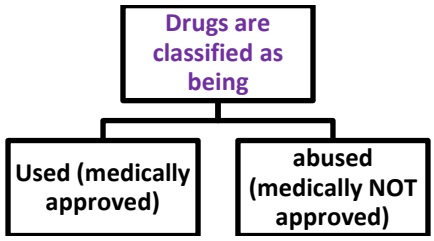
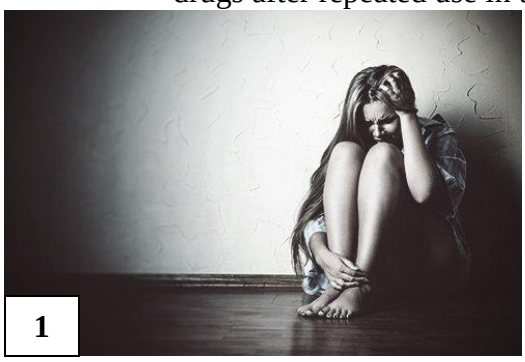


- **What is the difference between dependence and addiction?**
  - **Dependence (image-1):** reflects physical dependence in which the body adapts to the drug, requiring more of it to achieve a certain effect (tolerance) and eliciting drug-specific physical or mental symptoms if drug use is abruptly ceased (withdrawal syndrome).
  - **Addiction (image-2):** compulsive (irresistible urge) drug use despite harmful consequences and it is characterized by failure to meet work, social or family obligations. Addictive drugs are those which give you the feeling of euphoria الـ نشوة and reward by stimulating the release of dopamine in the brain.
    On other words, addiction = psychological dependence while dependence = physical dependence.
- **Etiology of dependence:**
  - **There are different factors which play a role in converting a person to a drug abuser/ addict:**
    - ✓ Agent (the drug):
      - ❖ Characteristics of a drug which encourage a person to abuse them are: being available, cheap and potent.
      - ❖ Notice that there are different ways of drug administration: chewing (as a gum), intranasal (sprays), inhalation, subcutaneous, intramuscular or intravenous.
    - ✓ Host (user of the drug): all of the following characteristics have an influence
      - ❖ Heredity: innate tolerance (genetically determined sensitivity to a drug); speed of developing acquired tolerance; likelihood of experiencing intoxication as pleasure.
      - ❖ Metabolism of the drug (e.g. depending on how healthy are the organs which are involved in metabolism of drugs in the body).
      - ❖ Psychiatric symptoms.
      - ❖ Prior experiences/expectations.
      - ❖ Propensity النزوع إلى for risk-taking behavior.
    - ✓ Environment:
      - ❖ Social setting (e.g. being rich or living in poverty).
      - ❖ Community attitudes (e.g. friends which might influence you to take this wrong way).
      - ❖ Employment or educational opportunities (e.g. being unemployed with low level of education encourages drug abuse).
      - ❖ Conditioned stimuli (e.g. environmental cues become associated with drugs after repeated use in the same environment).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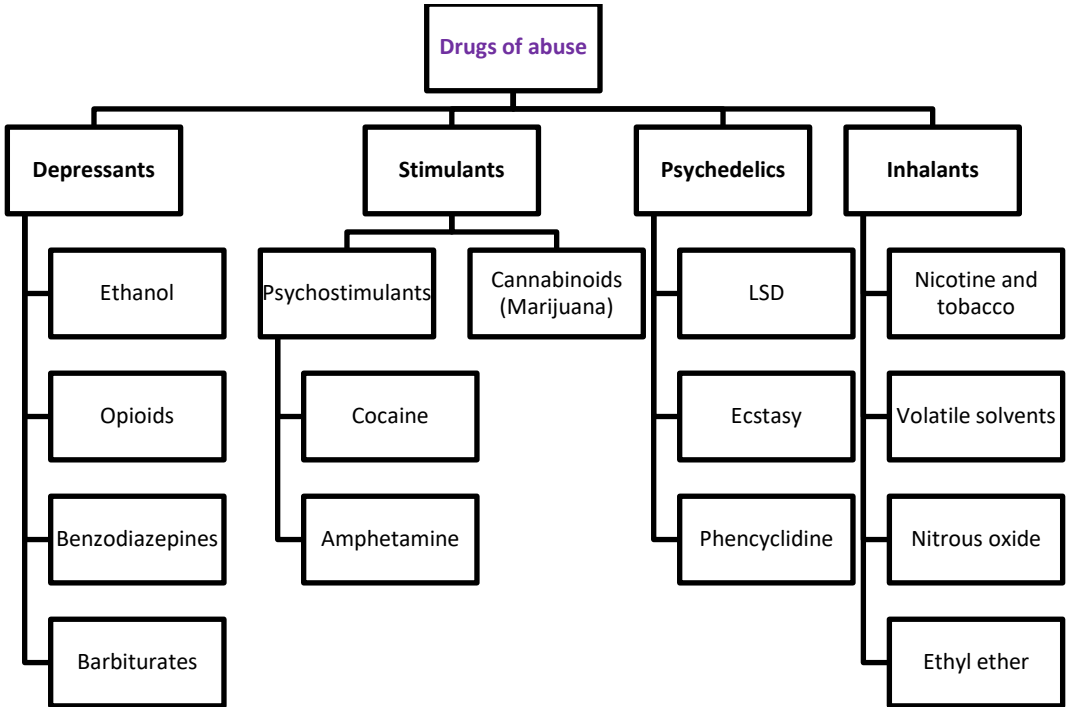
- **Internet Addiction Disorder (IAD):**
  - **This disorder is also known as**: Problematic Internet Use (PIU), Compulsive Internet Use (CIU) or internet overuse.
  - **It is simply defined as excessive use of the internet which interferes with daily life (image-3).**

