

Ethnobotany. Lecture 35

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Outline

Pharmacognosy

- Plants curing hormone imbalance

- Plants curing sexual disorders: aphrodisiacs

- Plant remedies for endocrine and urinary diseases (the rest)



Pharmacognosy

Plants curing hormone imbalance

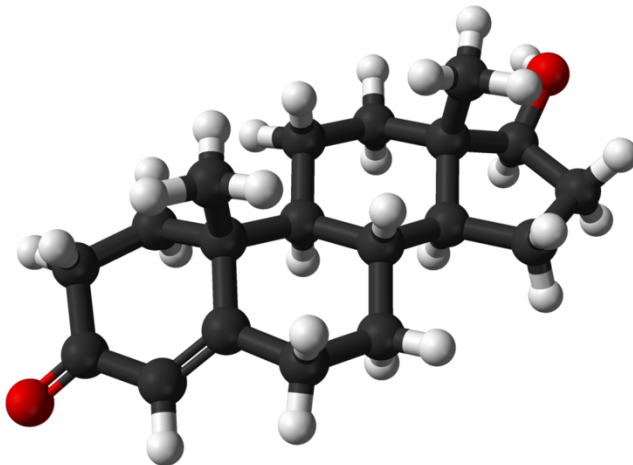


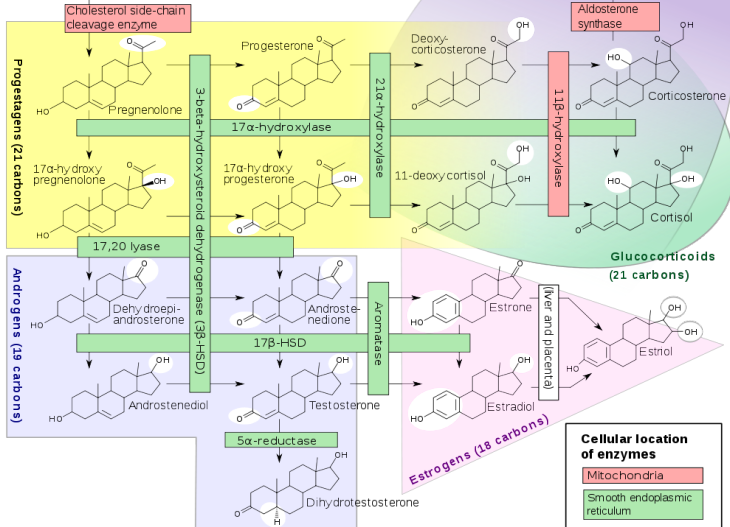
Testosterone

- ▶ In prenatal development, induces gender identity
- ▶ Generally, promotes growth of muscle system through facilitation the synthesis of proteins
- ▶ Growth of muscle system stimulates growth of bones
- ▶ Has androgenic effects: secondary sex characteristics, sperm development
- ▶ Regulates fight-or-flight response, aggressive behavior and overall level of muscle energy
- ▶ Present in both males and females in 10:1 proportion



Testosteron



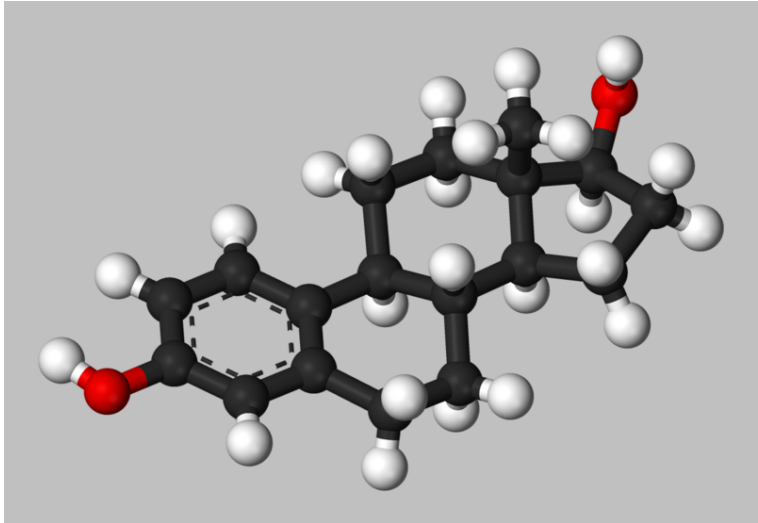


Estrogens

- ▶ Group of hormones, most important are estrone (E1) and estradiol (E2)
- ▶ Regulate female menstrual cycle
- ▶ Activate metabolism, reduce muscle mass, increase the level of fat storage, fasten cholesterol metabolism, promote female secondary sexual characteristics
- ▶ Rapid changes of estrogen levels reflects on mental health
- ▶ Promote development of some breast cancers
- ▶ Present in both males and females



