

# Ethnobotany. Lecture 14

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# Outline

- 1 Plants and human sex
  - Plants curing hormone imbalance
  - Plants curing sexual disorders: aphrodisiacs



# Plants and human sex

## Plants curing hormone imbalance

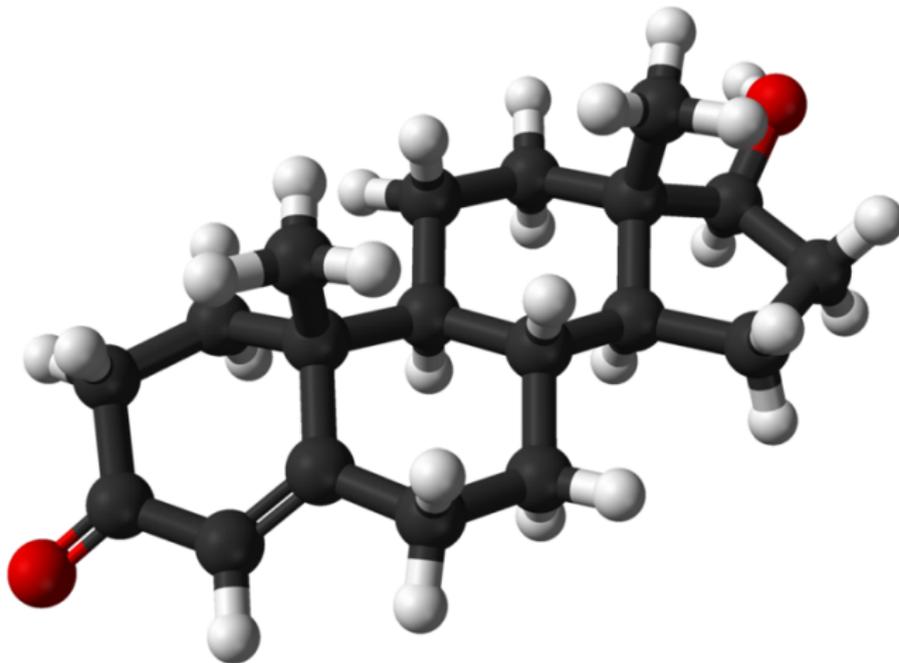


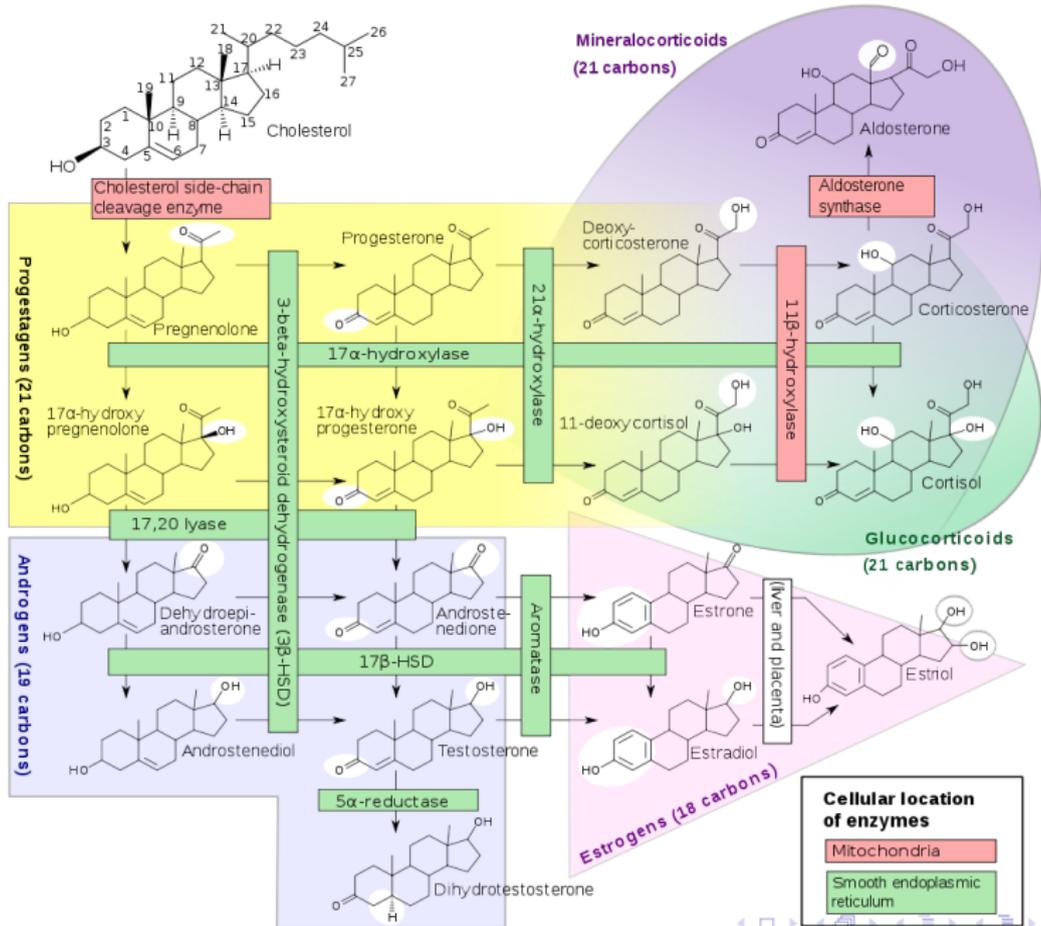