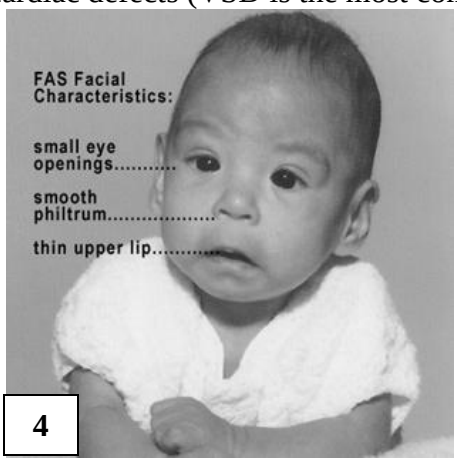
3

- **Medical addict:**
  - This is defined by a patient who is taking drugs for his chronic medical illness but becomes addicted to those prescribed drugs. Therefore, the patient will start to increase the dose and frequency of the drug by his own.
- **Tolerance and withdrawal:**
  - **Tolerance**: a person needs more of a drug in order to achieve the same effects that he felt previously with smaller amounts.
  - **Withdrawal**: a series of symptoms that may appear when a drug on which a user is physically dependent is stopped or significantly reduced. The withdrawal symptoms vary depending on a range of factors including the drug type and tend to be opposite to the effects produced by the drug.
    Notice that tolerance and withdrawal are NORMAL physiological adaptations to repeated use of drugs from many classes and NOT NECESSARILY drug abuse. For example, a patient with sickle cell disease might always receive a painkiller (such as morphine) to reduce his pain but after a period of time this same dose of morphine will not express the same effect because tolerance has been developed by the patient. Therefore, the dose has to be increased which results in increased adverse effects.
- **What are the types of tolerance?**

Innate tolerance	Pre-existing sensitivity or insensitivity to a drug
Acquired tolerance	• Acute tolerance: a drug has a greater effect as the blood concentration is rising. • Chronic tolerance: decreased response to a test dose from repeated administration of a drug. • Pharmacokinetics of tolerance: decreased concentration of a drug at the site of action because you are breaking the drug down more rapidly. • Pharmacodynamic of tolerance: there is a decreased effect of the drug due to biological adaptation. • Behavioral component of tolerance: decreased effect of a drug due to conditioned response, you learn ways to counteract effects.
Cross-tolerance	• It means that if you have tolerance to one drug of one family, you will be tolerant to all drugs of that family.



