



Introduction To Substance Use and Related Disorders

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What substances with abuse do you know?

- Please try to answer by your self before you go to the next slide

✓ ?

✓ ?

✓ ?

✓ ?

ICD 10: F10-F19 Mental and behavioural disorders due to psychoactive substance use

- F10 - Alcohol
 - F11 - Opioids
 - F12 - Cannabinoids
 - F13 - Sedatives or hypnotics
 - F14 - Cocaine
 - F15 - Other stimulants including caffeine and khat
 - F16 - Hallucinogens
 - F17 - Tobacco
 - F18 - Volatile solvents
 - F19 - Multiple drug use and use of other psychoactive substances
- Four- and five-character codes may be used to specify the clinical conditions

What Common Myths About Drug Abuse you know?...

- Please list what you know

Common Myths About Drug Abuse...

- Alcohol is not a drug
- Addiction is a moral weakness
- Drug abuse equates to drug addiction
- You have to want treatment for it to be successful
- Drug abuse is more common among minorities and

Why concern about substance abuse and addiction?

- Please try to answer by your self before you go to the next slide

✓ ?

✓ ?

✓ ?

✓ ?

Why concern about substance abuse and addiction?

- Abuse and addiction to alcohol, khat, tobacco, and illegal substances cost all over the world and in Ethiopia enormous amounts of money considering their combined medical, economic, criminal, and social impact.

Contributors to the Economic Costs of Substance Abuse and Addiction

- **Health care expenditures**
 - Alcohol and drug abuse services
 - Medical consequences
- **Productivity (lost earnings)**
 - Premature death
 - Impaired job performance
 - Institutionalized population
 - imprisonment
 - Criminal victimization
- **Other impacts on society**
 - Crime
 - Social welfare administration
 - Vehicular accidents

What is addiction?

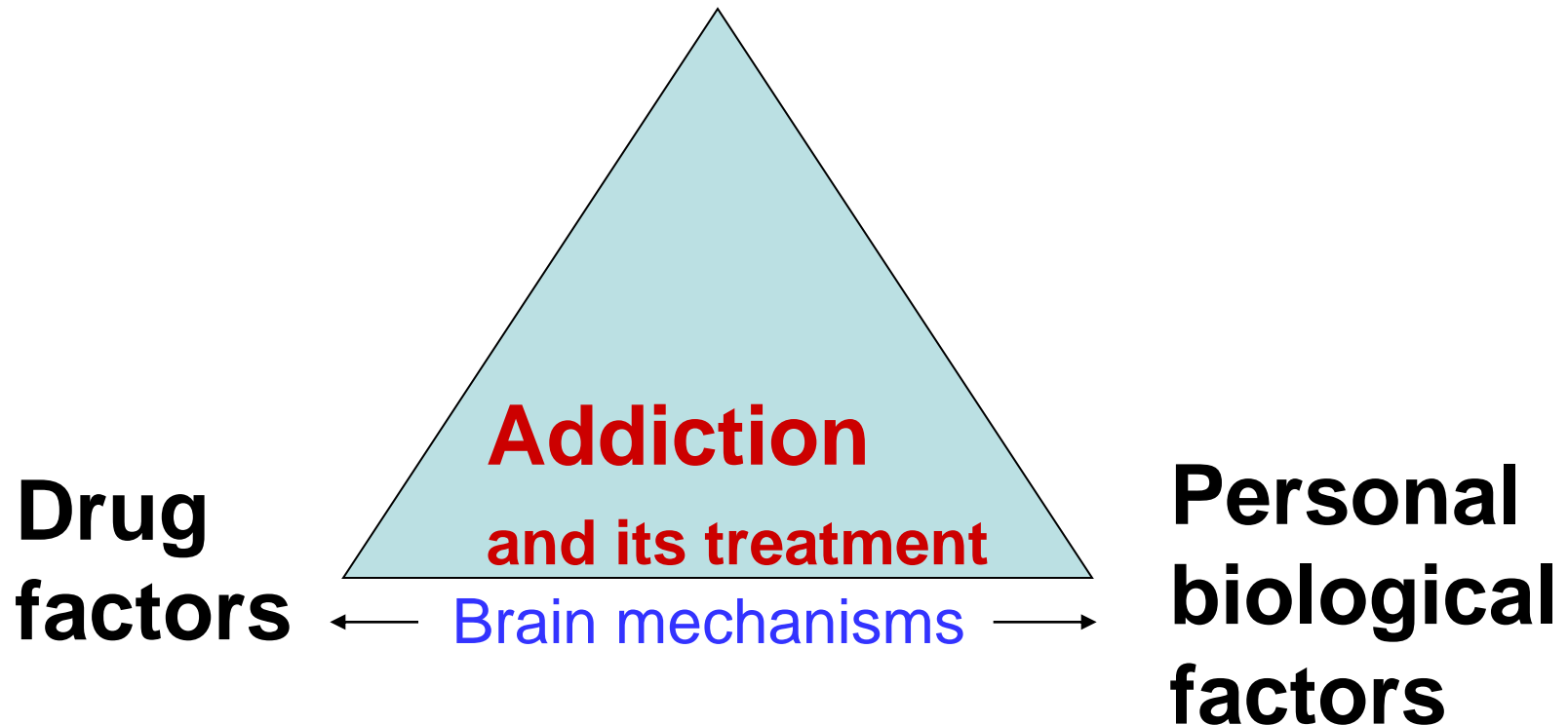
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What is addiction?

- Addiction is defined as a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences.
- It is considered a brain disease because drugs change the brain - they change its structure and how it works.
- These brain changes can be long lasting, and can lead to the harmful behaviours seen in people who abuse drugs.

Addiction – 3 elements

social / cultural factors



Who suffers as a result from substance abuse?

- Please try to answer by your self before you go to the next slide

Who suffers as a result from substance abuse?

- **Unborn**

exposed to legal and illegal drugs in the womb may be born premature and underweight. This drug exposure can slow the child's intellectual development and affect behaviour later in life.

- **Children and Adolescents**

who abuse drugs often act out, do poorly academically, and drop out of school. They are at risk of unplanned pregnancies, violence, and infectious diseases.

Cont...

- **Adults**

who abuse drugs often have problems thinking clearly remembering, and paying attention. They often develop poor social behaviours as a result of their drug abuse, and their work performance and personal relationships suffer.

- **Parents**

drug abuse often means chaotic, stress-filled homes and child abuse and neglect. Such conditions harm the well-being and development of children in the home and may set the stage for drug abuse in the next generation.

Why do you think people take drugs/substance?

- Please try to answer their reason to take substance before you go to the next slide

Why do people take drugs/substance?

- **To feel good.** Most abused drugs produce intense feelings of pleasure. This initial sensation of euphoria is followed by other effects, which differ with the type of drug used. Drugs are used to make social interactions easier.
- **To feel better.** Some people who suffer from social anxiety, stress-related disorders, and depression begin abusing drugs in an attempt to lessen feelings of distress, relief of pain, improve sleep.

Cont...

- **To do better.** The increasing pressure that some individuals feel to chemically enhance or improve their athletic or cognitive performance, to feel more energetic.
- **Curiosity and “because others are doing it.”**
In this respect adolescents are particularly vulnerable because of the strong influence of peer pressure; they are more likely, for example, to engage in “exciting” and “daring” behaviours

If taking drugs makes people feel good, what's the problem?

- At first, people perceive the positive effects with substance use and they think they can control their use; however, drugs can quickly take over their lives.
- Consider how a social drinker can become intoxicated, drives a car and quickly turn a pleasurable activity into a heartbreak for him and others.

Cont...

- Over time, if substance use continues, pleasurable activities become less pleasurable, and drug abuse becomes necessary for abusers to simply feel “normal.”
- Substance abusers reach a point where they seek and take drugs, despite the remarkable problems caused for themselves and their loved ones.
- Some individuals may start to feel they need to take higher or more frequent doses.

Why do some people become addicted to drugs, while others do not?

- As you did previously please try for your self

Why do some people become addicted to drugs, while others do not?