Estradiol



Phytoestrogens

- ▶ Plant analogs of steroids, “diet estrogens”
- ▶ Have both estrogen and anti-estrogen effects
- ▶ Soybeans contain significant amounts of phytoestrogens

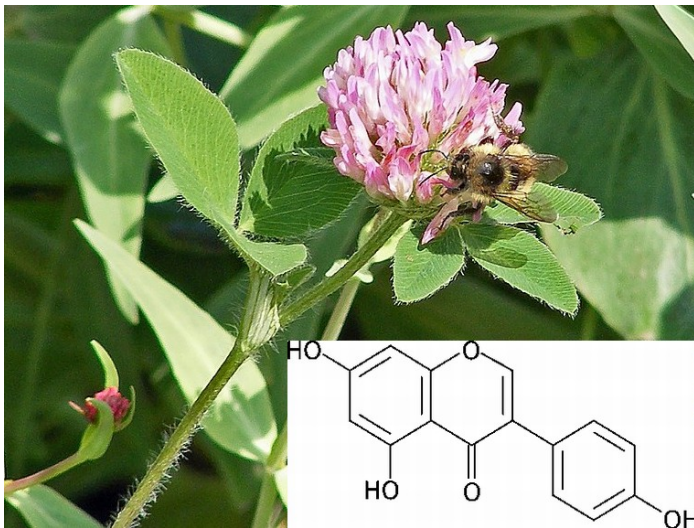


Red clover, *Trifolium pratense*

- ▶ First spotted because of effect on grazing sheep fertility
- ▶ Plant belongs to legume family, Leguminosae
- ▶ Red, 2–3 cm diameter flower heads
- ▶ European plant, used as a forage and naturalized in North America



Red clover and genistein



Red clover clinical effects

- ▶ Genistein and coumestrol are two main components
- ▶ Traditionally used for treating skin diseases
- ▶ Now often used for a natural hormone therapy, decreases risks of some cancers



Black conosh, *Cicimifuga racemosa*

- ▶ Belongs to butterwort family, Ranunculaceae
- ▶ The other name is “squawroot” because of traditional use for female therapy
- ▶ Traditionally, also used for curing snake bites (“black snakeroot”)



Black cohosh clinical effects

- ▶ Glycosides cimicifugosides (e.g., actein) are main active components
- ▶ Improve menopausal symptoms, also affects menstrual cycle
- ▶ Lowering blood pressure



Black cohosh and actein



Saw palmetto, *Serenoa serrulata*

- ▶ Belongs to palm family, Palmae
- ▶ Important component of Florida forests
- ▶ Fruits are small black berries



Florida pine flatwood: saw palmetto and slash pine (*Pinus elliotii*)

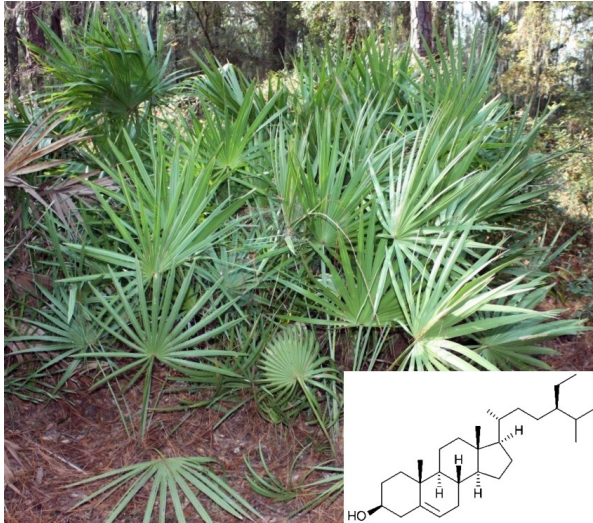


Clinical effects of saw palmetto

- ▶ Contains multiple phytosterols (e.g., β -sitosterol) with estrogen effects
- ▶ Used mostly for treating prostate diseases in males



