposia on a balanced selection of subjects, five plenary lectures, three meet-the-expert sessions, and three discussion forums. In addition, two satellite courses for pregraduate and graduate students, and a satellite debate also took place. A total of 305 abstracts were accepted. Some of them were presented in previously designated symposia, and the rest were presented either as oral communications or posters. Their distribution into different subjects is shown in the Table. Further information can be obtained at http://www.seccff.org/congresoXXXII/index.php.

Fifty years of Spanish physiology: Negrin's legacy

When our British colleagues read Juan Negrín's name in the preliminary programme, they asked me about who he was. As not even many young Spanish physiologists know Negrín's contribution to the development of Spanish science, a brief introduction would be worthwhile. Juan Negrín (1892-1956) is best known as the Prime Minister of the Spanish Government during the Civil War (1936-1939). However, he must be recognised as one of the founders of modern Spanish science (Tuñón de Lara *et al*, 1996). When he was 14 years old, Negrín moved to Germany and started his medical education in the University of Leipzig, in the *Physiologisches Institut* founded by Carl Ludwig in 1865. During this period Negrín worked under the instruction of Theodor von Brücke on the interactions between the endocrine and the nervous system, and the regulation of the vascular tone. In 1916, after gaining his doctoral degree, Negrín planned to join Walter Cannon's laboratory at Harvard University. However, he was forced to return to Spain to lead the Laboratory of General Physiology that had been created in Madrid as the brainchild of Santiago Ramón y Cajal. Only a few years later he became Professor of Physiology at the University of Madrid. He

then led an important project aimed to the development of experimental physiology and the creation of a number of active research groups in Spain.

Negrín's involvement in the organisational and financial problems of science in Spain at that time stimulated him to become involved in social issues. In 1934 he gave up his academic activities and totally dedicated his time to politics. The outbreak of the Spanish Civil War in 1936 and his exile in 1939 marked the tragic endpoint of this story.

To commemorate the 50th anniversary of its first meeting, in conjunction with the Juan Negrín Foundation, the SECF has created the Juan Negrín Prize to honour an outstanding career in physiology. On this first occasion it has been a pleasure to award it to Erwin Neher.

Physiology in Spain

The SECF was created in 1952 and had its first annual meeting a year later in Madrid. Since then, it has not only been the source of all home-grown generations of Spanish physiologists, but also the origin of several scientific societies on a broad scope of fields, such as biochemistry, cellular and molecular biology, endocrinology, neuroscience, and pharmacology. This scientific divergence has probably had an undesirable atomising effect. Thus, while some of these disciplines have developed with the impulse of new and fashionable experimental technology, physiology has somehow remained within the academic boundaries of teaching. In the last few years, however, the idea of reinforcing the core role of physiology to understand the underlying principles of the functioning of living beings – *the logic of life* (Boyd & Noble, 1993) – is clearly emerging.

Nevertheless, Spanish physiologists –either engaged with the SECF or with any of its derived societies— have extended into a wide number of departments. Most of them work in universities and in research institutes, and very few really do work in industry. A large number of Spanish physiologists mainly belong to the fields of endocrinology and neuroscience, with an important focus on the cellular and molecular approaches. These trends are particularly important in several Spanish regions, where interdisciplinary research institutes have recently been, or are in the process of being, developed.

Physiology at La Laguna

Host Departments and teaching tasks

The host group that organised this meeting belongs to the Departments of Animal Biology and Physiology, together being comprised of about 25 permanent academic staff. Both are situated in the Faculty of Biological Sciences and the Medical School, respectively. Even though the buildings are not so old and there is enough space for laboratories, the structure has deteriorated considerably and the need for modern facilities is now extremely urgent. Because of this, several members of these Departments, together with others from the Departments of Anatomy, Biochemistry and Molecular Biology, Cell Biology, and Medicine are working in the creation of a new research institute targeted to basic and applied biomedical sciences.

The two host Departments teach physiology to medical (current intake 125), nursery (75), physiotherapy (70), pharmacy (200), and biology (150) students. Most members of the staff are also engaged in two doctoral programmes, one on Life Sciences and the other on Basic Biomedical Research, and another part also participate in a Neuroscience programme.

Top Lago Martianez at Puerto de la Cruz

Above A typical old corner of Puerto de la Cruz

Research activities

Physiology in Tenerife could be considered as a relatively young research field, since it started in both the Faculty of Biological Sciences and the Medical School in the mid 70s. However, after three decades of active research several physiology teams are currently rated as being in the highest positions in the University of La Laguna. The main research lines in the host Departments are related to neuroscience, marine

The local organising committee.
From left to right: Mario Díaz, Raquel Marín, Guadalberto Hernández, and Rafael Alonso

science, and reproductive neuroendocrinology. In addition, members engaged in active research are integrated into more interdisciplinary groups with people from other Departments and clinicians working on different aspects of developmental, metabolic or neurological diseases. Presently, the different research teams can be grouped into the following areas:

Neuroendocrinology and oestrogen-mediated neuroprotection
Reproductive physiology has been a permanent research area in La Laguna. While whole animal studies were the current model to investigate the reproductive system in the past, more cellular and molecular approaches are now being used to characterise the interactions between peripheral hormones and central neurons. Thus, Rafael Alonso, Guadalberto Hernández, and Pedro Abreu, in collaboration with the industry, are characterising the mechanisms and signalling pathways by which oestrogens and selective oestrogen receptor modulators interact with the female rat gonadal axis at both hypothalamic and pituitary levels. Manuel Mas is extending classical studies of erectile responses in rats with spinal lesions with the dynamics of nitric oxide release at central and peripheral levels. In addition, together with andrologists, he is evaluating the evolution of sexual function in human subjects with spinal lesions and the response to erectogenic agents. Carmen González is working on neuroimmunoendocrine interactions and the role of local agents in the regulation of pituitary secretions. A particular area of recent interest is the characterisation of novel mechanisms involved in oestrogen signalling both in endocrine and neuronal cells. An integrated team composed of Rafael Alonso, Mario Díaz, Raquel Marín, Borja Guerra, and Araceli Morales is using neuronal cell lines to analyse the interactions between oestrogen hormones and their potential neuronal targets. One of the main aims of this research line is the identification of neuroprotective effects of oestrogens and the characterisation of the specific receptors and the underlying action mechanisms.