# Testosterone

- 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



# Testosterone



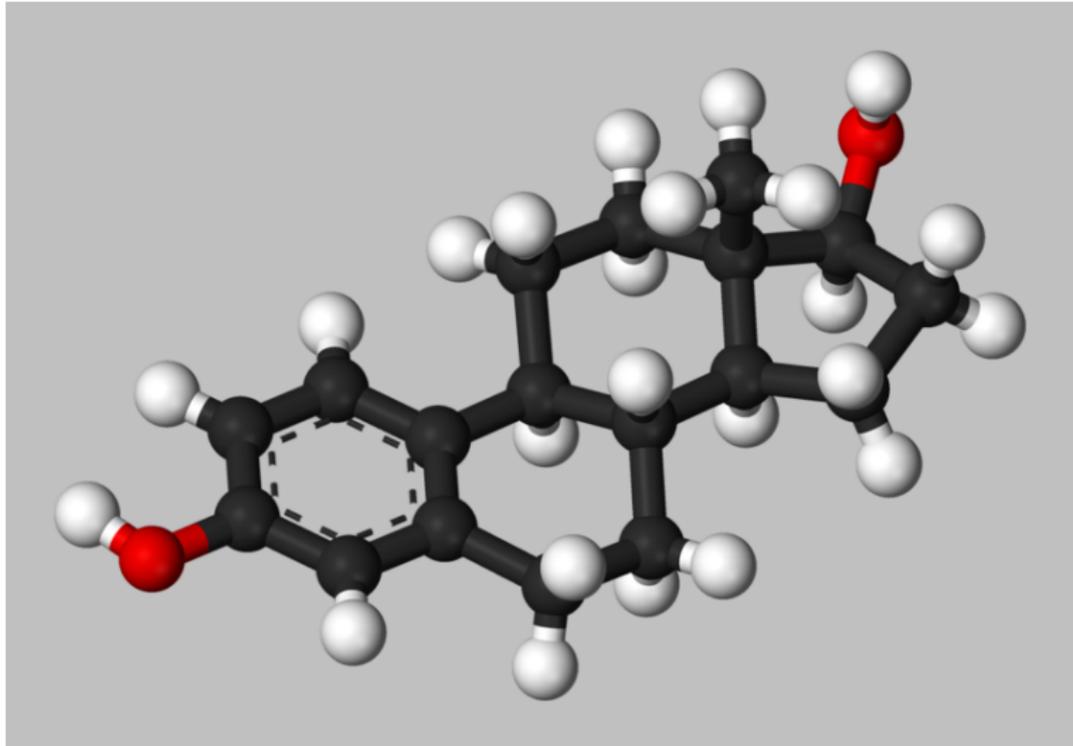


# Estrogens

- 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

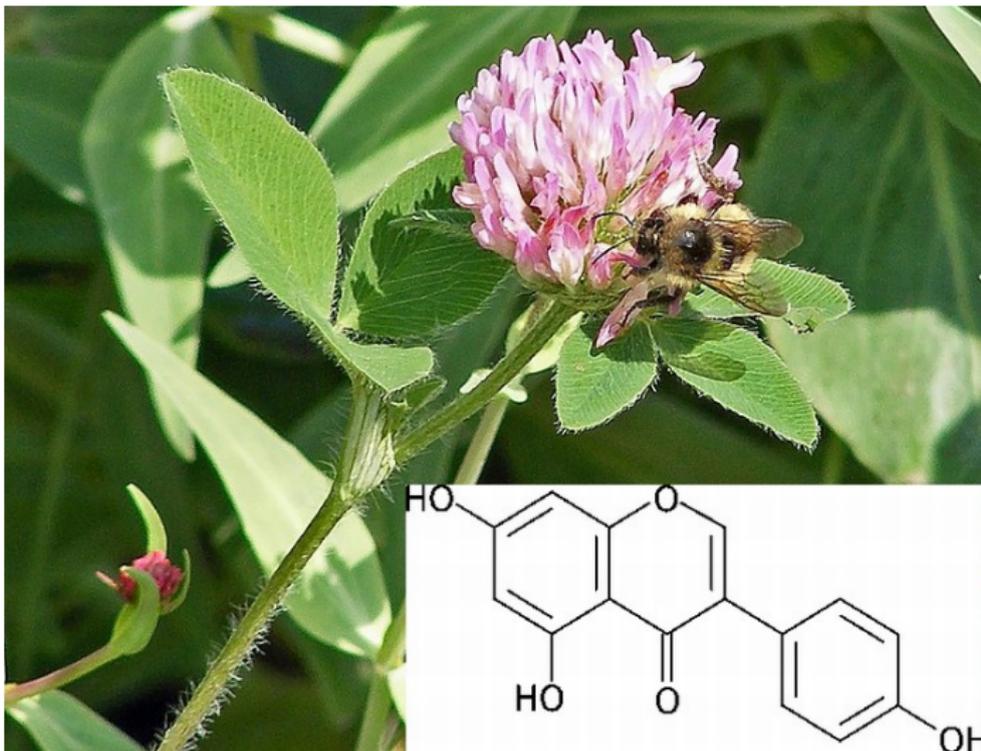


# Red clover, *Trifolium pratense*

- 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*)

