



UNITED NATIONS
Office on Drugs and Crime

New psychoactive substances:
severe challenges
to
public health

Gilberto Gerra

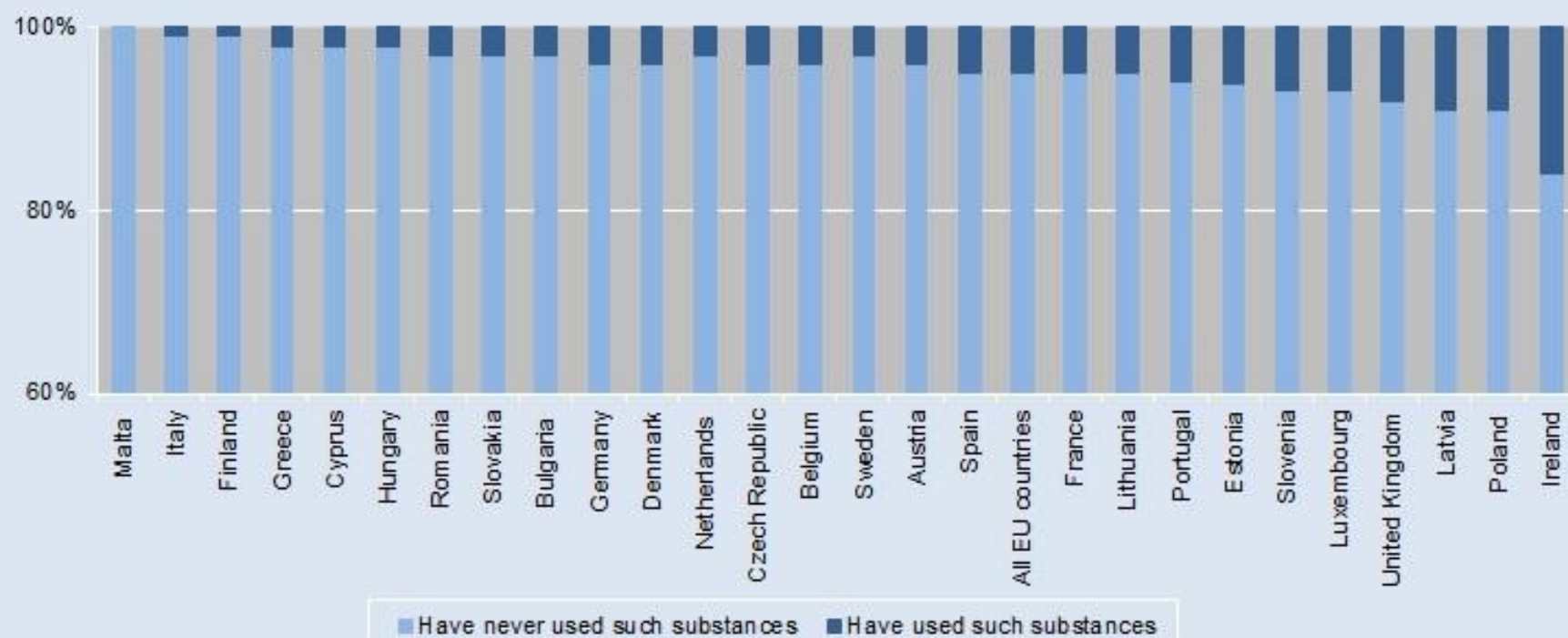
Chief

Drug Prevention and Health Branch

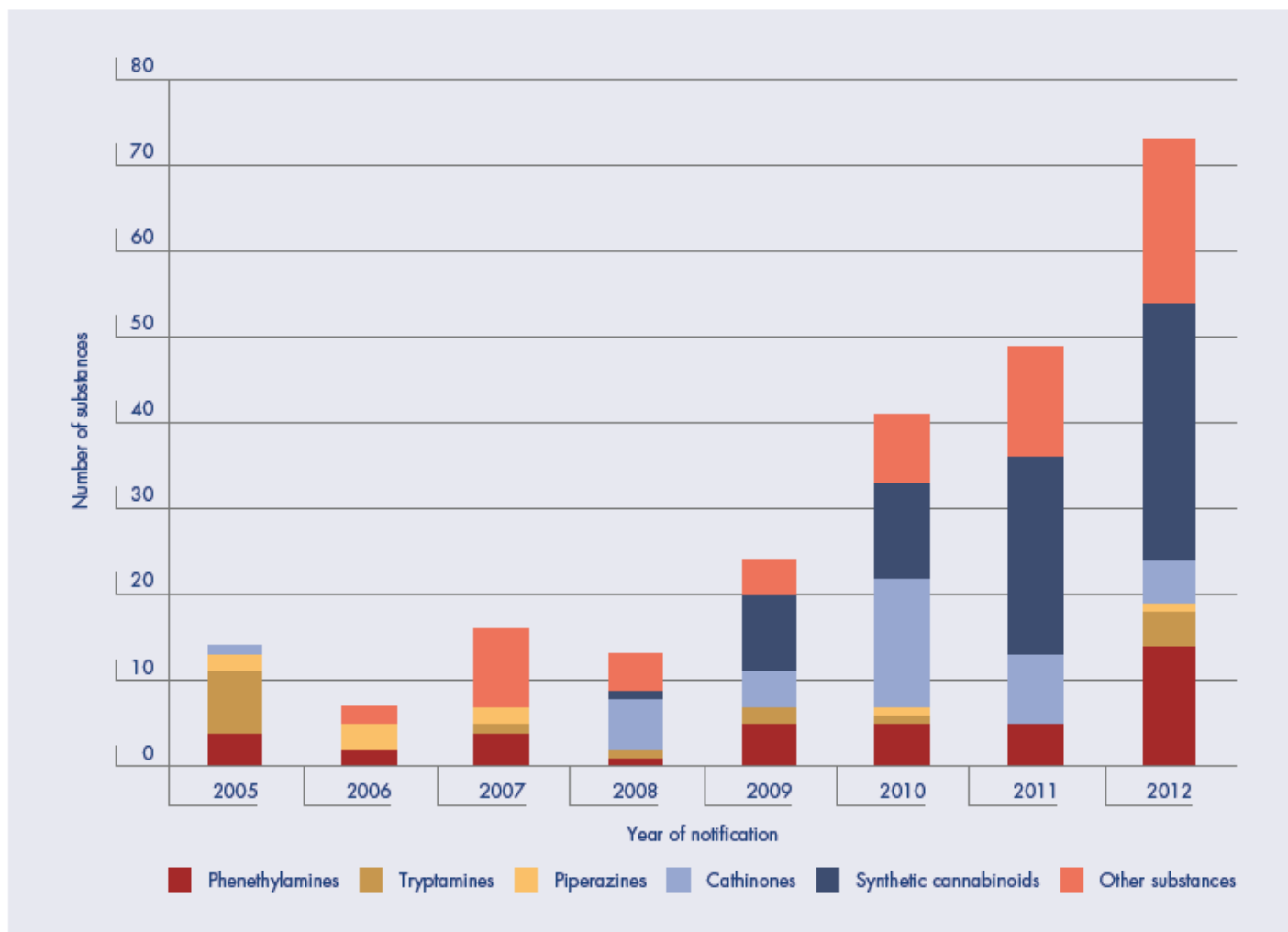


UNODC Laboratory and Scientific Section Portals

European Union: lifetime prevalence of NPS use in EU Member States

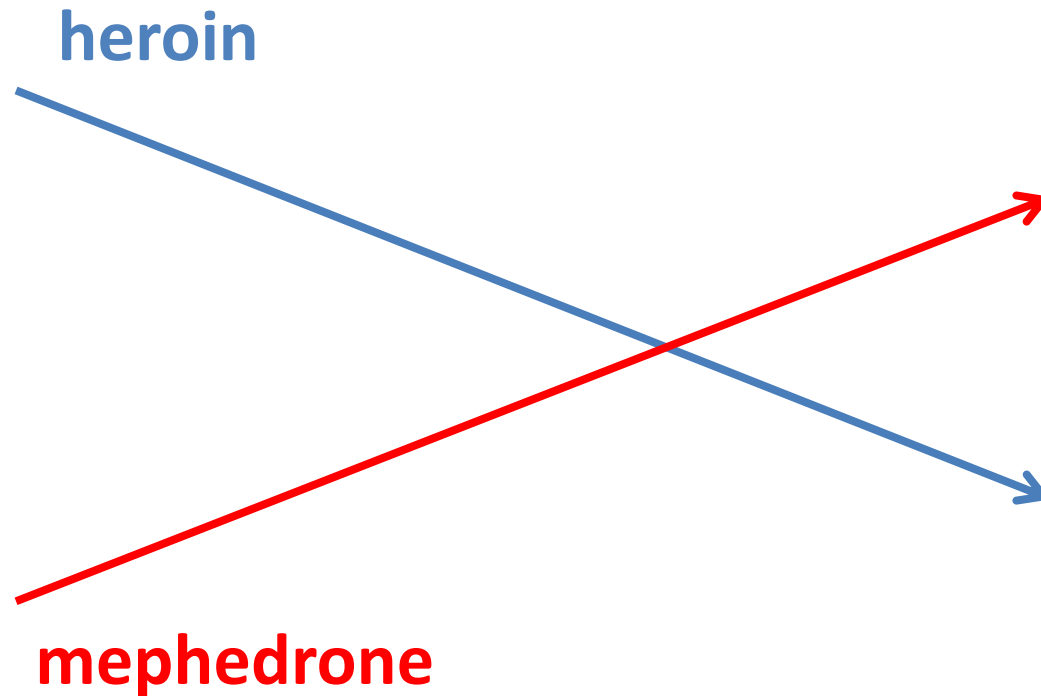


Number of new psychoactive substances notified to the European Early warning system, 2005–2012



Source: EMCDDA/EWS.

Changes in patterns of injecting drug use in Hungary: a shift to synthetic cathinones.