As with any other disease, vulnerability to addiction differs from person to person. In general, the more risk factors an individual has, the greater the chance that taking drugs will lead to abuse and addiction. “Protective” factors reduce a person’s risk of developing addiction.

What factors determine if a person becomes addicted?

What factors determine if a person becomes addicted?

The overall risk for addiction is impacted by:

- ✍ The biological makeup of the individual
- ✍ Influenced by gender
- ✍ Developmental stage
- ✍ The surrounding social environment (e.g., conditions at home, at school, and in the neighbourhood).

Is continued drug abuse a voluntary behaviour?

Is continued drug abuse a voluntary behaviour?

The initial decision to take drugs is mostly voluntary.

However, when drug abuse takes over, a person's ability to exert self control can become seriously impaired.

Brain imaging studies from drug-addicted individuals show physical changes in areas of the brain that are critical to judgment, decision making learning and memory, and behaviour control.

Biological factors increase risk of addiction

Scientists estimate that genetic factors account for between 40 and 60 percent of a person's vulnerability to addiction, including the effects of environment on gene expression and function.

4-fold increased risk in 1st degree relatives

4-fold increased risk also in adopted away children

Adolescents and individuals with mental disorders are at greater risk of drug abuse and addiction than the general population.

What factors increase the risk of addiction?

➤ **What factors increase the risk of addiction?**

Early use

Availability

Cost

Route of administration

Effect of drug itself

Genetics

Gender

Mental disorders

Chaotic home and abuse

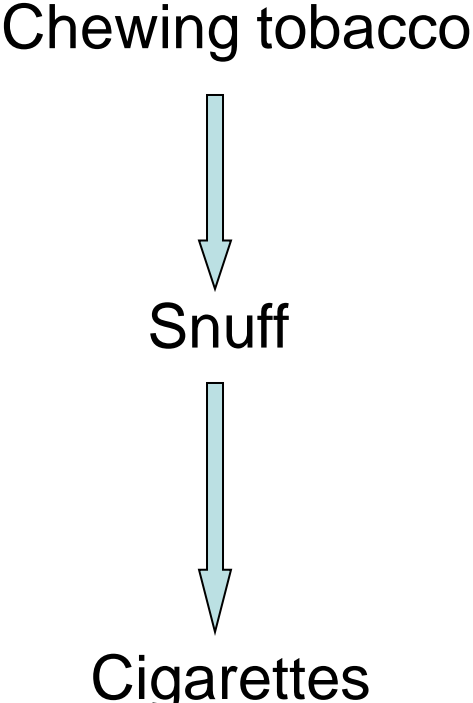
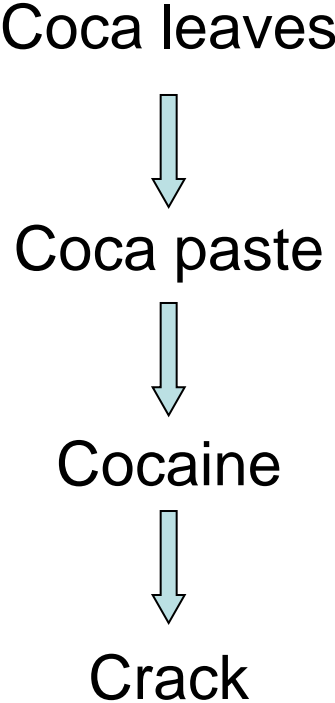
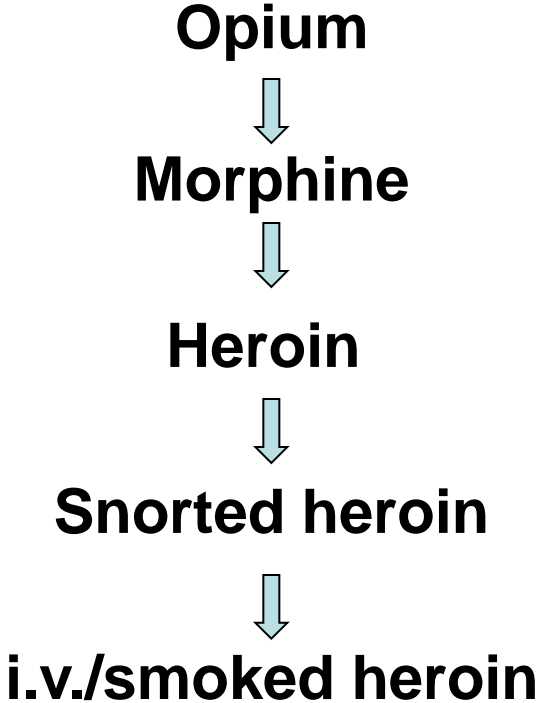
Parent's use and attitudes

Peer influences

Community attitudes

Poor school achievement

Faster brain entry → more effects → more addiction



What are protective factors?

Please list them.....

Protective Factors

Self-Control

Frustration Tolerance

Positive Relationships

Parental Monitoring + Support

Supportive peer group

Academic Competence

Anti-Drug Use Policies

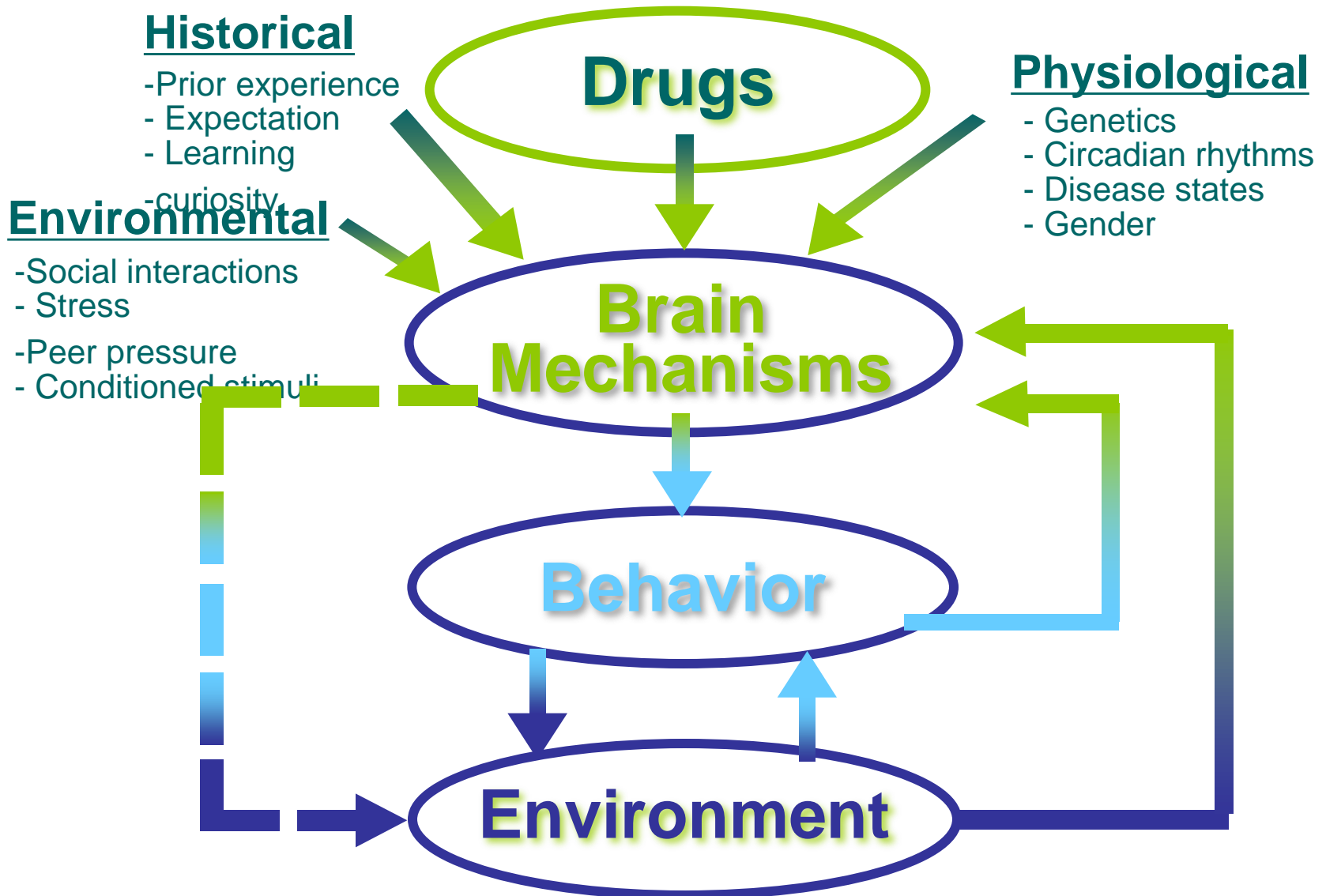
High price

Work and income

Strong Neighbourhood

you could add more.....

