

Prírodné psychedeliká

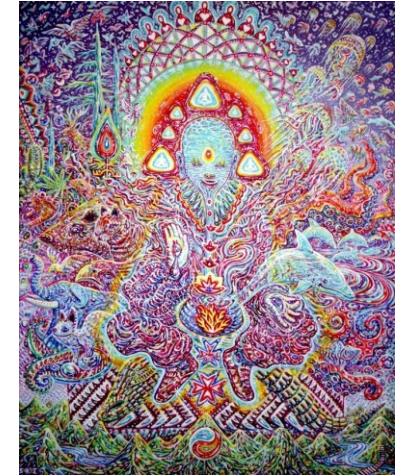
Halucinogenes (psychodysleptics)



Deliriogens

- Usually highly toxic, with significant physical side effects on the body
- Affect memory ("blackout") Delirium – hallucinations indistinguishable from reality
- A very diverse group of substances with various mechanisms of action
- A typical natural representative: scopolamine

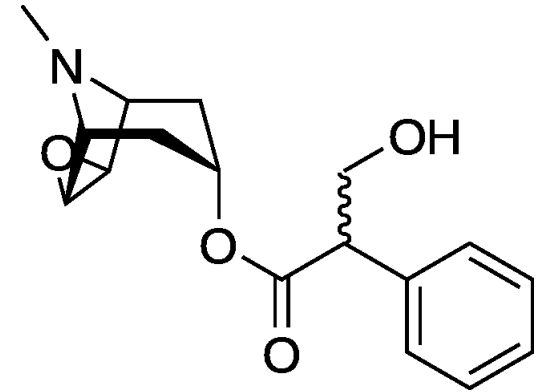
Psychedelics



- Low toxicity, predominantly psychological effects
- Usually a memorable experience
- Do not cause delirium, awareness of altered reality
- Typically act on 5-HT receptors (but many exceptions)
- A typical natural representative: psilocybin

Scopolamine

- The most significant natural deliriogen (*Datura sp.*, *Brugmansia sp.*)
- Plants used since prehistoric times in ecstatic cults (Bacchants, witchcraft)
- ***Hyoscyamus niger*** was a popular beer additive (*Bilsenkraut*)
- Possible identity of the berserker drink
- Tested for military use, applied in criminal activities
- Strong parasympatholytic effect, can be lethal
- Still used in medicine (motion sickness therapy)



„Magic“ mushrooms

- Genus *Psilocybe* (image above), significant for religious cults (teonanácatl)
- Gordon Wasson, amateur mycologist, participated in a ritual in Mexico
- Indole alkaloids psilocin, psilocybin: most well-known and dominant
- First isolated by Albert Hofmann (discoverer of LSD) in 1958
- Also present in other mushroom genera (*Panaeolus*, *Conocybe*)
- Found in some lichens and a fungus that infects cicadas (*Massospora cicadina*, image below)
- Baeocystin: little evidence of psychoactivity
- Wood lover's paralysis (Australia), unclear cause



Psilocybine/psilocine

Psilocin (above) is the active form, psilocybin (below) is a "prodrug" (more stable)

5-HT_{2A} agonists (may have gastrointestinal side effects)

