Drug dependence

Dependence is a physical state of neuroadaptation resulting from repeated administration of the drug, necessitating its continued use to prevent the appearance of distressing withdrawal syndrome.

Drug dependence is a state in which use of drugs for personal satisfaction is accorded a higher priority than other basic needs, often in the face of known risk to health. Person is depend on a particular drug to perform certain action.

- **Psychological dependence:** It is said to have developed when the ***individual believes*** that optimal state of wellbeing ***is achieved only through the actions of the drug***. The subject feels ***emotionally distressed if the drug is not taken***.
- It may start as liking for the drug effects and may progress to compulsive drug use in some individuals who then lose control over the use of the drug.
- ***The intensity of psychological dependence may from desire to craving***.

- **Reinforcement** is the ability of the drug to produce effects that the user enjoys and which make him/her wish to take it again or to induce drug seeking behavior.

- **Physical dependence:**
- It is an altered physiological state produced by repeated administration of a drug which necessitates the continued presence of the drug to maintain physiological equilibrium.
- Discontinuation of the drug resulting a characteristic withdrawal (abstinence) syndrome.

- Since the essence of the process is adaptation of the nervous system to function normally in the presence of the drug, it has been called 'neuroadaptation'.
- Drugs producing physical dependence are— opioids, barbiturates and other depressants including alcohol and benzodiazepines.
- Stimulant drugs, e.g. amphetamines, cocaine produce little or no physical dependence.

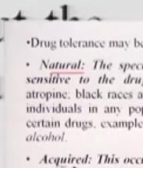
Tolerance

- Tolerance develops when after repeated administration a given dose of a drug produces a decreased effect than expected. (Example- Initially 50mg is effective but after repeated administration patient requires 200 mg of the same drug for same effect)
- It refers to the requirement of higher dose of a drug to produce a given response.
- Loss of therapeutic efficacy (e.g. of sulfonylureas in type 2 diabetes, or of ß agonists in bronchial asthma), which

•Drug tolerance may be:

- ***Natural: The species/individual is inherently less sensitive to the drug,*** e.g. rabbits are tolerant to atropine; black races are tolerant to mydriatics. Certain individuals in any population are hyporesponders to certain drugs, examples. *to ß adrenergic blockers or to alcohol.*

- ***Acquired: This occurs by repeated use of a drug*** in an individual who was initially responsive. Body is capable of developing tolerance to most drugs, bu
phenomenon is very easily recognized in the ca
CNS depressants, Analgesics etc.



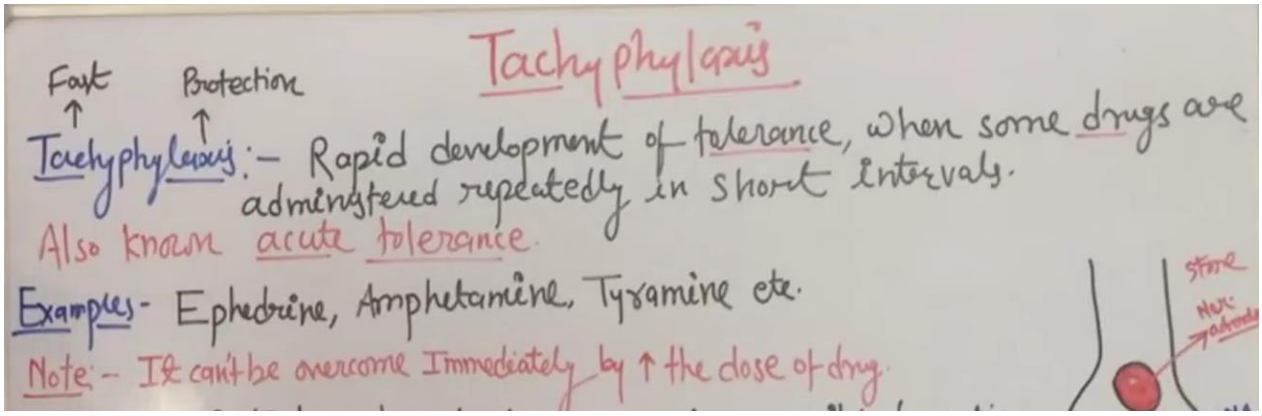
- ***Cross tolerance***

- It is the development of tolerance to pharmacologically related drugs, e.g. alcoholics are relatively tolerant to barbiturates and general anesthetics.

- ***Intolerance***

- It is the appearance of characteristic toxic effects of a drug in an individual at therapeutic doses.

- **Tachyphylaxis** (*Tachy-fast, phylaxis-protection*)
- It refers to rapid development of tolerance when doses of a drug repeated in quick succession result in marked reduction in response. This is usually seen with indirectly acting drugs, such as ephedrine, tyramine, nicotine.
- Changes in the sensitivity of target cells (Pharmacodynamic reason), example- Tachyphylaxis to nitroglycerine is observed among workers exposed to this drug in its manufactur industry **"MONDAY DISEASE".**



Drug Addiction

- Drug addiction is a chronic brain disease
- It is characterized compulsive, at time uncontrolled drug craving, seeking and use that persist even in the face of extremely negative consequences

