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The 4th Euro-Mediterranean Conference of Natural Products and Drug Discovery: Back to Mother Nature (BioNat-IV), Cairo/Sharm El-Sheikh, Egypt, March 3–7, 2015

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ABSTRACT

The 4th Euro-Mediterranean Conference of Natural Products and Drug Discovery: Back to Mother Nature (BioNat-IV) was recently (from March 3rd through 7th, 2015) convened in Cairo and Sharm El-Sheikh along the Red Sea coast of Egypt. Overall, the meeting provided a platform for scientists from different nations to discuss emerging ideas that focused on cell signaling in cancer; the pathogenesis of autoimmune diseases; the identification and use of natural products as well as novel drug delivery approaches for the treatment of cancer, arthritis, diabetes, tuberculosis, fungal infection, etc.; and untapped or unconventional sources for natural products. This fourth in a row conference tried to bridge the gap not only between basic research and clinical applications, but also between developed nations and developing countries. With the continuing success of these past meetings, the fifth Euro-Mediterranean Conference of Natural Products and Drug Discovery (BioNat-V) is slated to be in February 2017.

A natural product is a substance or chemical compound produced by a living organism that is found in nature. In the broadest sense, natural products include any substance produced by life. Natural products can also be replicated by chemical synthesis (both semisynthesis and total synthesis), and such undertakings have played a central role in the development of the field of organic chemistry by taking on challenging synthetic targets. The term natural product has also been embraced for commercial purposes to refer to cosmetics, dietary supplements, and foods produced from natural sources without added artificial ingredients. Within the field of organic chemistry, the definition of natural products is usually

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restricted to purified organic compounds isolated from natural sources that are produced via the pathways of primary or secondary metabolism.

Within the field of medicinal chemistry, the definition is often further restricted to secondary metabolites. Secondary metabolites are not essential for survival, but nevertheless provide the organisms that produce them with an evolutionary advantage. Many secondary metabolites are cytotoxic and have been selected and optimized through evolution for use as "chemical warfare" agents against prey, predators, and competing organisms. Natural products may possess pharmacological or biological activity that can be of therapeutic benefit in treating diseases. As such, natural products are the active components not only of most traditional medicines but also many modern medicines. Furthermore, because the structural diversity of natural products exceeds that readily achievable by chemical synthesis, and synthetic analogs of natural products can be prepared with improved potency and safety, natural products are often used as starting points for drug discovery.

Mixtures of plant-derived products are known as botanicals, and the term is defined by the United States (US) Food and Drug Administration (FDA) to describe finished, labeled products that contain vegetable matter as ingredients, which can include plant materials, algae, macroscopic fungi, and combinations thereof [1]. They can fall under the classification of a food (including a dietary supplement), a drug (including a biological drug), a medical device, or a cosmetic [1]. The vast majority of plant-derived treatments are based on synthetic, semisynthetic, or otherwise highly purified or chemically modified drugs [1,2]. According to the most recent report by BCC Research, the global plant-derived drug market was valued at US$ 22.1 billion in 2012, and sales are projected to grow to US$ 26.6 billion by 2017 at a compound annual growth rate (CAGR) of 3.8% [3].

Specifically for life, health-driven research is an ideal objective to aim for. With this in mind, in 2011 five Egyptian scientists from the City of Scientific Research, Egypt, who possessed administrative skills, professional experience, research capabilities and scientific relations/collaborations at local, regional (Arab) and international levels, decided to form the Euro-Mediterranean Association of Life Sciences (EMALS). The primary aims of EMALS were to contribute effectively to the international and national programs of scientific research development, along with providing strategic services that affect the lives of scientists, researchers and their assistants, develop their professional and research competence, and raise the awareness of various segments of the society for natural products research and the use of these products for health care. Another main goal of this Association was to biannually organize a conference series in the Euro-Mediterranean area and invite the leaders from all over the world to discuss latest developments in life sciences, drug discovery and cancer research and other major diseases. Special emphasis and encouragement are provided to students, and trainees in Egypt and Euro-Mediterranean are to attend these meetings and to network with the leaders in their fields.

The purposes of the series of Euro-Mediterranean Conferences of Natural Products and Drug Discovery (BioNat) are to promote discussion and interaction among academic researchers, practitioners, and other professionals in the field of natural products (metabolic networks, vitamins, carotenoids, flavonoids, anti-nutrients, toxins, products of plant-associated microorganisms and bioactive proteins). Attention is also devoted to herbal medicine, plant-derived drugs, phytopharmaceuticals, synthetic drugs, ethnopharmacology, biodiversity, as well as research strategies and legislations concerning natural products research. Ultimately, this series of conferences will overcome the challenges of drug discovery and drug delivery in a completely new way. BioNat hopes to help delegates convert these expensive, challenging and inefficient processes into more accessible and affordable ones.

Planned open panel discussions and breakout sessions on key thematic areas are effective in energizing the participants in defining the drug discovery and development landscape. Several eminent scientists are expected to continue to attend these conferences, and this will definitely contribute to advancing the scientific knowledge regarding natural products. Beside our normal scientific events, attendees have access to a variety of activities covering a large range of interests.

The first such conference (BioNat-I) was conducted in the city of Cairo under the title Plant Natural Products from Biodiversity to Bioindustry from 8 to 10 December 2009. The themes of the first meeting were (1) Plant Natural Products as Health Promoters and Food Additives; (2) Plant Biotechnology; (3) Plant Biodiversity, Protection and Conservation; (4) Plant Biodiversity & Chemical Ecology; (5) Plant Toxins; (6) Evaluation of Plant Antioxidant Activities; and (7) Novel Elicitation Strategies & Enhancing Secondary Metabolite Production in Plants. This conference was inaugurated by the then President of the Egyptian Academy of Scientific Research, Prof Mahmoud Saker.

The second international conference (BioNat-II) was conducted in the city of Alexandria under the title Natural Products from Biodiversity to Bioindustry from 11 to 13 December 2011. The themes of the second meeting were: (1) Biotechnology, Pharmacology, and Toxicology; (2) Biological Actions; (3) Phytochemistry; (4) Formulations, Applications, Folklore, and Standardizations; (5) Plant-associated Microorganisms; and (6) Biodiversity and Conservations. This conference was inaugurated by the Governor of Alexandria, the President of Alexandria University and the Director of City of Scientific Research.

The third international conference (BioNat-III) was conducted in the city of Cairo under the title Natural Products from Biotechnology to NanoMedicine from 4 to 7 January 2013. The topics covered in BioNat-III were (1) Stability and Efficacy of Natural Products; (2) Biotechnology and Molecular Biology; (3) Mode of Action of Natural Products; (4) Pharmacogenomics, Pharmacodynamics and Pharmacokinetics; (5) Nanoformulations, Nanoparticle Delivery and Nanotoxicology; (6) Pharmacology, Toxicology and Biological Actions; and (7) Risk Assessment, Formulations, Applications & Standardizations.

The fourth international conference titled Natural Products and Drug Discovery was convened in Sharm El-Sheikh, March 3–7, 2015. Long before the first foreign tourists dived beneath Sharm el Sheikh's crystal blue waters, this popular holiday destination was one of Egypt's most significant ports. Located at the southern tip of the Sinai Peninsula, where the Red Sea meets the Gulf of Suez and the Gulf of Aqaba, Sharm el Sheikh has grown from a sleepy fishing village where 100 Bedouins lived just 40 years ago, into a major touristic hotspot