Buccal administration: ~15-30 minutes

Oral administration: ~30-40 minutes

Duration: ~6-8 hours, peak usually 1-2 hours

Strong visual psychoactivity, similar to LSD

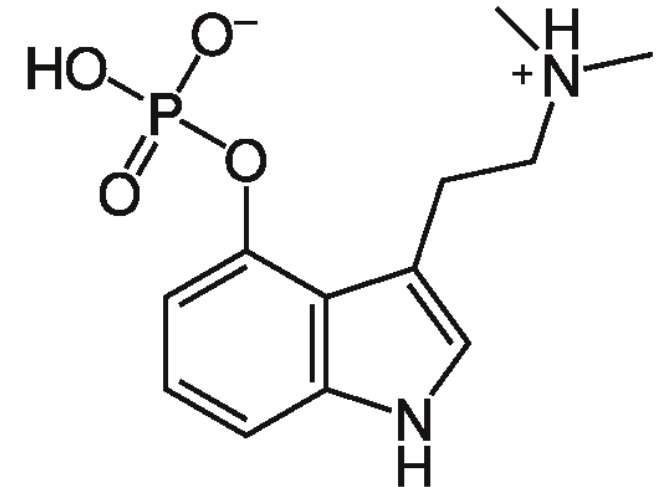
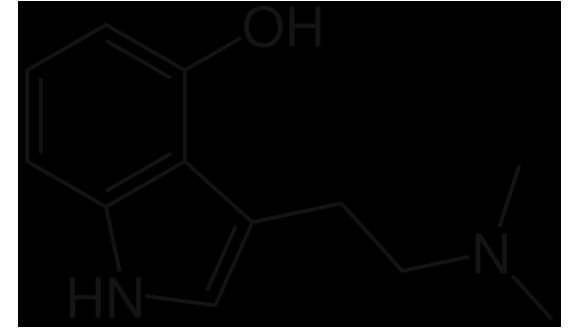
The brain processes more information while being less active

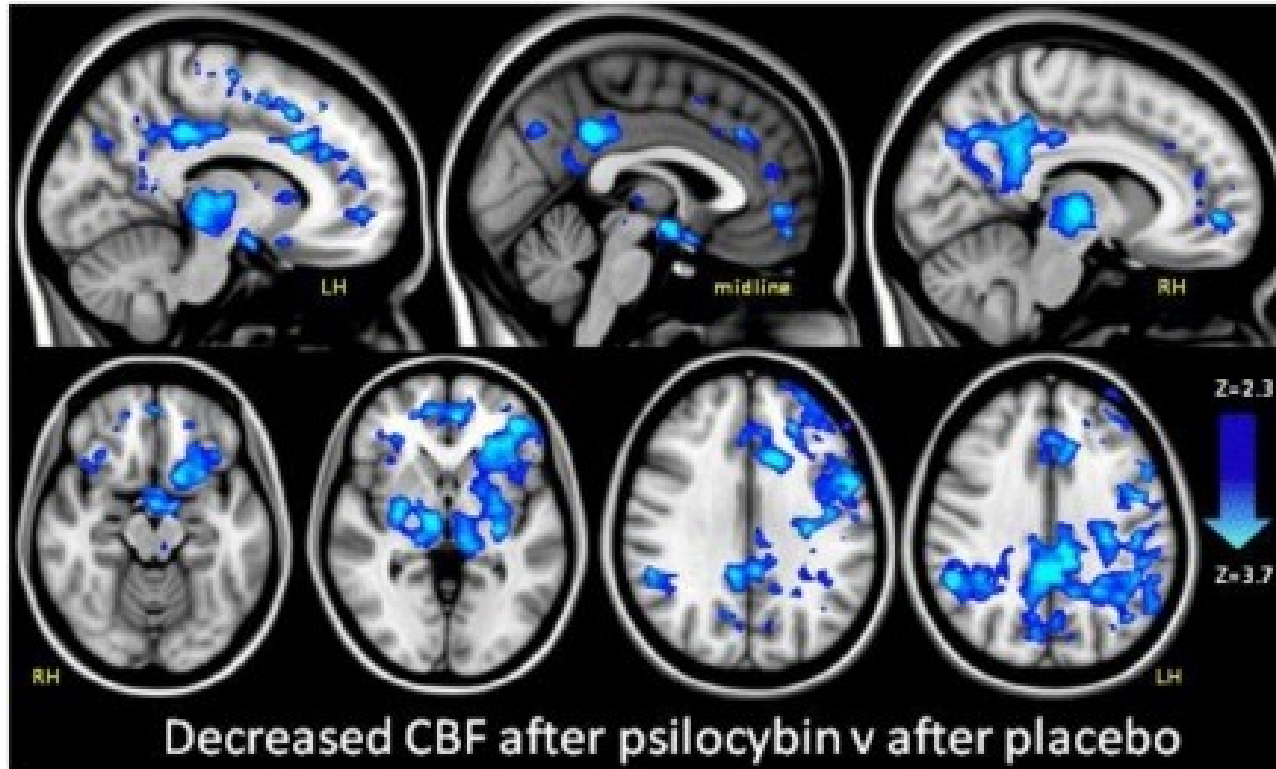
Alters neuronal organization, enhances neuroplasticity