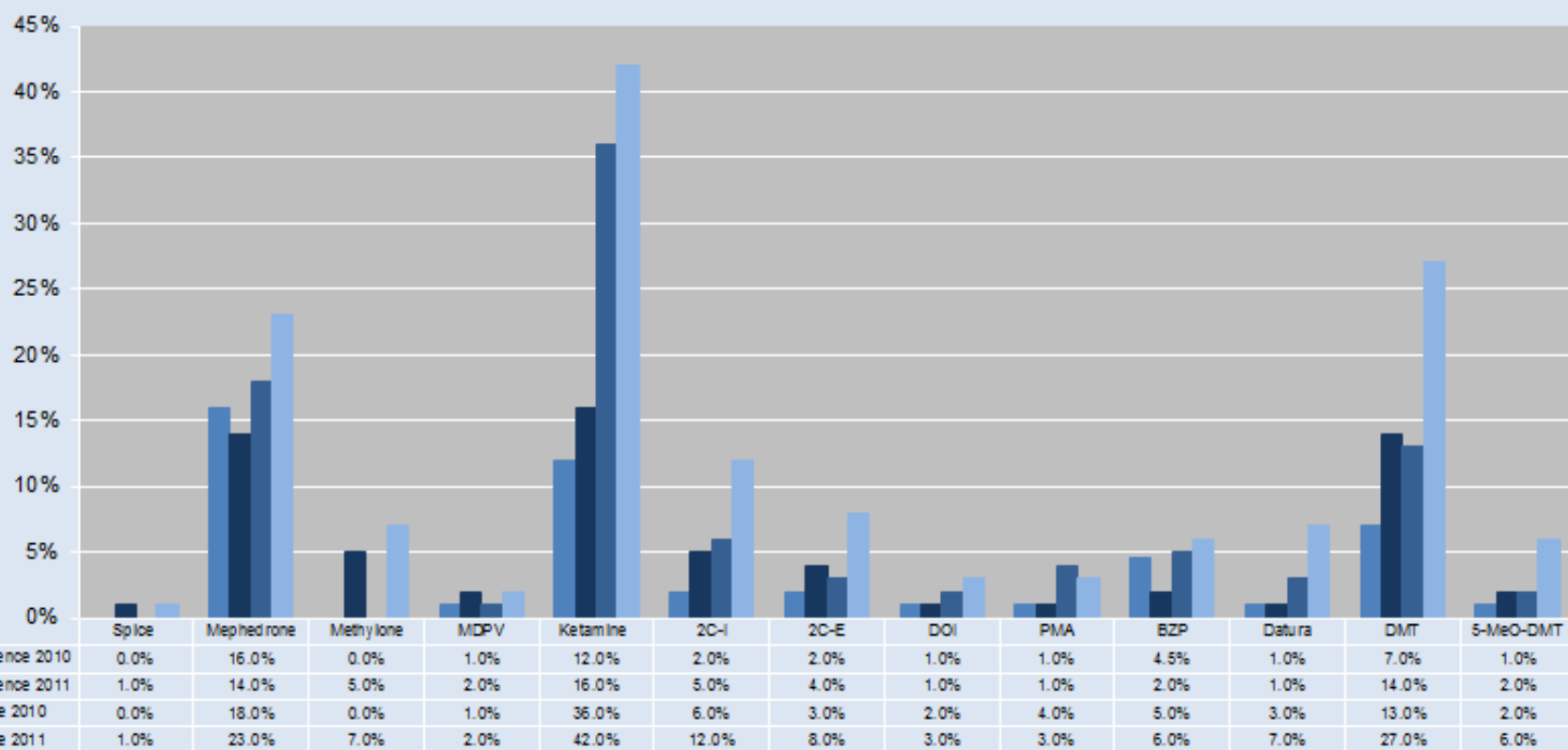


decreasing heroin use and the appearance of mephedrone injecting



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Australia: prevalence of drug and NPS use among regular ecstasy users (REU), 2010-2011



The rise of new psychoactive substance use in Australia

654 participants

regular ecstasy users

lived in a capital city

over 16 years of age

NPS were used by 44% of the total sample

2C-I (14%) and 2C-B (8%)

2-(4-bromo-2,5-dimethoxyphenyl)ethanamine (2C-B)

2,5-dimethoxy-4-iodophenethylamine (2C-I).

