

Traditional Medicine: The Goldmine for Modern Drugs

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Editorial

In the early development of modern medicine, biologically active compounds from plants have played a vital role in providing medicines to combat diseases. Plant-derived medicines continue to occupy an important niche in the treatment of diseases worldwide. However, several synthetic chemotherapeutic, cytotoxic and immunomodulating agents are also available in Western medicine to treat the diseases. Most modern medicines tend to target a single gene product or pathway at any given time. This is perhaps one of the major reasons that some of the recently discovered medicines are ineffective. Besides being enormously expensive, these drugs are also associated with serious side effects and morbidity [1]. Still, the search continues for an ideal treatment that has minimal side effects and is cost-effective. Therefore, herbal medicines are the best alternative to treat the diseases including cancer. In Asian countries, herbal and traditional medicines are continuously being used against several ailments. Today, in Western medicine, only a limited number of plant products are being used to treat the diseases.

In India, Ayurvedic medicine, which is a natural system of treatment, has been practiced for more than 5,000 years. Ayurveda, the 'science of life' emphasizes prevention of disease, rejuvenation of our body systems, and extension of life span through lifestyle interventions and natural therapies [2]. Similarly, Traditional Chinese Medicine originated in China at least 3,000 years ago. It is practiced not only in China rather throughout the East Asia. Besides these, Traditional Unani Medicine, Traditional Korean Medicine, and Traditional Native American Medicine have also originated in different parts of world a long back ago [3]. In all systems of traditional medicine the fundamentals are to use the medicinal plants in the treatment and prevention of disease, as well as in the maintenance of health [4].

In traditional systems, plant and plant products are used for the cure of diseases; however, in modern science the bioactive compounds of the plants are identified. These plants materials are being used for the development of modern drugs. It is believed that most of the drugs either traditionally used or used in modern science derived from natural sources. For the treatment of cancer, US Food and Drug Administration (FDA) has approved several drugs derived from natural sources. Of the 121 prescription drugs in use today for cancer treatment, 90 are derived from plants. At least 877 small-molecule drugs introduced worldwide between 1981 and 2002, most (61%) can be traced back to their origins in natural products [5]. These include Vincristine and Vinblastine (from *Vinca rosea*), Etoposide (from Mayapple), Irinotecan and Topotecan (from *Camptotheca acuminata*), Paclitaxel and Abraxane (from *Taxus brevifolia*), Solamargine (from *Solanum dulcamara*), Masoprocol (from *Larrea tridentata*), Arglabin (from *Artemisia glabella*), Alitretinoin (from *Daucus carota*) and others [6].

Moreover, there are numerous other natural compounds have shown chemopreventive and therapeutic efficacy and are in preclinical and clinical stage. One of the most widely studied molecules is curcumin, a component of turmeric. Turmeric is being used as a traditional medicine for the treatment of rheumatoid arthritis, chronic anterior uveitis, conjunctivitis, skin cancer, small pox, chicken pox, wound healing, urinary tract infections, and liver ailments. It is also being

used against digestive disorders, jaundice, menstrual difficulties, and colic; for abdominal pain and distension; and for dyspeptic conditions including loss of appetite, postprandial feelings of fullness, and liver and gallbladder complaints. Many South Asian countries use it as an antiseptic for cuts, burns, and bruises, and as an antibacterial agent [7]. Epidemiological and experimental studies suggested that curcumin is a pleiotropic molecule and can acts against wide varieties of diseases [8]. Because of its safety and efficacy, the FDA has declared turmeric and its active component curcumin as GRAS (generally regarded as safe). Other traditionally used natural compound is guggulsterone derived from the gum resin (guggulu) of the tree *Commiphora mukul*. The resin has been used in Ayurvedic medicine for centuries to treat a variety of ailments, including obesity, bone fractures, arthritis, inflammation, cardiovascular disease and lipid disorders. Recent studies have shown that guggulsterone is an antagonist for the bile acid receptor farnesoid X receptor and regulating cholesterol homeostasis. It exhibits efficacy against inflammatory diseases by modulating various signaling molecules [9].

There are other plant products have been used as a traditional medicine. Grape extracts have been used for human health over 2000 years ago in 'Darakhasava,' a well-known Indian herbal preparation whose main ingredient is *Vitis vinifera* L. This 'Ayurvedic' medicine is prescribed as a cardi tonic and also is given for other disorders. Latter chemical analysis showed that it has an active component resveratrol, which has numerous activities against several diseases. It exhibits antioxidant, anti-inflammatory, antimicrobial, and anticancer properties [10]. Another compound, flavopiridol, which is a semisynthetic flavonoid closely related to a compound originally isolated from the stem bark of *Dysoxylum binectariferum*. This plant indigenous to India and described in Ayurveda. Modern findings showed that flavopiridol is a potent inhibitor of cyclin-dependent kinases and acts against cancer and other chronic diseases. In Ayurveda, withanolide, which are extracted from *Withania somnifera*, are employed in the treatment of arthritis and menstrual disorders. This compound now investigated as potent inhibitors of angiogenesis, inflammation, tumor development, metastasis and oxidative stress, and a promoter of cardioprotection. The medicinal plant *W. somnifera* is widely known for its anti-inflammatory, cardioactive and neuroprotective effects. Boswellic acid, an active component of *Boswellia serrata* (also known as Salai guggul), is used in Indian traditional Ayurvedic medicine to treat rheumatic diseases, respiratory diseases and liver disorders. Extensive studies since last 30 years showed that the traditional therapeutic usefulness of Boswellic

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acid is a result of its anti-inflammatory activity, possibly mediated through the inhibition of 5-lipoxygenase and leukocyte elastase [2, 10].

Besides these different formulations and extracts of fruits vegetables, spices, cereal, legumes and other parts of plants including leaf, root and bark are being used against various ailments in different traditional medicines around the world. In Chinese traditional medicines alone over three hundred herbs are commonly being used. Some of the most commonly used herbs are ginseng, wolfberry, dong quai, astragalus, atractylodes, bupleurum, cinnamon, coptis, ginger, hoelen, licorice, ephedra sinica, peony, rehmannia, rhubarb, and salvia. Similarly, in Korean, Unani and Native American traditional medicine systems hundreds of other plants are being used. Modern sciences are investigating the active components and mechanisms of action of these plant products and are in preclinical and clinical stage. Along with their efficacy, recent findings suggest that these herbal components are safe and cost effective. Because of their pharmacological safety, these agents can be used alone or as adjuncts to current chemotherapeutic agents to enhance therapeutic effects and minimize chemotherapy-induced toxicity. Since more than 80% of the world's population cannot afford modern medicines, the use of these herbal drugs either raw or in pure form (modern medicine) is appreciated. Thus the use of these drugs provided by Mother Nature could increase the life span by decreasing the cost and toxicity of modern drugs.

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