

Psychoactive Substances

GE1328 BMS CityU 2015

Part 1:

Journey to the Center of the Mind

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Definition

A psychoactive drug or psychotropic substance is a chemical substance that acts primarily upon the central nervous system where it alters brain function, resulting in temporary changes in perception, mood, consciousness and/or behavior.

Five Historical Themes: Why do people use drugs?

1. Human beings have a basic need to find ways to cope with their environment and existence.
 - Early man by chance and experimentation found that ingesting certain plants could ease fear and anxiety, reduce pain, treat some illnesses, give pleasure, and let them talk to their gods in order to control their environment.

Five Historical Themes: Why do people use drugs?

2. The human brain chemistry can be affected by psychoactive drugs to induce an altered state of consciousness or mood.

Psychoactive drugs: Any substance that directly alters normal functioning of the central nervous system. These drugs are described by their chemical, trade, and street names.

- a. If psychoactive drugs did not affect the human brain chemistry in a desirable manner, then they would not be used.

Five Historical Themes: Why do people use drugs?

3. Governments and businesses have been involved in cultivating, manufacturing, taxing, and prohibiting drugs.
4. Technological advances in refining and synthesizing drugs have increased the potency of these substances.
5. The development of more efficient and faster methods of putting drugs in the body has intensified the effects.
 - a. Mix, absorb, inhale, inject, snort, dissolve, smoke, and crush.

History of Psychoactive Drugs

Prehistoric & the Neolithic Period (8500 BCE -4000 BCE)

- It has been estimated that 4,000 plants yield psychoactive substances although only about 150 have historically been used for that purpose.
- Alcohol has been the most popular psychoactive substance over the millennia.

Ancient Civilizations (4000 BCE - 400 CE)

- Heavy drinking was recognized as a problem by the Egyptians when their hieroglyphics recommended the moderate consumption of beer.
- Hippocrates, the Father of Medicine, recommended opium as a painkiller.

History of Psychoactive Drugs

Middle Ages (400-1400)

- A Greek philosopher emphasized that opium and other drugs can be medicine at low doses, a psychoactive drug at a moderate dose, and a deadly poison at high doses.

Renaissance and Age of Discovery (1400-1700)

- Through trade and colonization European explorers, soldiers, merchants, traders and missionaries carried their own culture's drug using customs and drugs to the rest of the world.
- During this time came about the first laws about alcohol use and taxation.

History of Psychoactive Drugs

Age of Enlightenment and Early Industrial Revolution (1700-1900)

- London Gin Epidemic from 1710 – 1750: 1 in 6 houses was a gin house.
- Production of gin was 1.23 million gallons in 1700 to 6.4 million gallons in 1735 to 7 million gallons by 1751.
- The Tippling Act of 1751 prohibited distillers from selling gin (prices rose and consumption declined). This incident showed how unlimited availability of a desirable substance causes excess use. Only stiff taxes and strict regulation of sales brought the epidemic under control.

History of Psychoactive Drugs

Age of Enlightenment and Early Industrial Revolution (1700-1900)

continued:

- 1804: A German pharmacist discovered how to refine morphine from opium. Morphine is 10 times more powerful than opium causing it to be a more effective pain reliever.
- 1855: The reusable hypodermic needle was invented (drugs could easily be put directly into the bloodstream causing more intense effects).
- 1874: Heroin was refined from morphine, but it was not until 1898 that it was marketed as a remedy for coughs, chest pains, and tuberculosis.
- 1785: The first Temperance (limiting drinking) Movement was started by Dr. Benjamin Rush.

History of Psychoactive Drugs

Twentieth Century (1900-2000)

- The invention of the automatic cigarette rolling machine (1884), a milder strain of tobacco enabling smokers to inhale deeply, advertising, and a more plentiful supply of the leaf vastly expanded the market for cigarettes.
- 1920: The Eighteenth Amendment (Prohibition) – Prohibited the manufacture and sale of any beverage with an alcohol content greater than .5%.
- 1934: Alcoholics Anonymous (AA) was founded by two alcoholics Bill Wilson and Dr. Bob Smith.

Classification of Psychoactive Drugs

Psychoactive drugs: Any substance that directly alters normal functioning of the central nervous system. These drugs are described by their chemical, trade, and street names.

Major Drugs

Uppers: Stimulants

Physical Effects:

- Energized muscles
- Increase in heart rate and blood pressure
- Insomnia
- Decrease in appetite

Classification of Psychoactive Drugs

Mental/Emotional Effects:

- Increased confidence
- Gives you a rush
- Anxiety, aggressiveness, paranoia, and psychosis

Downers: Depressants

Physical Effects:

- Slows heart rate
- Relaxes and decreases inhibitions
- Dulls senses, sedates
- Sexual dysfunction

Classification of Psychoactive Drugs

Mental/Emotional Effects:

- Lower inhibitions
- Dulls mind, causes depression
- Physical and psychological dependence

All Rounders: (psychedelics) substances that can distort perceptions and induce illusions, delusions, or hallucinations.

Illusions: a mistaken perception of an external stimulus (i.e. rope misinterpreted as a snake).

Delusions: a mistaken idea that is not swayed by person or other powerful evidence (someone thinking that they can fly).

Hallucinations: a sensory experience that does not come from external stimuli (seeing something that does not exist).

Classification of Psychoactive Drugs

Physical Effects:

- Nausea and dizziness (generally)

Mental/Emotional Effects:

- Distorted sensory messages
- Hallucinations
- Delusions
- Illusions

Inhalants: gaseous or liquid substances that are inhaled and absorbed through the lungs.

Physical Effects:

- Act like depressants
- Dizziness, slurred speech
- Drowsiness, stupor, coma, asphyxiation

Classification of Psychoactive Drugs

Mental/Emotional *Effects*:

- Impulsivity
- Excitement
- Delirium and hallucinations

Anabolic Steroid and Sports Drugs

Physical Effects:

- Increased muscle mass
- Acne
- Shrunken testes; masculinized women

Mental/Emotional Effects

- Confidence
- Rhoid Rage (outbursts of anger; temper tantrums)

Five common ways that drugs enter the body:

- 1. Inhaling:** Acts more quickly than any other method of use (7-10 seconds before the drug reaches the brain and begins to cause changes).
- 2. Injecting:** Intravenous, intramuscular, and subcutaneous (15-30 seconds intravenously, 3-5 minutes in a muscle or under the skin).
- 3. Mucous Membrane Absorption:** Snorted in the nose, under the tongue, or between the cheeks and the gums (3-5 minutes).
- 4. Oral Ingestion:** Absorbed in stomach (20-30 minutes).
- 5. Contact Absorption:** Applied to the skin through saturated adhesive patches (1 to 2 days).

