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# Search of New Molecules/Prospects of Drug Discovery from Herbal Medicines

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## Opinion

Global data now indicates that 80% of world's population rely for their health care primarily on ethno-botanical remedies and plant drugs; therefore over the decades researchers have focused on drug discovery from botanical sources, an important group of complementary and alternative medicine therapy. On the other hand, the research and development of conventional drugs are very costly, in spite of huge investment, say, US $50 billion, only around 20 compounds are approved by FDA, and two to three compounds reaches into clinical pipeline. Plant-derived herbs, are therefore the ideal choice for drug discovery and at present, more than 35,000 plant species are used for medicinal purposes around the world, however, World Health Organization has listed 21,000 medicinal herbs for the purpose [1,2]. Herbs contain hundreds of active ingredients like important class of alkaloids, terpenoids, flavonoids and phenolics compounds, products of plant secondary metabolism. Drugs so far recognized from medicinal plants are: i) anti-neoplastic: vinblastine, vincristine from Catharanthus roseus, camptothecin from Camptotheca acuminatae, taxol from Taxus baccata , ii) anti-malarial: artemisinin from Artemisia annua, quinine, quinolone from Cinchona ledgeriana, iii) anti-diabetic: allicin from Allium sativum and for iv) brain functions: caffeine from Coffea canephora and nicotine from Nicotiana tabaccum and many more [3,4].

Medicinal plants are therefore, may be the fertile source of many biologically active molecules/drugs. The vast majority of chemical potential of unexplored medicinal plants around the world awaits discovery and is hidden away in plant genomes. Identification of the underlying genes for the enzymes of metabolic pathways for the biosynthesis of new products/molecules inside medicinal plant requires genome research/genome sequencing. The emergence of new herbal genomics research together with advances in other omics information may help in the speedy discovery of previously unknown enzymes/metabolic pathways [5]. Now, breakthroughs in sequencing technology, and the use of inexpensive next-generation sequencing (NGS) technologies has enabled/accelerated genome-wide prediction of metabolic enzymes, pathways and gene clusters in diverse plants including medicinal plants [6,7]. With a view to understand the metabolic potential/pathways of herb "herb genome programme'' was initiated [8] and complete genome sequenced data achieved for some medicinal plants [9-11].

Genomic information, together with other omics data/knowledge accumulated in traditional medicine, therefore plays an important role in enhancing the success rate of drug discovery from herbal medicine. Moreover, to meet the escalating demand for medicinal plants, herbal agriculture or farming of these plants is essential- and the development of agro-technology related to herbal production has become an area of active research and farming medicinal plants for herb production has created and will create a number of jobs worldwide. Researchers are also looking into transgenic plants for supplying source materials for drug discovery from herbal medicine, e.g. in case of artemisinin [12].

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