

Biophysics in Spain

Subjects: Biophysics

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In the 1960s, Biophysics was an unheard of scientific field in Spain, and even outside Spain, the distinction between Biophysics and Molecular Biology was not clear at the time.

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1. Biophysics: A New Term? A New Field?

The term Biophysics was already used internationally before World War II, and its prominence increased during the years after it. It encompassed a broad field of study in biology, in which knowledge and techniques from physics were used. Then, the development of atomic physics during WWII, inseparable from that of the biomedical sciences, included demands for further research on biomolecules and their interactions, on cells, and on subcellular structures, particularly on chromosomes. The promotion of physical-chemical approaches in the life sciences, supported by the Rockefeller Foundation, also had a direct influence. All this worked like a new culture that selected and promoted many initiatives and projects that were considered as a part of a novel field, Biophysics. In practice, Biophysics was defined by those who claimed to practice it. Manuel Cortijo, improving on a previous definition by Peter Bailey, has defined Biophysics as “the study of biological phenomena using physical and physical-chemical concepts and methods” ^[1].

Important landmarks in the early stages of Biophysics as a differentiated discipline were the launching of new journals and the birth of new learned Societies, who in turn organized scientific meetings devoted solely to our discipline. The journal *Progress in Biophysics and Biophysical Chemistry* appeared in 1950, and in their preface the editors confessed that they had difficulties in deciding the specific field that the magazine was going to cover. The US Biophysical Society was created in 1950 and held its first congress in 1957, one of its objectives being “to know if there is such a thing as Biophysics and what kind of thing can that Biophysics be?” Later, other Biophysics journals appeared as the field was becoming more clearly delimited: *Biophysical Journal* (1960); *Quarterly Reviews of Biophysics* (1968); *Biophysics of Structure and Mechanism* (1974), etc. The British Biophysical Society was founded in 1960, and a year later, the German Society (*Deutsche Gesellschaft für Biophysik*) followed. The International Union for Pure and Applied Biophysics (IUPAB) was created in 1961 in Stockholm, beginning to organize its congresses on a three-yearly basis. The European Biophysical Societies' Association (EBSA) had a late birth (Bristol, 1984) and did not manage to hold its first congress until 1997, in Orléans, France, under the chairmanship of Manuel Cortijo.

The present essay owes much to the book “*Veinticinco años de la Sociedad de Biofísica de España (1986–2011)*”, edited by Manuel Cortijo, Juan Carmelo Gómez-Fernández, José López Carrascosa y Juan Antonio Subirana ^[1]. This book, together with extensive conversations with those four colleagues, plus my own reminiscences, constitute the basis on which the present summary has been built.

2. The Origins of Biophysics and Molecular Biology in Spain: International Relations

In Spain, a generation of researchers who returned from abroad in the second half of the 1960s considered Molecular Biology as their field and contributed to defining it both philosophically and experimentally. The international scientific organizations that emerged since the 1950s played an essential role in that articulation, in which specialists from different countries were able to use that international space in full emergence as a mechanism of legitimation of their academic and research interests in their own national laboratories. Spanish scientists participated from the early stages in these strategies, and this participation had the consequence of a permanent scientific update and an exchange of recognition that made these scientists, if not founders, at least pioneering participants in the emergence of a new academic and experimentation space.

In 1968, the possibility of Spanish scientific groups joining the international institutions in Biophysics and Molecular Biology was considered. The International Union for Pure and Applied Biophysics (IUPAB) was the main target. In this international context, in which both Biophysics and Molecular Biology were being defined, the contacts established by the Catalan molecular biologist Juan Antonio Subirana were particularly important. Subirana used his previous personal relationships to network with IUPAB leaders and in particular with the molecular biologist John Kendrew, who was also, for many years, the Secretary General of the European Molecular Biology Organization (EMBO).

Subirana's contacts were at the origin of a proposed biophysics meeting, to be held in Barcelona. John Kendrew had been in town to give a lecture at the College of Physicians in 1969. There he announced that the EMBO Executive Council had agreed to accept as members the Catalan biologists Subirana and Jaume Palau, and the biochemist Ángel Martín-Municio, a Professor at the Madrid Complutensis University. Subirana considered Kendrew's lecture and the announcement of the first Spanish members of EMBO as a wake-up call to the academic authorities on the possibilities of the development of Molecular Biology in Spain.

