



Psychoactive Mushrooms

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Topics To Cover:

- Psilocybin containing “magic mushrooms”
- *Amanita muscaria* / Fly Agaric mushrooms
 - History/tradition/culture
 - Pharmacology

“Magic Mushrooms”

- Multiple species of the *Psilocybe* genus
 - 240 psychoactive mushrooms, 170 are psilocybin-containing
 - 60 *Psilocybe spp.* growing naturally in the US, 25 are hallucinogenic



Traditional Use

- Used by Mesoamerican natives
- Religious communion, divination, and healing
- Used for thousands of years until Spanish invaded
- 1955: Wasson first westerner to take mushrooms

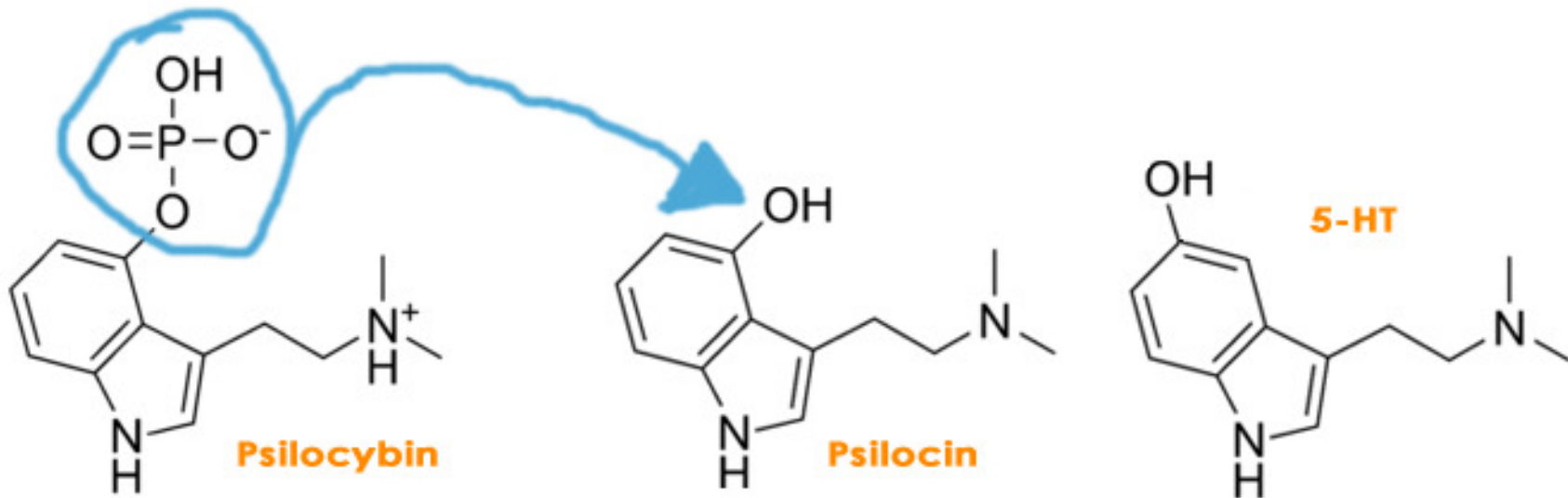


Effects

- Mood lift, euphoria, giggling, laughter, giddiness, increased flow of ideas/deep thinking, things become more interesting/colourful
- General change in consciousness, feeling more emotionally sensitive, time dilation, photosensitivity, sleepiness, pupil dilation, buzzing/energy in periphery
- Intense fear, headache as effects subside, nausea, GIT discomfort, anxiety, dizziness, confusion, lightheadedness/syncope

Pharmacology

- Active compounds: **Psilocybin** and **Psilocin** – tryptamines
- Only Psilocin is biologically active



Psilocin

- 5HT2A, 5HT2C and 5HT1A agonist
- Hallucinatory effects due to 5-HT2A binding in brain
- No effects on DA systems
- Only affects NA systems in high doses
- Extent of blue/black bruising is indicative of potency

Clinical Implications

- No recognised medical use
- BUT – used as experimental treatment for a variety of disorders