Respondents in the NPS group were:

younger

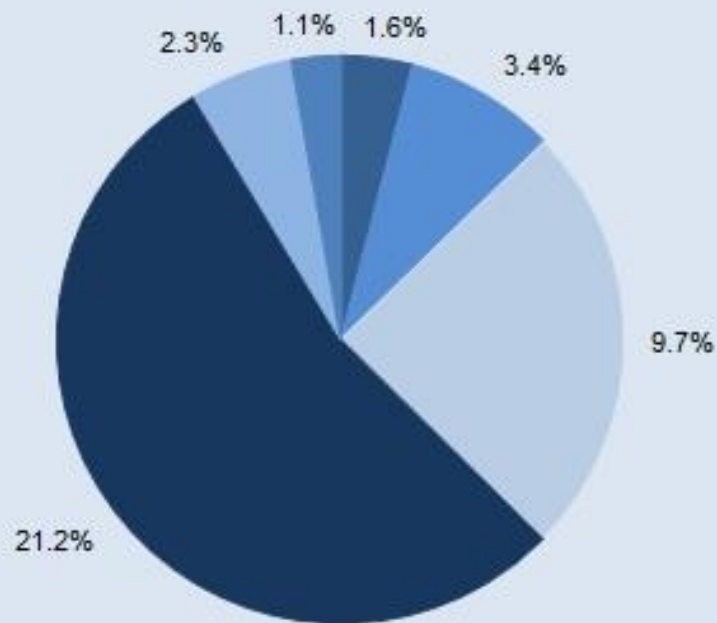
more frequent use

more types of drugs



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Canada: last-year prevalence of drug and NPS use among
secondary school students - Youth Smoking Survey, 2010 - 11

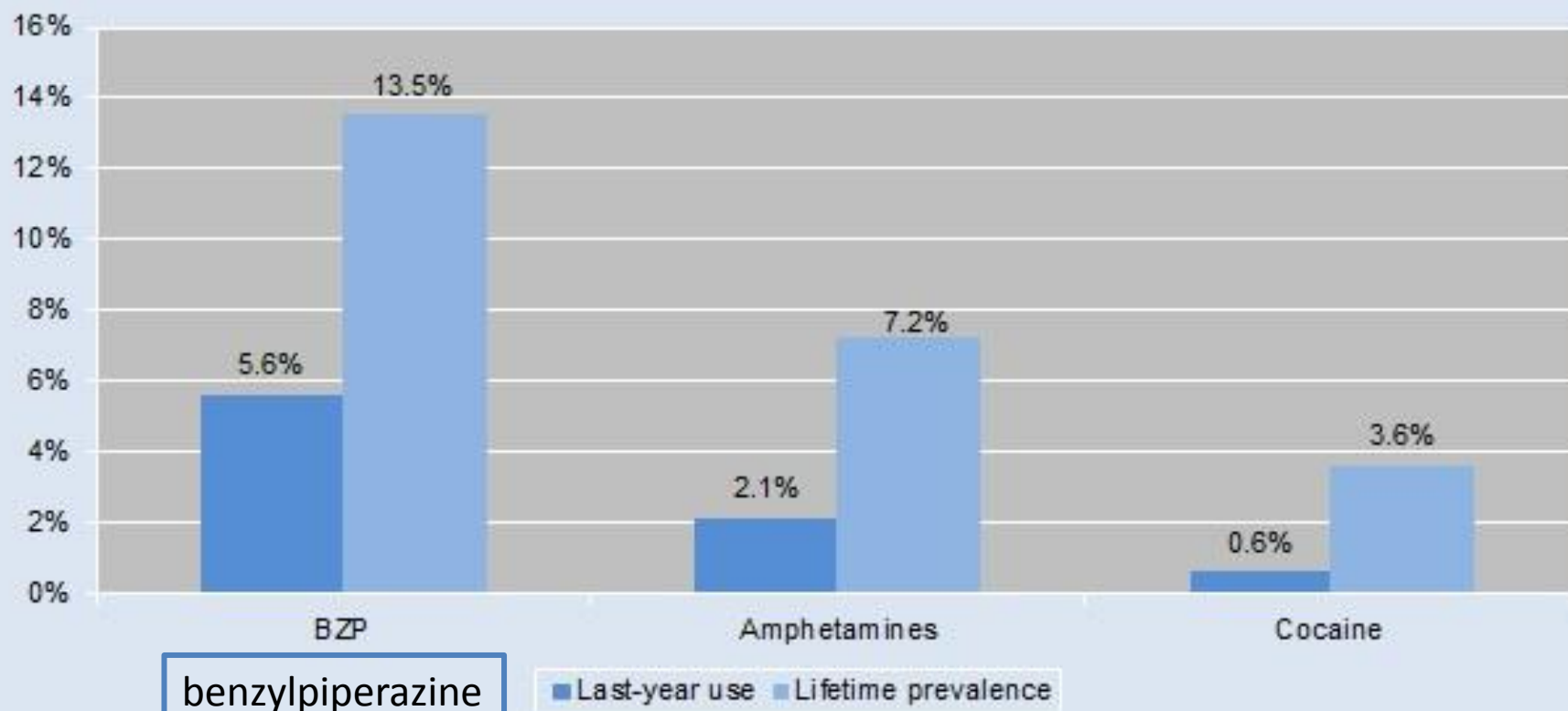


■ Ketamine	■ <i>Salvia divinorum</i>	■ Other illicit drugs
■ Cannabis	■ Cocaine	■ Heroin