Substance Dependence: A Complex Behavioral and Neurobiological Disorder



Why are children and adolescents so vulnerable?

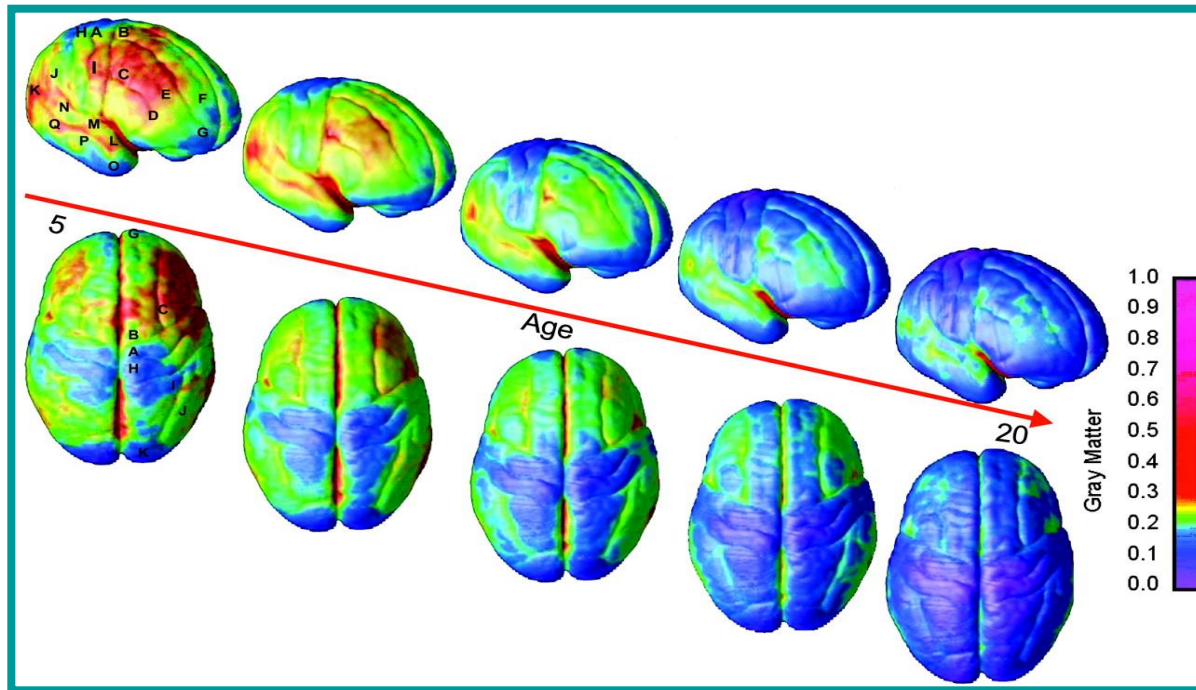
The brain continues to develop into adulthood and undergoes dramatic changes during adolescence.

One of the brain areas still maturing during adolescence is the prefrontal cortex—the part of the brain that enables us to assess situations, make sound decisions, and keep our emotions and desires under control.

The fact that this critical part of an adolescent's brain is still a work-in-progress puts them at increased risk for poor decisions (such as trying drugs or continued abuse).

Neuronal Development over Time

Grey matter maturation moves from back to front



Gogtay et al (2004) PNAS, 101 (21), National Academy of Science, U.S.A.

What brain areas are affected by drug abuse?

What brain areas are affected by drug abuse?

Brain stem

controls basic functions critical to life, such as heart rate, breathing, and sleeping.

Limbic system

contains the brain's reward circuit—it links together a number of brain structures (eg. hippocampus, amygdala, cingulate gyrus) that control and regulate our ability to feel pleasure. Feeling pleasure motivates us to repeat behaviours such as eating—actions that are critical to our existence.

The limbic system is activated when we perform these activities - and also by drugs of abuse. In addition, the limbic system is responsible for our perception of other emotions, both positive and negative, which explains the mood-altering properties of many drugs.

Frontal Cortex

Planning, Strategizing, Logic,
Judgment

Corpus Callosum

Connects Hemispheres
Creativity and Problem
Solving

Cerebellum

Coordinates muscles/ movement
and thinking processes

Thalamus

Nucleus accumbens

Ventral tegmental area

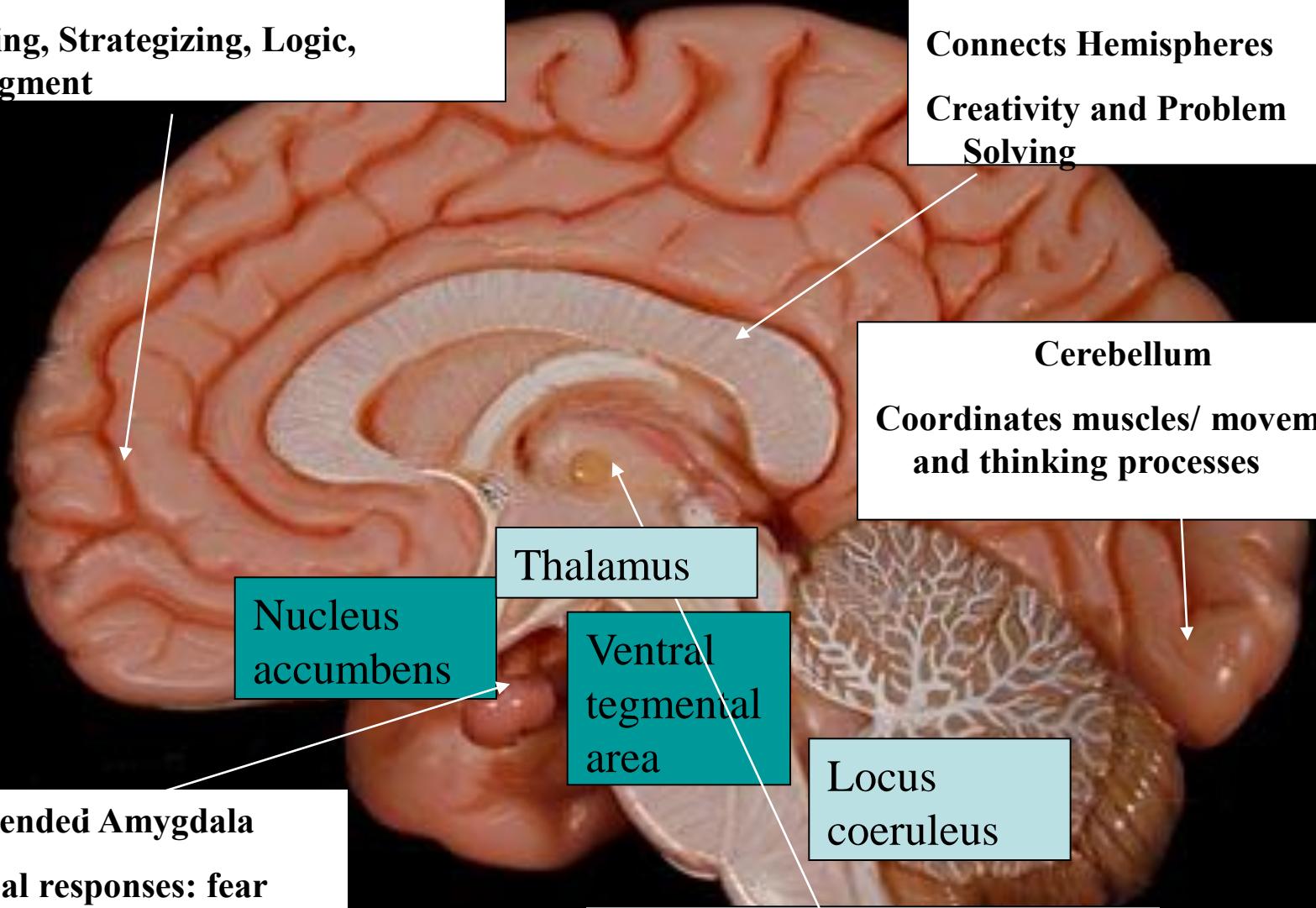
Locus coeruleus

Extended Amygdala

Emotional responses: fear
and anger

Hippocampus

Forms Memories, Coordinates
thinking processes



The cerebral cortex

Is divided into areas that control specific functions.