Potential in treating psychiatric and neurological disorders

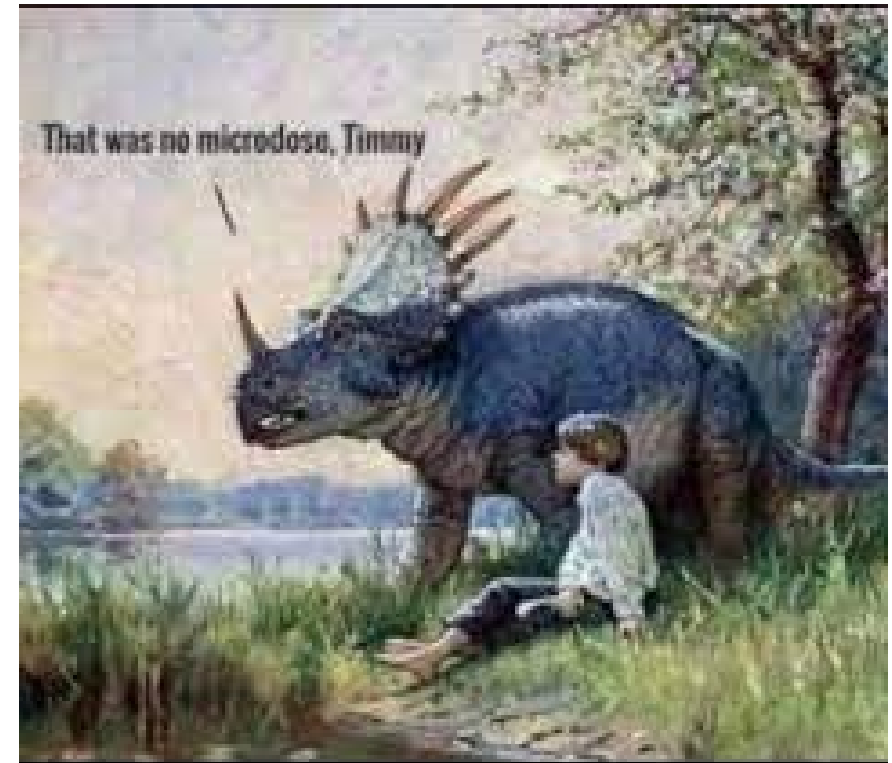
Key compound in the current "psychedelic revolution",

e.g., Prof. Carhart-Harris, in the Czech Republic, Prof. Horáček





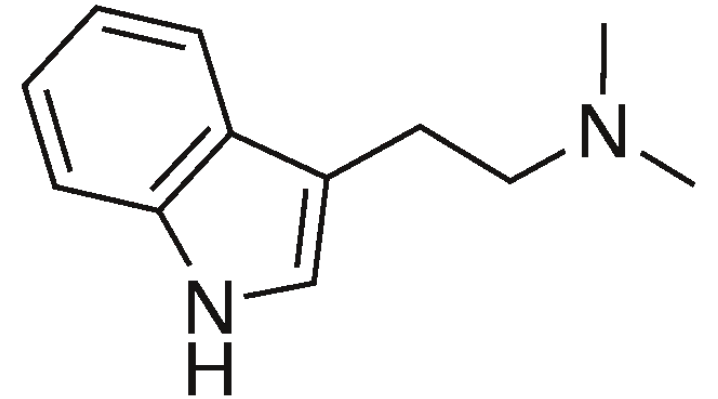
Psilocybin reduces blood flow in certain parts of the brain. **Source:**
<https://www.nature.com/articles/s41598-017-13282-7>



The difference between **microdosing** and **macro dosing** is not precisely defined. **Source:**
<https://www.pinterest.com/pin/that-was-no-microdose-timmy--525091637815042745/>