PSYCHOACTIVE DRUGS FROM PLANTS

Importance

- o cultural
- o medicinal–pharmacological
- o economic
- o abuse–recreational–addiction

Most important drugs

- o Near Eastern center

 - + ergot (LSD)

 - + cannabis–marijuana

 - + opium–*Papaver*

 - + *Amanita muscaria*

- o South America

 - + coca

 - + yagé or ayahuasca

 - + virola

- o Africa
 - + khat
 - + iboga

- o Mexico
 - + peyote (peyotl)
 - + ololiuqui
 - + *Heimia*
 - + *Psilocybe*
 -

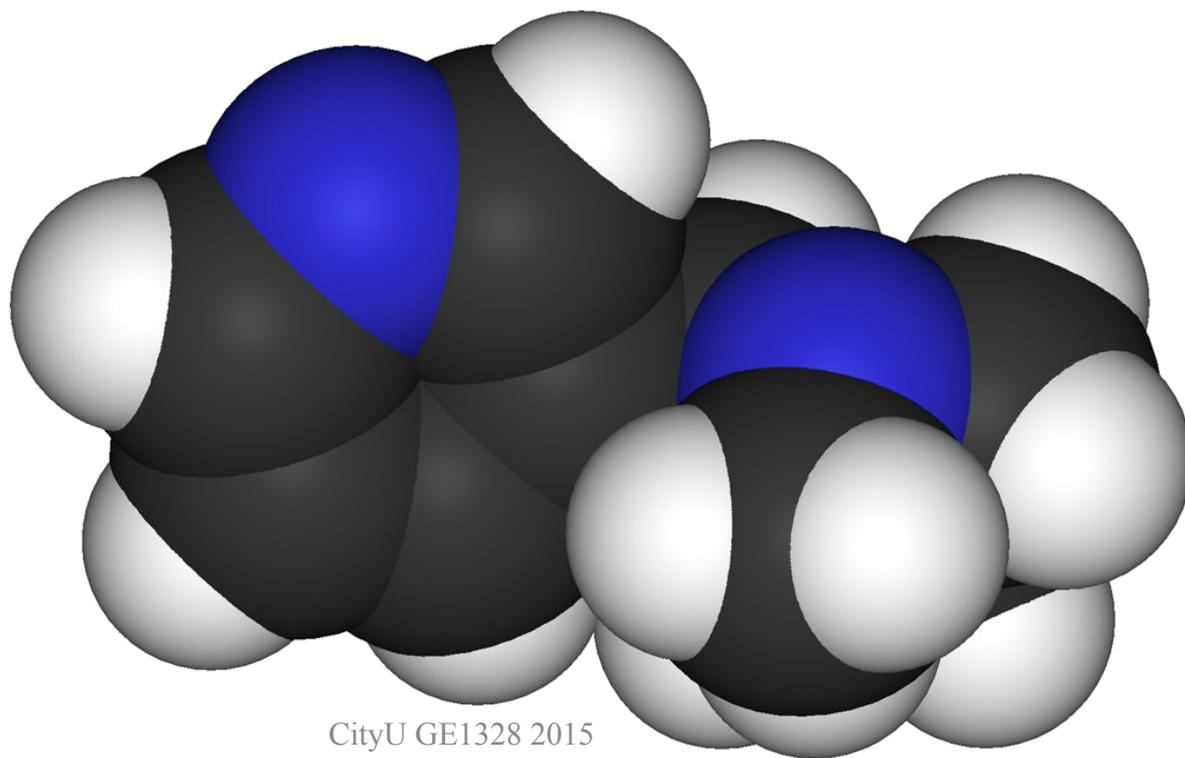
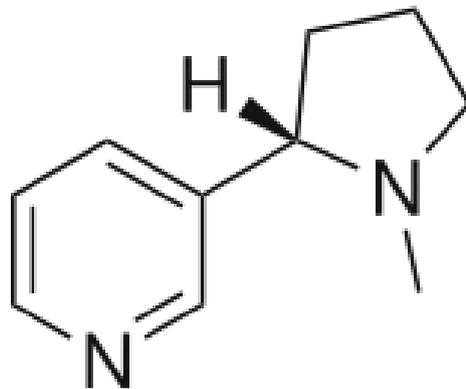
- o South Pacific
 - + Kava

The 2 Most Dangerous & Addictive Drugs are Legal

Nicotine

Alcohol

Nicotine



Nicotine

Nicotine is a potent parasympathomimetic alkaloid found in the nightshade family of plants (*Solanaceae*) and a stimulant drug. It is a nicotinic acetylcholine receptor (nAChR) **agonist**, except at nAChR α 9 and nAChR α 10 where it acts as an antagonist. It is made in the roots of and accumulates in the leaves of the nightshade family of plants. It constitutes approximately 0.6–3.0% of the dry weight of tobacco and is present in the range of 2–7 $\mu\text{g}/\text{kg}$ of various edible plants. It functions as an antiherbivore chemical; consequently, nicotine was widely used as an insecticide in the past and nicotine analogs such as imidacloprid are currently widely used.



He's one of the busiest men in town. While his door may say *Office Hours 2 to 4*, he's actually on call 24 hours a day.

The doctor is a scientist, a diplomat, and a friendly sympathetic human being all in one, no matter how long and hard his schedule.

According to a recent Nationwide survey:

MORE DOCTORS SMOKE CAMELS THAN ANY OTHER CIGARETTE

DOCTORS in every branch of medicine—113,597 in all—were queried in this nationwide study of cigarette preference. Three leading research organizations made the survey. The gist of the query was—What cigarette do you smoke, Doctor?

The brand named most was Camel!

The rich, full flavor and cool mildness of Camel's superb blend of costlier tobaccos seem to have the same appeal to the smoking tastes of doctors as to millions of other smokers. If you are a Camel smoker, this preference among doctors will hardly surprise you. If you're not—well, try Camels now.



Your "T-Zone" Will Tell You...

**T for Taste ...
T for Throat ...**

that's your
proving ground
for any cigarette.
See if Camels
don't suit your
"T-Zone" to a "T."