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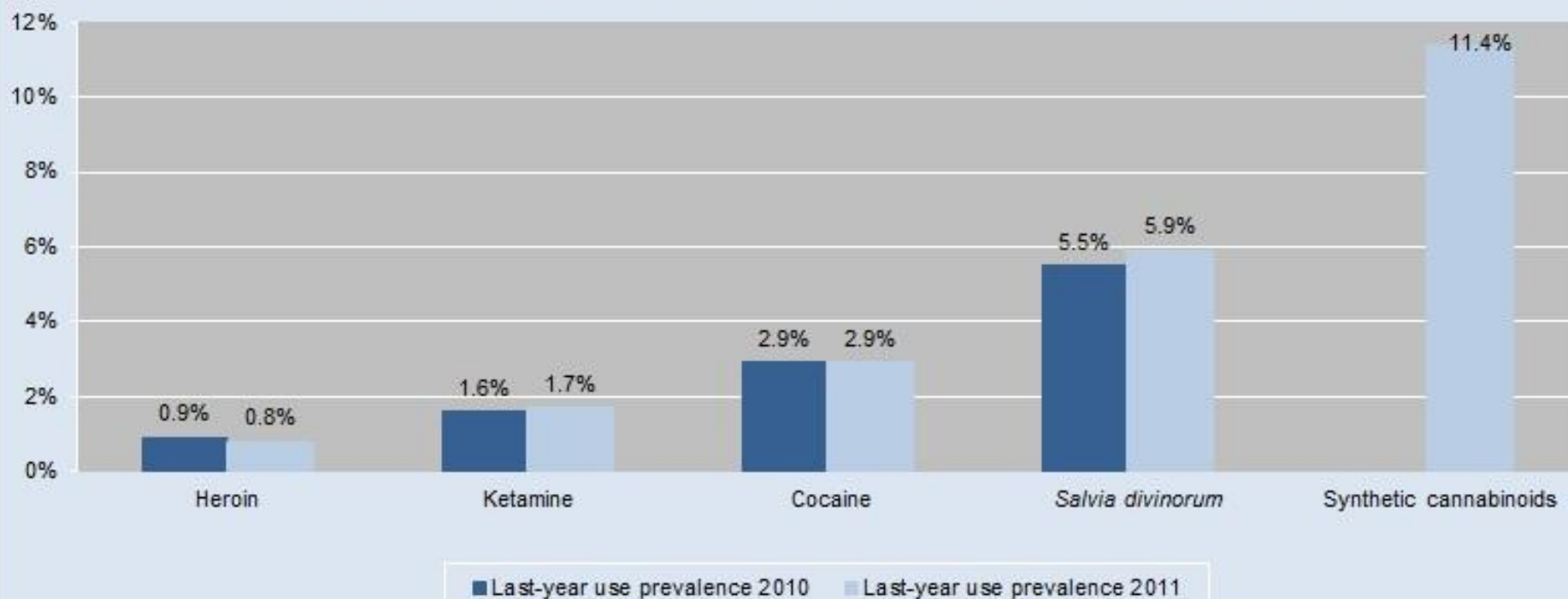
New Zealand: prevalence of drug and NPS use in the adult population of New Zealand, 2007 - 08





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United States: prevalence of drug and NPS use among 12th graders, 2010 - 2011



NPS: "Internet drugs/designer drugs/legal highs" in Sweden

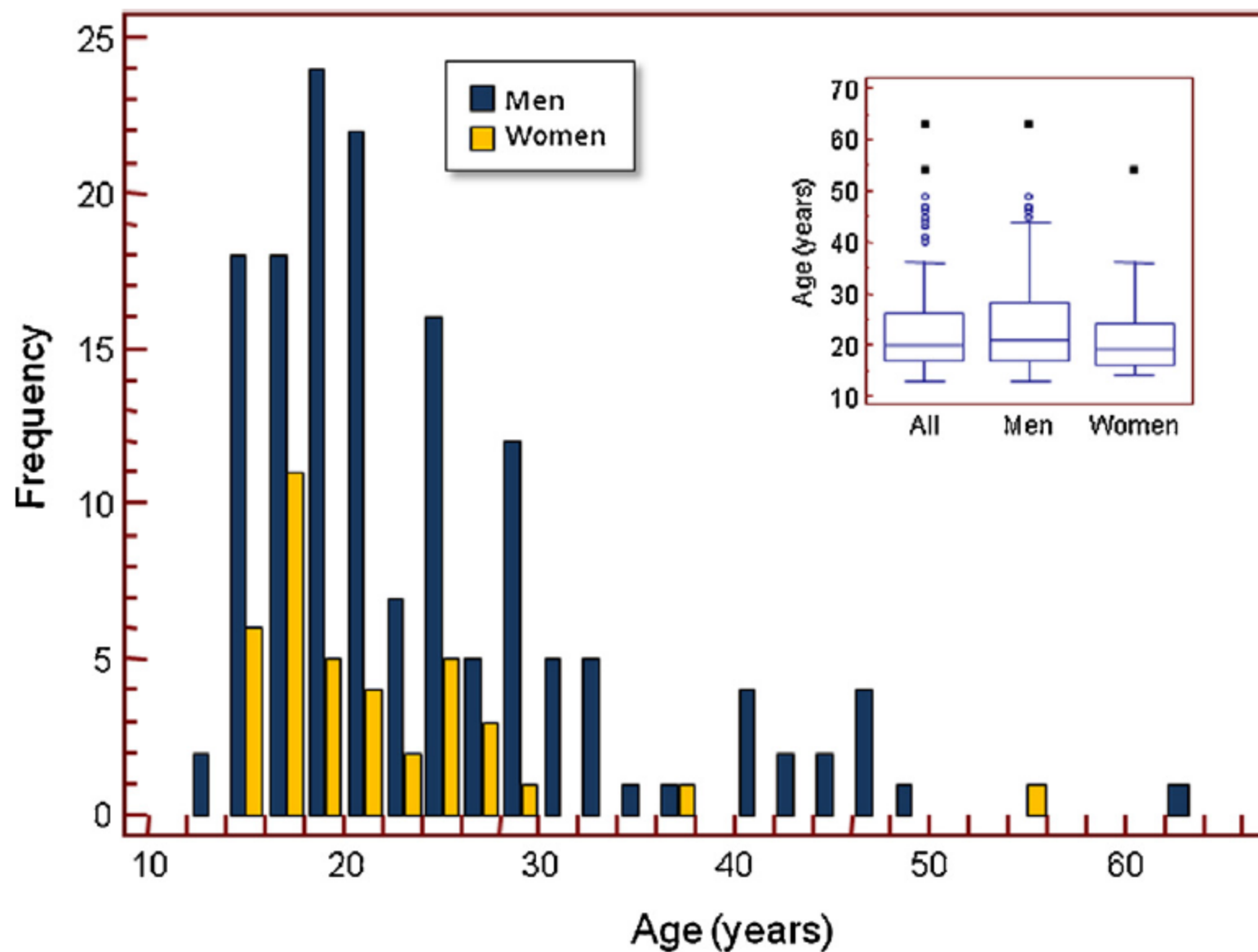
Among 189 cases of drug intoxications at emergency departments and intensive care units

50 substances identified:

- synthetic cannabinoid receptor agonists ("Spice")
- piperazines
- substituted phenethylamines
- synthetic cathinones
- hallucinogenic tryptamines
- piperidines



Helander et al., 2014



Spice, bath salts, and the U.S. military: the emergence of synthetic cannabinoid receptor agonists and cathinones in the U.S. Armed Forces.

- synthetic cannabinoid receptor agonists
- "bath salt " synthetic cathinones

Serious medical and psychiatric problems



Security problems?

Loeffler et al., 2012

piperazines
phenethylamines
tryptamines
piperidines

stimulant

entactogenic

hallucinogenic

Hill and Thomas, 2011



The clinical toxicology of the designer "party pills" benzylpiperazine and trifluoromethylphenylpiperazine.

palpitations
agitation
anxiety
confusion
dizziness
headache
tremor
mydriasis
insomnia
urine retention
vomiting
seizures



New psychoactive substances as adulterants of controlled drugs. A worrying phenomenon?

173 samples believed to be MDMA, amphetamine, ketamine, cocaine, mescaline, or methamphetamine.

