Therapeutic applications of bioactive phytochemicals

Young-Joon Surh
Tumor Microenvironment Global Core Research Center, College of Pharmacy, Seoul National University, Seoul, South Korea

In reality, drugs derived from natural product resources, especially those in plant kingdom, are of immense importance in terms of their potential applications for the management of a multiplicity of human disorders. Thus, a substantial proportion of all prescriptions dispensed from community pharmacies in the world contain one or more ingredients derived from higher plants. It is estimated that approximately 80% of the world’s population depends exclusively on plants for their health and healing.
A wide array of modern drugs included the international pharmacopoeia have an origin in ethnopharmacology and traditional herbal medicine. Numerous plant extracts and their ingredients have unique pharmacological activities, such as anti-inflammatory, anti-diabetic, anti-carcinogenic, vasodilatory, anti-bacterial, anti-viral, anticonvulsant, sedative and antipyretic effects. However, very few randomized-controlled studies have been carried out to precisely evaluate their therapeutic efficacy and safety. Nonetheless, for some of the botanical materials, there are relatively well-organized database available describing the therapeutic potential, and their active ingredients can be tested by exploiting modern scientific methods.
In the early days of pharmacology, therapeutic drugs were often discovered incidentally from medicinal plants as part of folk remedy. These desirable accidental discoveries are referred to as drug serendipity. There are many other examples of medicinal plants and their constituents that have provided serendipitous bedside observations. Such clinical hits can be a basis of drug discovery and development. Recent advances in combinatorial chemistry and systems biology have created many drugable new entities.
Drug discovery strategies based on natural products and traditional medicines are re-emerging as attractive options. The R&D thrust in many pharmaceutical sectors has focused on development of botanical drugs through investigation of leads from the traditional herbal medicine. Herbs are of great importance as a reservoir of chemical diversity and can be explored for discovery of potential drug candidates. Knowledge and experimental database of traditional herbal medicine can provide new functional leads to reduce time, money and toxicity – the three main hurdles in the conventional drug development.

*Corresponding author: Tel. 02–880–7848, e-mail: surh@plaza.snu.ac.kr