

Definitions

Bioactive A substance that when extracted from a plant or biological sources, produces a physiological response after it enters the body of another species

Bioprospecting An intentional program of scientific research involving systematic collection of plant-derived matter followed by evaluation of its pharmacological properties using standardised tests

Screening Systematic use of standardised bioassay method to evaluate a large number of compounds or plants extract for a specific pharmacological action

Bioassay A scientific method that provides information on the concentrations or potency of a substances by assessing its effects individual enzymes living cells or animal tissues

Pharmacognosy the branch of scientific knowledge that is concerned with the study of plant-derived medicines

Examples of Factors effecting Bioprospecting

Cultural Legal issues arise when Drug companies try to get IP rights for drugs that have been used in a traditional fashion for native peoples.

Environmental Cinchona:
The high demand for the tree bark caused over harvesting. This led to the slow extinction of the natural forests in south america. after a shortage of quinine during ww2, a synthetic version was created

Toxicological

Artemisinins

The Drug discovered by Youyou Tu was named Artemisinin. It contains an endoperoxide Bridge (C-O-O-C), this is similar to hydrogen peroxide. this gives it anti-parasitic properties. the drug is extracted from a strain of Artemisia. The drug is highly effective, but is more effective when partnered with other remedies.

Steps of Discovery Progress

Plant Selection

Extraction Preparation

Bioassay Screening

Compound Identification

Animal Testing

Human Testing

Regulatory Approval

Marketing

Types of Secondary Metabolics

Pest Deterrents Plants produce these chemicals to ward away predators. They leave a fowl taste, and may negatively impact, or kill the predator

Growth Regulator These chemicals regulate the growth of leaves, roots, cells etc. this allows plants to respond quickly to environmental change

Natural Sunblock Many plants produce a chemical which can absorb high levels of UV radiation

Cellular Communication Plant cells can emit chemicals to communicate with neighbouring cells. this can tell the cell to: grow, freeze, die etc

A secondary metabolic is a chemical produced by a plant which is not directly linked to the primary functions of the plant.

What is Malaria

Malaria is caused when an anopheline mosquito injects Plasmodium sporozoites into a victim. The bacteria travels through the bloodstream to the liver. In the liver the parasite multiplies for 7-10 days. when the infected liver ruptures it releases the parasite into the blood stream. they feed on important cell components. the bacteria is also called mrozoites.



Plant Medicines - Origins

Morphine (1804) From: Dried Poppy Resin
By: Friedrich W. Sertürner
Use: Moderate-Severe pain

Quinine (1820) From: Cinchona Bark
By: Pelletier+Caventou
Use: Malarial fevers

Colchicine (1820) From: Autumn Crocus
By: Pelletier+Caventou
Use: Gout

Caffeine (1821) From: Various Sources
Friedrich F. Runge
Use: Drowsiness

Atropine (1831) From: Bellaonna
By: Mein
Use: Dilation of the pupil

Salicylic Acid (1838) From: Weeping Willow
By: Rafaele Piria, Felix Hoffman
Use: Aspirin

Cocaine (1860) From: Coca Leaves
By: Albert Neimann
Use: N/A (too addictive)

Plant Medicines - Origins (cont)

Ephedrine (1887) From: Ma Huang
By: Nagai Nagayoshi
Use: Asthma

L-DOPA (1914) From: Broad Bean
By: Marcus Guggenheim
Use: Parkinson's

Cardiac Glycosides (1930) From: Foxglove
By: Sydney Smith
Use: Congestive Heart Failure

Warfarin (1948) From: Mouldy Sweet Clover
By: Karl Link
Use: Anticoagulant

Paclitaxel (1967) From: Pacific Yew
By: US Cancer Institute
Use: Anticancer

Youyou Tu

Youyou Tu led a group of researchers during Project 523. they isolated constituents from over 2000 herbal remedies and tested in on mice. they found that an extract from the qianghao plant proved effective. However, they struggled to replicate the tests. however, they found an ancient text which recommended that qinghao must be steeped in room temperature, and not hot water, to cure fevers. Youyou Tu developed a cold extraction method using water, alcohol and ethyl.