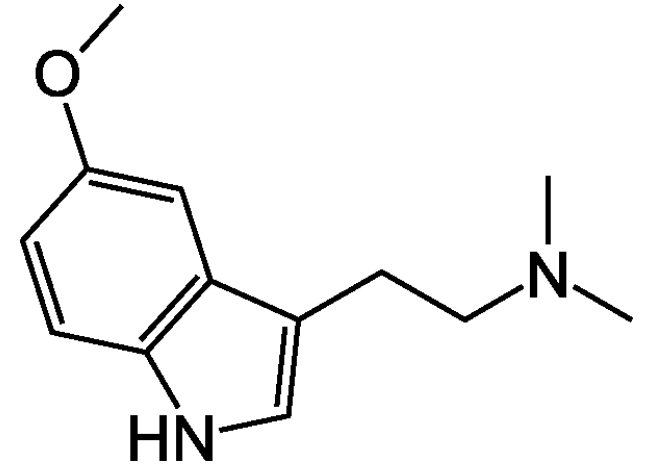
DMT

- Very common in nature in small amounts
- Also in Europe, e.g., *Phalaris* sp. (Poaceae)
- Some plants contain over 1% of dry weight (e.g., *Psychotria viridis*)
- Active when smoked (cebíl) or snuffed (yopo), but rapidly broken down by MAO when ingested orally
- Fast and short-lasting effect, approx. 15 minutes ("businessman trip")
- Combined with MAOIs – usually beta-carboline alkaloids
- *Banisteriopsis caapi* (harmala alkaloids) – ayahuasca, "pharmahuasca"
- Ayahuasca effect: lasts ~10 hours, with strong digestive side effects
- *Acacia* (symbol of Freemasons), DMT mainly found in root bark
- Unconfirmed endogenous role in the body (potentially pineal gland)
- Rick Strassman: conducted extensive experiments on volunteers



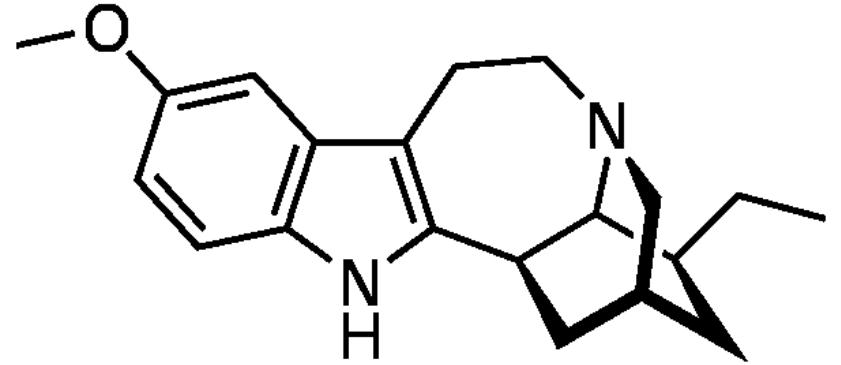
5-MeODMT

- Present in plants (*Anadenanthera colubrina*)
- Often together with DMT and bufotenine (5-OH-DMT)
- *Bufo alvarius* – southern USA,
- Very potent (candidate for the strongest natural psychedelic)
- Fast and short-acting (similar to DMT)
- Strong visual activity, intense sense of depersonalization
- Orally inactive without MAOI
- Recently controversial practices (Octavio Rettig)
- Alexander Shulgin synthesized many analogs
- Kambo (*Phylomedusa bicolor*): not a hallucinogen



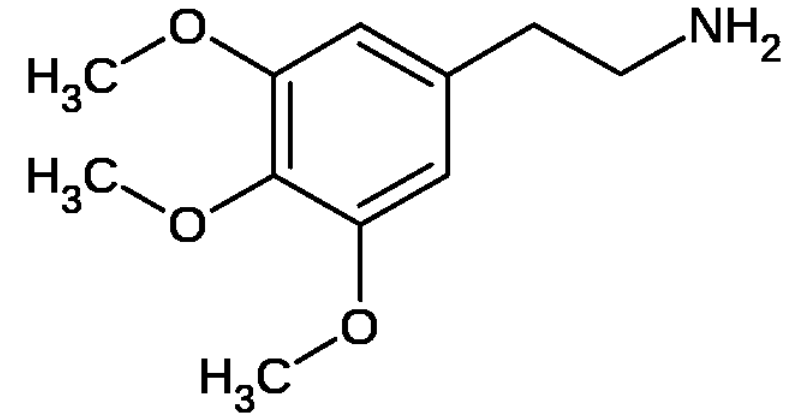
Ibogaine

- In various tropical plants from the Apocynaceae family
- Most famous: *Tabernanthe iboga*
- Occurs together with similar alkaloids (e.g., voacangine)
- Complex mechanism of action, not fully understood
- Partially by opioid receptors sigma and kappa
- West African coast, initiation rituals
- Extremely high doses of root bark, on the verge of delirium
- Used for addiction withdrawal, likely affects opioid receptors
- Side effects: ataxia, nausea, significant bradycardia, dangerous interactions
- In the past, used as a doping agent, improves concentration during hunting (small doses)
- *Tabernaemonthana* sp. eye drops Sananga (Amazon)