Different areas process information from our senses, enabling us to see, feel, hear, and taste.

The front part of the cortex, the frontal cortex or forebrain, is the thinking center of the brain; it powers our ability to think, plan, solve problems, and make decisions.

How do drugs work in the brain?

How do drugs/substance work in the brain?

They tap into the brain's communication system and interfering with the way nerve cells normally send, receive, and process information.

Marijuana and heroin, can activate neurons because their chemical structure mimics that of a natural neurotransmitter. This similarity in structure "fools" receptors and allows the drugs to lock onto and activate the nerve cells.

Amphetamine or cocaine, can cause the nerve cells to release abnormally large amounts of natural neurotransmitters or prevent the normal recycling of these brain chemicals. This produces a greatly amplified message, ultimately disrupting communication channels.

How do drugs work in the brain to produce pleasure?

What do you think how it gives pleasure ? please say something before you go to next slide

How do drugs work in the brain to produce pleasure?

Most drugs of abuse directly or indirectly flood the brain's reward pathway with dopamine.

Dopamine is a neurotransmitter present in regions of the brain that regulate movement, emotion, cognition, motivation, and feelings of pleasure.

The overstimulation of this system, which rewards our natural behaviours, produces the euphoric effects sought by people who abuse drugs and teaches them to repeat the behaviour.

The Reward Pathway

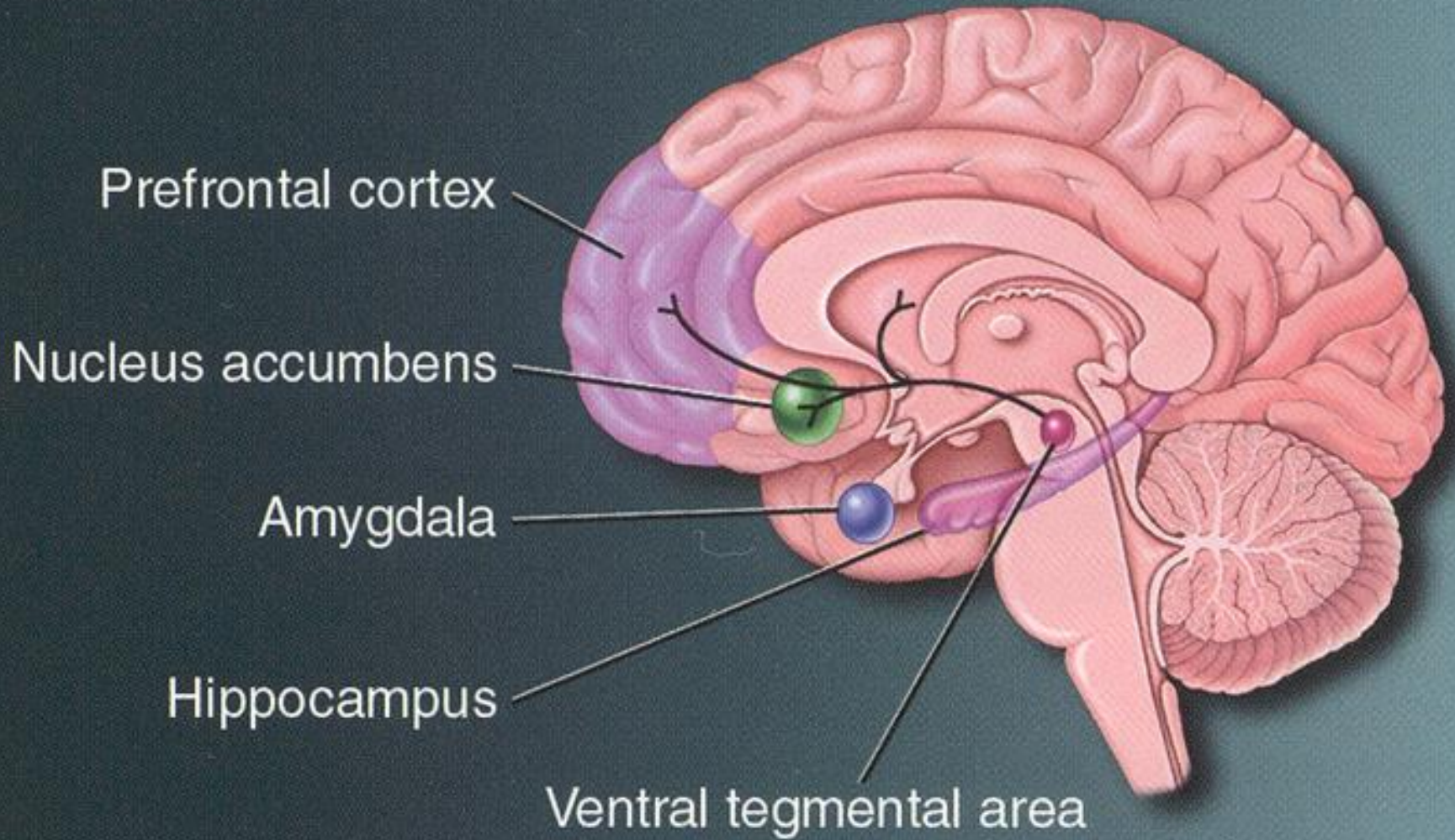
Located in the limbic system – functions to monitor internal homeostasis, mediate memory, mediate learning and experience emotion.

Includes the hypothalamus, amygdala, hippocampus, nucleus accumbens (NA), the ventral tegmental area (VTA), locus ceruleus and the prefrontal cortex.

