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State of lipid research in Greece

Despite the fact that one class of biomolecules was named *proteins*, after the greek verb "protevo"= be the first, in order to show their dominant role in life, today it is accepted that all the biomolecules are essential for the life, since each one has a unique role.

The dramatic emergence of molecular biology and its implied goal to curing all diseases through cloning and gene manipulation evolved along with revolutionary changes in our understanding of membrane biochemistry and biology. We have understood that membrane lipids and the changes in membrane lipids subsequent to agonist interaction play an important role in the signal transduction system initiated by the interaction of an agonist with a sensitive cell. The potential role of lipids (named from the Greek *lipos* = fat), and especially phospholipids, not only as passive components and semi-permeable membrane structures but also in the signal transduction pathway, was formulated some 50 years ago.

The history of lipid research in Greece started in the middle 1950's by *D. S. Galanos*. After his training and pioneering research on plant phytosphingolipids with *H. E. Carter* in USA, he established lipid research in the Laboratory of Food Chemistry at the University of Athens. The research here followed the way lipids were studied all around the world. First it was developed as "static biochemistry" of lipids, concentrated on their structure and distribution in natural products. Only with such an approach, that is isolation from animal and vegetable tissues, purification, and determination of their chemical structure, can one hope to interpret their exact role in cellular reactions. Subsequently, the research program of the Laboratory of Food Chemistry was extended to include studies on phospholipids and on glyceryl ether biochemistry and metabolism by *V. M. Kapoulas*, former Prof. *Galanos*' student having also training in USA with Prof. *D. J. Hanahan*. A number of methods for fractionation of phospho- and phosphonolipids devised by *Galanos* and *Kapoulas* were adopted by other researchers and special books, while effective methods for detection of adulteration of olive oil and butter were also adopted by the greek *Chemical Codex* and *IUPAC*. Later, Prof. *V. M. Kapoulas* moved to the University of Ioannina where he created another active lipid research group.

As a student of *Galanos* and *Kapoulas*, I was the third generation in the University of Athens who was engaged in lipid research. Having the opportunity to work close to Prof. *Hanahan*, I was lucky to be involved in the research program concerning the study of Platelet-Activating Factor (PAF), the glyceryl ether structure of which I elucidated and synthesized in 1979. Until the late 1970s, the concept of an intact phospholipid acting as an agonist was not a topic of great interest since it seemed to be such a remote possibility. However, in 1979 the finding that a compound associated with the development of systemic anaphylaxis in IgE rabbits was a phospholipid changed our views in a significant manner. Today PAF is characterized as a universal mediator, which seems to belong to a family of lipid molecules with different structures and from different sources, but sharing similar biological activities, apparently with different physiological role in animals, plants and monocellular organisms.

My group continues to work on this subject, as a major research project, in Greece at the University of Athens. Research on the methodology for analysis and elucidation of the structure of lipids, lipid metabolism, structure and function of biological membranes, calcium mobilization after stimulation with lipids, food allergy, mediterranean diet in correlation with lipids, and cardiovascular diseases etc., is also performed, supervised by myself and other members of the Laboratory.

The students and later colleagues of Prof. *Kapoulas* and mine are now serving as faculty members in other Greek Universities and continue lipid research in collaboration or by themselves. For example, in the University of Ioannina, *D. C. Tsoukatos*, *A. D. Tselepis* and their group are studying the oxidative modification of low density lipoprotein (LDL) and its pathophysiological role, as well as the specific enzyme (PAF-acetylhydrolase) which inactivates PAF. In the *Harocopio* University, *S. Antonopoulou* studies lipid methodology, elucidation of the structure of lipids isolated from natural sources, implication of biologically active lipids in pathophysiological conditions such as cardiovascular and renal diseases etc. In the School of Medicine, University of Athens, *H. Kotsifaki* studies the oxidative modification of LDL and the biologically active lipids implicated in periodontal disease, and their role in the induction of cardiovascular diseases.

The majority of other very significant researchers working in small groups in different Greek hospitals and research centers collaborate with our groups of the Laboratory of Food Chemistry, University of Athens, which plays a central role in lipid research in Greece.

All these groups have to exhibit a significant number of publications in international scientific journals and congresses that have been accompanied by high scores of citation numbers.

There is also a Greek Scientific Society of PAF research, organizing *Panhellenic* conferences on PAF, while the Greek scientists have a massive participation in most world congresses on PAF research taking place every 3 years.

Today, around the world, the number of major University settings (main campus, medical schools etc) that have faculty members with an expertise in the area of lipid chemistry and biochemistry is low. In addition, the graduate courses in chemistry and biochemistry of lipids that are offered as well as the training of persons with true expertise and knowledge in lipids are reduced. However, the situation in Greece seems to be better than average, and promising. Many of our students, as mentioned above, continue to be engaged in lipid research, as faculty members of other Universities and research centers, and a large number of graduate students obtain master and doctor degrees based on lipid research.

There is no doubt that this journal will greatly contribute to the efforts of lipid research in Europe. Therefore, its perfect presentation should be assisted by all, not only for the sake of Europe and lipids, but also for research in general.



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