Current status and future direction of Chinese herbal medicine

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Current medical therapeutics rely on scientific knowledge to improve health. However, certain aspects of medicine have not been practiced in a scientific manner. Chinese medicinal herbs are among the oldest evidence-based alternative and complementary therapies and their formulations are often not subjected to pre-market toxicity testing. With the booming market of Chinese herbal medicine worldwide, a new strategy must be formulated for the assessment of drug efficacy, effectiveness and toxicity to optimize the therapeutic and preventive potential of Chinese herbal medicine.

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Chinese medicinal herbs are some of our oldest and complementary medicines and their ever-increasing use is a good indication of the public interest in such medicines. Although Chinese herbal medicines constitute multi-billion-dollar industries worldwide and >1500 herbals are sold as dietary supplements or ethnic traditional medicines, the formulations of these medicines are commonly not subjected to pre-market toxicity examination to test their safety or efficacy. With the trend of ‘back-to-the-nature’ and the fact that China recently became a member of the World Trade Organization (WTO), a greater boost in the use of Chinese herbal medicine might be expected, with a projected $400 billion market by 2010. The seemingly overwhelmed herbal market will facilitate new herbal product development. However, such development will bring, and already has brought, more challenges to herbal enterprise in China and the world. One example is that of the weight-loss dietary drug ephedra or Ma Huang, which was withdrawn from the market as a result of its risk of promoting heart valve problems. From a healthcare perspective, safety issues taking into account the balance between adverse effects and therapeutic benefit must be dealt with.

Herbal medicine has long been used in Chinese traditional healing systems and its associated pharmacology and pharmaceutical products are updated frequently. More than 25 ginsenosides have been extracted from ginseng, and might be associated with a wide range of therapeutic actions in the CNS and cardiovascular and endocrine systems [1]. Indeed, ginseng promotes immune function, and possesses anti-stress and anti-aging activities. Several ginsenosides were proven to be non-organ-specific tumor suppressors and to improve learning and memory in patients with Alzheimer’s disease [2]. Other examples of herbs with pharmacological effects include: danshensuan, isolated from danshen (Salvia miltiorrhiza), which limits not only the progression but also the symptoms of several cardiovascular diseases, an effect that is probably related to its antioxidant activity [3,4]; and acetylsalvianolic acid A, a semi-synthetic analog of salvianolic acid that significantly reduces cerebral infarction, prevents thrombosis formation and attenuates neurological deficits [3,4].

Garlic (Alium sativa), which has been used as a food and condiment for centuries, has been shown recently to contain three main components, allicin, allitridin and aj genes, that possess potential beneficial health effects such as anti-carcinogenic activity. It is believed that garlic can normalize plasma lipid levels, blood pressure, fibrinolytic activity, and suppress carcinoma growth and platelet aggregation [5]. Several mechanisms are likely to account for the beneficial effects of garlic, such as its ability to increase the serum concentration of nitric oxide, reduce the concentration of serum endothelin and depress carcinogen bioactivity [5].

Ginkgo biloba (Fig. 1) is a dioecious tree with a long history of traditional Chinese herbal medicine. The standardized extracts of its leaves have been used widely as a phytomedicine in Europe and as a dietary supplement in the USA. The primary active constituents of its leaves include flavonoid glycosides and unique diterpenes known as ginkgolides; the latter are potent inhibitors of platelet-activating factor [6]. Clinical studies showed that ginkgo extracts exhibited therapeutic effects in a variety of conditions including Alzheimer’s disease, memory loss, age-related dementia, cerebral and ocular blood flow occlusion, premenstrual problems, and altitude sickness [6]. As a result of its potent antioxidant properties and ability to enhance peripheral and cerebral circulation, ginkgo shows prospective value in the treatment of cerebrovascular dysfunctions and peripheral vascular disorders [7].

Approximately 15 compounds have been isolated from Tripterygium wilfordii,
Ca\textsuperscript{2+} on the move: ways and means to translate a multifarious signal

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Following the seminal demonstration at the end of the 19th century of the role of Ca\textsuperscript{2+} ions in triggering muscle contraction, intracellular Ca\textsuperscript{2+} homeostasis has been recognized as a key aspect of signal transduction [i.e. the mechanisms that allow cells to decode extracellular signals (e.g. hormones, neurotransmitters, growth factors and differentiation agents) into defined actions]. Ca\textsuperscript{2+} ions are ubiquitous second messengers, and the rapid rise of their intracellular concentration (occurring via entry from the Ca\textsuperscript{2+}-rich extracellular fluid or release from internal sources) mediates the occurrence of the most important events in the life of our cells (e.g. secretion, contraction, fertilization, proliferation and apoptotic death).

A symposium held in Cavalese, Italy 100 years after the discovery of the sarcoplasmic reticulum (SR) (the source of Ca\textsuperscript{2+} released in muscle contraction) by the Italian