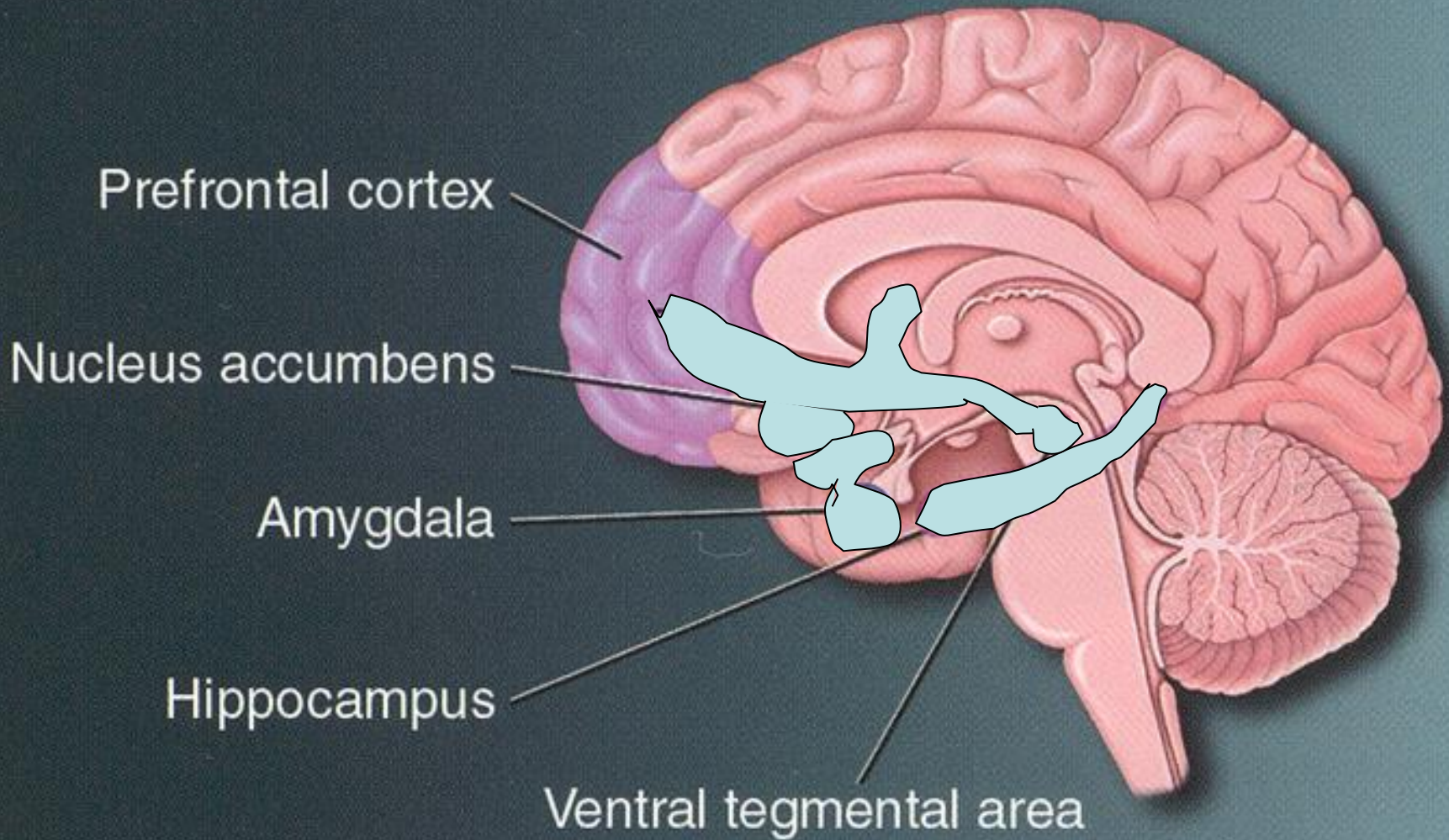
This reward pathway is activated by:
Food, water, nurturing, sex, thrill seeking behaviour (eg. sky diving, paragliding etc) and exercise

This reward pathway is also activated by alcohol and drugs

ALCOHOL



ALCOHOL



Brain Reward Circuitry

Please mention other activities which has effects on reward pathways without drug/substance

Behaviors that result in the experience of release from a biological tension (i.e. eating) make us feel good.

This “feel good” response is registered in a certain part of the brain and with a brain chemical called **dopamine.**



The Reward Pathway

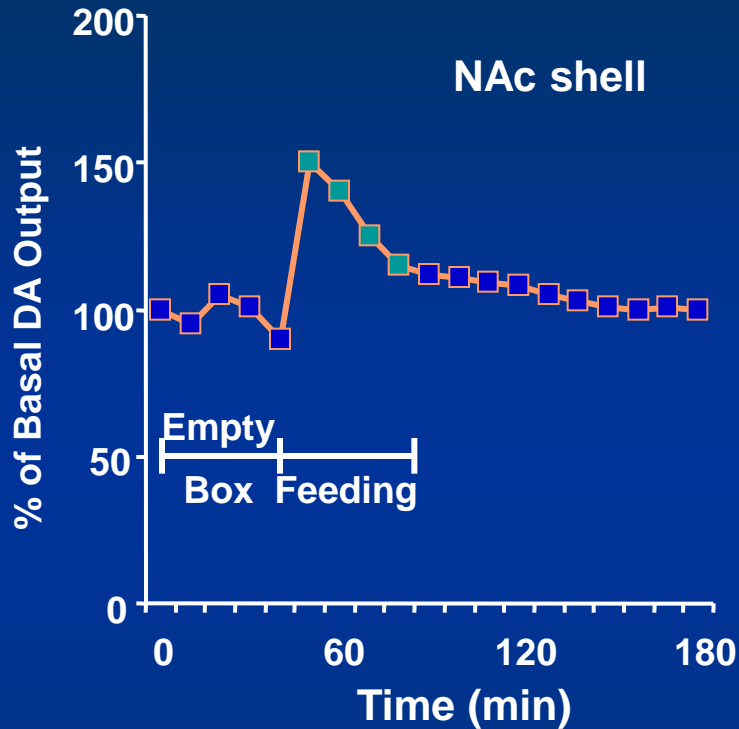
Dopamine is the primary neurotransmitter of the reward pathway.

All drugs of abuse increase **dopamine** levels in the brain reward pathway although they often act through separate mechanisms.

Drugs that are not abused have no effect on **dopamine** concentrations in the reward pathway.

