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**Medical Aspects of Plants**

Medicinal plants, additionally called medicinal herbs, have been located and used in traditional medicinal drug practices for the reason that prehistoric times. Plants synthesise hundreds of chemicals for features such as defence against bugs, fungi, sicknesses, and herbivorous mammals. Numerous phytochemicals with ability or mounted biological activity had been diagnosed. However, in view that a unmarried plant consists of extensively diverse phytochemicals, the effects of using an entire plant as medicinal drug are uncertain. Further, the phytochemical content material and pharmacological actions, if any, of many vegetation having medicinal potential remain unassessed by rigorous clinical studies to outline efficacy and protection. In the USA over the length 1999 to 2012, despite numerous hundred programs for brand new drug repute, simplest two botanical drug candidates had enough evidence of medicinal price to be permitted through the Food and Drug Administration.

- The earliest historic facts of herbs are found from the Sumerian civilisation, in which loads of medicinal vegetation which includes opium are indexed on clay drugs. The Ebers Papyrus from historical Egypt describes over 850 plant medicines, even as Dioscorides documented over one thousand recipes for medicines using over 600 medicinal flowers in De materia medica, forming the idea of pharmacopoeias for a few 1500 years.
- Drug studies makes use of ethnobotany to look for pharmacologically lively substances in nature, and has in this way discovered hundreds of useful compounds. These encompass the commonplace capsules aspirin, digoxin, quinine, and opium. The compounds found in flora are of many types, but most are in four essential biochemical classes: alkaloids, glycosides, polyphenols, and terpenes.

**Prehistoric Time**

- Plants, along with many now used as culinary herbs and spices, were used as drugs, no longer always correctly, from prehistoric instances. Spices were used partly to counter food spoilage micro organism, particularly in warm climates, and mainly in meat dishes which smash extra easily.
- Angiosperms (flowering vegetation) had been the original supply of maximum plant medicines. Human settlements are frequently surrounded with the aid of weeds used as herbal drug treatments, inclusive of nettle, dandelion and chickweed. Humans have been no longer by myself in using herbs as drug treatments: some animals including non-human primates, monarch butterflies and sheep ingest medicinal flowers whilst they're unwell. Plant samples from prehistoric burial websites are some of the strains of proof that Paleolithic peoples had expertise of herbal medicine.
- For example, a 60000-year-vintage Neanderthal burial web site, "Shanidar IV", in northern Iraq has yielded massive amounts of pollen from 8 plant species, 7 of which can be used now as herbal remedies. A mushroom turned into found inside the personal

consequences of Otzi the Iceman, whose body changed into frozen within the Otztal Alps for extra than five,000 years. The mushroom changed into possibly used against whipworm.

### **Ancient Times**

- In historic Sumeria, masses of medicinal vegetation such as myrrh and opium are indexed on clay tablets. The ancient Egyptian Ebers Papyrus lists over 800 plant drug treatments including aloe, hashish, castor bean, garlic, juniper, and mandrake.
- From historic instances to the existing, Ayurvedic medicinal drug as documented inside the Atharva Veda, the Rig Veda and the Sushruta Samhita has used hundreds of pharmacologically active herbs and spices which include turmeric, which incorporates curcumin. The Chinese pharmacopoeia, the Shennong Ben Cao Jing information plant medicines which include chaulmoogra for leprosy, ephedra, and hemp.
- This became improved in the Tang Dynasty Yaoxing Lun. In the fourth century BC, Aristotle's pupil Theophrastus wrote the primary systematic botany textual content, Historia plantarum. In the primary century AD, the Greek health practitioner Pedanius Dioscorides documented over 1000 recipes for drug treatments the usage of over six hundred medicinal flowers in De materia medica; it remained the authoritative reference on herbalism for over 1500 years, into the 17th century.

### **Middle Ages**

- In the Early Middle Ages, Benedictine monasteries preserved scientific information in Europe, translating and copying classical texts and keeping herb gardens.
- Hildegard of Bingen wrote Causae et Curae ("Causes and Cures") on medicinal drug. In the Islamic Golden Age, scholars translated many classical Greek texts including Dioscorides into Arabic, including their very own commentaries.
- Herbalism flourished within the Islamic world, specially in Baghdad and in Al-Andalus. Among many works on medicinal plants, Abulcasis (936–1013) of Cordoba wrote The Book of Simples, and Ibn al-Baitar (1197–1248) recorded loads of medicinal herbs which includes Aconitum, nux vomica, and tamarind in his Corpus of Simples.
- Avicenna covered many plants in his 1025 The Canon of Medicine. Abu-Rayhan Biruni, Ibn Zuhr, Peter of Spain, and John of St Amand wrote in addition pharmacopoeias.

### **Early Modern**

- The Early Modern duration noticed the flourishing of illustrated herbals across Europe, starting with the 1526 Grete Herball.
- John Gerard wrote his well-known The Herball or General History of Plants in 1597, based on Rembert Dodoens, and Nicholas Culpeper posted his The English Physician

Enlarged. Many new plant medicines arrived in Europe as merchandise of Early Modern exploration and the ensuing Columbian Exchange, in which farm animals, crops and technologies were transferred among the Old World and the Americas in the 15th and 16th centuries.

- Medicinal herbs arriving in the Americas protected garlic, ginger, and turmeric; espresso, tobacco and coca travelled inside the other direction. In Mexico, the 16th century Badianus Manuscript described medicinal vegetation to be had in Central America.

