

HUMAN HEALTH AND DISEASE..

Father of Medicine → Hippocrates.

Hippocrates and Indian Ayurveda

(Good Humour Hypothesis)

Black bile → Hot personality → Fever.

Disapproved by William Harvey
(Blood Circulation)

Mind, Mental state → affects Health.

Health is affected by →

Genetic Disorders Infections Lifestyle.

Health → State of complete physical, mental and social well-being.

Disease → Functioning of organs/ system of body adversely affected.

Pathogen → An infectious agent.
(Can be Bacteria, Virus, protozoa, fungi)..
Most parasites.

Disease

Infectious

Spread to others, by various means.

Caused by pathogens
Bacterial, Viral, fungal..

Contagious

Non-Infectious

Do not spread.

Genetic
Immune System disorder
Lifestyle.

Disease

Bacterial

Viral

Fungal

Protozoan

Helminthic

Bacterial Diseases

① Typhoid → Salmonella typhi
(pathogenic bacterium)

Enters small intestine through contaminated food and water.
(feco-oral route)

- High fever (39° - 40° C)
- Weakness, Stomach pain, Constipation, headache, loss of appetite.

Severe Cases → Intestinal perforation and Death.

- WIDAL TEST (for confirmation)
- Mary Mallon (Typhoid Mary)

② Cholera → Vibrio Cholera

- Contaminated food and water (feco-oral route)

- Diarrhoea, Vomiting (rice type ⁺ faeces)

③ Pneumonia → Droplet Infection

Streptococcus Pneumonia,

• Haemophilus influenzae

- fluid filled alveoli.

• affect lower respiratory tract, severe problem in respiration

- Fever, Chills, Cough, Headache.

• Severe Cases → Lips and fingernails grey to bluish.

④ Bubonic Plague (Black Death) -

• Yersenia pestis

• Carrier - Xenopsella (rat flea)

- High fever, Headache.

• axillary lymph node enlarges

- Red spot → Black.

⑤ Tuberculosis (Koch's Disease) →

- Mycobacterium tuberculosis.
- fever, cough, sputum with blood.
- BCG Vaccine.

⑥ Leprosy (Hansen's disease) →

- Mycobacterium leprae.
- Light colour patches on skin, thickening of nerves, loss of sensation.
- Deformity of toes and fingers.

⑦ Diphtheria → Corynebacterium diphtheria.

- High fever, Causes suffocation membrane inside throat.
- Grey.
- DPT Vaccine.

⑧ Tetanus → Clostridium tetani

- (Lock Jaw) • Often fatal.
- Sustained contraction of voluntary muscles.
- ATS (anti tetanus serum) given after injury.

⑨ Dysentery → Shigella Dysenteriae

- Abdominal pain, Mucus/Blood in stool.
- Orofecal route.

Viral Diseases

① Common Cold → Rhino Virus.

- Infect nose and respiratory passage but not lungs.
- Nasal congestion and discharge, sore throat, hoarseness, cough, headache, tiredness etc..
- Droplet Infection (3-7 days)

② Chikungunia → Chikungunia Virus

- ↳ Vector - female aedes aegyptis.
- ↳ Fever, Joint pain, Swollen Lymph node.

③ Dengue → Flavi-arbo Virus

- ↳ Vector - female aedes aegyptis.
- ↳ Fever, Headache, pain behind eyes. Platelets ↓↓.

④ Covid 19 → Corona Virus

- ↳ Difficulty in Breathing
- ↳ SS RNA, ↳ Rt PCR
- ↳ Droplet Infection

Small pox, Chickenpox.
↓
completely eradicated.

Measles, Rabies → 100% fatal
Dog, Hydrophobia

Mumps → Infection of parotid gland.