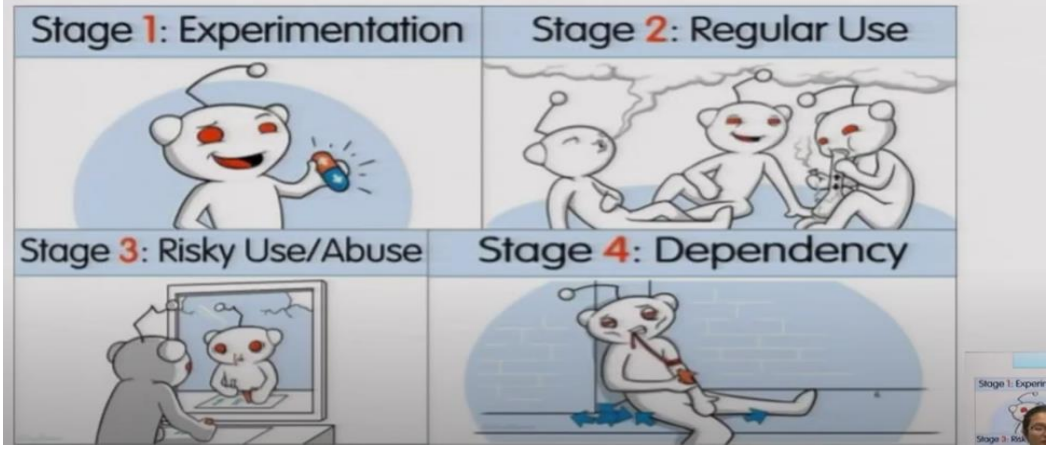
Drug addiction

- Addiction: an uncontrolled craving, seeking and use of a substance such as alcohol and another drug.
- Drug addiction is a chronic disease affecting the brain, in which a person believe that sense of well being achieved only through the drug taken.
- It is a pattern of compulsive drug use characterized by overwhelming involvement with the use of a drug.

Causes of Drug Addiction

- There are several factors and causes to be consider with addiction. First there is a genetic component, that is, what is passed on to you through your family
- If your blood relatives had the predisposition to become addicted, there is the chances you have the same tendency
- Personality contributes to drug addiction
- Peer pressure is both for the teenagers and adults alike

Stages of Addiction

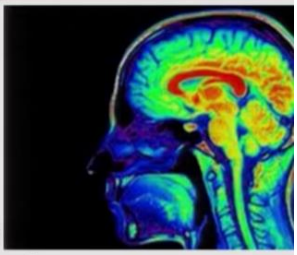


Drug Addiction Side-effects

- ✓ Loss of Appetite
- ✓ Headache
- ✓ Anxiety
- ✓ Elevated blood pressure
- ✓ Chest Pain
- ✓ Irregular heart best
- ✓ Cold/Bluish finger]
- ✓ Difficulty in urination
- ✓ Changes of body temperature

Consequences of Drug Addiction

- ❑ All drug of the abuse (nicotine, cocaine, marijuana and others effect the brain " reward circuit" which is a part of limbic system
- ❑ Drugs hijack the "reward system" causing unusually large amount of dopamine to flood the system
- ❑ Due to high level of dopamine it causes the euphoria condition



MECHANISM

In normal condition: Natural signal ------ Brain ----- Reward point ----- increase secretions of Dopamine ------ good feeling ---- Felling of being happy

Addiction: Drug-prescription/ abuse---- increase threshold ---- Repeated use ---- To increase level of dopamine -----Tolerance (Need more drug)

Drug abuse

- Refers to use of a drug by self-medication in a manner and amount that deviates from the approved medical and social patterns in a given culture at a given time.
- The term conveys social disapproval of the manner and purpose of drug use. For regulatory agencies, drug abuse refers to any use of an illicit drug.

Drug Abuse

Some of the drugs used for abuse are

- **CNS stimulant:** Amphetamine, methylphenidate, cocaine, caffeine, nicotine

- **CNS depressants:**
  - Opioids- Morphine, Heroine, Pethidine, Ethyl alcohol, Barbiturates, Benzodiazepines, Methaqualone
  - Hallucinogens- LSD, Mescaline, Phencyclidine (PCP), Psiocybine, Psilocin, Dimethyltryptamine (DMT), Cannabinoids

Drug Abuse

❑ **CNS Depressant**

1. Sedative Hypnotics: Like barbiturates, benzodiazepines, diazepam's are abused for their pleasurable effects and anxiolytics properties. Barbiturates overdose can causes the fatal
2. Ethanol: It is the most common and oldest agents of abuse. Chronic drinkers develop withdrawal symptoms on suddenly stopping alcohol and develop a craving from the drug

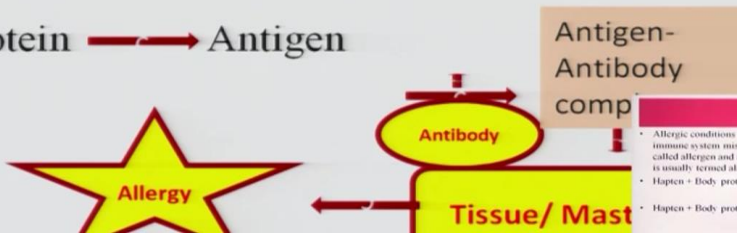
- **Idiosyncrasy-** an idiosyncrasy in an unusual feature of a person.
- These are harmful and sometimes fatal reactions that occur in a small minority of individuals, for which the cause is yet poorly understood.
- Example- Aspirin induced late onset asthma or chronic renal failure and thaizide diuretics induced erectile impotence.

Allergy

- Allergic conditions and allergic reactions occur when the immune system misidentifies harmless foreign substance called allergen and react to them as if they were harmful. It is usually termed also as sensitivity.
- Hapten + Body protein → Antigen → Antibody

Stimulus for formation of antibody

- Hapten + Body protein → Antigen



- Allergic responses to drug occur when there has been previous exposure to drug and when this sensitized individual is re- exposed to the same drug again.