

DISEASE

⇒ an illness or disorder of the body that leads to poor health.

→ each disease has its signs & symptoms.

→ Disease

- **Infectious disease** (aka communicable diseases)
 - caused by **pathogens**
 - passed from infected → uninfected ppl
- **non-infectious disease**
 - eg. inherited / genetic, deficiency diseases
 - caused by malnutrition, mental disease

→ some ppl spread a pathogen even though do not have disease → **carriers**

→ **Transmission cycle** ⇒ the way in which a pathogen passes from one host to another

→ **Vaccination** makes us immune

→ **Endemic** ⇒ diseases always in the population

→ **Incidence of disease** ⇒ no. of ppl diagnosed over certain period of time.

→ **Prevalence** ⇒ no. of ppl who have the disease at any one time

→ **Epidemic** ⇒ sudden increase in the no. of ppl with a disease

→ **Pandemic** ⇒ increase in no. of cases throughout continent / world

→ **Mortality** ⇒ death rate.

→ **MOT** = methods of transmission

→ **Pathogen** → **Vibrio Cholerae**

↳ bacterium

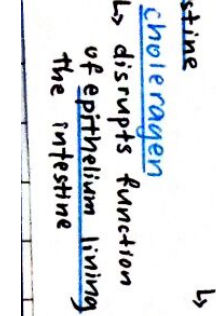
→ **MOT** → food-borne, water borne

↳ no access to proper sanitation

↳ contaminated food.

→ How? → bacteria reach small intestine

→ multiply, **secrete toxin** → **cholera toxin**



↳ disrupts function of epithelium lining the intestine

↳ glucose is absorbed into blood & takes ions (Na⁺, K⁺) with it.

→ Symptoms → severe diarrhoea, loss of H₂O & salt, dehydration, weakness.

→ Treatment → oral rehydration therapy

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MALARIA

P. falciparum, P. vivax, P. ovale, P. malariae

→ Pathogen → **Plasmodium**

↳ protoctist

→ **MOT** → insect vector (main)

→ blood transfusion

→ mother to fetus

→ How? → Female **Anopheles** mosquito feed on human to obtain protein for eggs

→ some of the pathogen's gametes taken up

→ the male & female gametes fuse in mosquito's gut to form **infective stages**.

→ infective stages move to the mosquito's salivary gland.

→ mosquito injects **anticoagulant** from salivary gland ∴ infective stages enter human blood.

→ why eradication program x successful / concerns

→ **plasmodium** became resistant to drugs

→ mosquitoes became resistant to DDT (insecticide)

→ difficult in developing vaccine

→ migration of ppl

→ increase of cases by *P. falciparum* (fatal)

→ drugs used in combination to reduce chances of resistance.

organism which carries disease from one person to another

→ symptoms → fever, anaemia

nausea, enlarged spleen, muscle pain, headaches.

→ Treatment → **Prophylactic drug**

↳ eg. quinine, chloroquine, proguanil, doxycycline.

↳ inhibits protein synthesis & prevents parasite spreading within body

↳ inhibiting sexual reproduction of P. in mosquito

→ Prevention → Kill insect vector

↳ **Bacillus thuringiensis**

→ kills mosquito larvae, not toxic to others.

→ avoid being bitten

→ use drugs.

→ **AIDS (Acquired Immune Deficiency Syndrome)**

→ Pathogen → **Human Immuno deficiency virus**

→ **MOT** → semen / vaginal fluids

→ infected blood products

→ contaminated syringes

→ mother to fetus across placenta / at birth / in breast milk.

→ **retrovirus** → genetic material = RNA

→ once in host cell, viral RNA converted back to DNA, then incorporated into human chromosomes (helper T cells)

→ providing drainage

→ clean H₂O supply.

