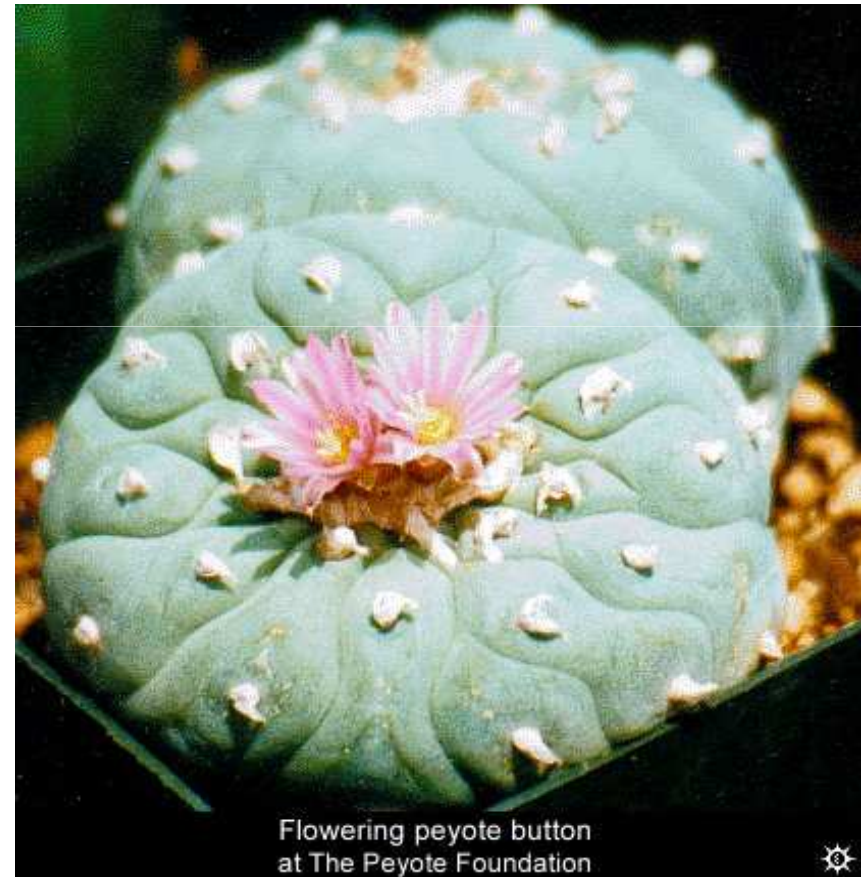


Psychoactive Plants

Hallucinogens II: Peyote (Mescaline) and Others

Peyote - *Lophophora williamsii*

- ❑ Small spineless barrel cactus
- ❑ Native to Mexico and southwest Texas

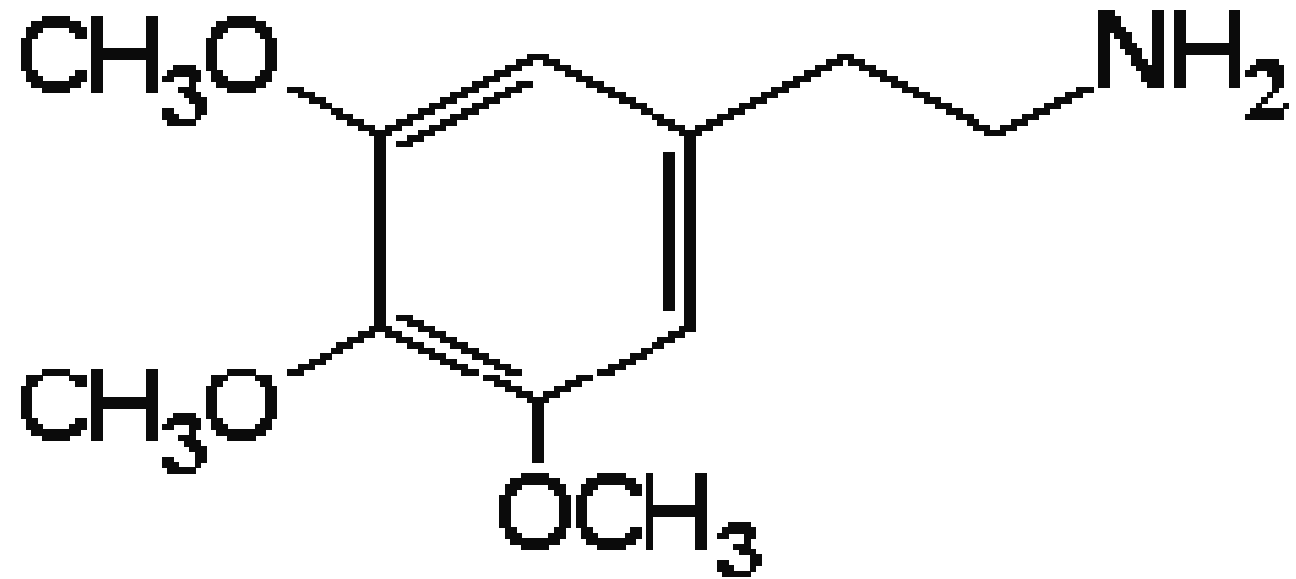




Peyote

- Early history
- Peyote contain about 30 alkaloids with mescaline the major hallucinogen
- Mescal buttons

