

Immunopharmacological Studies of Medicinal Plants

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Introduction

Medicinal plant products are characterized by the presence of several bioactive (primary and secondary metabolites) constituents that are present. Phytochemical (qualitative and quantitative analysis) and immunopharmacological based studies may provide new compounds in the form of drugs for eliminating intracellular as well as extracellular infections. Several immunopharmacological based reports have shown the action of medicinal plant products and its constituents (i.e. primary and secondary metabolites) against various pathogens i.e. cancer, inflammation, diabetes etc.

Recently, infectious diseases are considered to be one of the major human health problem. Number of bacterial and viral agents are responsible for causing disease. Most of the medicinal plant products e.g. terpenes showed number of immunopharmacological activities and used for medical purposes e.g. anti-malarial drug artemisinin and anti-cancer drug paclitaxel. At the same time, number of terpenoids derivatives isolated from various medicinal plants and used as efficacious compounds in human disease therapy and prevention.

The capacity or ability of these medicinal plants particularly related to inhibition or stimulation of B and T cell immune response with respect to immune mediated disorders. According to Ayurveda, there are about millions of medicinal plants are present all over the world and most of them showed various medicinal properties. Till now, most of the medicinal plants have not investigated till yet and these plants should be used for various treatments of various diseases or disorders.

Extraction of Proteases from Medicinal Plants and determined its immunopharmacological applications

Development of vaccines against intracellular infectious diseases e.g. polio, mumps, smallpox etc. have been controlled but infections like HIV have been difficult to target because of variation in genotypes. As per literature, infectious diseases have widely been treated using various medicinal plants and about 25% of current medicines originated from medicinal plant products. Numerous medicinal plants are known for their magical medicinal properties and serve as an indispensable reservoir for drug discovery against infectious diseases. In this regard, separation of these active metabolites using HPTLC technique have enabled researchers

to find out the active compounds of medicinal plants as antiviral agents and to overcome the provocation of emerging infectious disease in human population. There is a wide range of medicinal plants which are being used to extract compounds from plant products that are being used for various immunopharmacological activities e.g. antimicrobial, antidiabetic, anti-inflammatory etc.

Recently, pharmaceuticals used proteases as drug or in the form of formulation for the treatment of various diseases. These are based largely on the production of small molecules identified through HPTLC or synthesized by microbes. It includes various hormones, antibiotics, analgesics etc. Previously, researchers mostly focused on plant proteins in the form of large or complex molecules and tried to use as therapeutic agents. The first protein i.e. Insulin was used to treat diabetes that is more common cardiovascular disease in all over the world and it was a major breakthrough in that era of biotechnology. Now a day, scientists focused on those proteases (crude enzyme of protein against specific protein antigen) extracted from medicinal plants and is responsible for breaking down the simple or complex protein that is responsible for causing intracellular infections.

Plant based adjuvants

The evaluation and development of plant based immunomodulators, as the alternative adjuvants for providing maximum and lasting protective immune responses with existing vaccines, is justified because of their being safer in comparison with synthetic variants. One such plant derived QS21 (*Quillaja saponaria*), 299A (*Picrorhiza kurroa*), BOS2000 (*Boswellia serrata*) which possess significant immunomodulatory/adjuvant activity and is being chemically tested. In view of credibility of plant-based adjuvants with numerous supporting and related bioactivities, it seems worthwhile that the directional approach may help grant potential protection to immune system in combination with vaccines. Strategy for the development of immune adjuvants of plant origin may thus open a new era of vaccination therapy. The ability of plant-based vaccine adjuvant to deliver sufficient antigen to induce protective immune responses is now well established for a wide range of antigens. A plant-based vaccine adjuvant may offer a range of advantages over traditional vaccine production and delivery systems. Today's development of novel vaccines stresses the need for plant-based adjuvants that are inexpensive, easily

administered and capable of being stored and transported without refrigeration. Without these characteristics, developing countries find it difficult to adopt vaccination as the central strategy for preventing their most devastating diseases. A promising approach is the production of vaccines containing plant-based adjuvant. In short, Plant based adjuvants are emerging as suitable candidates and increasing efforts are being made to discover potential suitable adjuvants.

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