### **Phytochemical Basis**

- All plants produce chemical compounds which give them an evolutionary advantage, such as defending against herbivores or, in the example of salicylic acid, as a hormone in plant defenses.
- These phytochemicals have potential for use as drugs, and the content and known pharmacological activity of these substances in medicinal plants is the scientific basis for their use in modern medicine, if scientifically confirmed.
- For instance, daffodils (Narcissus) contain nine groups of alkaloids including galantamine, licensed for use against Alzheimer's disease. The alkaloids are bitter-tasting and toxic, and concentrated in the parts of the plant such as the stem most likely to be eaten by herbivores; they may also protect against parasites.
- Modern knowledge of medicinal plants is being systematised in the Medicinal Plant Transcriptomics Database, which by 2011 provided a sequence reference for the transcriptome of some thirty species. The major classes of pharmacologically active phytochemicals are described below, with examples of medicinal plants that contain them.

### **Alkaloids**

Alkaloids are sour-tasting chemical substances, very full-size in nature, and frequently toxic, determined in many medicinal plants. There are several classes with exceptional modes of action as drugs, each recreational and pharmaceutical.

Medicines of different lessons include,

- Atropine
- Scopolamine
- hyoscyamine (all from nightshade)

The conventional medicinal drug berberine,

- caffeine (Coffea)

- cocaine (Coca)
- ephedrine (Ephedra)
- morphine (opium poppy)
- nicotine (tobacco)
- reserpine (Rauwolfia serpentina)
- quinidine and quinine (Cinchona)
- vincamine (Vinca minor)
- vincristine (Catharanthus roseus).

### **Glycosides**

Antraquinone glycosides are determined in medicinal flora which includes,

- Rhubarb
- Cascara
- Alexandrian senna.

Plant-primarily based laxatives crafted from such flowers consist of,

- Senna
- rhubarb
- Aloe.

The cardiac glycosides are powerful pills from medicinal plants together with foxglove and lily of the valley. They encompass digoxin and digitoxin which help the beating of the coronary heart, and act as diuretics.

### **Polyphenols**

- Polyphenols of several classes are good sized in plant life, having various roles in defenses against plant diseases and predators. They include hormone-mimicking phytoestrogens and astringent tannins. Plants containing phytoestrogens have been administered for centuries for gynecological problems, consisting of fertility, menstrual, and menopausal issues. Among those flora are Pueraria mirifica, kudzu, angelica, fennel, and anise.
- Many polyphenolic extracts, inclusive of from grape seeds, olives or maritime pine bark, are offered as dietary dietary supplements and cosmetics with out evidence or prison health claims for useful health effects.
- In Ayurveda, the astringent rind of the pomegranate, containing polyphenols referred to as punicalagins, is used as a medicinal drug.

**Terpenes**

- Terpenes and terpenoids of many types are discovered in a selection of medicinal vegetation, and in resinous vegetation consisting of the conifers. They are strongly aromatic and serve to repel herbivores. Their scent makes them beneficial in crucial oils, whether or not for perfumes together with rose and lavender, or for aromatherapy.
- Some have medicinal uses: as an example, thymol is an antiseptic and was once used as a vermifuge (anti-bug remedy).

**Drug Discovery**

- The pharmaceutical industry has roots within the apothecary stores of Europe within the 1800s, wherein pharmacists provided local traditional drugs to customers, which included extracts like morphine, quinine, and strychnine.
- Therapeutically crucial pills like camptothecin (from *Camptotheca acuminata*, used in conventional Chinese medicinal drug) and taxol (from the Pacific yew, *Taxus brevifolia*) have been derived from medicinal plant life.
- The Vinca alkaloids vincristine and vinblastine, used as anti-most cancers drugs, were discovered in the Fifties from the Madagascar periwinkle, *Catharanthus roseus*.

Hundreds of compounds had been identified using ethnobotany, investigating flowers utilized by indigenous peoples for possible medical programs.

Some crucial phytochemicals, which include,

- Curcumin
- epigallocatechin gallate
- genistein

resveratrol are pan-assay interference compounds, that means that in vitro research of their hobby often provide unreliable data. As a result, phytochemicals have often established incorrect as lead compounds in drug discovery.

The pharmaceutical enterprise has remained interested in mining traditional makes use of of medicinal plants in its drug discovery efforts. Of the 1073 small-molecule capsules accredited in the length 1981 to 2010, over 1/2 were either at once derived from or stimulated with the aid of natural substances.

**Safety**

- Plant drug treatments can cause detrimental outcomes and even death, whether or not through aspect-outcomes of their lively substances, via adulteration or infection, through overdose, or through inappropriate prescription.
- Many such results are acknowledged, whilst others remain to be explored scientifically. There is no cause to presume that because a product comes from nature it must be secure: the life of powerful herbal poisons like atropine and nicotine shows this to be untrue.
- Further, the excessive standards carried out to conventional medicines do now not usually follow to plant medicines, and dose can range widely depending at the growth situations of plants: older flowers can be much greater toxic than younger ones, for instance.

Pharmacologically lively plant extracts can have interaction with conventional tablets, both due to the fact they will provide an accelerated dose of similar compounds, and due to the fact a few phytochemicals interfere with the body's structures that metabolise drugs in the liver including the cytochrome P450 machine, making the drugs ultimate longer in the body and have a greater effective cumulative effect. Plant medicines may be risky in the course of being pregnant. Since flora may additionally incorporate many distinct substances, plant extracts may additionally have complicated outcomes at the human frame.