

Ethnobotany. Lecture 30

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Outline

Pharmacognosy

- Plant remedies for gastrointestinal and biliary systems

- Plant remedies for cardiovascular system

- Plant remedies for respiratory system



Pharmacognosy

Plant remedies for gastrointestinal and biliary systems



Nausea and vomiting

- ▶ Often components of “motion sickness”
- ▶ Spasmolytic constituents are often used

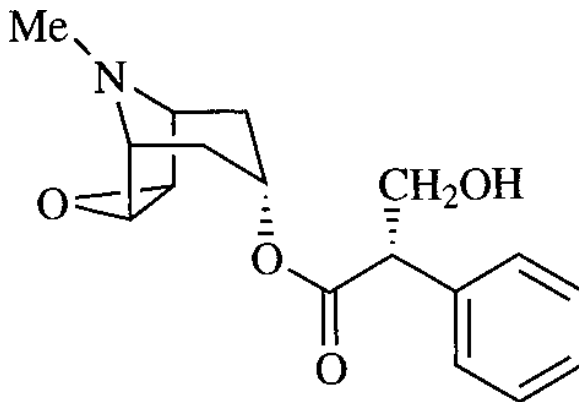


Hyoscine from Solanaceae plants

- ▶ Occur in *Scopolia*, *Hyoscyamus* and *Datura*
- ▶ Tropane alkaloid, poisonous



Hyoscine



Ginger, *Zingiber officinale*

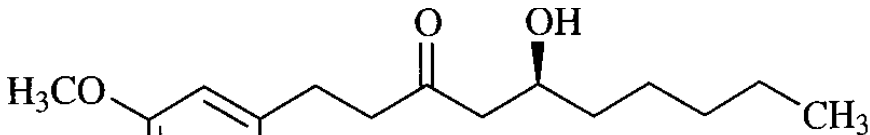
- ▶ *Zingiberis rhizoma*
- ▶ Multiple effect plant, essential oils gingerol and shogaol are responsible for pain relief, anti-sickness and other activities
- ▶ Extremely valuable in Eastern medicines



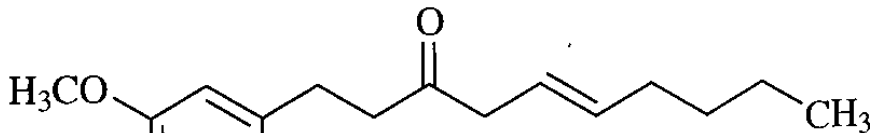
Ginger, *Zingiber officinale*



Gingerol and shoagol



6-Gingerol



6-Shogaol



Bloating and carminatives

- ▶ Bloating may be a result of bacterial activity (especially on arabinose)
- ▶ Carminatives provide both pleasant taste and anti-gas effect (precise mechanism is still unclear)



Mints, *Mentha* spp.

- ▶ *Menthae folium*
- ▶ Essential oil menthol and similar compounds



Umbelliferous fruits

- ▶ Carvi fructus from caraway (*Carum carvi*)
- ▶ Foeniculi fructus from fennel (*Foeniculum vulgare*)
- ▶ Contain essential oils like carvone, anethole and others



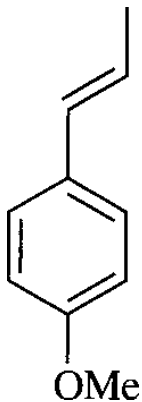
Caraway, *Carum carvi*



Section of mericarp



Anethone



Pharmacognosy

Plant remedies for cardiovascular system



Heart problems (arrhythmic conditions, failure etc.)

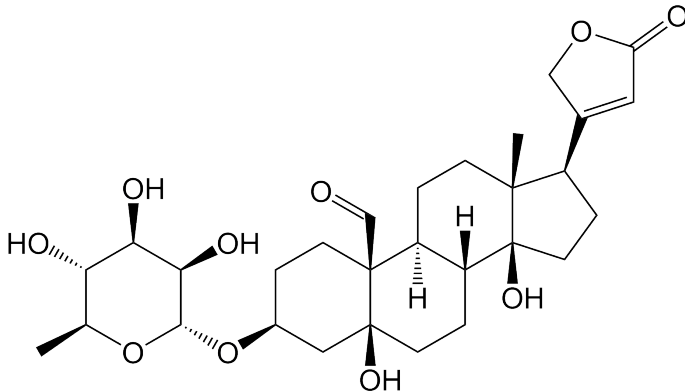
- ▶ Plants with cardiac glycosides
- ▶ In addition, lily of valley (*Convallaria majalis* with convallatoxin) and motherwort (*Leonurus cardiaca* with specific essential oils)