→ don't use raw human sewage to irrigate

→ vaccines has been dropped (only short term)

infectious diseases

- Symptoms → oral thrush
- pneumonia
- (infections that tend to be the characteristic) → Kaposi's sarcoma
- ↳ type of skin cancer

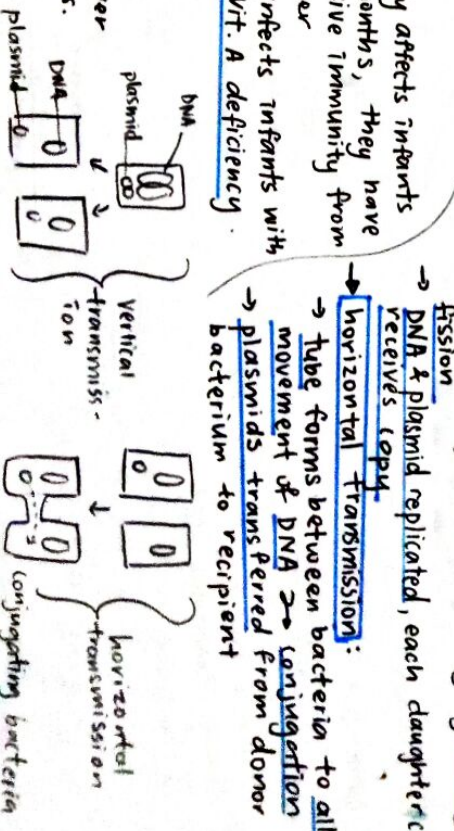
- Treatment → no cure
- drug therapy to slow down onset of AIDS.
- ↳ Zidovudine binds to the viral enzyme reverse transcriptase & blocks its action
- ↳ This stops the replication of viral genetic material
- ↳ Lymphocytes →

- **ANTIBIOTICS**
- a drug that kills or stops the growth of bacteria, without harming the cells of the infected organism.
- inhibit:
 - synthesis of bacterial cell walls
 - activity of proteins in cell surface membrane
 - Enzyme action
 - DNA synthesis
 - Protein synthesis

- Action of Penicillin:
 - Prevents the synthesis of the cross-links between the peptidoglycan polymers in the cell walls of bacteria
 - by inhibiting enzymes that build cross-links.
- Details:
 - Newly formed bacterial cell secretes enzymes called autolysins
 - which make little holes in cell wall
 - ↳ allow the wall to stretch so new peptidoglycan chains can link
 - Penicillin prevents chains from linking, autolysins keep making new holes ∴ cell wall = weaker
 - H₂O enter by osmosis ∴ cell burst

- **ANTIBIOTIC RESISTANCE**
- arise when mutation occurs so nucleotide sequence codes for a slightly different protein that is not affected by antibiotic.
- ↳ eg. acquired gene that codes for β -lactamase
- ↳ occurs on plasmid
- ↳ Course of antibiotic must be completed ∴ if dose followed correctly, entire population die
- if not, some susceptible bacteria survive
- if mutations occur might confer resistance

- **Vertical transmission:**
 - bacteria reproduce asexually by binary fission
 - DNA & plasmid replicated, each daughter cell receives copy
- **horizontal transmission:**
 - tube forms between bacteria to allow movement of DNA → conjugation
 - plasmids transferred from donor bacterium to recipient



TUBERCULOSIS (TB)

- Pathogen → Mycobacterium tuberculosis
- ↳ Mycobacterium bovis
- MOT → air-borne droplets (M. tuberculosis)
- ↳ undercooked meat / unpasteurised milk (M. bovis)
- HOW? → infected people cough / sneeze
- ↳ bacteria carried in droplets of liquid in air
- ↳ uninfected ppl inhale
- ↳ ∴ spreads rapidly in overcrowded conditions.
- ↳ Consuming beef / milk

- Treatment → several drugs
- ↳ prevent resistance
- Prevention → BCG vaccination
- ↳ cattle tested for TB
- ↳ milk pasteurised
- ↳ HIV infection can reactivate M. tuberculosis.
- **MEASLES**
- Pathogen → Morbivirus
- MOT → air-borne droplets
- HOW? → virus enters body & multiplies inside cells in upper respiratory track.
- Symptoms → rash, fever, runny nose, cough, conjunctivitis, white spots in cheeks
- Treatment → bed rest & medicine for fever
- ↳ no medicines for measles.
- Prevention → vaccination

- rarely affects infants < 8 months, they have passive immunity from mother
- infects infants with Vt. A deficiency.

- Symptoms → racking cough
- coughing blood
- chest pain
- shortness of breath
- fever
- sweating
- weight loss
- emaciated