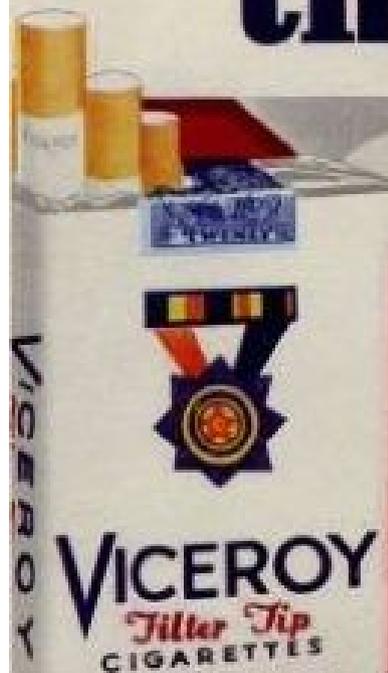
CAMELS

Costlier Tobaccos

R. J. REYNOLDS
TOBACCO COMPANY
WELLS-BRIGGS, N. C.

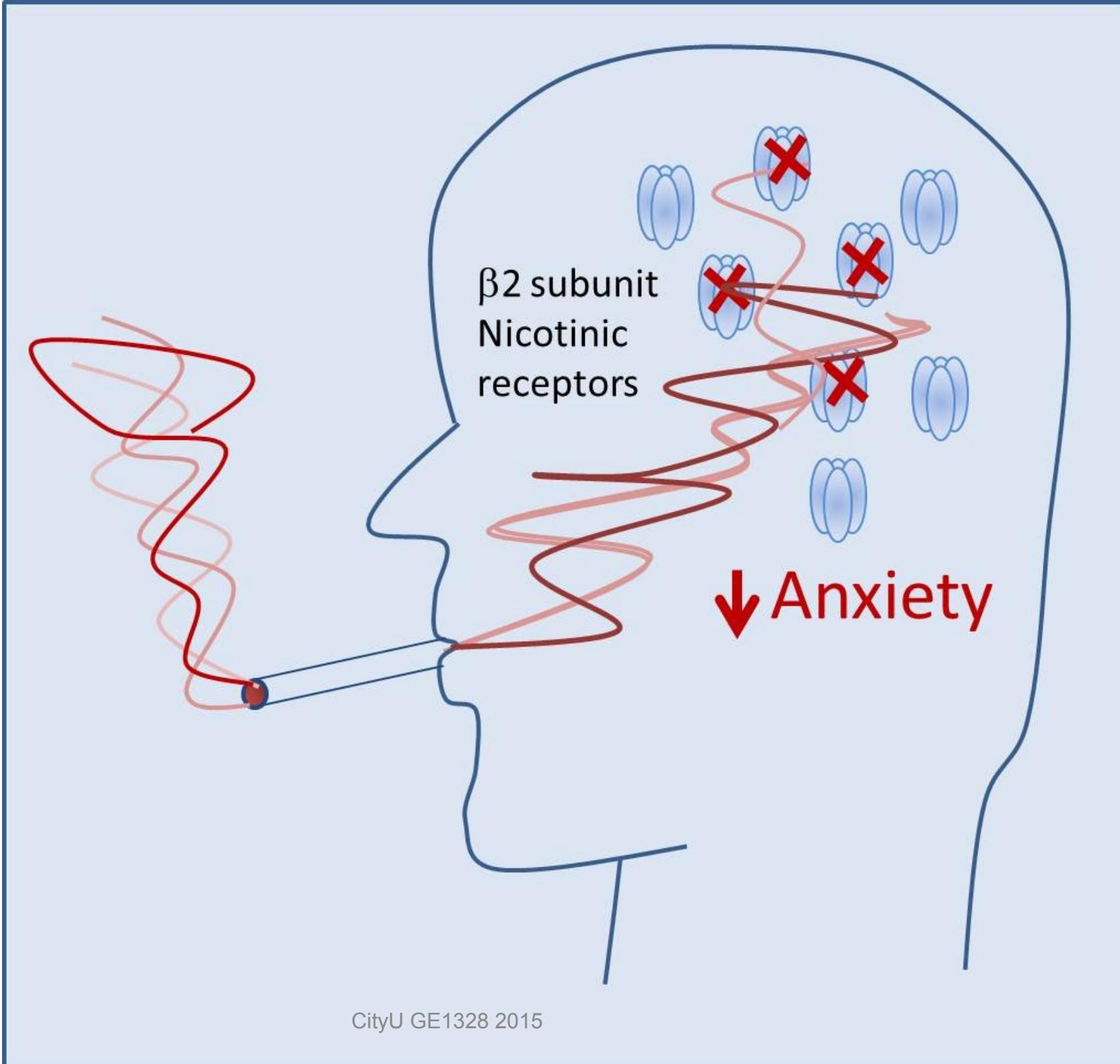
Viceroy's

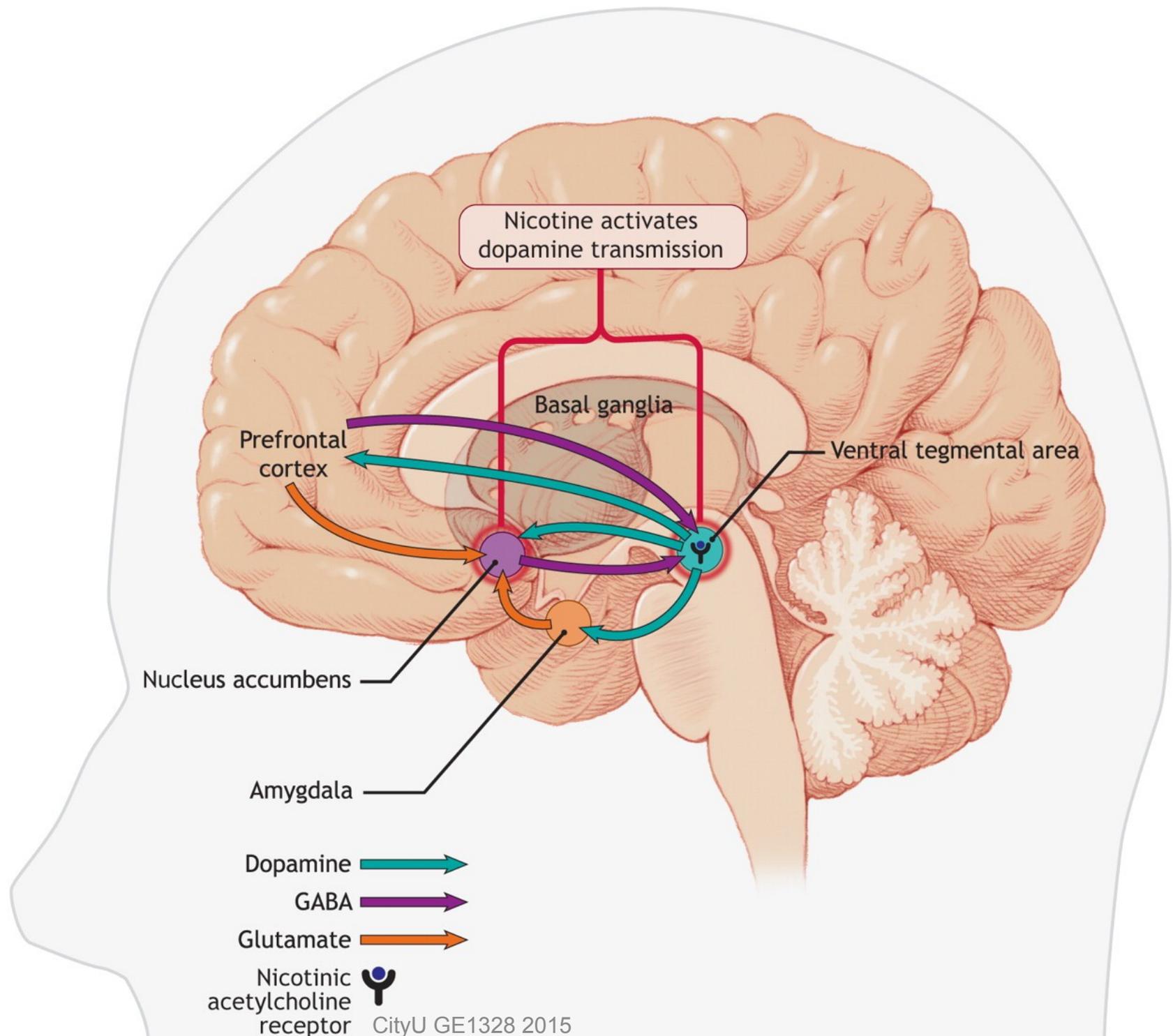
FILTER
the Smoke!