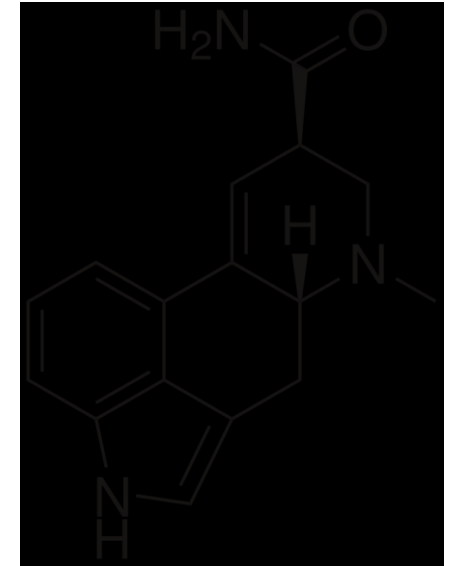
Mescaline

- Source: Cactaceae, many species
- Most notable: peyote (*Lophophora williamsii*)
- San Pedro (*Echinopsis pachanoi*)
- Peyote contains approximately 3% mescaline in dry matter ("mescal buttons")
- Contains many other protoalkaloids, such as hordenine
- Active dose is around 200mg, effect lasts 10-12 hours
- Primarily active on 5-HT and D receptors
- Legal since 1995 for members of the Native American Church
- First trendy psychedelic in Europe, Aldous Huxley: *The Doors of Perception*
- In the USA, Allen Ginsberg (*Howl*) and Ken Kesey (*One Flew Over the Cuckoo's Nest*)



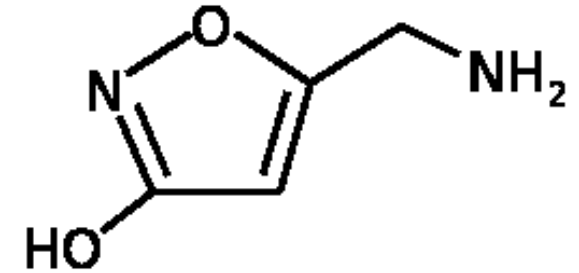
Derivatives of lysergic acid

- *Claviceps purpurea*, highly toxic, psychoactivity very variable
- Hypothesis about the origin of kykeon in the Eleusinian mysteries
- Amides of lysergic acid (ergine), Lysergol
- In plants from the Convolvulaceae family (e.g., *Argyreia nervosa*) and Ipomoeaceae (*Ipomoea violacea* - lolium)
- Psychoactivity primarily mediated by 5-HT_{2A} receptors
- Overall similar receptor profile to LSD but with significantly lower affinity
- Relatively mild psychoactive substance, practically without side effects, legal