Mescaline





Possible mode of action

- ❑ Sympathomimetic – enhance nor-epinephrine
- ❑ OR mescaline possibly binds to serotonin reuptake transporters, allowing serotonin to stay in synapse longer
- ❑ Binding by mescaline causes some conformational changes to this protein that may allow other neurotransmitters, such as dopamine and glutamate, to enter the axon terminal



Hallucinogens

- ❑ Serotonin agonists may cause hallucinations
- ❑ The relationship between the hallucinogenic drugs and serotonin has given rise to the hypothesis that schizophrenia is caused by an imbalance in the metabolism of serotonin
 - excitement and hallucinations result from an excess of serotonin in certain regions of the brain
 - depressive and catatonic states resulting from serotonin deficiency
 - therapy with hallucinogens outlawed in late 1960s

History of Native American Church



cover photo courtesy of Myers Wahnee



Crumbo

intercolor 11 3/4" x 19 1/2"

PEYOTE RELIGIOUS CEREMONY
Woody Crumbo

The Thomas Gilcrease Institute of American History and Art
Tulsa, Oklahoma



Nutmeg - *Myristica fragrans*

- History as a spice and hallucinogen
- In Ayurvedic medicine in India was called the "narcotic fruit."



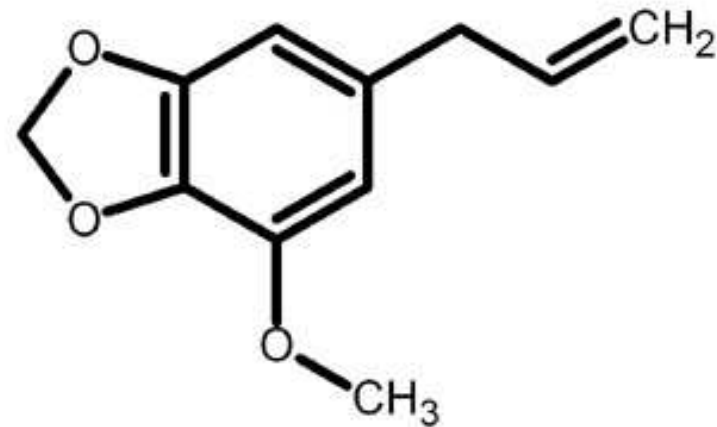


Nutmeg

- The reaction to nutmeg is unpredictable since the active principle is volatile and thus potency varies greatly
- Side effects, however, are predictable and extremely unpleasant
 - headache, nausea, dizziness, vomiting, irregular heart beat – a few fatalities in literature
 - unpopular choice as a hallucinogen

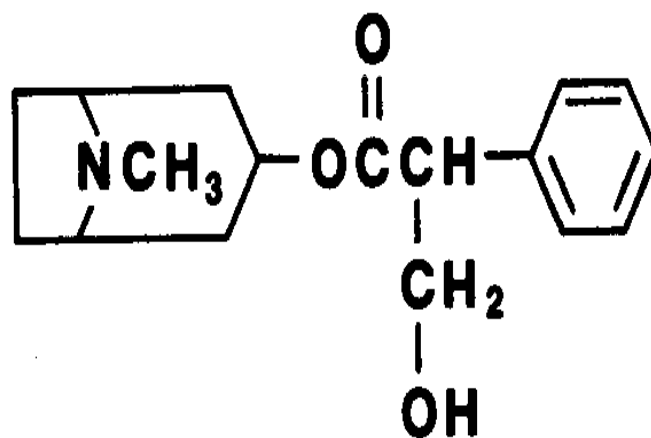
Myristicin

- ❑ Hallucinogenic compound in nutmeg is myristicin (and maybe also elemicine)
- ❑ Myristicin a phenolic essential oil (volatile)
- ❑ Myristicin an MAO inhibitor – so enhances monoamine levels in synapse
- ❑ Also found in other herbs and spices



Tropane Alkaloids

BELLADONNA TYPE (TROPANE OR ATROPINE ALKALOIDS)



Belladonna (*Atropa*)

Jimson weed (*Datura*)

Henbane (*Hyoscyamus*)

Mandrake (*Mandragora*)

Coca tree (*Erythroxylum*)

Figure 3-1 Atropine



Tropane Alkaloids

- A group of alkaloids with similar structure and similar physiological action
- Found predominantly in the family Solanaceae
- Tropane alkaloids include
 - **atropine**
 - **hyoscyamine**
 - **scopolamine**
- Primarily act as antagonists at the muscarinic acetylcholine receptor sites



Tropane Alkaloids

- Have a variety of physiological effects
 - relax smooth muscles
 - dilate the pupils of the eye
 - dilate blood vessels
 - increase heart rate and temperature
 - induce sleep and lessen pain
 - stimulate and then depress CNS
 - some induce hallucinations