Lily of valley, *Convallaria majalis*



Convallatoxin



Common motherwort, *Leonurus cardiaca*



Foxglove, *Digitalis purpurea*, Plantaginaceae, Europe

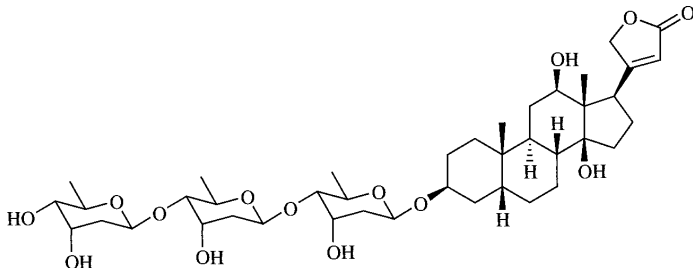
- ▶ *Digitalis purpureae folium*
- ▶ Contain digoxin and other cardiac glycosides
- ▶ Increase the heart muscle contractility and reduces conductivity inside a atrioventricular node



Foxglove



Digoxin



Hawthorn, *Crataegus* spp., Rosaceae, North hemisphere

- ▶ *Crataegi folium/flores*
- ▶ The mixture of cyanide glycosides and flavonoids
- ▶ Blocks repolarizing potassium current in ventricular muscle and prolongs its activity



Venous insufficiency problems

- ▶ Hemorrhoids, varicose veins
- ▶ Antioxidants are normally used as remedies



Bilberry, *Vaccinium myrtillis*, Ericaceae, Eurasia

- ▶ *Myrtilli fructus*
- ▶ Anthocyanosides have vascular spasmolytic effects



Bilberry



Butcher's broom, *Ruscus aculeatus*, Asparagaceae, Eurasia

- ▶ *Rusci rhizoma*
- ▶ Saponin glycosides, including ruscine have been shown to produce positive effects to lipid profiles



Ruscus



Horse chestnut, *Aesculus* spp., Sapindaceae, North hemisphere

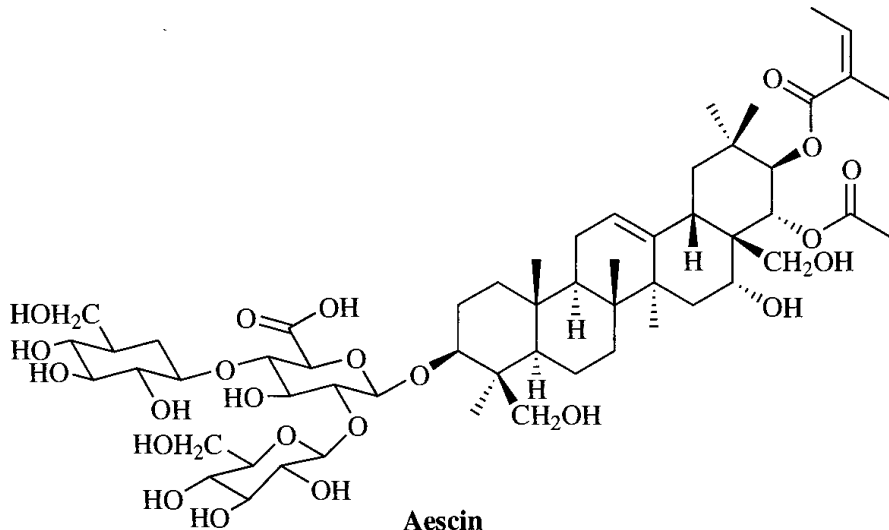
- ▶ Seeds contain mixture of saponin flavonoids, e.g., aescin
- ▶ Have multiple membrane-related effects: anti-edema, thrombolytic etc.