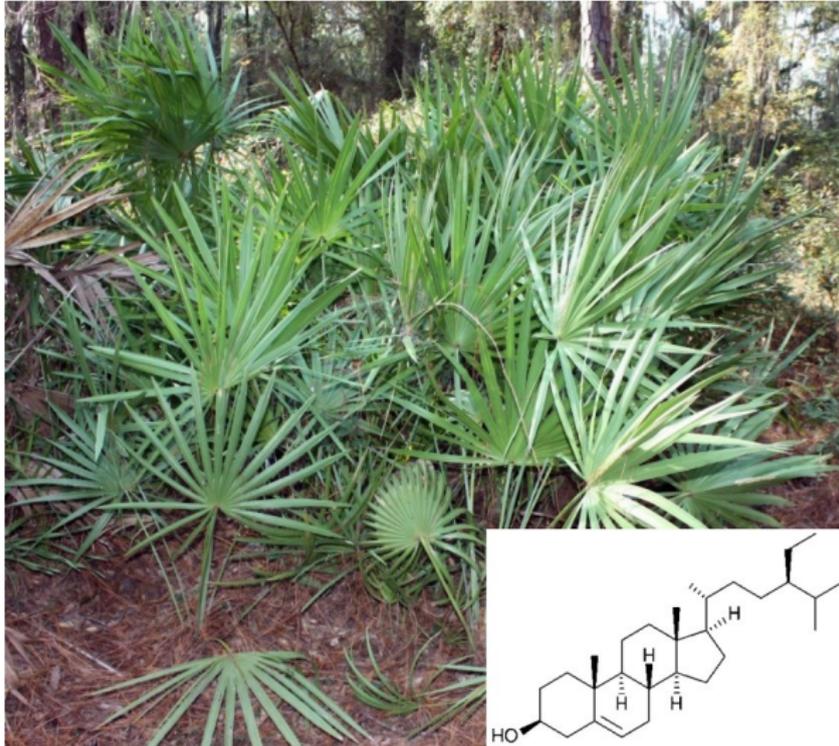


# Clinical effects of saw palmetto

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



# Saw palmetto and $\beta$ -sitosterol



# Plants and human sex

## Plants curing sexual disorders: aphrodisiacs

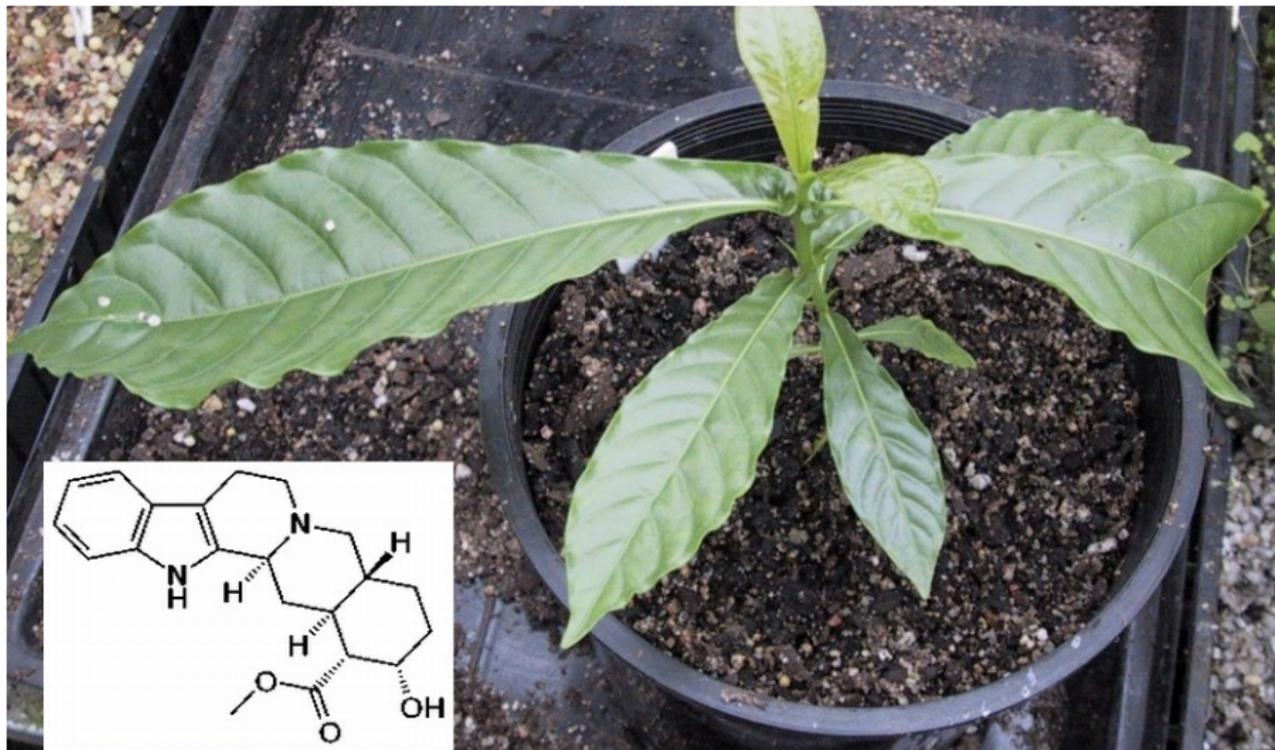


# African Yohimbe, *Pausinystalia yohimbe*

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



# Yohimbe and yohimbine

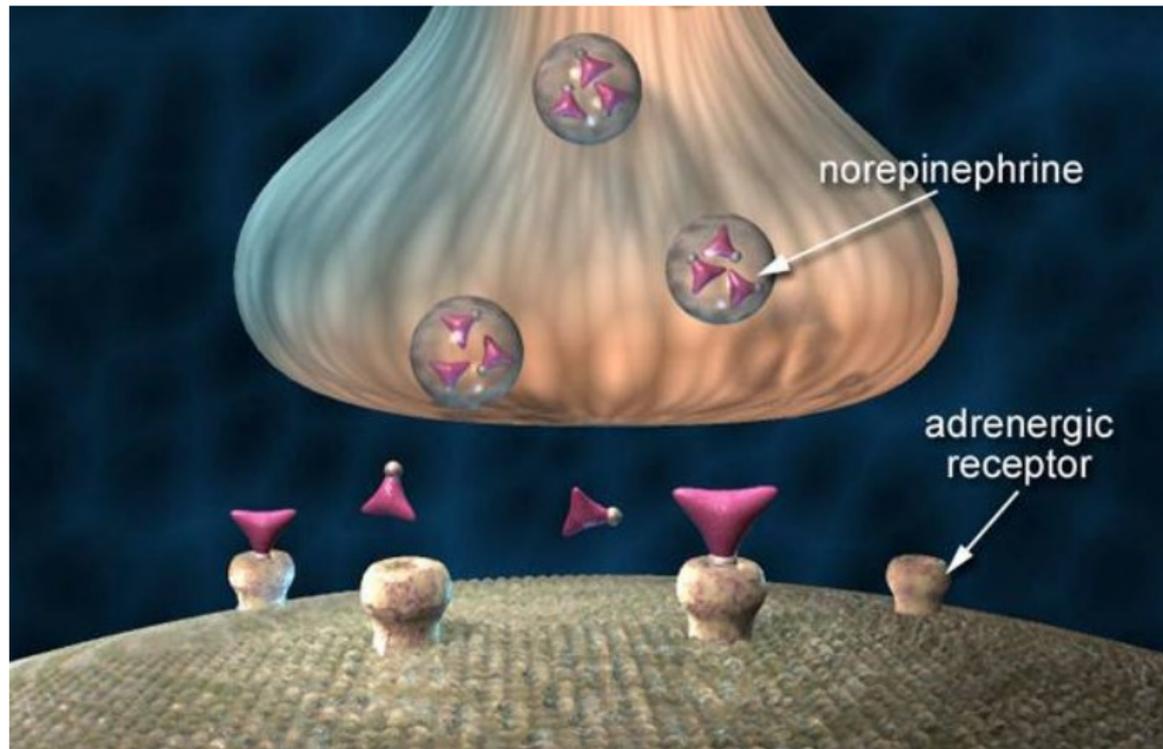