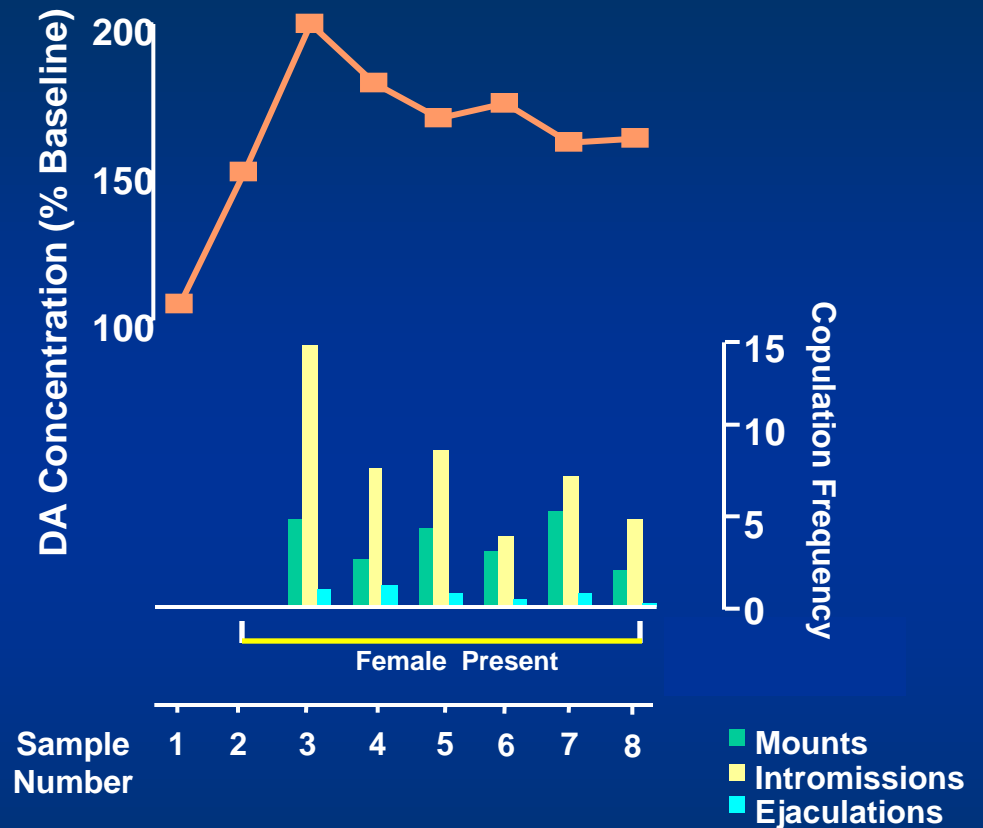
Natural Rewards Elevate Dopamine Levels

FOOD



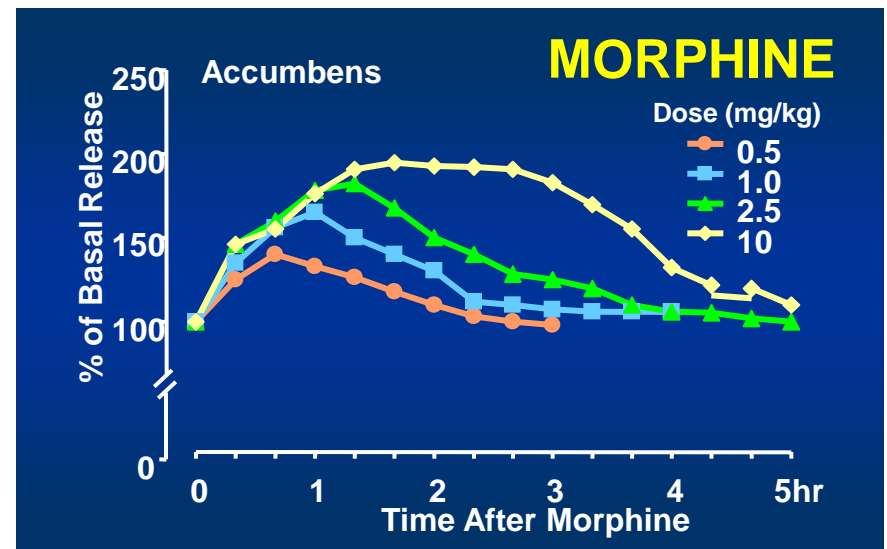
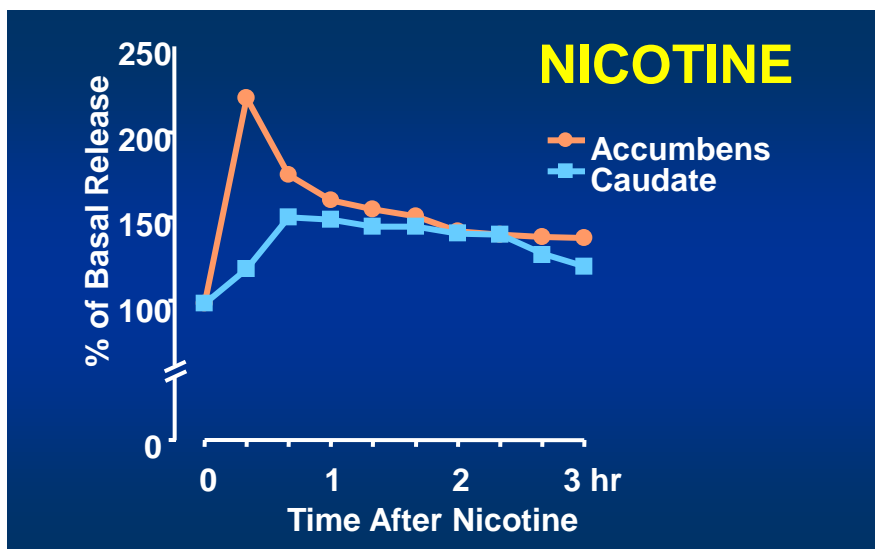
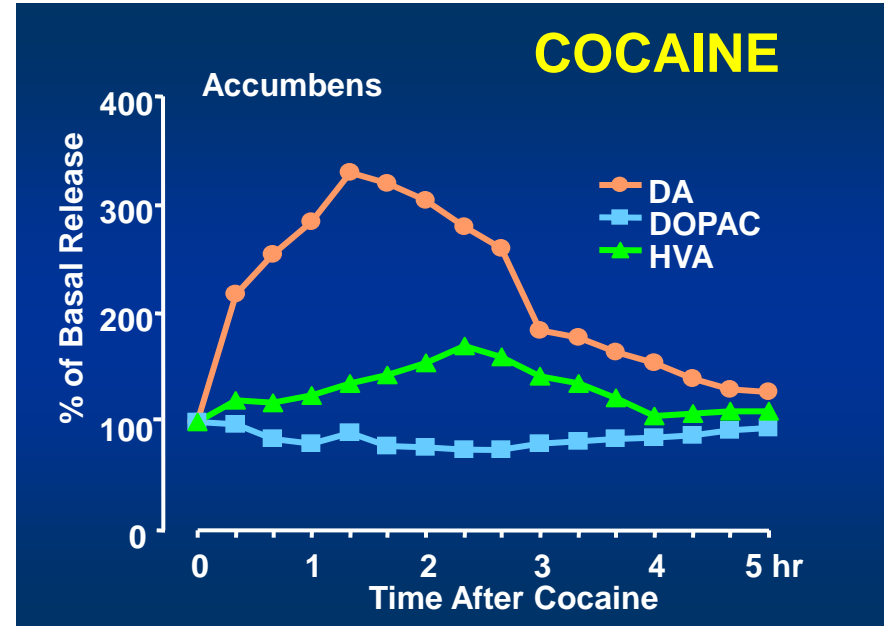
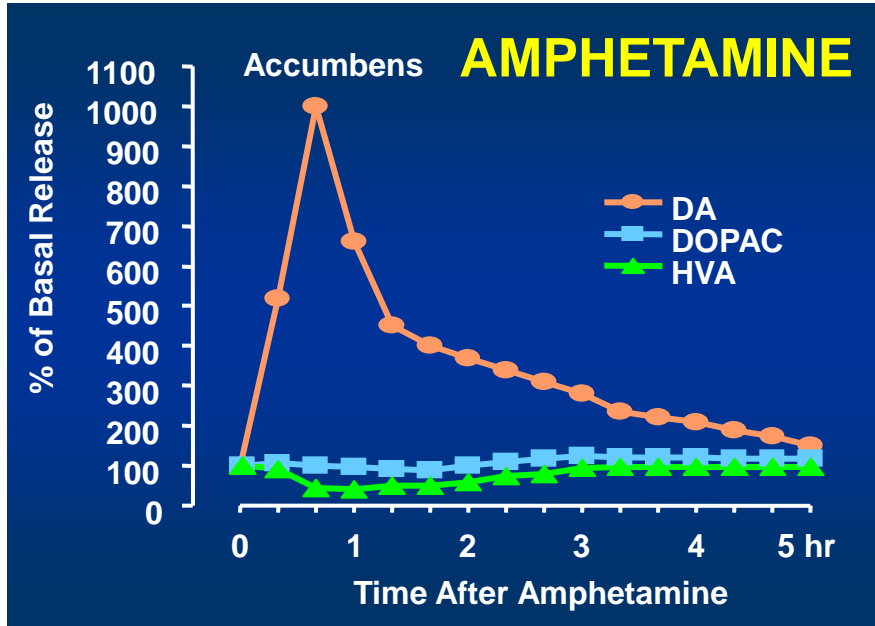
Di Chiara et al., Neuroscience, 1999.

SEX



Fiorino and Phillips, J. Neuroscience, 1997.

Effects of Drugs on Dopamine Release



The following neurotransmitters act on the reward pathway:

Dopamine

Receptors: D1, D2

Function: pleasure, euphoria, mood, motor function

Serotonin

Receptors: 5HT3

Function: mood, impulsivity, anxiety, sleep, cognition

Cannabinoids

Receptors: CB1, CB2

Function: Pain, appetite, memory

Opioid peptides (Endorphins, Enkephalins)