Tropane Alkaloids

- One unique property of tropane alkaloids is their ability to be absorbed through the skin,
- Tropane alkaloids occur in varying levels in
 - *Atropa belladonna* - deadly nightshade or belladonna
 - *Datura* spp - Jimsonweed
 - *Hyoscamus* spp.- henbane
 - *Mandragora officinarum* - mandrake



Atropa belladonna

- ❑ Branching herbaceous perennial native to Europe and Asia
- ❑ Long history of use as a medicinal, psychoactive, and poisonous plant - extremely toxic
- ❑ One use of the plants that led to its name "belladonna" was the practice by Mediterranean women of applying the plant's juice to the eyes
- ❑ The result was dilation of the pupils to produce an alluring effect; hence "bella donna" or beautiful lady.
- ❑ Response is due to atropine which is used today by ophthalmologists

Atropa belladonna





Other medical uses of atropine

- ❑ As an anti-spasmodic for treating Parkinson's disease, epilepsy, and stomach cramps
- ❑ As a bronchodilator for treating asthma
- ❑ As a heart stimulant following cardiac arrest
- ❑ As an antidote for various poisons or overdoses



Datura species

- *Datura* spp. have a cosmopolitan distribution
- Grows wild over much of U.S.
- Have been extensively used by many indigenous peoples for both medicinal and hallucinogenic purposes
- In the New World, there are several species of *Datura* which have an extensive history as sacred hallucinogens
- *Datura stramonium* – Jimson weed most widely distributed species



Flower



Seed Capsule





Jimsonweed

- ❑ All parts of the plant contain atropine and scopolamine but highest level in the seeds
- ❑ Commonly consumed in herbal teas
- ❑ Seeds, leaves, and flower nectar can also be eaten or smoked
- ❑ High experienced by users often includes delirium, delusions, hallucinations, disorientation, and incoherent speech
- ❑ **Red as a beet, mad as a hatter, dry as bone**
- ❑ Often users do not recall the experience



Morning Glory Seeds

- ❑ The seeds of *Ipomoea violoaceae* as well as other *Ipomoea* and *Rivea* species contain amides of D-lysergic acid similar to, but far milder than LSD
- ❑ Known as *ololiuqui* among the Aztecs - it was used in divination as well as other religious and magical rites
- ❑ The shaman would consume a drink prepared from the seeds and in the hallucinogenic state that followed would divine the cause of a person's illness



Heavenly Blue Morning Glory (*Ipomoea violacea*)

Photo by F. Conte, © 2001 Erowid.org





Heavenly Blue Morning Glory (*Ipomoea violacea*)

Photo by F. Conte, © 2001 Erowid.org



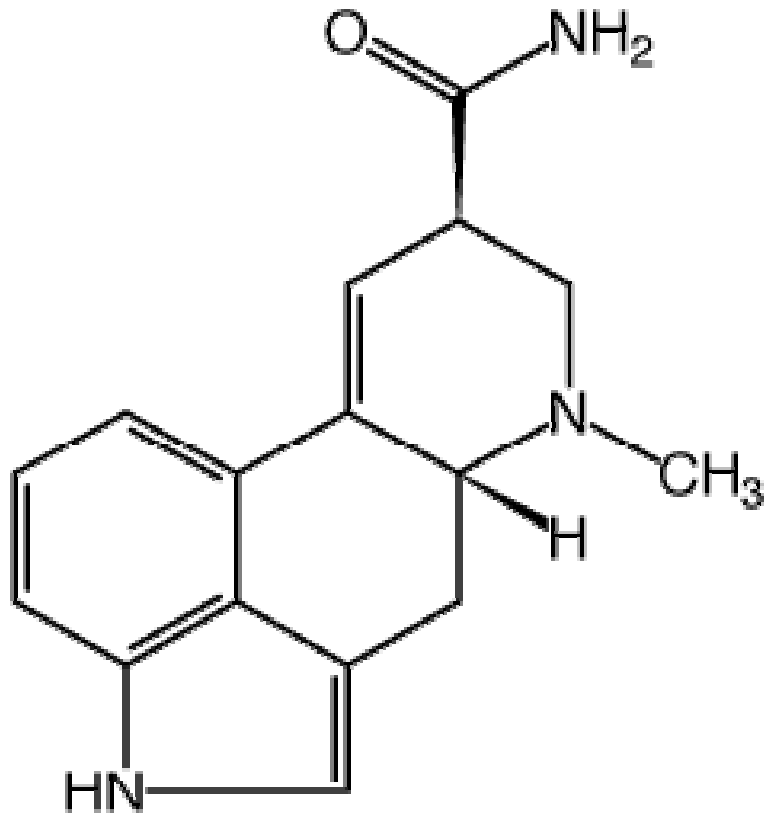


Heavenly Blue Morning Glory Seeds

Photo by Erowid, © 2000 Erowid.org



Lysergic Acid Amide



- Derivative of tryptamine, an indole alkaloid
- Act as serotonin enhancers in upper brain stem
- Has about 1/10 the potency of LSD