Saw palmetto and β -sitosterol



Pharmacognosy

Plants curing sexual disorders: aphrodisiacs

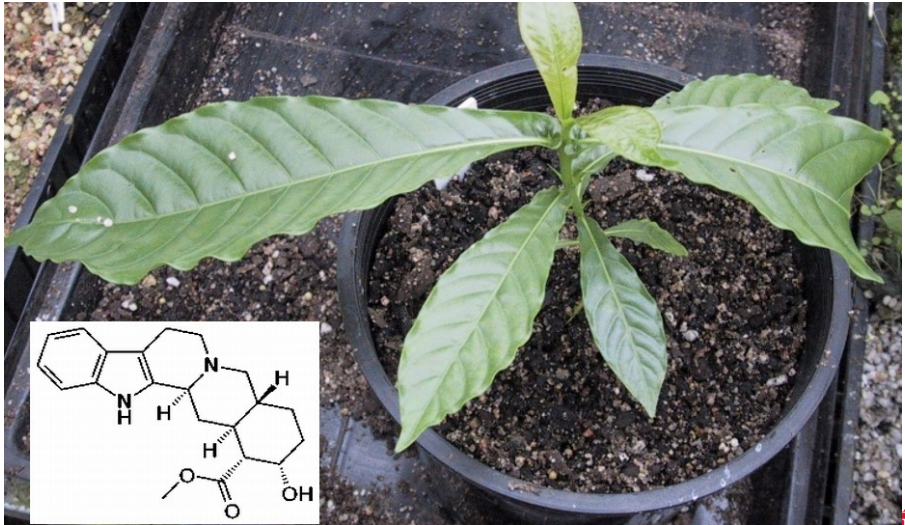


African Yohimbe, *Pausinystalia yohimbe*

- ▶ Belongs to Rubiaceae family (which is rich of medicinal plants)
- ▶ Tall West African tree
- ▶ Bark is most rich of pharmaceutical components



Yohimbe and yohimbine

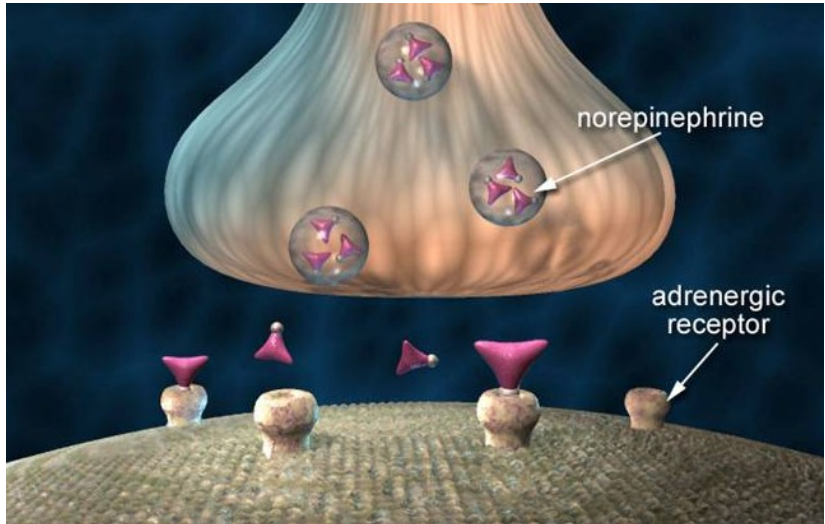


Yohimbe pharmacological effects

- ▶ Contains multiple alkaloids, including yohimbine
- ▶ Alkaloid is α -adrenergic blocker, widely used as sexual stimulant



Adrenergic receptor



Mediterranean garden rocket, *Eruca sativa*

- ▶ Herbaceous plant from cabbage family, Cruciferae
- ▶ Used as leaf vegetable and as a sexual stimulant from Roman times
- ▶ Source of digestive alcohol, *rucolino*



Garden rocket and “Rucolino”