In the Summer of 1967, the then IUPAB Secretary General and Harvard Medical School biophysicist Arthur K. Solomon met Subirana through Harvard's molecular biologist Paul Doty and suggested that the Spanish Section of the International Union be created. Aaron Katchalsky, head of the Department of Polymer Chemistry at the Weizmann Institute where Subirana had spent a year during his postdoctoral training, was the IUPAB president at the time. After exchanging some letters, in April 1969, Solomon reported to Subirana that the third international congress of the IUPAB would take place in September of that same year at the Massachusetts Institute of Technology (MIT) in Boston and that, during that meeting, Solomon expected the incorporation of Spain to that organization (in fact, Spain's incorporation to IUPAB did not take place until 1981).

Meanwhile, Ángel Martín-Municio created a Biophysics group at the *Real Sociedad Española de Física y Química* (Royal Spanish Society of Physics and Chemistry, RSEFQ). Two scientific organizations in Spain dealt with Biochemistry and Molecular Biology, the Spanish Society of Biochemistry (now *Sociedad Española de Bioquímica y Biología Molecular*, SEBBM), created in 1963, and the Royal Spanish Society of Physics and Chemistry (RSEFQ), dating from 1903. Thus Biochemistry, and closely related Molecular Biology, seem to have competed to occupy an academic and research space and for achieving institutional recognition. This happened through two independent societies, one predominantly biological and one mostly chemical in approach, suggesting the weight of disciplinary origins in the negotiation of new academic disciplines.

3. The Spanish National Committee for Biophysics and IUPAB

In Spain, the National Committees were collegiate bodies of experts established by the Ministry of Education and Science to promote and convey Spanish participation in the Scientific Unions, Committees and International Programs. The Spanish Biophysics Committee had as specific missions to represent Spain in the IUPAB Assemblies and to analyze (and eventually vote) the matters that were dealt with in those assemblies, as well as to convey the information emanating from this International Union to all Spanish biophysicists.

The Spanish Biophysics Committee at IUPAB was created on 25 March 1981 through an agreement by CSIC for Spain to adhere to the IUPAB, naming a Committee on June 3, 1981, with Juan A. Subirana as Chairman and Armando Albert as Secretary. Spain was accepted as an IUPAB member in its 7th congress (Mexico City, August 1981). Four years later, in 1985, the CSIC appointed a new Biophysics Committee, again chaired by Juan A. Subirana, and with José L. Carrascosa as Secretary. This was the Committee that put forward and effectively helped in the formation of the Spanish Biophysical Society (see below).

As of that date, the Spanish Committee of IUPAB was fundamentally in charge of its true objective: to represent Spain before the IUPAB. The activities of the Committee passed through many different stages, not so much by the will of its members, but by the varying degrees of interest that the successive Ministries of Education and Science showed in the National Committees and their representation in international institutions.

In 2004, the Ministry created the ICSU National Commission, as the collegiate body of representatives of the different National Committees. ICSU's function was to coordinate the actions of the various Committees. Within this new framework the Spanish Ministry of Innovation appointed a new Spanish Committee for Biophysics, chaired by José L. Carrascosa, who continued serving as Chairman for the next decade.

The new operating framework of the committees integrated in ICSU made it possible to invigorate international representation activities, facilitating the presence of community representatives of Spanish biophysicists in the executive

committees of international organizations such as IUPAB itself, or EBSA. In addition, it teamed with the *Sociedad de Biofísica de España* (SBE), whose president Alicia Alonso (2006–2010) reshaped the SBE interactions with IUPAB and the Ibero-American societies. The fruits of this combined activity included the 2010 Spanish-Portuguese conference in Zaragoza, the Ibero-American congress in Búzios (Brazil) in 2009, as well as various workshops and international and national meetings. The Spanish committee of IUPAB used to hold a minimum of two annual meetings since its re-foundation in 2004, although at present, it is undergoing one of its Government-induced lethargy periods.