Ion channels, membrane lipids and cellular responses to apoptotic agents
Mario Díaz runs a group currently working on the mechanisms by which oestrogen and antioestrogen compounds modulate several types of ion channels in excitable cells. By using electrophysiological, biochemical and imaging techniques they are studying how oestrogens modulate contractile activity of mouse intestinal smooth muscle. These effects are apparently due to direct interactions of steroid molecules with L-type calcium and $BK_{(Ca)}$ channels. In addition, Mario Díaz together with Covadonga Rodríguez, Tomás Gómez and Eduardo Almansa are studying the role of membrane lipid composition on the function of several intrinsic membrane proteins, including ion channels and membrane transporters. They are also working together with a group led by Antonio Lorenzo on the identification of the physiological basis for the essentiality of certain fatty acids on fish growth and development.

Temporal dynamics encoding information in the nervous system
Julián González, Luis de Vera, and Ernesto Pereda are using linear and non-linear technical approaches to analyse temporal series from brain and heart electrical activity, both in humans and experimental animals. A particular area of interest is the analysis of the non-linear relationships between cardiorespiratory and brain activities during awake and sleep stages, as well as during some noxious situations such as sudden death in the newborn. Furthermore, by using these mathematical approaches, they are also characterising the interdependencies and intrinsic variability on brain-derived electrical signals while performing specific perceptive tasks. By using similar methodological and conceptual approaches, Juan V. Sánchez-Andrés is analysing the temporal signals which encode relevant information in excitable cells, such as the pancreatic

beta cell and the pyramidal neurons of the hippocampus. The general hypothesis underlying this research line is that the characterisation of the signalling mechanisms participating in synchronous cellular activity may help to understand the pathophysiology of some diseases involving alterations in the pattern of excitability.

Neuronal vulnerability and neuroprotection

Manuel Rodríguez and Tomás González (from the Anatomy Department) are trying to characterise the mechanisms underlying neuronal degeneration of the dopaminergic system in Parkinson's disease. During the last few years they have developed some useful animal models of Parkinson's disease which allow them to carry out direct testing of the working hypothesis. Thus, the role of intrinsic and extrinsic factors affecting dopaminergic synapses are being analysed by a combination of electrophysiological, behavioural, and morphological methods. In addition, in collaboration with a team of neurologists they are working on the design of different pharmacological and surgical strategies in the prevention and treatment of Parkinson's disease.

Neurochemical monitoring and neuroimaging

José L. González-Mora works in an interdisciplinary group mainly involved in the development of new techniques aimed at real-time monitoring of neuroactive molecules in experimental animals. In addition, in collaboration with other Departments of the University of La Laguna and members of the Institute of Astrophysics, they are developing some devices to ameliorate sensorial deficiencies in people suffering from neurological diseases. In this respect, a virtual acoustic space has recently been designed to allow perception in blind people.

Top Mario Díaz at the confocal imaging system

Centre Guadalberto Hernández trying to get blood from the hypophyseal portal vessels of the rat

Bottom Raquel Marín in the culture room

CATEGORIES	ORAL	POSTER	TOTAL
Autonomic function		3	3
Blood-brain barrier		3	3
Cardiovascular & respiratory control	10	12	22
Cell signalling	10	17	27
Cellular neurophysiology	18	16	34
Comparative physiology		17	17
Development & plasticity		4	4
Epithelial & membrane transport	10	23	33
Gastrointestinal tract		13	13
Heart & cardiac muscle		6	6
Integrative neurophysiology		9	9
Ion channels	7	14	21
Microvascular & endothelial physiology	8	2	10
Muscle contraction	8	6	14
Neuroendocrinology	8	14	22
Renal & respiratory physiology		9	9
Reproductive physiology		7	7
Sensorimotor physiology	10	7	17
Smooth muscle	10	13	23
Teaching		7	7
TOTAL	99	202	301

Table Subject distribution of oral communications and posters

As mentioned above, the need for interdisciplinary approaches has induced us to work towards a highly integrated research project. About 30 staff members and an equivalent number of fellows are now in the process of establishing the Institute of Biomedical Technologies of Tenerife (ITB). By incorporating people from a broad scope of disciplines, we are developing a strategic plan aimed at the search for technological solutions to those biomedical problems derived from the interaction between ageing and environmental injuries. Thus, the general framework of the ITB will be that of biodegeneration, with a particular emphasis on their neural aspects. We are confident that next time we organise a meeting it will be hosted in the new facilities of the ITB.

Rafael Alonso

Chairman of the Joint Meeting at Tenerife
Chairman Elect of The Spanish Society of Physiological Sciences

ralonso@ull.es

References

Boyd CAR, Noble D (1993) The Logic of Life. Oxford University Press, Oxford.

Juan Negrín López (1996). El hombre necesario. Tuñón de Lara M, Miralles R, Díaz-Chico BN (eds.). Ciencia y Tecnología en Canarias, Santa Cruz de Tenerife.