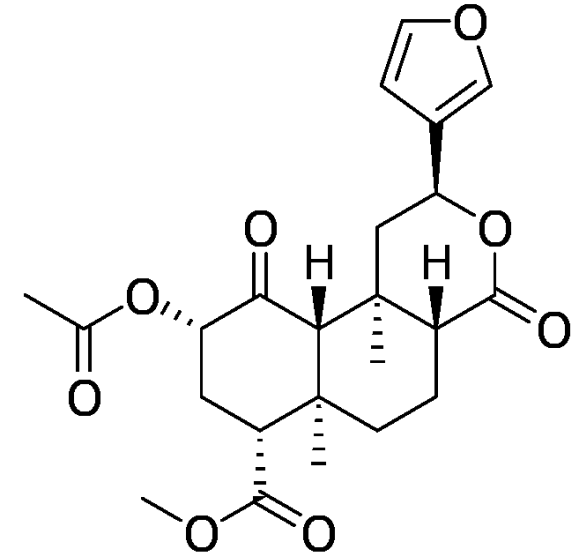
Isoxazole

- The most important compounds are muscimol (primarily responsible for the effects) and ibotenic acid
- Active dose is around 10mg of muscimol
- Effect lasts approximately 12 hours (depending on the dose).
- Source: *Amanita muscaria* and other species
- Toxicity is relatively low (the primary source of side effects is likely muscarine)
- GABAA agonists, they have a sedative effect and induce dream-like hallucinations
- Popular in Siberian shamanism (urine drinking)
- Traditionally used in America (by the Mayans) and Japan
- Possible identity of soma (but also the drink of the berserkers)
- Likely the oldest used natural psychedelic
- Muscimol has been clinically tested (for epilepsy)



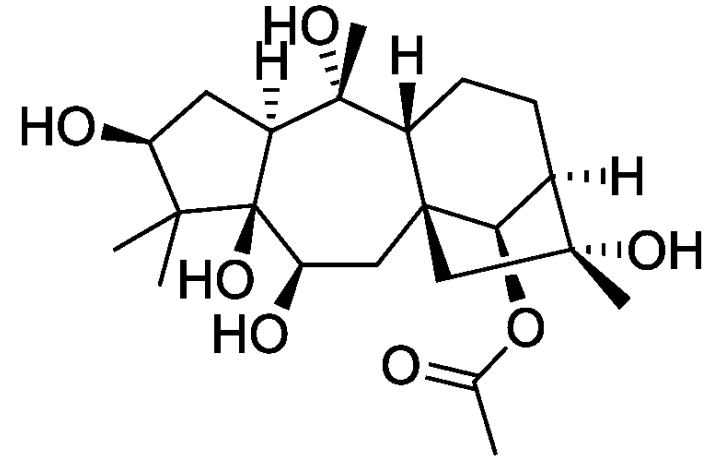
Salvinorin

- Salvinorin A discovered in 1982
- Considered the strongest natural psychedelic
- Effective dose is around 200 mcg
- The only known highly effective psychedelic that does not contain nitrogen (diterpenoid)
- Source: *Salvia divinorum* (endemic to Mexico)
- Contains only very low concentrations
- Mazatecs (chewing leaves, smoking) – a substitute for mushrooms
- Today, typically smoked as dry extracts
- Effect follows a similar course to DMT (rapid, short, intense)
- Mechanism not well understood (likely primarily sigma opioid receptors)
- Pipiltzintzintli (?) – traditional drug of the Aztecs



Psychoactive terpenoids

- **Lamiaceae:** possible psychoactivity in several species
- ***Coleus pumilus*, *C. blumei*:** "male" prophetic sage
- ***Leonotis leonurus*:** Africa, substitute for cannabis
- **Asteraceae:** traditionally attributed hallucinogenicity of thujone (unconfirmed)
- ***Calea zacatechichi*:** causes vivid dreams, active substance unknown
- ***Helichrysum foetidum*:** Africa, cannabinoids?
- **Ericaceae:** diterpenoids, grayanotoxin
- ***Rhododendron sp.*:** grayanotoxin (pictured above) – passes into honey,
- ***R. luteum*, *R. ponticum*:** "mad honey," mainly in Turkey and the Himalayas, keeps sodium channels open longer, delirium-inducing
- ***R. tomentosum* (syn. *Ledum palustre*, pictured below):** ledol, palustrol, delirium-inducing
"Labrador tea," beer additive
- ***Cannabis sp.*:** very rich in terpenes, broad spectrum, affect the psychoactivity of THC (e.g., myrcene – "couch lock effect")



Other drugs

Myristica fragrans

Contains

myristicin and elemicin

Popular as a prison drug

Very mildly psychoactive



Boletus manicus

New Guinea,
likely indole alkaloids
"Fungal madness"



Hallucinogenic fish

Observed in many
species (e.g., *Sarpa
salpa*), the effect is
typically delirium-
inducing

Probably caused by
bacterial product



Giraffe liver (Humar,
Sudan)

In the form of a drink
Probably just a placebo
(but giraffes eat acacias)



Thank you for attention