- **Ethanol:**
  - **It is a depressant which produces sedation and sleep but there is an initial stimulant effect when used at small doses due to suppression of inhibitory systems in CNS.**
  - **Therefore, mild intoxication can occur to anyone and will produce:**
    - ✓ Initial stimulation and garrulousness ثرثرة الـ كلام – كـ ثرة الـ
    - ✓ followed by motor incoordination and sleepiness.
  - Sedation will increase as the concentration of ethanol in blood increases and this might eventually result in coma and even death!
  - High doses of ethanol will produce "blackouts" after which the drinker has no memory of his behavior while intoxicated.
  - Heavy consumers of alcohol acquire tolerance and physical dependence with frequent alcohol-withdrawal symptoms (which are not life-threatening).
  - **Ethanol consumption is associated with the following:**
    - ✓ Cross-tolerance to other sedatives (such as benzodiazepines).
    - ✓ Increased toxicity of acetaminophen (paracetamol).
  - **Fetal alcohol syndrome (image-4):**
    - ✓ It is caused by alcohol (the most common teratogen).
    - ✓ Fetal alcohol syndrome may occur if a woman chronically drinks alcohol or binges during her pregnancy.
    - ✓ Features include the following: small-for-gestational-age, microcephaly, long smooth philtrum with a thin smooth upper lip, mental retardation, attention deficit and cardiac defects (VSD is the most common).



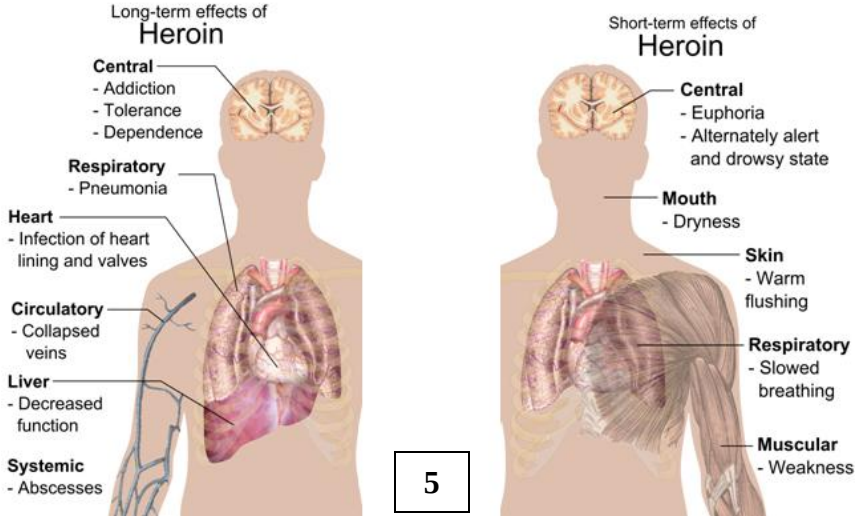
- **Ethanol detoxification:**
  - ✓ Alcohol-withdrawal syndrome is potentially lethal, you have to keep attention to the following when managing the patient:
    - ❖ *Hydration and electrolytes.*
    - ❖ *Vitamins (especially high-dose thiamine).*
    - ❖ *Anticonvulsants (e.g. carbamazepine) if seizures are experienced.*
  - ✓ Detoxification is the first step in your management but keep in your mind that your long-term goal is that the patient stops consuming alcohol completely (this is achieved by modifying his behavior). Some drugs can be used to help the patient such as:
    - ❖ *Disulfiram*: it block aldehyde dehydrogenase (the second step in ethanol metabolism) resulting in accumulation of acetaldehyde which gives unpleasant flushing reaction when alcohol is ingested.

- **Opioids:**

- **What are the clinical uses of opioids?**
  - ✓ It is used as a pain killer (by inhibiting nerve firing and pre-synaptic transmitter release), anesthetic, for diarrhea (because it produces constipation) and for cough.
- **Where do opioids act?**

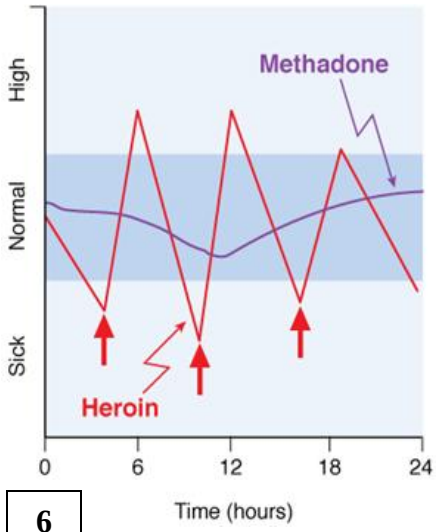
Opioid receptors	
Receptor	**Effects**
μ-receptor	Spinal/supraspinal analgesia, euphoria, respiratory depression, miosis and constipation
K-receptor	Spinal analgesia, sedation, dysphoria and miosis
δ-receptor	Spinal/supraspinal analgesia