The NPS adulterant most frequently observed
2-(4-bromo-2,5-dimethoxyphenyl)ethanamine
(2C-B)

- **69 different combinations of substances were detected:**
- 20 involving a controlled drug combined with an NPS
- 49 involving one or more NPS that substituted the controlled drug

Changes in the prevalence of new psychoactive substances before and after the introduction of the generic scheduling of synthetic cannabinoids in Japan.

After the enforcement of the **generic scheduling** for naphthoylindoles in March 2013, these substances have been completely replaced by other types of drugs

continuous and dedicated monitoring
for the emergence of these substances
is necessary

Kikura-Hanajiri et al., 2013

New psychoactive substances legislation in Ireland. Perspectives from academia.

Difficult to study controlled substances (!)

We have found that it is administratively challenging to perform scientific research on controlled substances at academic institutions.

It is desirable to gather analytical, pharmacological, and toxicological data on these substances as they emerge on the market

Due to the **restrictive nature of licensing requirements**, once a substance is controlled, this becomes more difficult.

Promoting innovation and excellence to face the rapid diffusion of novel psychoactive substances in the EU: the outcomes of the ReDNet project.

Recreational Drugs European Network project established itself as the first Europe-wide prevention programme designed for NPS based on the efficacy of novel information and communication technology-based forms of intervention.

More than 650 NPS

Effects and risks associated with novel psychoactive substances: mislabeling and sale as bath salts, spice, and research chemicals

EMCDDA

synthetic cannabinoids (39.3%)

synthetic cathinones (16.6%)

altered mood and perception

agitation

tachycardia

hypertension

cardiovascular problems

psychiatric side effects (derealization/depersonalization)

serotonin syndrome (hyperthermia, fatal rhabdomyolysis)

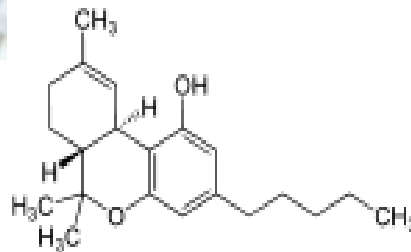




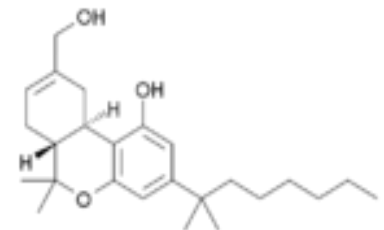
Naphthoyl-indoles
Aminoalkyl-indoles

**cannabinoid receptors
agonists**

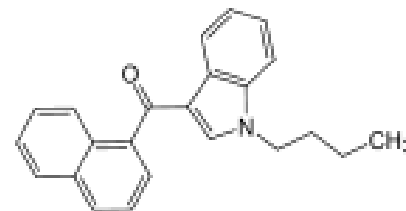
hypertension
tachycardia
myocardial infarction
agitation
vomiting
hallucinations
psychoses
seizures
panic attacks



THC



HU-210



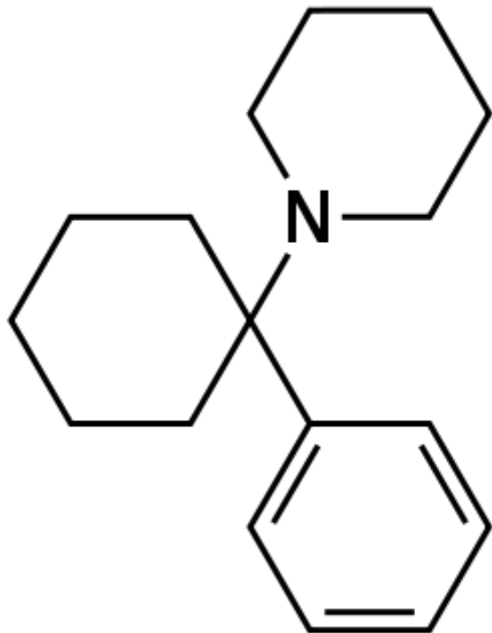
JWH-073

Phencyclidine (1-(1-phenylcyclohexyl)piperidine), PCP, angel dust

dissociative hallucinogenic effects

NMDA receptor antagonist

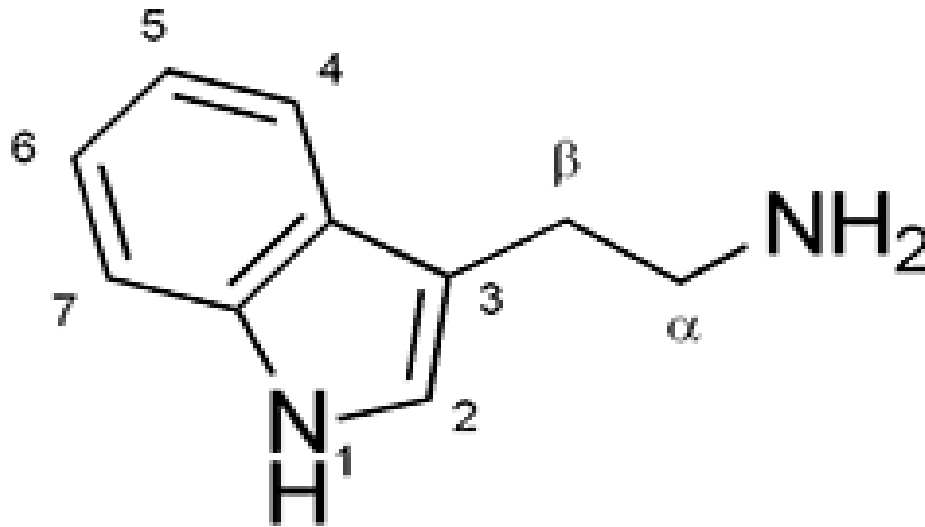
antiglutamatergic hallucinogen



**Dangerous
behaviours**

Tryptamines: monoamine alkaloid found in plants, fungi and animals

Binding serotonin receptors – hallucinogenic effects



Psilocybin (*O*-phosphoryl-4-hydroxy-*N,N*-dimethyltryptamine)