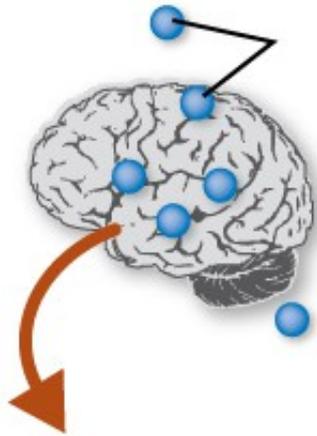
As your Dentist,
I would recommend
VICEROYS





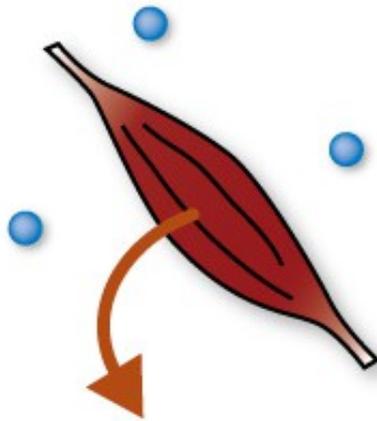


Brain



- Stimulation of central nervous system
- Addiction

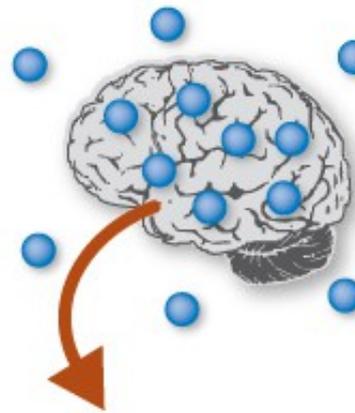
Muscle



- No effect

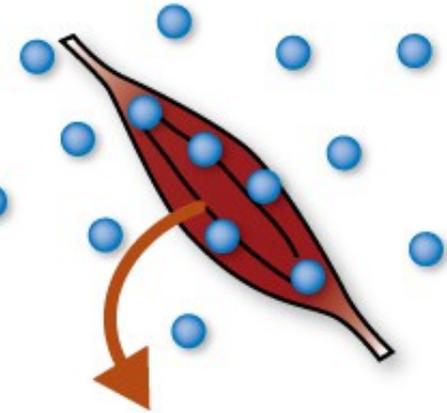
At low concentrations, nicotine binds only to receptors in the brain.

Brain



- Confusion
- Seizure
- Coma

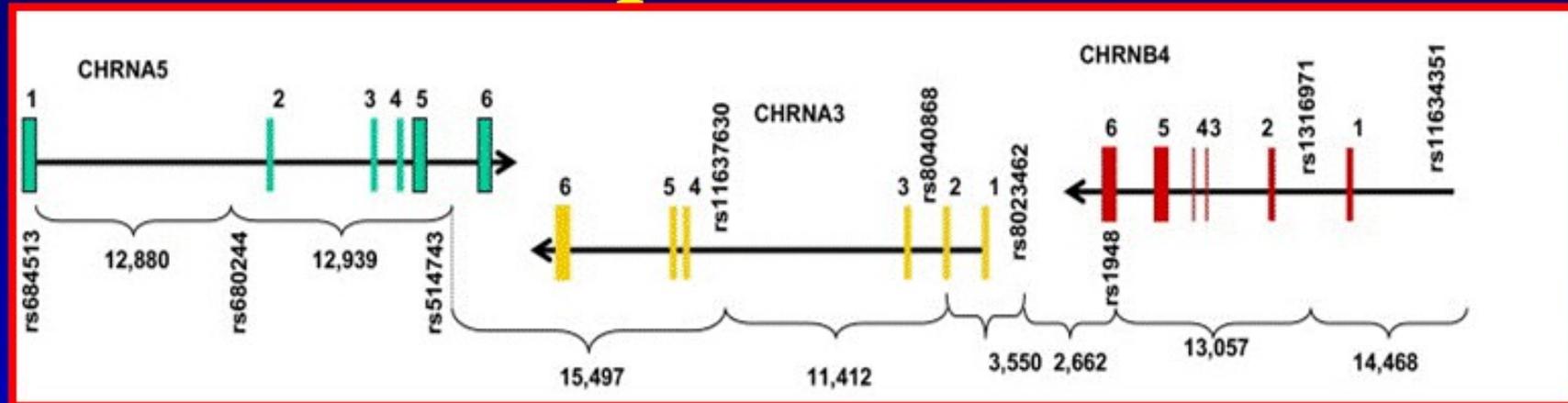
Muscle



- Muscular twitching
- Muscle paralysis
- No breathing

At high concentrations, nicotine binds to receptors both in the brain and on muscles.

Gene Cluster is Associated with Nicotine Dependence



Human Molecular Genetics, 2007, Vol. 16, No. 1 24-
doi:10.1093/hmg/ddl441
Advance Access published on December 7, 2006

Novel genes identified in a high-density genome wide association study for nicotine dependence

Laura Jean Bierut^{1,*}, Pamela A.F. Madden¹, Naomi Breslau², Eric O. Johnson³,
Dorothy Hatsudis¹, Louis Fox¹, Nicholas G. Martin¹, and Jen C. Wang¹

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The CHRNA5/A3/B4 Gene Cluster Variability as an Important Determinant of Early Alcohol and Tobacco Initiation in Young Adults

Isabel R. Schlapfer, Nicole R. Hoft, Allan C. Collins, Robin P. Corley, John K. Hewitt, Christian J. Hopfer, Jeffrey M. Lessem, Matthew B. McQueen, Soo Hyun Rhee, and Marissa A. Ehringer

Molecular Psychiatry (2008), 1-6
© 2008 Nature Publishing Group. All rights reserved 1359-4184/08 \$30.00
www.nature.com/mp

IMMEDIATE COMMUNICATION

α -5/ α -3 nicotinic receptor subunit alleles increase risk for heavy smoking

W Berrettini^{1,2,3}, X Yuan^{2,3}, F Tozzi^{2,3}, K Song^{2,3}, C Francks^{2,3}, H Chilcoat⁴, D Waterworth^{2,3}, P Muglia^{2,3,5} and V Mooser^{2,3}

Vol 452 | 3 April 2008 | doi:10.1038/nature06846

A variant associated with nicotine dependence, lung cancer and peripheral arterial disease

Thorgeir E. Thorgeirsson^{1,*}, Fozan Geller^{1,5}, Patrick Sulem^{1,*}, Thorunn Rafnar^{1,*}, Anna Wiste^{1,2}, Kristinn P. Magnusson¹, Andrei Manolescu¹, Gudmar Thorleifsson¹, Hreinn Stefansson¹, Andres Ingason¹, Simon N. Stacey¹, Jon T. Bjornthorsson¹, Steingunnur Thorgeirsdottir¹, Julius Gudmundsson¹, Thorlakur Jonsson¹