A remarkable event for Spanish Biophysics was the 2017 election of Juan Carmelo Gomez-Fernández, former President of our Society, as Secretary General of IUPAB. Unfortunately, the untimely death (2022) of our colleague blunted his time of brilliant service to the International Union.

4. The Spanish Biophysical Society (Sociedad de Biofísica de España, SBE)

As mentioned above, the 1985 Spanish Biophysics Committee agreed at its first meeting, on 10 September 1985, to create a Spanish Society of Biophysics, for which intensive work during 1985 and 1986 was required. Several of its members (Subirana, Cortijo, Goñi) used their frequent scientific activities in several European countries (England, Germany, France, Italy) to get first-hand knowledge of the problems of their Biophysical Societies and prepare a report for the Committee. A draft of the Statutes of the new Society was prepared, and it was agreed to hold a Constituent Congress in Sitges, near Barcelona, on 1–4 October 1986, under the name Spanish Biophysics Meeting. In this meeting, the steps were made for the creation of the new Society, and a Steering Committee was appointed, constituted by most of the members of the Organizing Committee. Finally, on 19 January 1987, the SBE was registered in the Registry of Associations of the Ministry of the Interior with the number 69,930. The number of Society members has grown from 80 in 1987 to about 300 in 2022.

When the Society was created, it was ensured that everyone involved with Biophysics would be welcome within the SBE and could present his/her results in our congresses, hoping (as it soon happened) that the very dynamics of the events would take all of us to a situation analogous to that of our international colleagues. The Society was initially structured in an open way but around three large groups, which reflected not only the investigations carried out in Spain, but also the evolution in the international scene. Those three main subjects were Structural Biophysics, Biomembrane Channels, and Membrane Structure. The initial groups of physiologists and structuralists had quickly understood during the years of mutual communication within the Biophysics Committee that they needed each other. When, in the mid-eighties, the group that was researching biological membranes joined the National Committee, it was clearly perceived that the mutual interaction between the three groups would produce synergistic effects in our investigations, as in fact did happen. Other groups of biophysicists, such as theoreticians or those working on irreversible processes, have continued to have their niche within the Society, despite being a minority in Spain.

SBE has always intended (and successfully so) to establish friendly relationships with the other learned societies in Spain. In fact, most of the founding partners, and even of the current ones, often belong to two or three of the related scientific Societies, such as the ones devoted to Biochemistry and Molecular Biology, to Cellular Biology, Crystallography, Physiology, etc. This is probably so because of the peculiar interdisciplinarity of Biophysics.

Perhaps the main activity of SBE has been the organization of successful congresses, well attended by both Spanish and foreign biophysicists. As an example, the most recent one, held jointly with the Portuguese Biophysical Society, took place in Bilbao (Spain) in June 2022. Over 200 delegates attended the meeting. From the first formal congress, held in Valladolid in 1987, 10 congresses were held on a more or less biennial basis until 2010. From then on, at the initiative of the then President J.C. Gómez-Fernández, congresses are held annually.

SBE Congresses are also a good opportunity for international networking, both at the institutional and personal level. From 1989 (Seville) joint meetings with the Portuguese society have been held, the Bilbao one in 2022 being the eighth in the Iberian series. Moreover, again from 1989, some congresses have also included the Ibero-American societies. The 10th Ibero-American Congress took place in Castellón, Spain, in 2018. In 1987 and 1990, two Spanish-Soviet Biophysical Congresses were held, in Granada and Kiev, respectively. In 2003, Alicante (Spain) was the venue of the joint IV European Biophysics Congress (EBSA) and VIII SBE Congress.

SBE Prizes and Awards are also important elements in catalyzing the scientific activity of members, particularly of the younger ones. The oldest one is the Bruker Award that was accorded to Rafael Picorel in 1998 and is still awarded annually, under the name “Manuel Rico–Bruker”, in remembrance of the distinguished NMR specialist and SBE member.

Two other prizes, namely 'E. PÉREZ PAYA–SBE 40', and 'ANTALGENICS–SBE 33' are awarded annually to the younger members of the Society.

References

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