Horse chestnut



Aescin



Atherosclerosis

- ▶ Drugs should decrease platelet formation and risks of thrombosis and atherosclerosis
- ▶ Aspirin (modified salicylic acid from willows, *Salix* is the main drug)



Garlic, *Allium sativum*, Alliaceae, Eurasia

- ▶ *Allii sativi bulbi*
- ▶ Sulphuric compounds like allicin and ajoene inhibit synthesis of LDL (low density lipoprotein)



Pharmacognosy

Plant remedies for respiratory system



Bronchitis and nasal congestion

- ▶ Overproduction of mucus, the effect similar to edema
- ▶ Synthetic analogs of adrenalin (oxymetazolin etc.) are normally used



Ephedra, ma huang, *Ephedra* spp., Ephedraceae, worldwide

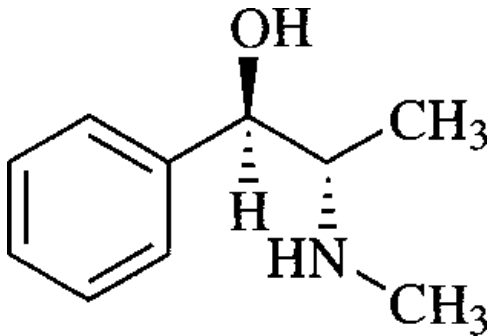
- ▶ Old component of TCM
- ▶ Ephedrine alkaloid has multiple effects (stimulation of CNS, decongestion etc.)
- ▶ Theophylline from tea and cocoa may be used for the same purposes



Ephedra



Ephedrine



Asthmatic conditions

- ▶ Inhalations have a positive, broncholytic effect
- ▶ Essential oils and camphor are common component of inhalations



Eucalyptus, *Eucalyptus* spp., Myrtaceae, Australia

- ▶ *Eucalypti aetheroleum*
- ▶ 1,8-cineole is a major component
- ▶ Has multiple effects like antiseptic and antispasmodic



Eucalyptus



Allergy

- ▶ Mostly due to the activation of histamin receptors
- ▶ Synthetic drugs (like cetirizine etc.) have multiple side effects



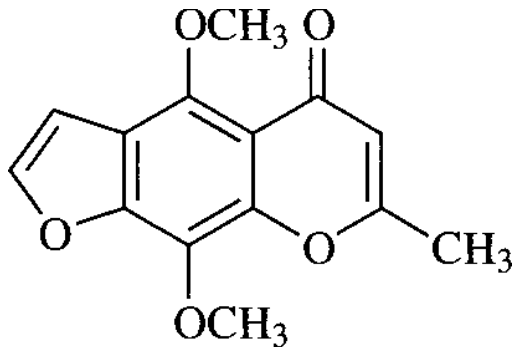
Khella, *Ammi visnaga*, Umbelliferae, Mediterranean

- ▶ Active compounds are coumarins like khellin
- ▶ Have vasodilating effects, blocks calcium membrane channels



Khella





Khellin



Butterbur, *Petasites hybridus*, Compositae, Eurasia

- ▶ Sesquiterpene lactones (eremophinolides like petasin)
- ▶ Traditionally used as anti-asthmatic and against migraine, but has strong anti-histamin effect



Butterbur



Mucolytics

- ▶ Have a softening effect for cough
- ▶ Reduce viscosity of mucus



Sage, *Salvia officinalis*, Labiatae, Eurasia

- ▶ *Salviae folium*
- ▶ Contains essential oil thujone
- ▶ In addition, has a memory-stimulating and antimicrobial effects



Senega, *Polygala senega*, Polygalaceae, North America

- ▶ *Polygalae radix*
- ▶ Triterpenoid saponins: senegin
- ▶ Mucolytic and antiseptic effects



Senega



Summary

- ▶ Most of plant remedies for gastrointestinal system are symptomatic; chemically, most of them are terpenes or glycosides
- ▶ Heart and vessel system problems are often threatening with glycosides
- ▶ Respiratory system remedies are essential oils and alkaloids



For Further Reading



A. Shipunov.

Ethnobotany [Electronic resource].

2011—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_310



Heinrich et al. 2012.

Fundamentals of Pharmacognosy and Phytotherapy.

Churchill Livingstone, Edinburgh.