Side effects of **Nicotine**

Blood
- Increased clotting tendency

Lungs
- Bronchospasm

Muscular
- Tremor
- Pain

Gastro-intestinal
- Nausea
- Dry mouth
- Dyspepsia
- Diarrhea
- Heartburn

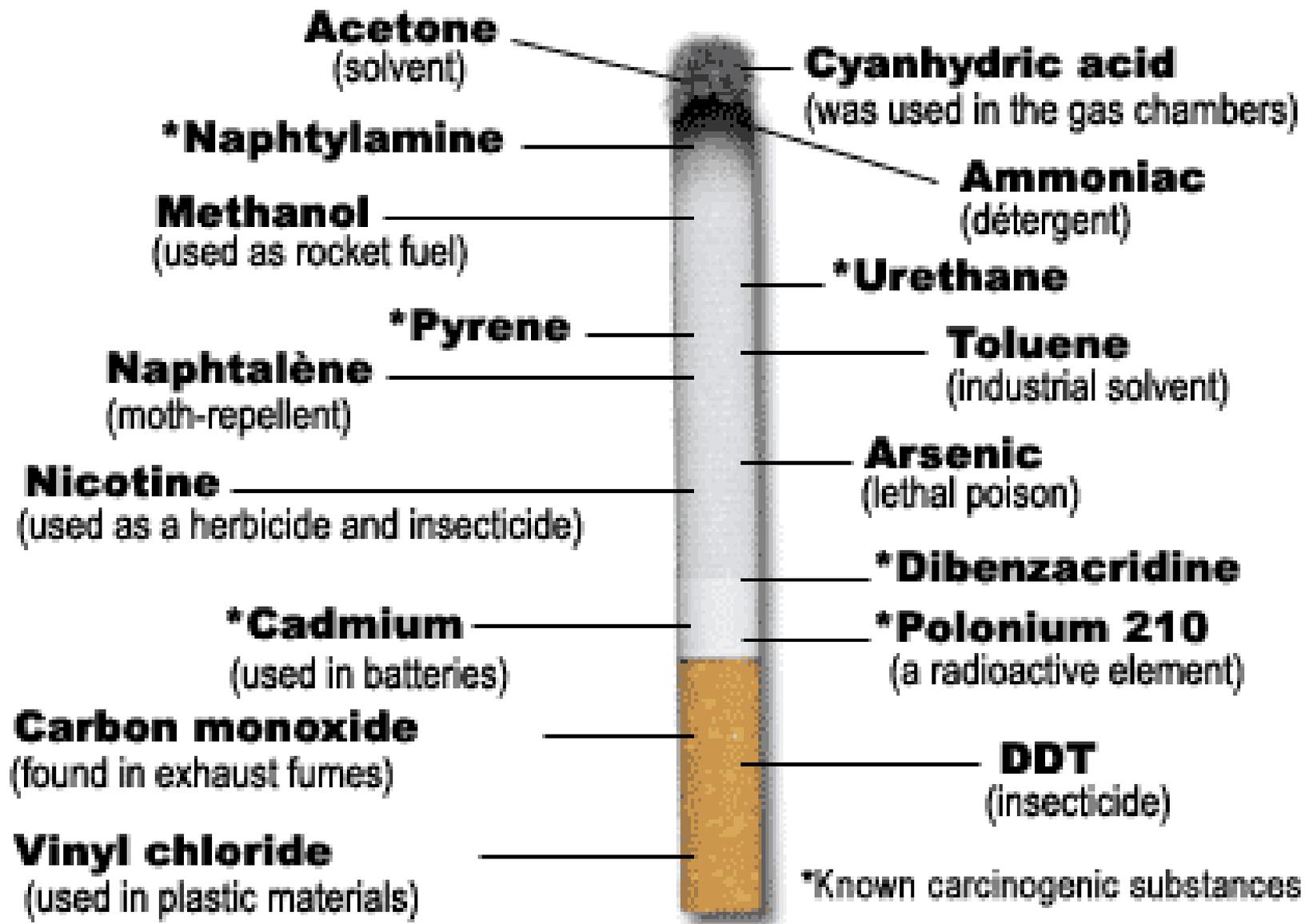
Joints
- Pain

Central
- Lightheadedness
- Headache
- Sleep disturbances
- Abnormal dreams
- Irritability
- Dizziness

Heart
- Increased or decreased heart rate
- Increased blood pressure.
- Tachycardia
- More (or less) arrhythmias
- Coronary artery constriction

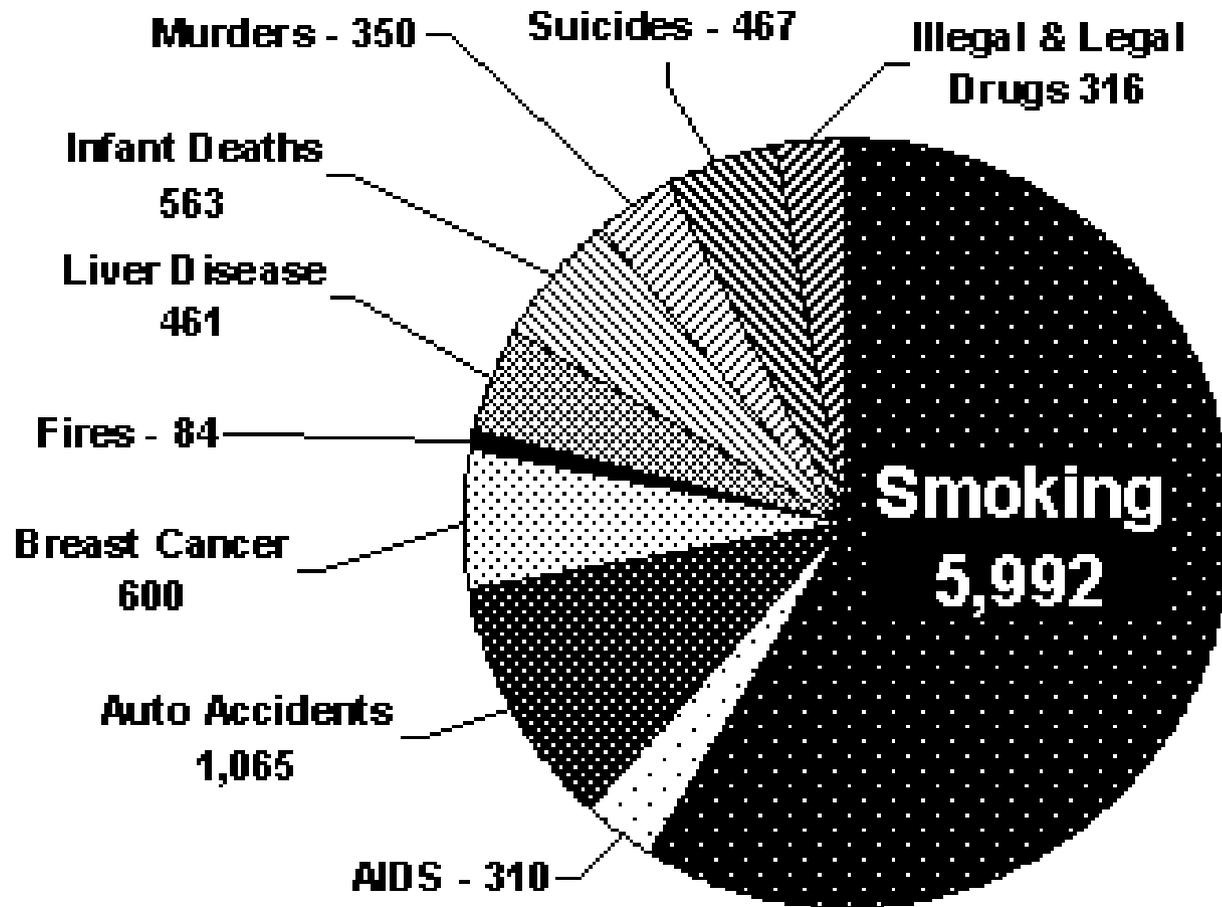
Endocrine
- Hyperinsulinemia
- Insulin resistance

DANGER POISON !