Cluster headaches

Easing psychological suffering
associated with cancer



Amanita muscaria





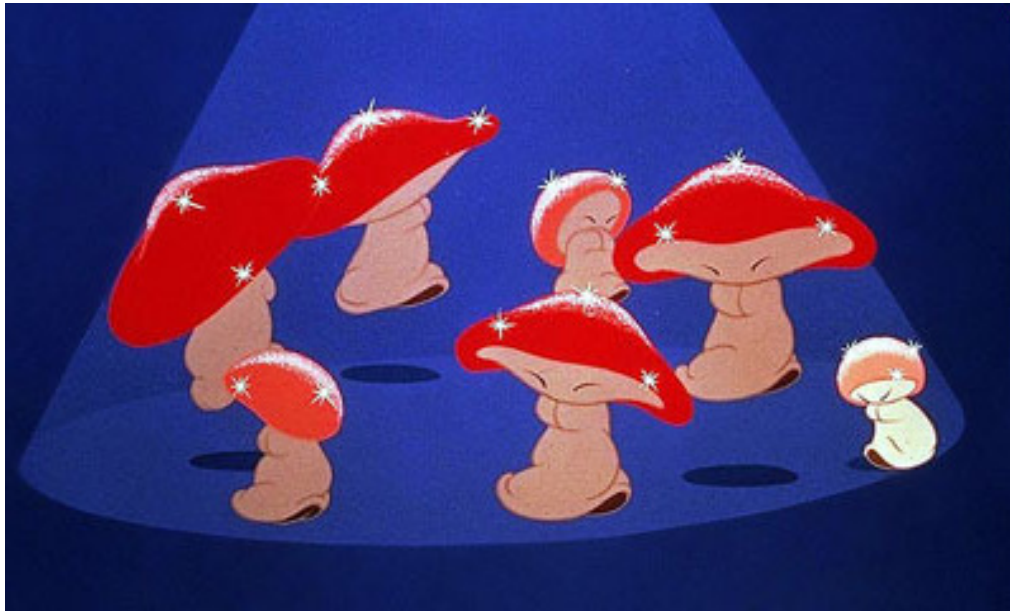
Amanita muscaria

- Grows throughout the northern hemisphere
- Poisonous when fresh
- Completely legal

Amanita muscaria

- Appear (alongside *Psilocybe spp.*) in Algerian art from 3500 BC
- Appearances in paintings from renaissance, more prominent in Victorian era
- Typically associated with fairies, elves, “little people”
- Christmas
- *Alice in Wonderland*

Amanita muscaria



Traditional Use

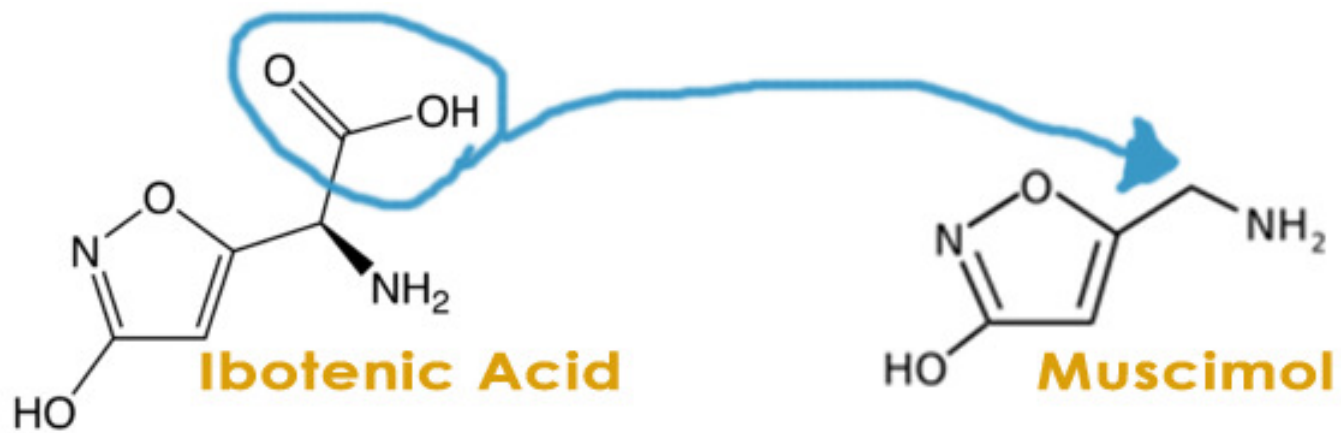
- Use was widespread, but in Siberia in particular
- Siberian shamans would use it as an alternative method to enter a trance state
- Eastern Siberian shamans and laypeople used it religiously and recreationally

Effects

- Euphoria, analgesia, relaxation, trance/dreamlike state, synaesthesia, clarity of thought, social feelings, increased sexual feelings, seeing little people
- Sedative (but some people become energetic), changes in body perception (motor skills, size, proprioception), pupil dilation, blurred vision, watery eyes, runny nose.
- Nausea, GIT discomfort, muscle twitching, increased salivation and perspiration, powerful dissociation and delirium at high doses

Pharmacology

- Active compounds: **Ibotenic acid** and **Muscimol**
 - Ibotenic acid is a neurotoxin
 - Found use as a brain lesioning agent
 - Responsible for toxic delirium when fresh mushrooms are eaten
 - Decarboxylates into Muscimol during drying process



Muscimol

- Selective GABA-A agonist/GABA-C partial agonist
 - Binds to GABA site, not an allosteric modulator
- Alters neuronal activity in many brain regions
 - Cerebral cortex, hippocampus, cerebellum
- Passes through the body unaltered

Muscimol Bits & Pieces

- Alcohol withdrawal can lead to hallucinations of “little people”
 - Alcohol also acts on GABA systems
 - Could these symptoms be related?
- Siberian tribes used to drink their shaman’s urine
 - We now know muscimol passes through the body unchanged → presence in urine
 - Who decided to try this first?!
- Negligable muscarinic effects

Muscimol as a Tool

- Reversible inactivation of brain areas
- Compared with axon-sparing brain lesions
- Useful method for inferring brain behaviour relationships
 - Where and when neuronal events for learning/memory take place