Receptors: Kappa, Mu, Delta

Function: pain

Dopamine Pathways

Serotonin Pathways

Frontal cortex

Striatum

Substantia nigra

Nucleus accumbens

VTA

Hippocampus

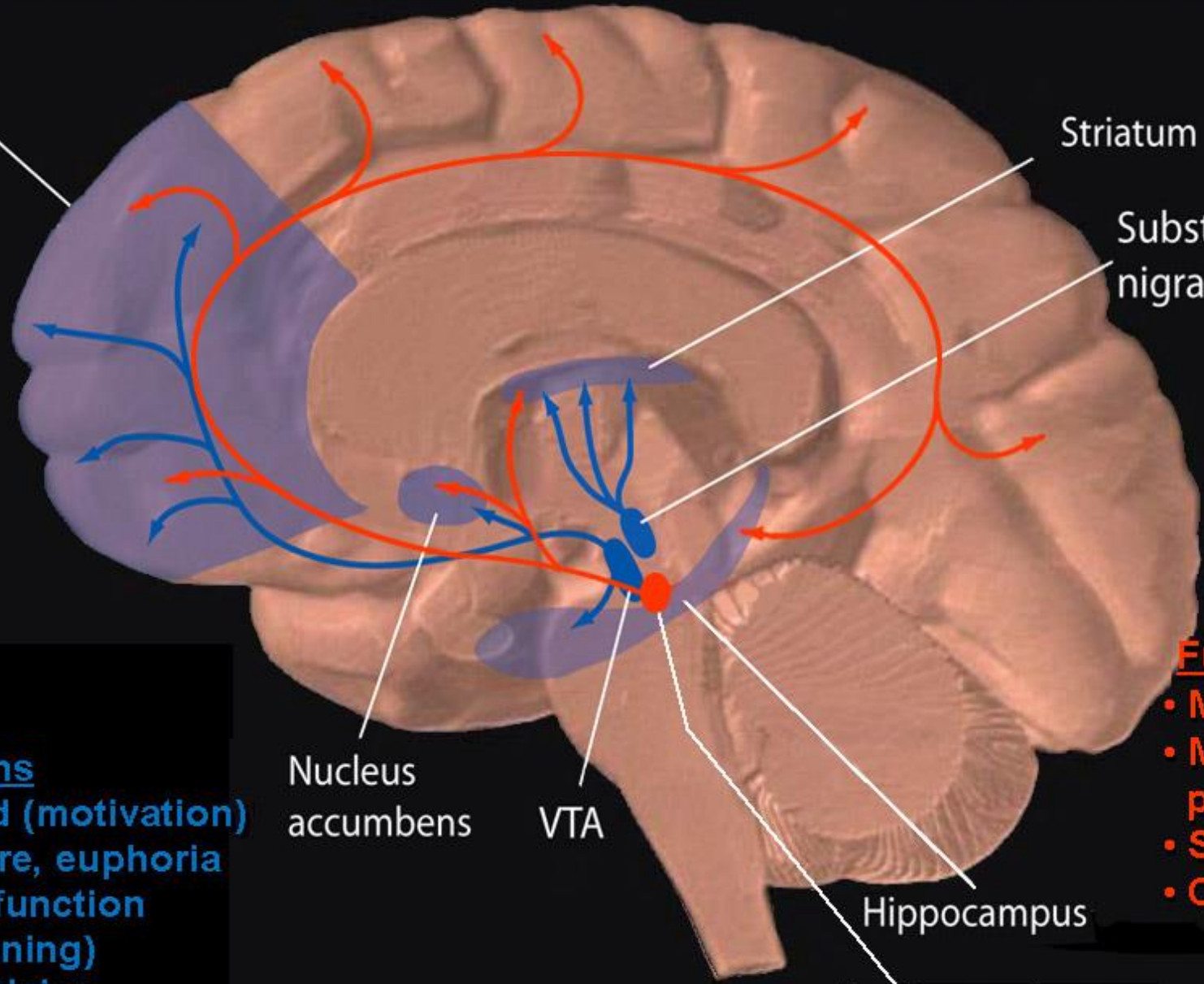
Raphe nucleus

Functions

- Reward (motivation)
- Pleasure, euphoria
- Motor function (fine tuning)
- Compulsion
- Perseveration

Functions

- Mood
- Memory processing
- Sleep
- Cognition



Neurotransmitters and anatomical sites involved in the acute reinforcing effects of drugs of abuse:

Dopamine

Ventral tegmental area, nucleus accumbens

Opioid Peptides

Nucleus accumbens, amygdala, ventral tegmental area

GABA

Amygdala, nucleus
of stria terminalis

Glutamate

Nucleus accumbens

Drug Action and Reward Pathway

Alcohol

Inhibit GABAergic neurons that project to dopaminergic neurons in the VTA

Heroin

Binds to opioid receptors that inhibit GABAergic neurons that project to dopaminergic neurons in the VTA

Cocaine

Blocks the function of DAT (by binding to the DAT and slowing transport)

Nicotine

Activates cholinergic neurons that project to dopaminergic neurons of the VTA

**Why are drugs more addictive than natural rewards?
Please tell the reasons for your self**

Why are drugs more addictive than natural rewards?

When some drugs of abuse are taken, they can release 2 to 10 times the amount of dopamine that natural rewards do. In some cases, this occurs almost immediately (as when drugs are smoked or injected), and the effects can last much longer than those produced by natural rewards.

The resulting effects on the brain's pleasure circuit dwarfs those produced by naturally rewarding behaviours such as eating and sex. The effect of such a powerful reward strongly motivates people to take drugs again and again.

What happens to your brain if you keep taking drugs?

I hope you would have something to say regarding this

What happens to your brain if you keep taking drugs?

The brain adjusts to the overwhelming surges in dopamine (and other neurotransmitters) by producing less dopamine or by reducing the number of receptors that can receive signals.

As a result, dopamine's impact on the reward circuit of a drug abuser's brain can become abnormally low, and the ability to experience any pleasure is reduced.

This is why the abuser eventually feels flat, lifeless, and depressed, and is unable to enjoy things that previously brought them pleasure.

They must take larger amounts of the drug than they first did to create the dopamine high—an effect known as tolerance.

How does long-term drug taking affect brain circuits?

We know that substance dependence can lead to profound changes in neurons and brain circuits, with the potential to severely compromise the long-term health of the brain.

For example, glutamate is another neurotransmitter that influences the reward circuit and the ability to learn. When the optimal concentration of glutamate is altered by abuse, the brain attempts to compensate for this change, which can cause impairment in cognitive function.

Similarly, long-term drug abuse can trigger adaptations in habit or nonconscious memory systems. Conditioning is one example of this type of learning, whereby environmental cues become associated with the drug experience and can trigger uncontrollable cravings if the individual is later exposed to these cues, even without the drug itself being available.

This learned “reflex” is extremely robust and can emerge even after many years of abstinence. **(addiction memory)**

What other brain changes occur with abuse?

Chronic exposure to drugs of abuse disrupts the way critical brain structures interact to control and inhibit behaviours related to drug abuse.

Just as continued abuse may lead to tolerance or the need for higher drug dosages to produce an effect, it may also lead to addiction, which can drive an abuser to seek out and take drugs compulsively.

Drug addiction erodes a person's self-control and ability to make sound decisions, while sending intense impulses to take drugs.

**Can addiction be treated successfully?
What you think?**

Can addiction be treated successfully?

YES

Addiction is a treatable disease. Discoveries in the science of addiction have led to advances in drug abuse treatment that help people stop abusing drugs and resume their productive lives.

Can you think addiction be cured?

Can addiction be cured?

No, not like pneumonia but like hypertension ,diabetes mellitus it can be managed.

Addiction need not be a life sentence. Like other chronic diseases, addiction can be managed successfully.

Treatment enables people to counteract addiction's powerful disruptive effects on brain and behaviour and regain control of their lives.

**Does relapse to drug abuse mean treatment has failed?
What you say?**

Does relapse to drug abuse mean treatment has failed?