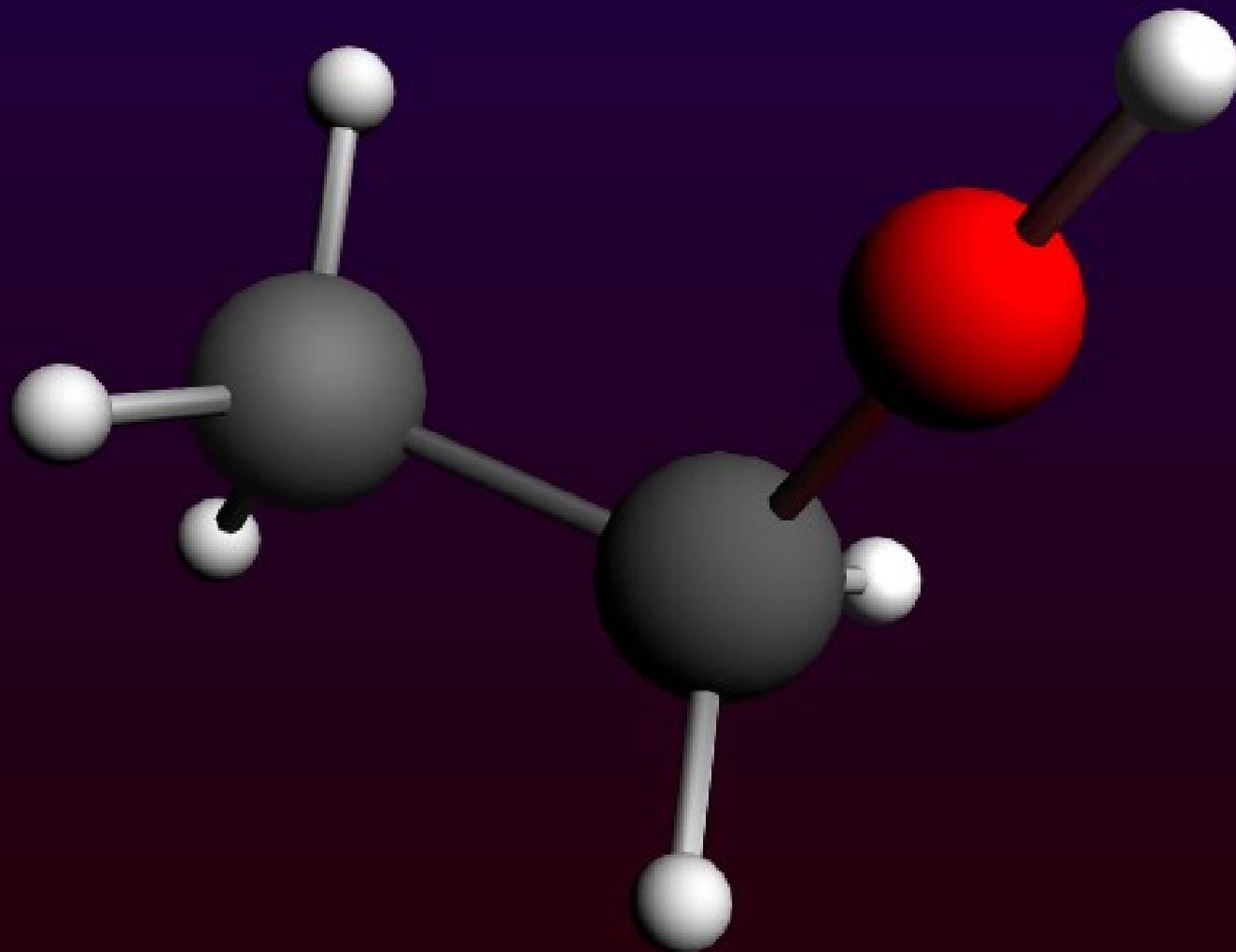
STOP SMOKING!

Select S.C. Annual Death Tolls



Sources: 1999-2001 CDC Death Statistics and U.S. 2000 Census

Ethanol





TONI-KOLA
VIN APERITIF A LA KOLA
SE BOIT TRES FRAIS

DEBILITE - NEURASTHENIE - FAIBLESSE - CONVALESCENCE

BIODYNAMINE

OBERLIN

Formule pour
10 cc. de Vin
de Quinquina aromatisé

- Sulfate de Strychnine 0,0016
- Méthylarsinate de Soude 0,012

Reconstituant, Stimulant, Véritable Aliment

MODE D'EMPLOI : 1, 2 ou 3 cuillerées à soupe
suivant indications du Médecin.
Général. Atonie, Surmenage, Neurasthénie

Pris 57,30
Médicament autorisé

Arrêté 5480 du 16-7-1911
Ancien de 1^{re} Classe de la
17, Rue Cadet, PARIS

Exposé au Laboratoire National de Contrôle des Médicaments

Effects of Alcoholism and Alcohol Abuse

Brain

Headaches, Blackouts, Delusions, Paranoia, Forgetfulness, Impaired Judgement, Decline in IQ, Dementia, Epileptic fits, Wernickes disease (due to vitamin deficiency), Haemorrhage, Peripheral neuritis, Korsakoff's psychosis & Death

Nervous System

Peripheral neuritis - degeneration of the nervous system supplying limbs

Throat

Pressure on portal circulation- risk of haemorrhage. Increased incidence of cancer - 40x if smoker

Lungs

A small amount of alcohol escapes unused via breath 2-4%

Gullet

Corrosive effect - risk of cancer

Liver

Fatty cells, tissue scarring, jaundice, hepatitis, irreversible cirrhosis - the liver breaks down 90% of alcohol consumed

Muscles

Degeneration, weakness, pain

Kidneys

A small amount of alcohol escapes unused via urine 2-4%

Heart

Weak & "fatty" heart, weakening of heart muscles, high blood pressure. Anaemias due to decreased absorption of vitamins.