Indian gokharu, *Tribulus terrestris*

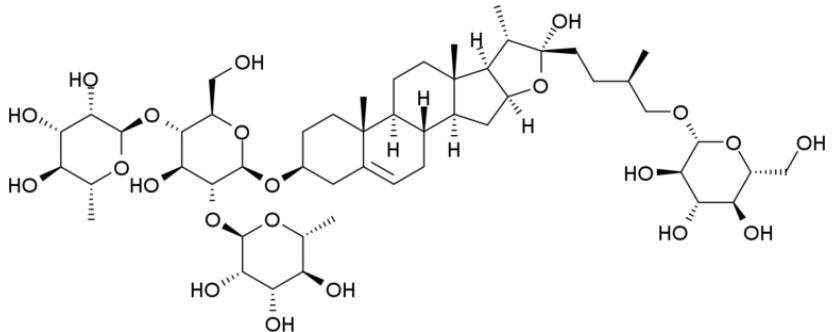
- ▶ Eurasian herbaceous creeping plant from Zygophyllaceae family, naturalized in U.S.
- ▶ Fruits have extremely large spines dangerous even to bicycles
- ▶ Important traditional part of Indian Ayurveda and Unani medicinal traditions
- ▶ Main component is steroidal protodioscin, increases the level of testosterone



Gokharu



Protodioscin



South Asian tonghat, *Auricoma longifolia*

- ▶ Small Indonesian tree from Simaroubaceae family
- ▶ Main active components are extremely bitter (50 times more than quinine) quassinoids (e.g., eurycomalactone) from tree roots
- ▶ It is shown that root extract increase sperm count, testosterone level, and even anti-cancer
- ▶ Now widely used as anabolic for bodybuilders



Tonghat and eurymalactone



Central American damiana, *Turnera diffusa*

- ▶ Shrub from Turneraceae family, native to southern U.S. and Mexico
- ▶ Native Americans prepared “damiana tea” as sexual stimulator
- ▶ It is shown that constituents may take part in estrogen metabolism



Damiana



Southern American walking palm, *Socratea exorrhiza*

- ▶ Small palm from Amazonian forests
- ▶ Widely known as “walking plant” because it constantly develops new stilt roots whereas older are decaying
- ▶ Inner parts of stilt roots are used as aphrodisiac



Walking palm



Pharmacognosy

Plant remedies for endocrine and urinary diseases (the rest)



Antidiabetics

- ▶ Used for treatment in case of type 2 diabetes (non-insulin-dependent)
- ▶ Lower concentration of glucose in blood (hypoglycaemic effects)



Bitter melon, *Momordica charantia*, Cucurbitaceae, South Asia

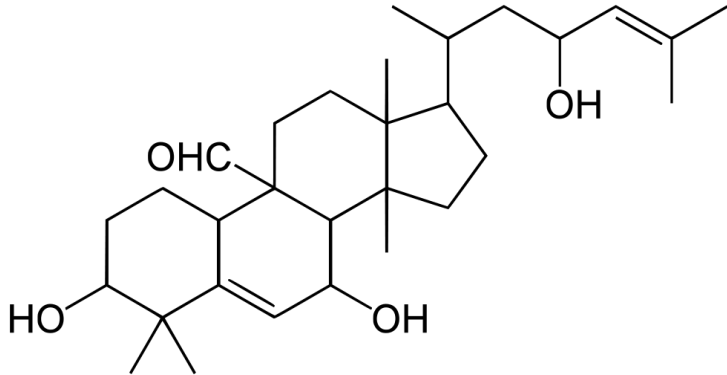
- ▶ Leaves and fruits contain triterpene glycosides momordicosides
- ▶ Have hypoglycaemic effects



Bitter melon



Momordicin



Guar, *Cyamopsis tetragonolobus*, Leguminosae, Africa

- ▶ *Cyamopsidis seminis*
- ▶ Seeds are normally used, they contain galactose and mannose polymers which reduce absorption of glucose



Guar



Gymnema, *Gymnema sylvestris*, Apocynaceae, India

- ▶ (Covered previously)
- ▶ Large vine, leaves chewing results in temporary disappearance of sweet taste



Raspberry, *Rubus idaeus*, Rosaceae, North Hemisphere

- ▶ Tea from raspberry leaves was traditionally used to facilitate child birth
- ▶ Active components are most probably polypeptides and flavonoids



Raspberry leaves



Summary

- ▶ Plant quinones and essential oils tend to be antimicrobial



For Further Reading



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Mode of access:

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



Heinrich et al. 2012.

Fundamentals of Pharmacognosy and Phytotherapy.

Churchill Livingstone, Edinburgh.