# Yohimbe pharmacological effects

- Contains multiple alkaloids, including yohimbine
- Alkaloid is  $\alpha$ -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*

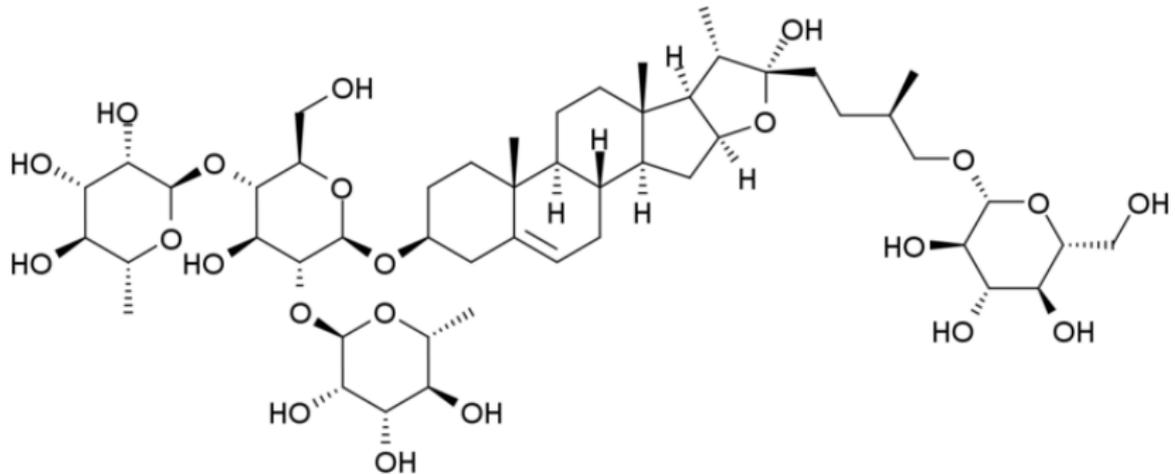
- Eurasian herbaceous creeping plant from Zygophyllaceae family, naturalized in U.S.
- Fruits have extremely large spines dangerous even to bicycles
- Important traditional part of Indian Ayurveda and Unani medicinal traditions
- Main component is steroidal protodioscin, increases the level of testosterone



# Gokharu



# Protodioscin



## West 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



# Summary

- There are two main ways for plants to influence human reproductive system: produce hormone analogs, or act directly to nervous centers



# For Further Reading



A. Shipunov.

*Ethnobotany* [Electronic resource].

2011—onwards.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_310](http://ashipunov.info/shipunov/school/biol_310)