Pancreas

Bad digestion, malnutrition, early diabetes

Stomach

Gastritis, peptic ulcer (direct corrosive effect)

Sweat Glands

A small amount of alcohol escapes unused via sweat glands 2-6%

Fingers

Pins & needles

Sex Organs

Male

Depressed testicular production, impotence, breast growth due to female hormones not broken down by liver

Intestines

Inflammation (corrosion from alcohol)

Nervous System

Malfunctions, skakiness, tremors

Female

Failure to ovulate, spontaneous abortion

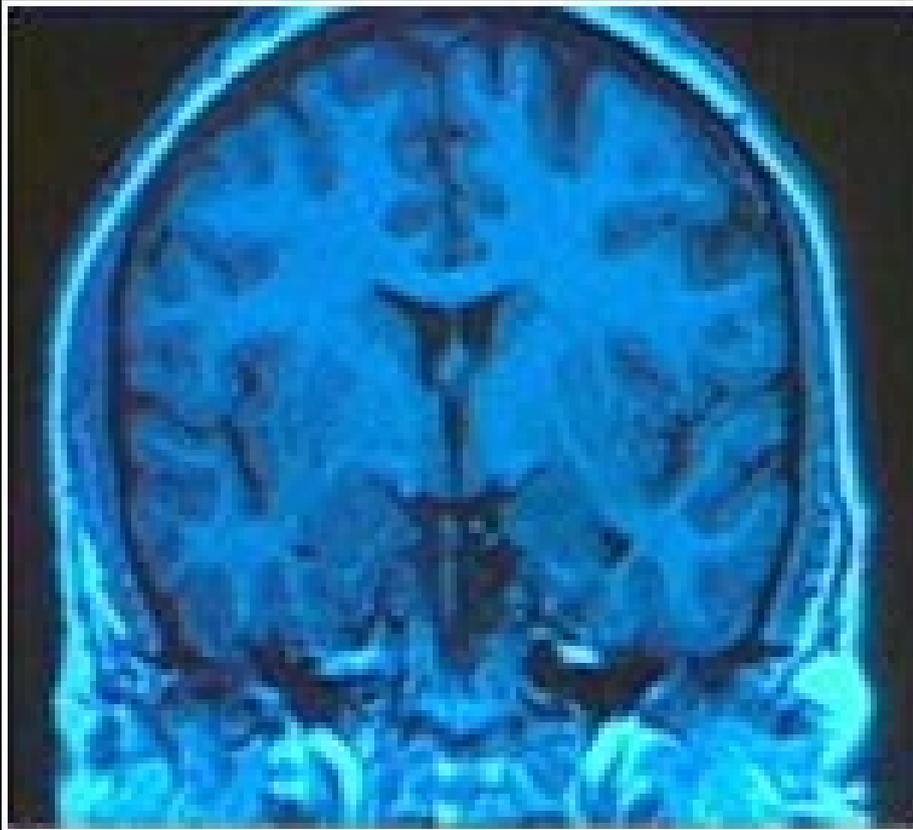
Bones

Degeneration - risk of fracture

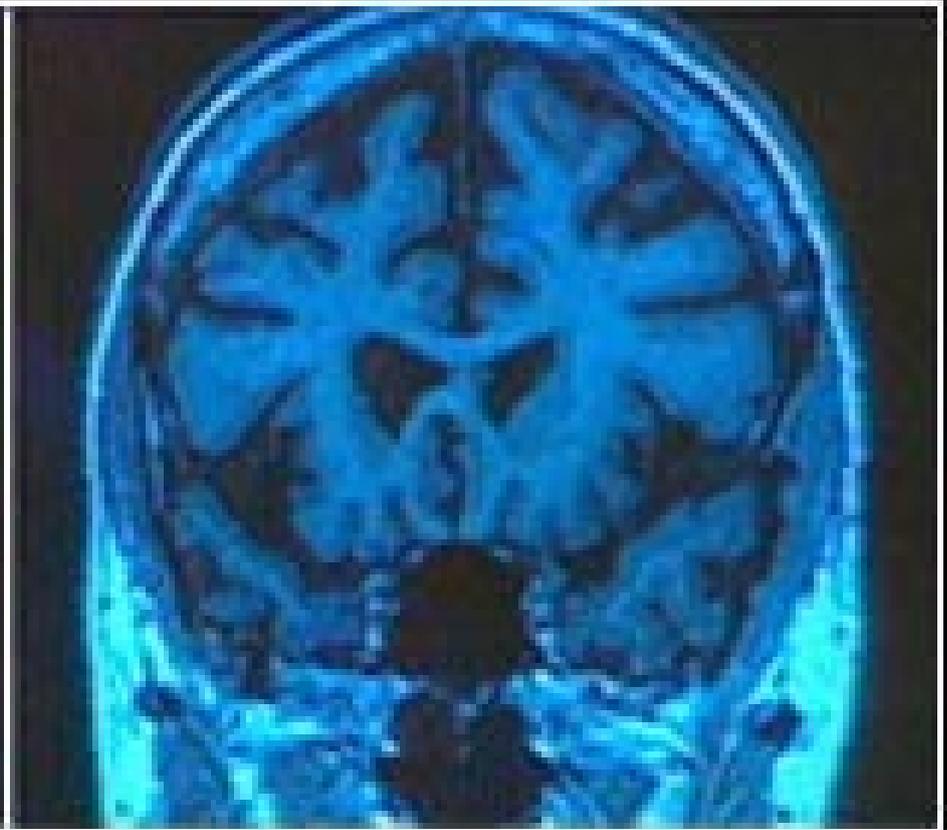
CityPage 1328, 2015

Morningside Recovery

Alcohol pickles your brain



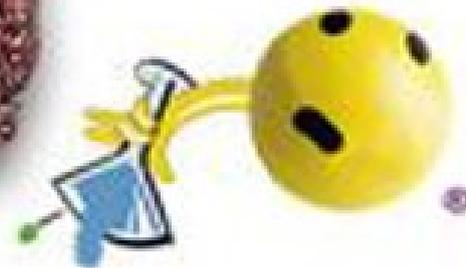
Normal
43-year-old



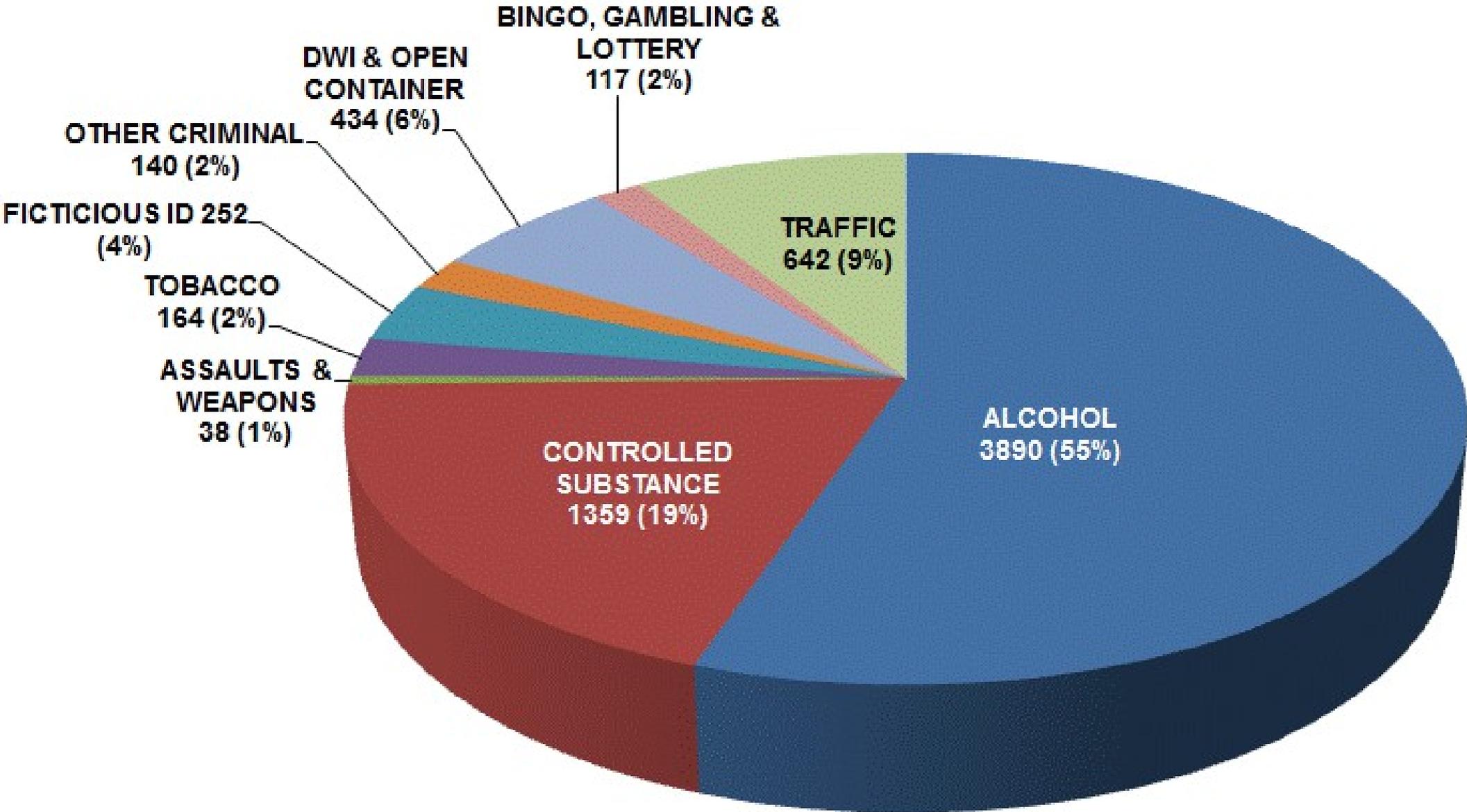
Alcoholic
43-year-old



Healthy



Cirrhosis



France: 68 Million Inhabitants