α-methyltryptamine

N,N-diisopropyltryptamine

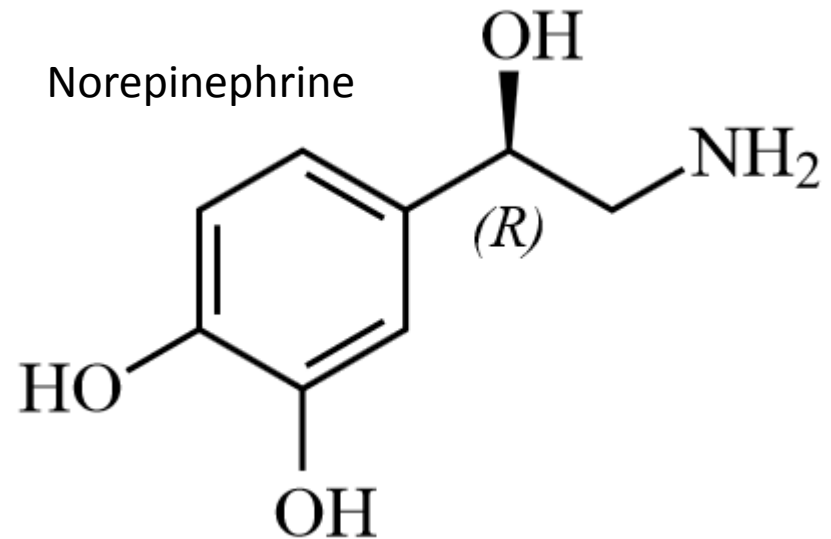
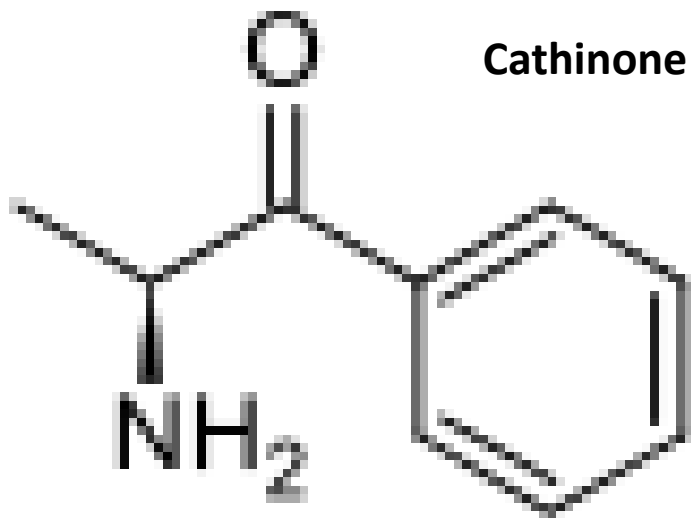
4-hydroxy-*N*-methyl-*N*-ethyltryptamine

Cathinone

Monoamine alkaloid found in *Catha edulis* (khat)

Cathinone induces the release of dopamine

Stimulant action



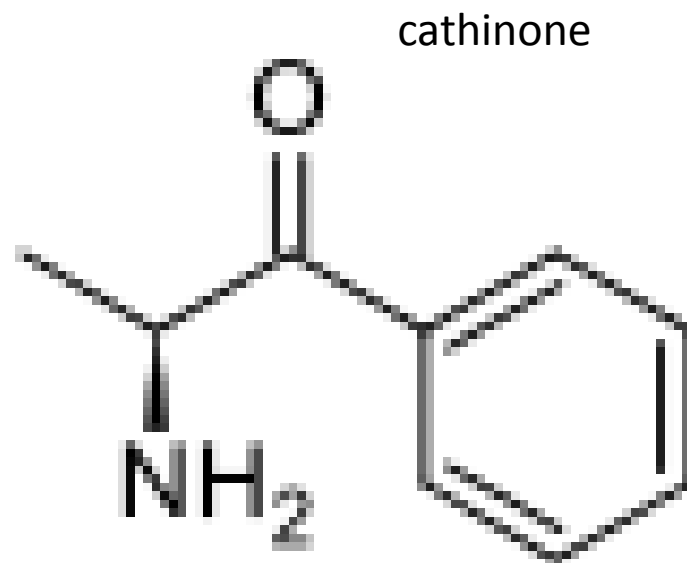
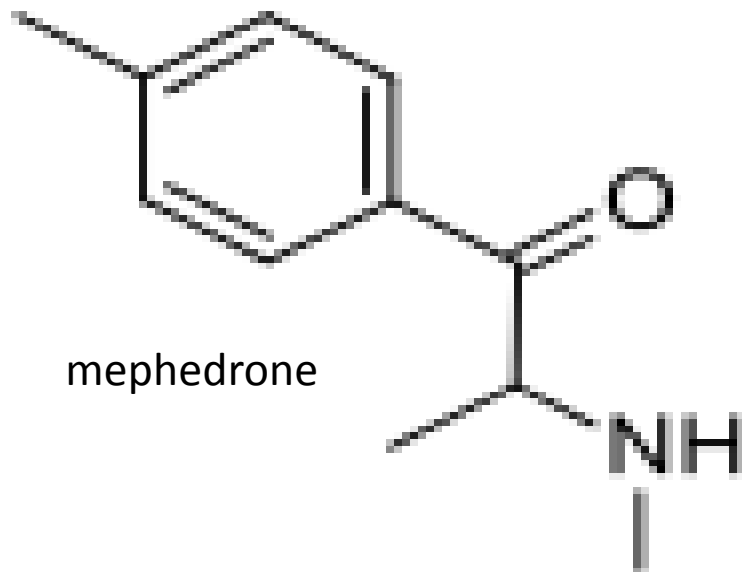
**Mephedrone, 4-methylmethcathinone(4-MMC)
or 4-methylephedrone:**

Mephedrone induces dopamine/norepinephrine release
Stimulant effects

Teeth grinding, cardiovascular problems

Bath salts containing substituted cathinones

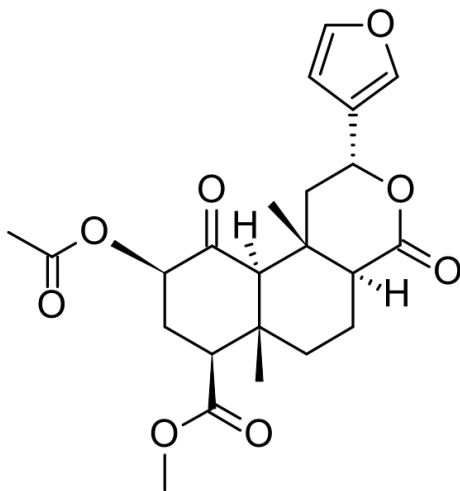
White crystals often resemble legal bathing products



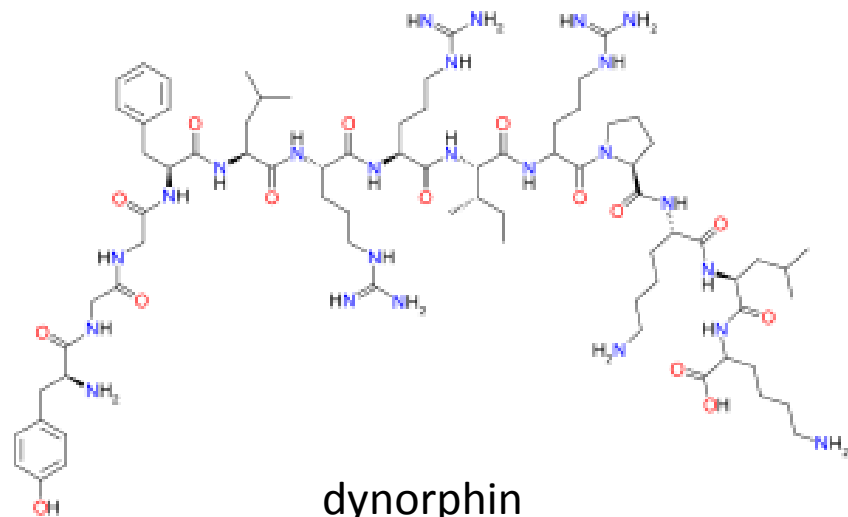
Salvia divinorum

- hallucinatory experiences
- visionary states of consciousness

salvinorin A: a potent κ -opioid and D_2 receptor agonist



salvinorin



dynorphin

Mitragyna speciosa (Alkaloid)

