Human Health and Disease Class 12 Key Points

CBSE Class 12 Biology · NCERT · for boards, NEET and JEE revision

ChapterNotes

Health and Disease

Health = physical + mental + social well-being (WHO)

Trap: 'absence of disease only' is always the WRONG NEET option.

- Disease = disturbance in normal body function (signs seen, symptoms felt)
- Infectious/communicable: caused by pathogens, spread person to person
- Non-infectious: confined to the person (cancer, allergy, diabetes)

Pathogens and Transmission

5 pathogen groups: bacteria · virus · protozoa · fungi · helminths

Each route has a signature prevention; match route → prevention.

- Air/droplets → common cold, pneumonia (masks, cover coughs)
- Food/water → typhoid, amoebiasis (clean water, hygiene)
- Vector → malaria (Anopheles); body fluids → AIDS

Bacterial and Viral Diseases

Typhoid → Salmonella typhi · Widal test

Common cold attacks the nose, NOT the lungs.

- Typhoid: Salmonella typhi, food/water, sustained high fever
- Pneumonia: Streptococcus pneumoniae, fills the alveoli
- Common cold: Rhinoviruses, upper respiratory tract

Protozoan, Worm and Fungal Diseases

Malaria → Plasmodium · female Anopheles · toxin haemozoin

Ringworm is a FUNGUS, not a worm - a classic trap.

- Malaria: P. falciparum = malignant; haemozoin gives chill-and-fever
- Amoebiasis: Entamoeba histolytica, houseflies are carriers
- Ascariasis = Ascaris (roundworm); Filariasis = Wuchereria; Ringworm = fungi

Innate Immunity

4 barriers: physical · physiological · cellular · cytokine

Interferons belong to the cytokine barrier, protecting uninfected cells from viruses.

- Physical: skin and mucus lining
- Physiological: stomach acid, saliva, tears
- Cellular: PMNL-neutrophils, monocytes, macrophages, NK cells

Acquired Immunity and Antibodies

Antibody = H_2L_2 (2 heavy + 2 light chains, Y-shaped)

Graft rejection = CMI (T-cells); antibody is H_2L_2, never H_4L_2.

- Humoral (AMI): B-cells secrete antibodies into blood/lymph
- Cell-mediated (CMI): T-cells; cause graft rejection
- Five classes 'GAMED': IgG, IgA, IgM, IgE, IgD

Primary vs Secondary Response

1st exposure = slow primary → memory cells → fast strong secondary

This anamnestic response is the basis of a booster vaccine dose.

- Primary response is slow, weak, leaves memory cells behind
- Secondary (anamnestic) starts earlier and rises much higher
- Memory cells fire instantly on re-exposure to the same antigen

AIDS and Cancer

HIV (retrovirus): RNA →(reverse transcriptase) DNA · diagnosed by ELISA

AIDS is NOT spread by hugging, food or mosquitoes; metastasis marks malignant tumours.

- HIV enters macrophages first, then destroys helper T-cells
- Cancer cells lose contact inhibition; malignant ones metastasise
- Carcinogens: physical (UV, X-ray), chemical (tobacco), biological (oncogenic viruses)

Active vs Passive Immunity and Allergy

Active = own antibodies, slow, has memory; Passive = ready-made, fast, no memory

Colostrum (IgA), ATS and antivenom are passive; vaccination is active.

- Allergy: allergen → IgE on mast cells → release histamine, serotonin
- Treat allergy with anti-histamines; mediator is IgE
- Autoimmunity attacks own cells, e.g. rheumatoid arthritis

Drugs and Alcohol Abuse

Heroin → Papaver somniferum (depressant); Cocaine → Erythroxylum coca (stimulant)

LSD is from the fungus Claviceps purpurea, NOT a plant - a guaranteed trap.

- Cannabinoids: Cannabis sativa inflorescence, affect cardiovascular system
- Cocaine blocks dopamine transport; opioids bind CNS opioid receptors
- Nicotine stimulates adrenal gland → adrenaline/nor-adrenaline → raises BP

Quick revision

- Malaria: Plasmodium, female Anopheles; Filariasis: Wuchereria, female Culex
- Innate immunity: born with; Acquired: after exposure (active/passive)
- Vaccination: active artificial immunity; Serum: passive artificial immunity
- HIV: retrovirus, attacks CD4+ T-cells; ELISA screening, Western Blot confirmation
- Cancer: oncogenes (promote), tumour suppressors (prevent); benign vs malignant
- Antibodies: IgG (most common), IgA (colostrum), IgE (allergy)

Full chapter notes with solved examples and practice questions: https://chapternotes.in/cbse/class-12-biology/human-health-and-disease-class-12-notes/