2015 Report on Costs/year to the Community

Alcohol: **240 Billions €**; Illicit Drugs: **8.7 B. €**



HORRIFYING FACTS

○ Alcohol is the primary **drug of abuse** in SA.

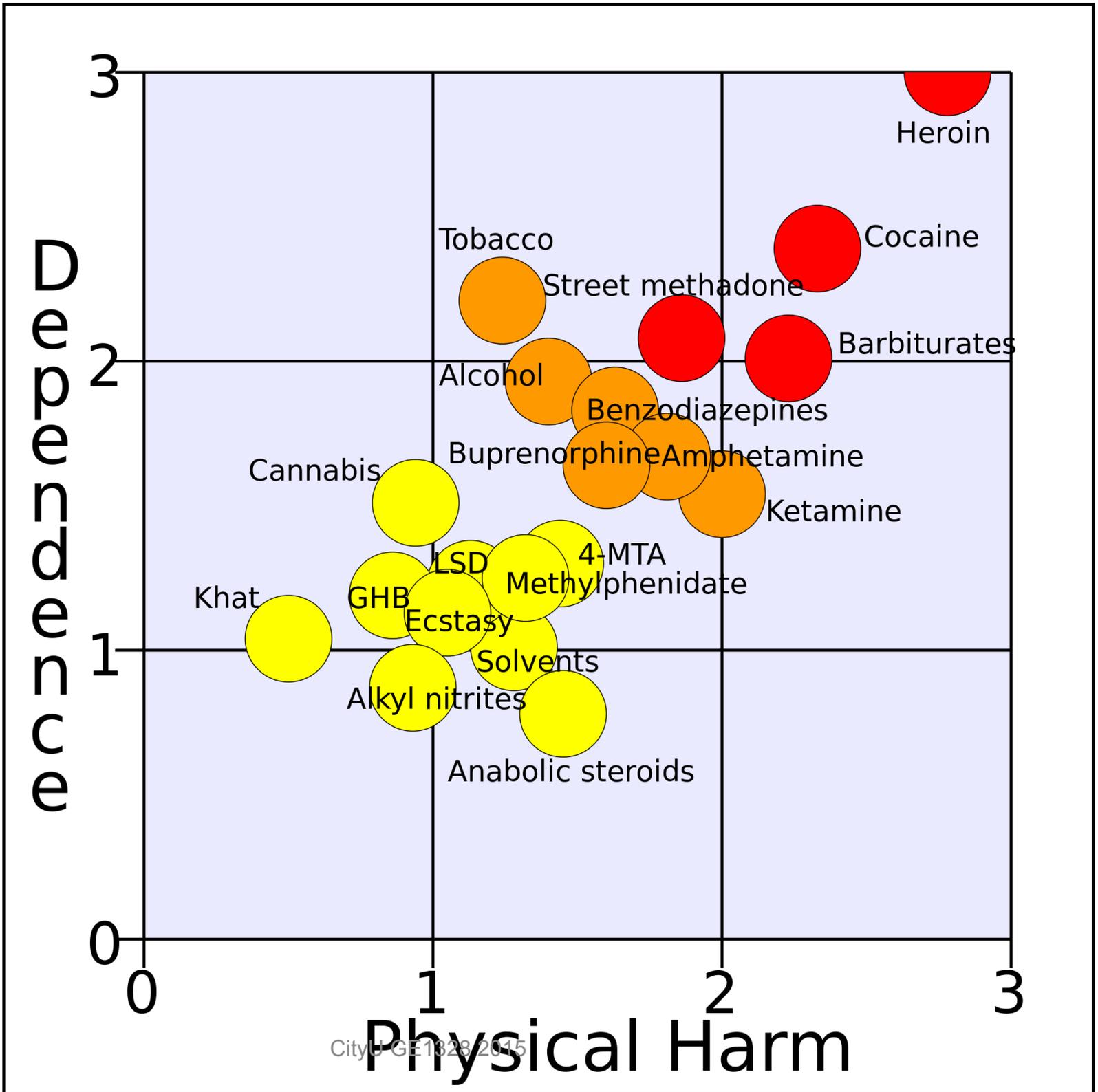
- Over 30% of our population have an alcohol problem or are at risk of having one.

○ It's responsible for **nearly half** of all motor accidents.



- 18-22 years olds are the group of heaviest alcohol abuse
- 20% of 14 year old boys and 49% of 17 year old boys used alcohol
- Girls was a bit lower with 18% of 14 year olds and 35% of 17 year olds

Stats from department Social Development in South Africa -Central Drug Authority (CDA) an advisory body in terms of the Prevention of and Treatment for Substance Abuse Act (Act No. 70 of 2008) and is mandated to assist in the fight against substance abuse in the country.



End of Part One