Kratom Low dose stimulant / high dose depressant

μ -opioid receptor agonist



management
of chronic pain

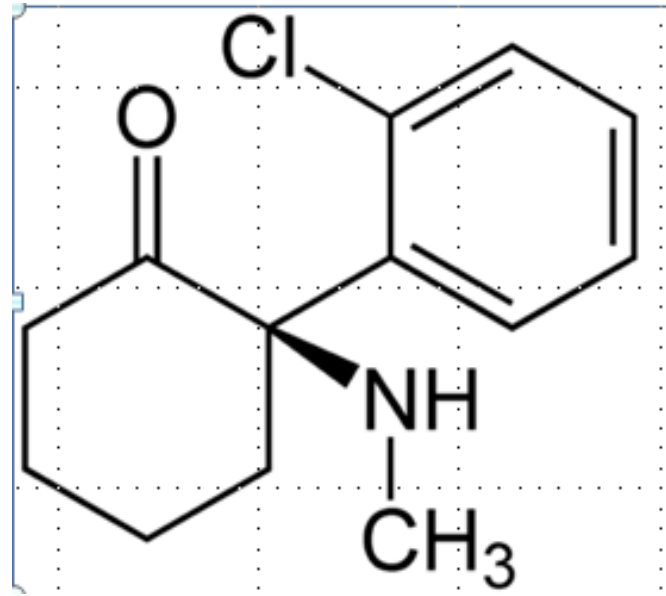
morphine like
effects

Dizziness
Double vision
Euphoria
Blurred vision
Finding it hard to express emotions
Feeling sick and vomiting
Nightmares
Illusions
Hallucinations
Changed body image
Impaired memory and attention

Ketamine is a NMDA antagonist

Dissociative anaesthetic

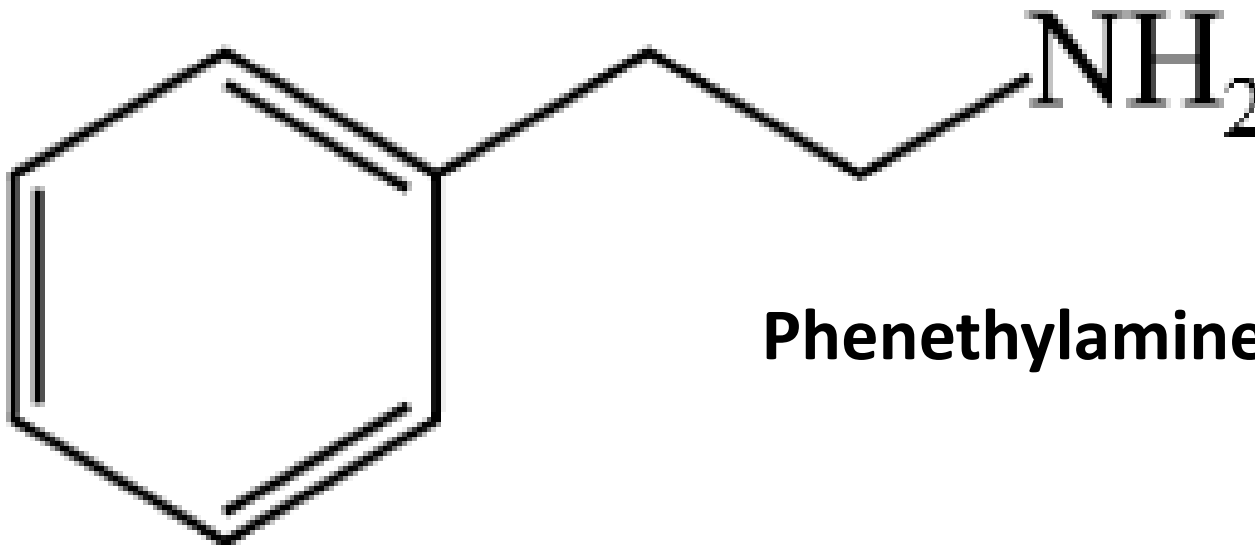
Useful drugs in shock/surgery patients
because of blood pressure maintained



Phenethylamine, β -phenethylamine, or phenylethylamine

a natural monoamine alkaloid
amine in the brain

Monoamines uptake inhibitors. Stimulant effects



Phenethylamine

Phenethylamine and derivatives

Phentermine

Mescaline 3,4,5 trimethoxyphenethylamine

MDMA 3,4-methylenedioxy-N-methylamphetamine

DOM 2,5-dimethoxy-4-methylamphetamine

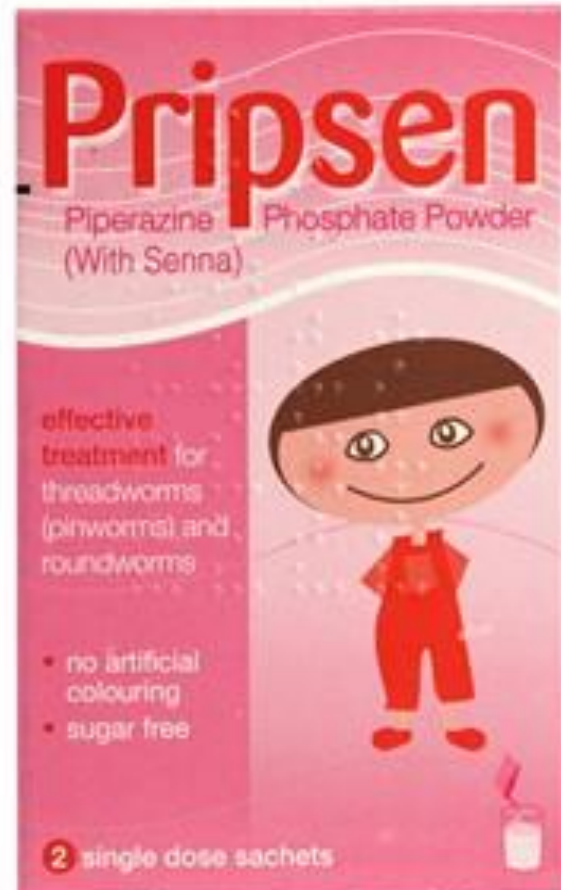
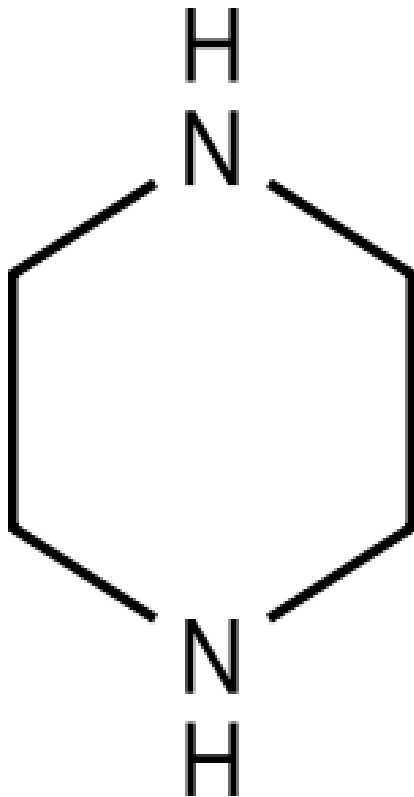
DOB 2,5-dimethoxy-4-bromo amphetamine