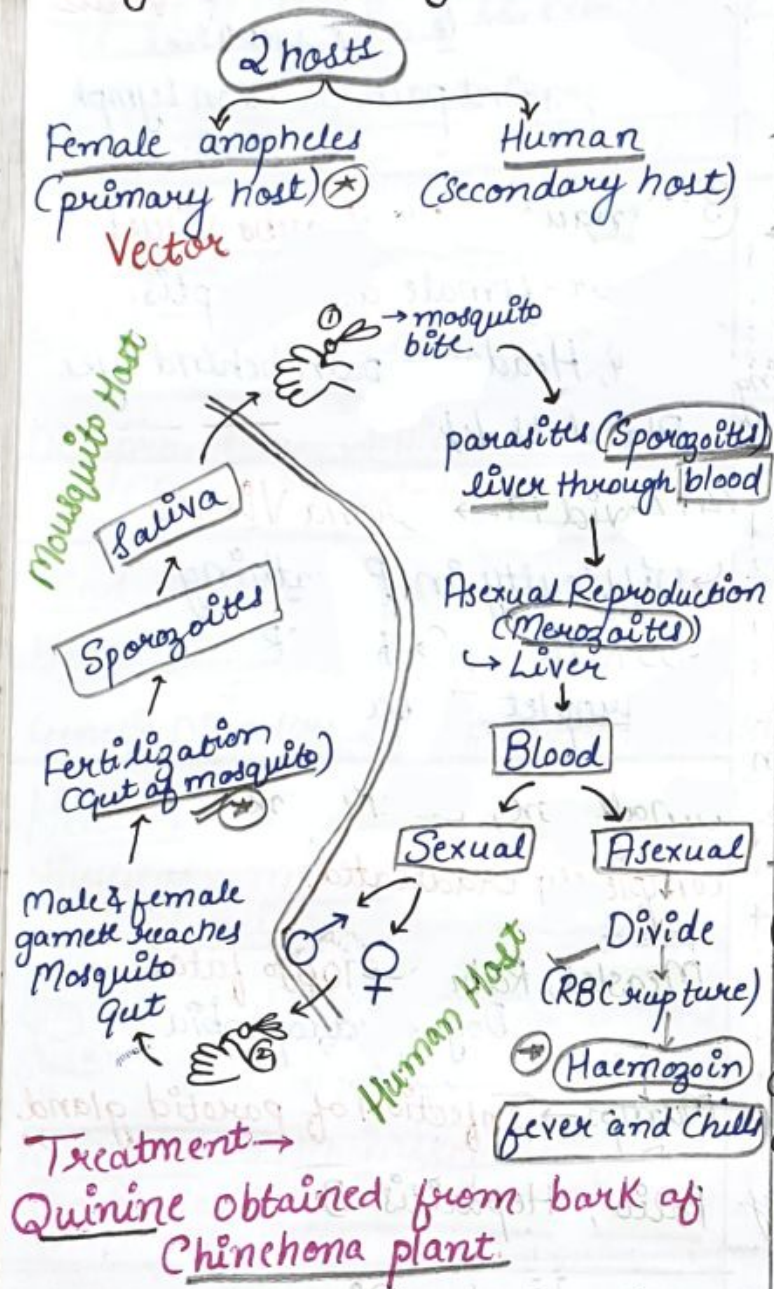
Polio, Hepatitis-B

Protozoan Diseases →

① Malaria → Plasmodium (tiny protozoan)

- ↓
- P. Vivax (most common)
- P. Malaria
- P. Falciparum (most serious, causes malignant malaria)
↓
even fatal.

Stages in life cycle of Plasmodium



Amoebiasis (Amoebic dysentery)

- Entamoeba histolytica (protozoan parasite)
- Constipation, abdominal pain, cramps, stool with excess mucous and blood clots.
- Mechanical Carrier → Housefly *
- Lives in large intestine *
- Food and Water contaminated by tetranucleated cyst

Minuta Trophozoite / Magma

→ Minuta forms tetranucleated cyst.

→ Magma start to eat the blood and tissues of wall of intestine.

Helminthic Disorders

① Ascariasis: Ascaris (Common round worm)

- Only one host → Human
- Spread by food and water contaminated with eggs of Ascaris.
- Lives in Small Intestine.
- Internal bleeding and blockage of intestinal passage, muscular pain, fever.
- Eggs of parasite are excreted along faeces.

② Filariasis / Elephantiasis:

Wucheria Bancrofti and W. Malayi (filarial worm)

- Slowly developing chronic inflammation
- Inflammation of organs in lower part of body due to blockage of lymph vessels.
- Vector → Female mosquito Culex *

Fungal Diseases

① Ringworms →

Genera Microsporum, Trichophyton, Epidermophyton

- most common infection
- Dry, Scaly lesions → SKIN, nails and scalp.
- Develop by intense itching, heat and moisture.

Disease Prevention Method

- Maintenance of personal and public hygiene → for typhoid, amoebiasis, ascariasis (by food)
- air-borne diseases → pneumonia, common cold.
- Malaria, filariasis → (Insect Vectors) By Controlling Vectors.
- Gambusia (fish) → feed on mosquito larvae
- Vaccine, antibiotics, other drugs

Immunity

Ability of host to fight disease-causing microorganisms, conferred by Immune system.

