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Molecular Pharmacognosy: A Promising and Prospective Scope in the Field

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Editorial

Pharmacognosy is considered one of the most attractive areas of pharmacy education. The term "Pharmacognosy" is derived from the Greek words "pharmakon" (drug) and "gnosis" (knowledge) and was delivered in 1811 by the Austrian physician Schmidt, then in 1815 by Seydler in his work Analecta Pharmacognostica [1].

In the past, it was defined as the study of crude drugs of plant and animal origin [2,3], but such broad description can't cope with the increasing specialization in all life sciences and especially in the pharmaceutical field. In fact, pharmacognosy is a multidisciplinary science that developed over the years and adapted itself with the continuously changing environment and the challenges of the future [4]. Thus recently, it incorporates different area of science including science of biogenic drugs, modern analytical techniques, quality control of herbal products, pharmaceuticals, poisons, medicinal foods [1], purified active extracts, fractions [5], essential oil isolation and characterization [6-8], and even application of molecular docking techniques [9].

Pharmacognosy originated from dealing with taxonomy and morphology of crude drugs, to focus on isolation and structure elucidation of active constituents, and then recently start concerning with the potential biological activity of crude drugs, which can result in discovering novel lead drugs for certain disease or even new unknown biological activities [4].

By the discovery of DNA structure in 1953, all life sciences were affected with special impact on molecular biology. This led to the generation of many interdisciplinary sciences such molecular pharmacognosy. The term molecular pharmacognosy was first introduced at 1995 by professor Lu-qi Huang – professor of Pharmacognosy at the institute of Chinese materia medica, China. He proposed three theoretical bases for molecular pharmacognosy. First, it brought biologically related branches as pharmacognosy into a molecular level. Secondly, pharmacognosy combined both crude drugs that contain DNA in their cells and molecular biology that is based on DNA as its material base. Thirdly, the study level of crude drugs in pharmacognosy developed from organism, tissue, organ, and cell into genetics. Thus the development of pharmacognosy was closely related to molecular biology, promoting the study of pharmacognosy into a molecular level [10].

Many techniques of molecular biology are applied to pharmacognosy, such as molecular markers, recombinant DNA, gene chip technique that is used for gene expression profiles and construction of genomic library and also elicitors which are compounds stimulating plant defense and thus can be used to increase secondary metabolites production [11].

Molecular pharmacognosy is concerned with distinguishing the genuine drugs from the false ones to solve the problem of variety confusion, assessment of drug quality and thus excellent varieties can be researched and cultured for high yield, maximum quality and fast growth [10]. Molecular markers with important traits can be searched and undergo breeding [4]. Molecular pharmacognosy is also concerned with gene regulation of metabolic pathway as an attempt to improve the content of active constituents and the quality of herbal drugs [10].

Thus the ultimate goal of this editorial article is to highlight the role of molecular pharmacognosy, that extends from study of molecular taxonomy, phylogenetic evolution of medicinal plants and animals, conservation of endanger species, molecular identification of medicinal raw materials, controlling metabolic pathways and biosynthetic regulation of secondary metabolites in plants, conservation of biodiversity, genetic engineering, tissue culture technology, production of pollution free medicinal plants [10], to transforming the term "Pharmacognosy" to be a molecular science that explores naturally occurring structure-activity relationships with a drug potential [4].

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