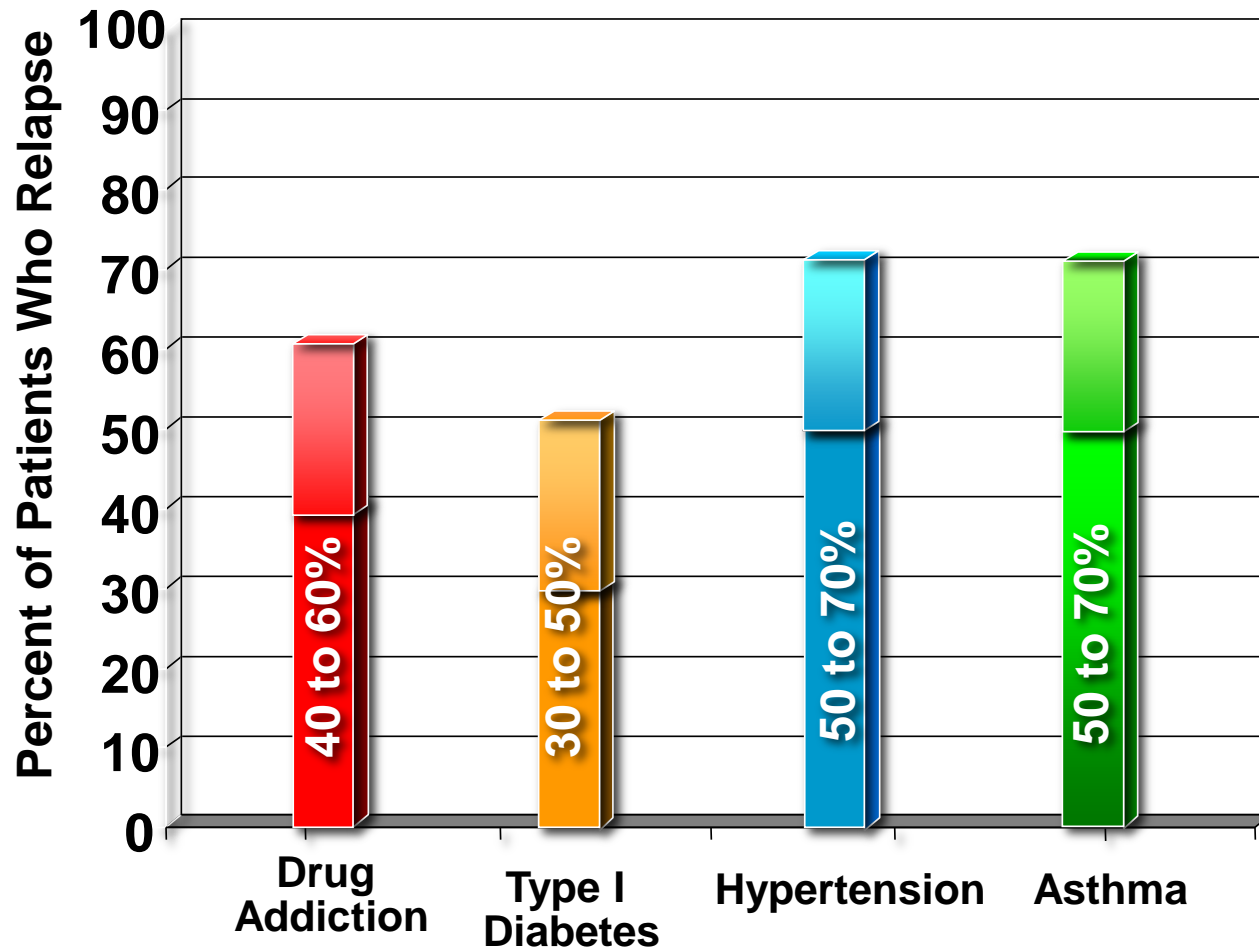
No!

The chronic nature of the disease means that relapsing to drug abuse is not only possible, but likely. Relapse rates (i.e., how often symptoms recur) for drug addiction are similar to those for other well-characterized chronic medical illnesses such as diabetes, hypertension, and asthma, which also have both physiological and behavioural components.

Treatment of chronic diseases involves changing deeply imbedded behaviours, and relapse does not mean treatment failure.

For the addicted patient, lapses back to drug abuse indicate that treatment needs to be reinstated or adjusted, or that alternate treatment is needed.

Relapse Rates Are Similar for Drug Addiction and Other Chronic Illnesses



The principles of effective addiction treatments

Research shows that combining treatment medications, where available, with behavioural therapy is the best way to ensure success for most patients.

Treatment approaches must be tailored to address each patient's drug abuse patterns and drug-related medical, psychiatric, and social problems.

How can medications help treat drug addiction?

Different types of medications may be useful at different stages of treatment to help a patient stop abusing drugs, stay in treatment, and avoid relapse.

Behavioural therapy

Behavioural treatments help engage people in drug abuse treatment, modifying their attitudes and behaviours related to drug abuse and increasing their life skills to handle stressful circumstances and environmental cues that may trigger intense craving for drugs and prompt another cycle of compulsive abuse.

Moreover, behavioural therapies can enhance the effectiveness of medications and help people remain in treatment longer.

How do the best treatment programs help patients recover from the pervasive effects of addiction?

How do the best treatment programs help patients recover from the pervasive effects of addiction?

Getting an addicted person to stop abusing drugs is just one part of a long and complex recovery process. When people enter treatment, addiction has often taken over their lives. The compulsion to get drugs, take drugs, and experience the effects of drugs has dominated their every waking moment, and drug abuse has taken the place of all the things they used to enjoy doing. It has disrupted how they function in their family lives, at work, and in the community, and has made them more likely to suffer from other serious illnesses. Because addiction can affect so many aspects of a person's life, treatment must address the needs of the whole person to be successful. This is why the best programs incorporate a variety of rehabilitative services into their comprehensive treatment regimens. Treatment counsel to select from a menu of services for meeting the individual medical, psychological, social, vocational, and legal needs of their patients to foster their recovery from addiction.

Treatment must address the whole person

Motivational Interviewing. Employs strategies to evoke rapid and internally motivated behavior change to stop drug use and facilitate treatment entry.

Cognitive Behavioural Therapy:

Seeks to help patients recognize, avoid, and cope with the situations in which they are most likely to abuse drugs.

Group Therapy:

Helps patients face their drug abuse with other drug dependent persons, come to terms with its harmful consequences, and boost their motivation to stay drug free. Patients learn effective ways to solve their emotional and interpersonal problems without resorting to drugs.

Treating Substance Dependence is Complex

We Must Go Beyond Just Fixing the Chemistry

A biopsychosociocultural approach is needed

Addiction in Developing Countries

Global Burden of Disease Study

- The important Global Burden of Disease study (Murray & Lopez, 1996) listed the most important causes of disability.
- To the surprise of many health experts, five of the top 10 causes of disability were mental disorders of which depression and alcohol abuse were the most important

• **BURDEN OF DISEASE IN DISABILITY- ADJUSTED LIFE YEARS (DALYS) BY CAUSE (ESTIMATES FOR 2001)**

	% total
1. Infections and parasitic diseases	22,7
2. Injuries	12,4
<u>3. Neuropsychiatric disorders</u>	<u>12,3</u>
4. Respiratory infections and diseases	11,3
5. Cardiovascular diseases	10,3
6 Maternal/Prenatal Conditions	8.5
7. Malignant Neoplasm's	5,3
8. Digestive diseases	3,3
9. Nutritional deficiencies	3,1

BURDEN OF DISEASE IN DISABILITY- ADJUSTED LIFE YEARS (DALYS) BY CAUSE (ESTIMATES FOR 2001)

	% total
1. Depressive disorders	35,7
<u>2. Addictions</u>	<u>13,8</u>
3. Schizophrenia	8,9
4. Bipolar affective disorders	7,3
5. Dementias	6,5
6. Epilepsy	4,1
7. Others	23,7

Substance Abuse in Developing Countries

- Substance Abuse, specifically alcohol abuse, is a mental health problem which poses a major problem to many developed and developing countries.
- There is mounting evidence that alcohol abuse, apart from being the commonest addiction in developing countries, can have a major impact on the drinker's physical and mental health and is a major cause of impoverishment among already poor families (Patel 2000)

- **Increase of Substance Abuse in Developed Country**

As with alcohol, most drug users live in the poor world not the rich.

Countries such as China and Pakistan in the case of heroin, and Colombia in the case of cocaine, have local traditions of drug use and vast uprooted urban populations to provide expanding markets.

In future years the growth of substance abuse will be concentrated in developing countries.

Individual assignment

What drugs are causing problems in Ethiopia?
please discuss in detail the kind of drugs/substance as well as the problem in Biopsychosocial model and economical influences

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STAY SAFE AND HOME