2C-B 2,5-dimethoxy-4-bromophenethylamine

Piperazine

organic compound

GABA (γ -aminobutyric acid) receptor agonist
Serotonin agonist



Piperazines

Clozapine

Olanzapine

4-Bromo-2,5-dimethoxy-1- benzylpiperazine(2C-B-BZP)

1-Benzylpiperazine (BZP)

2,3-Dichlorophenylpiperazine (DCPP)

4-Chlorophenylpiperazine(pCPP)

Sold as ecstasy

Stimulant / hallucinogenic effects

Sources:

Street/disco club/after-hour dealers

Herbal medicine shops

Prescriptions / diversion

Internet

Clandestine laboratories

Drug designers

Garage labs: limited impact

Criminal organizations (diversion from the legal market/precursors)

Clandestine large scale labs/production

Unemployed professionals recruited by criminal organizations

National Early Warning System 2009-2014

laboratories

emergency rooms

forensic toxicology labs

law enforcement reports

poison control centres

primary care reports

mental health reports

European Monitoring Center on Drugs

and Drug Addiction in Lisbon:

more than 360 new psychoactive substances

Control mechanism

CND request for WHO investigation/evaluation

CND approval after WHO report

Time necessary:

International control: years

National control: months

- The need of new regulations...
- Full market restriction for non-medical purposes

A more proportionate system: EU

Substance posing a moderate risk: consumer market restrictions

Substance posing a high risk: full consumer market restrictions

Does limited market restriction mean sold in a dispensary?

Does control mean exclusion from the medical use?

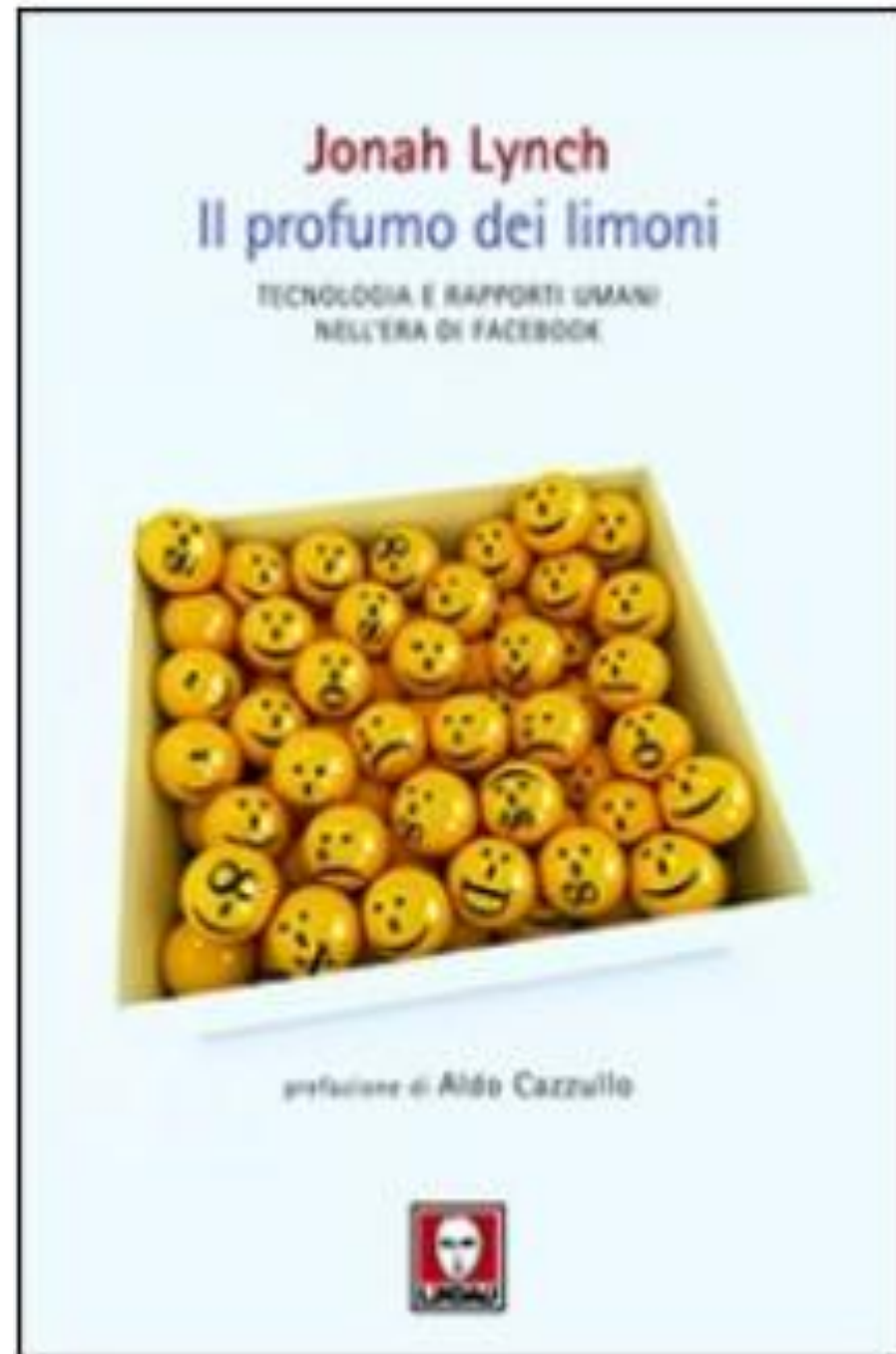
European Parliament (17-04-2014) : Commission Proposal
to tackle rapidly emerging new psychoactive substances
used as alternatives to illicit drugs (IP 13/837 and MEMO/13/790)

New Zealand more restricted control

The 41 substances previously available in the free market,
now under control.

**The virtual world
rather than the real one**

**The virtual contacts
rather than
the interpersonal
relationships**



The myth of creativity

**« Chemical effects are boring:
Need to change the environment
and the emotions to change
the effects...»**

(LSD user report, 1987)

A person is shown from behind, standing on a path that leads into a series of concentric, glowing circular portals. The person is in a meditative pose with arms outstretched. The scene is set against a dark, textured background, possibly a cave or a forest at night. The overall color palette is dominated by dark blues and greys, with bright white and yellow light emanating from the portals.

**The myth
of transcendence**

Enlightenment

**Spiritual
experiences**

The myth of knowing themselves in depth