- **Heroin (image-5):**
  - ✓ It is hydrolyzed into morphine and therefore has properties similar to morphine's. Heroin is, however, more lipid-soluble and crosses the blood-brain barrier more quickly than does morphine.
  - ✓ After an IV injection, effects appear within a minute and include the following:
    - ❖ Warmth and intense pleasure (often compared with sexual orgasm).
    - ❖ Then, the patient will become sedative and calm (for up to an hour).
    - ❖ Effects will disappear within 3-5 hours (depending on the dose).



  - ✓ Adverse effects:
    - ❖ Females: irregular menstrual cycle.
    - ❖ Males: problems in sexual performance.
    - ❖ A person becomes irritable and aggressive during withdrawal period.
    - ❖ Opioids will produce behavioral disruptions in which a person becomes incompatible with a productive life.

- **Opioid withdrawal: it is treated by three different approaches**
  - ✓ Methadone: it is administered orally and acting on μ-receptors. It is used therapeutically for narcotic detoxification إزالة السموم المخدرة because of its long half-life (15-50 hours → image-6). Methadone can prevent an addict from suffering severe withdrawal symptoms as the body normalizes.
  - ✓ Clonidine: it is an α_2-adrenergic agonist which decreases adrenergic neurotransmission from locus ceruleus.
  - ✓ Activation of endogenous opioid system (e.g. enkephalins, endorphins and dynorphins) without drugs: via transcutaneous electrical stimulation.



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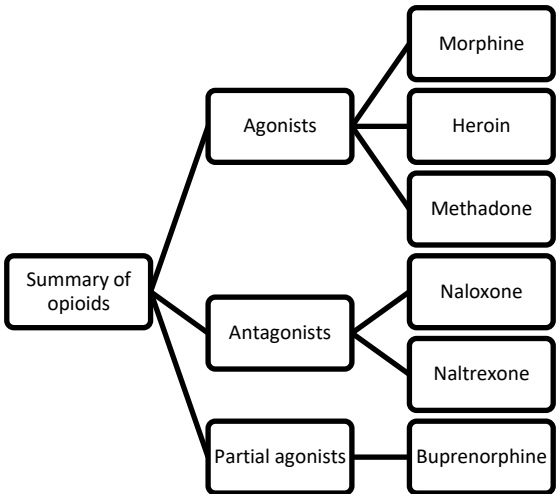
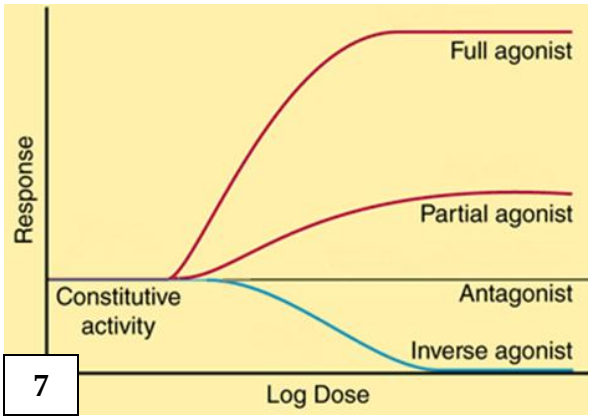
- **Long-term management of opioid withdrawal:**
  - ✓ Methadone: most successful.
  - ✓ Buprenorphine: it is a partial agonist acting upon μ-receptor. It dissociates from μ-receptors slowly, which may contribute to its long duration of action and low physical dependence.
- **Antagonist treatment (used after detoxification for patients with high motivation):**
  - ✓ Naltrexone: it binds to all opioid receptors. It is beneficial for treating opioid dependency because it can be given orally and has longer duration of action than naloxone (another opiate antagonist).





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