

Feature Article

Biochemistry and Molecular Biology in Morocco: Overview of Scientific Research and Education

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Just after independence in 1956, Morocco had only one university, the Mohamed V University, in Rabat, the capital of the country. In 2008, it boasts of 14 universities including a private institution.

From the beginning of university education, programmes in biology at the Faculty of Sciences initially focused on natural sciences, in which biochemistry comprised one of many subjects. Given the general nature of this training, the Moroccan system produced nonspecialized graduates. Indeed, the major objective was to train a native teaching corps for secondary education to replace the mass of foreign teachers, which, until then, had been responsible for this level of education. Furthermore, at the onset of university education, scientific research activities were very limited with respect to biochemistry and molecular biology. Consequently, there was no return effect on the education in these disciplines.

The development of biochemistry at each level of education together with scientific research is closely associated with the growth of the university system in Morocco over the last 40 years. This growth can be subdivided into two phases, one from 1957 till 2003 and the other from 2003 until the present day.

The first phase was typified by “education for all” with a centralized system of management while the second was characterized by a reformed system, preceded by the appearance in 1999 of the National Charter of Education and pertinent law (01.00) on the organization of higher education.

The second phase gave the Moroccan university a broad educational and scientific self-government and favored the development of specific programmes for education by reducing centralization. Higher education is now organized in modules, in

which the time devoted to biochemistry and molecular biology may vary from one university to another.

In many Moroccan universities, the first cycle includes two modules devoted to biochemistry, called “Structural Biochemistry – Enzymology” and “Metabolic Biochemistry – Molecular Biology”. Each module comprises an average of 90 hours, including 20% lab practice. In the second module, molecular biology covers 37% of the time allocated and includes 20% of lab practice. Programmes in the second cycle and the master’s courses increasingly include more biochemistry in their curricula, such as analytical techniques and supplementary training.

Scientific research in Morocco is still in its infancy for numerous reasons. Among these, of note is the lack of interest shown by the private sector in educational institutions and the many barriers between the distinct ministries and departments performing scientific research in Morocco. To enhance research opportunities in Morocco, a restructuring of this sector is essential.

A survey carried out in 1995 by the National Centre of Scientific and Technical Research showed that only a part of the 4% of research units among a thousand in Morocco performs research in biochemistry and molecular biology.

Even before the National Charter of Education in 1999, Morocco showed a clear need to develop scientific research and education in biochemistry and molecular biology. Indeed, in 1992 the educational body of our universities began to contemplate the development of an association. The fruit of this effort emerged in 1995 with the setting up of the Moroccan Society of Biochemistry, currently called the “Moroccan Society of Biochemistry and Molecular Biology” (SMBBM, <http://smbbm.org>).

The 10th anniversary of this association was held in 2005 and was marked by a series of activities. In addition to its association with the Federation of European Biochemical Societies (FEBS) (signed on October 25, 2002), the SMBBM is also a member of the IUBMB. This widened field of international cooperation is the result of perseverance for more than 10 years, and has been consolidated through the organization of the last

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two international biochemistry congresses, one in Marrakech in 2004 and the other in Agadir in 2006.

The permanent goal of the SMBBM is to associate its activities with those of other Societies of Biochemistry and Molecular Biology. It was the case with the French Society of Biochemistry and Molecular Biology in 2004 and the Spanish Society of Biochemistry and Molecular Biology in 2006. Locally, SMBBM supports the promotion of education and research in the field of biochemistry and molecular biology. One example of an initiative taken by the SMBBM is an activity called "Caravan of Biochemistry," which has helped to give local support to many scientists in nine towns in Morocco. In addition, by supporting young researchers, the SMBBM is faithful to its mission of promoting biochemistry and molecular biology in Morocco.

The scientific research programmes involving biochemistry and molecular biology in Morocco are diversified. During the last two biochemistry congresses organized by SMBBM, in 2004 and 2006, communications related to "Biochemistry, biotechnology and natural substances," "Biochemistry and environment," and "Biochemistry and health" were the most represented. Also, many laboratories participated in a workshop on

biotechnologies in Morocco, organized by the Society in 2005. These data show a growing interest in biochemistry and molecular biology with a tendency to their increased involvement in biotechnologies and environment.

In the field of health, the Pasteur Institute of Morocco makes a significant contribution to several lines of research in biochemistry. Its recent involvement in a transverse research programme called "Plasmid Resistance to quinolones in Africa and in Asia" is evidence of this. The Institute has several laboratories, including specialized labs for tuberculosis, viral hepatitis, and AIDS.

In Moroccan universities, techniques used in biochemistry and molecular biology are applied to several domains, such as disease screening, genetic diversity labeling, and the study of resistance to biotic and abiotic stresses.

To support scientific research, between 2000 and 2004 Morocco set up several technical research units (UATRS), such as the Genomic and Proteomic Unit in Rabat, which started its activities in 2005. In addition, the established community of Moroccan researchers overseas constitutes a crucial human resource for the development of scientific research in biochemistry and molecular biology in Morocco. Exchange programmes and technology transfer initiatives are under way.