Medicine and Drugs

- Introduction
  - What is a drug or medicine?
    - Alter mood or emotions
    - Alter a physiological state
    - Alter incoming sensory sensations
  - Administer drugs:
    - Oral
    - Rectal
    - Inhalation
    - Injection
    - Patches
  - LD50:
    - See how toxic a molecule might be (smallest is the most toxic)
    - Lethal Dose: a substance that kills off 50% of a population
  - Placebo effect: hints at our brain's ability to influence our physiology
  - Drug tolerance: how much chemical can be taken to the body before undesirable symptoms occur
- Antacids
  - Neutralize excess acid in the stomach to adjust the stomach pH
  - Relieve indigestion and allow damage done by excess acid to the stomach lining to repair itself
  - Combine with alginates that produce a neutralising layer that prevents acid reflux
  - Equations:

• $MgO + 2HCl \rightarrow MgCl_2 + H_2O$	• $Mg(OH)_2 + 2HCl \rightarrow MgCl_2 + 2H_2O$
• $Al(OH)_3 + 3HCl \rightarrow AlCl_3 + 3H_2O$	• $CaCO_3 + 2HCl \rightarrow CaCl_3 + H_2O + CO_2$
• $NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$	

  - Alkalosis is a rise in the pH of blood
  - Al is better than Mg because neutralized more mol
- Analgesics
  - Relieves pain without aid of sleep
  - Mild Analgesics: work at the side of pain

	Salicylic Acid	Aspirin	Paracetamol
Problems	• Too acidic	• Lead to stomach bleeding • Allergic reactions • Liver/brain disease • acidosis (low pH of blood)	• No side effects of Aspirin • Massive liver damage

  - Strong Analgesics: go straight to the brain
    - Morphine
    - Codeine
    - Heroin
  - Opiate
    - Opium poppy
    - Cause addiction

Short term effects	Long term effects
• Induce a feeling of euphoria • Dulling of pain • Depress nervous system • Slow breathing and heart rate • Cough reflex inhibited • Nausea and vomiting • High does--coma and/or death	• Constipation • Loss of sex drive • Disrupts menstrual cycle • Poor eating habits • Risk of AIDS, hepatitis, etc. through shared needles • Social problems, e.g. theft, prostitution

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- Depressants
  - Calm and relax the central nervous system by interfering with nerve impulse transmission.
  - Slow down activity of the brain and other organ
  - Reduce rate of breathing and dull emotion responses
  - Effect:

Low dose	Moderate dose	Higher dose	Extremely high dose
• Little or no effect	• Induce sedation	• Induce sleep	• Death

  - Types:

Tranquilizer	Sedative	Hypnotic
• Do not produce sleep	• Soothing of distress • Without sleep	• Produce sleep

  - Ethanol: C_2H_5OH
  - Alcohol:

Short term effect	Long term effect
• Feeling of relaxation • Increase confidence • Dilates small blood vessels (warmth)	• Feeling of relaxation • Heart disease/ high blood pressure • Miscarriages/ deformities

  - Synergistic effects: combination of two drugs is more harmful than either drug taken alone
    - Alcohol + sleeping pills: increase risk of heavy sedation, even leading to coma and death
    - Alcohol + aspirin: stomach bleeding
  - Breathalyser:
    - K2Cr2O7 as oxidising agent
    - + $C_2H_5OH \rightarrow CH_3COOH$
    - From orange to green if there is alcohol
    - Oxidation # change of Cr change from 6 to 3
- Stimulants
  - Stimulated the brain and the central nervous system by increasing the state of mental alertness
  - Mimic effects of stimulated sympathetic nervous system
  - Sympathomimetic drugs: substances that mimic the effects of the sympathetic nervous system
  - Types and its effect:

Caffeine	Nicotine

• Diuretic
• Alertness
• Restlessness
	• Addiction
	• Lead to lung disease, ulcers, and cancer
	• Withdrawal symptoms:
	  o Cravings, nausea, depression
	  o Weight gain, insomnia, irritability

- Antibacterial
  - Infectious agents:

Bacteria	Virus
• Consisting of circular strand of DNA • Rigid cell walls are made of protein-sugar • Cytoplasm contains enzymes to break down food and build cell parts	• Reproduce only inside a living cell using its enzymatic machinery • Attach to host cell and control them • DNA surround by capsid (protein coat)

  - Broad and narrow spectrum:

Broad spectrum	Narrow Spectrum
• Effective against wide variety of bacteria	• Effective against only certain types

  - Penicillin G:
    - First penicillin used
    - Deactivated by stomach acid, had to be injected

Unedited Version