① Innate Immunity

- Non specific type of defense.
- By Birth Immunity.
- Diff. types of Barriers

i) Physical Barriers

- Skin, Mucus coating of epithelium lining the respiratory, gastrointestinal, urogenital tract.
- Prevent entry of microbes in body.

ii) Physiological Barriers

- Create adverse environment for pathogen.
- Acid in stomach, Saliva in mouth, tears from eyes.
- Prevent microbial growth.

iii) Cellular Barriers

- Leucocytes (WBC) - polymorpho nuclear-leucocytes (PMNL - neutrophils)
- Monocytes - Macrophage
- natural killer → phagocyte and destroy microbes

iv) Cytokine Barriers

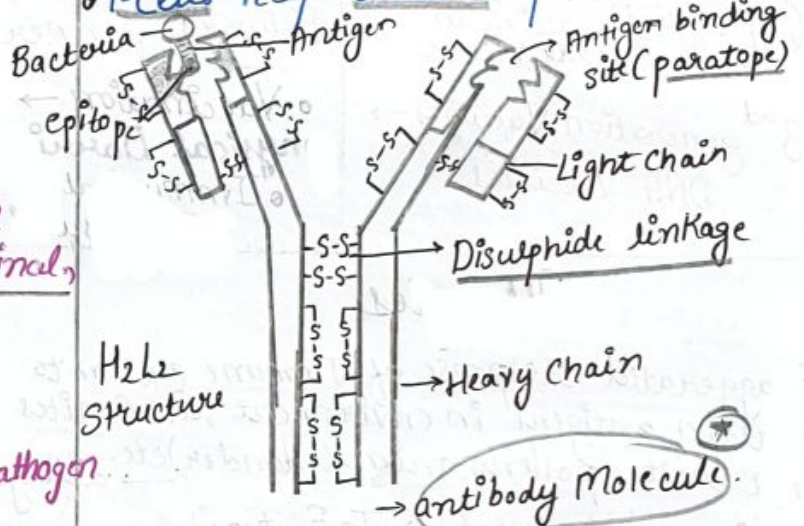
- Virus-infected cells → proteins ↓ Interferons
- protect non-infected cells from Viral Infection

② Acquired Immunity

- pathogen specific, diverse.
- Characterised by memory.
- Remember previous encounter.
- primary response
- Secondary anamnestic response
- body encounters pathogen for first time.
- Subsequent encounter with same pathogen
- low intensity
- Highly intensified
- Humoral Immunity (By B-lymphocytes)
- Cell mediated Immunity (By T-lymphocytes)

① Humoral Immunity

- B cells released army of tiny protein called antibodies.
- T-Cells help B-cells to produce them.



Antibody

- IgA → Body fluids (Blood, Milk)
- IgG → Smallest, Crosses placenta, most abundant.
- IgE → Mediates hyper sensitivity, allergic responses.
- IgM → Largest, protect blood stream, release during 1st response.
- IgD → activation of B-lymphocytes.

② Cell Mediated Immunity →

- Cytotoxic T-cells kill infected human cells.
- Responsible for Graft Rejection.
- Recognition b/w self and non-self.

Immunity

Active Immunity
(antibodies generated inside body)

Natural
e.g. → Chickenpox

Artificial
↓
Vaccines

1st generation Vaccine →
(Dead microbes, DPT, BCG) Bacteria

2nd generation Vaccine →
(Antigens)
(Hepatitis B vaccine in Yeast) Virus

3rd generation Vaccines →
DNA Vaccines

Passive Immunity
(antibodies supplied from outside)

Natural
↓
Colostrum
IgA

Artificial
↓
Anti-venom
Anti-tetanus Serum

• Discovery of Vaccination →
Edward Jenner

- Vaccination → physical Barriers
- Immunisation → Results

Allergies

- Exaggerated response of Immune system to certain antigens in environment like (mites, dust, pollen, animal dander) etc. → allergens
- antibody produced → IgE type ✓
- Sneezing, watery eyes, running nose, difficulty in breathing.
- Histamine and Serotonin produced from mast cells.
- Cure → antihistamine, adrenaline, steroid.
- eg → Asthma, Hay fever, Anaphylactic shock

Auto Immunity

- Due to genetic or unknown reasons, body attacks self cells.
- e.g. → Rheumatoid Disease, Psoriasis, Vitiligo, Myasthenia Gravis, Graves' disease

Immune System in the Body

- Consists of lymphoid organs, tissues, cells and soluble molecules like antibodies.

primary lymphoid Organs
formation, maturation and proliferation of lymphocytes

Bone Marrow
WBC ✓

Thymus
(reduces with age)

Secondary lymphoid Organs

- Site of interaction of lymphocytes and antigens.
- Spleen, Lymph node, tonsil, peyer patches of small intestine, appendix
- Spleen is reservoir for RBC and filter of blood by trapping blood-borne microorganisms
- Mucosa associated lymphoid tissue (MALT)
 - 50% of total lymphoid tissue
 - Found in lining of respiratory, digestive and urogenital tract

AIDS

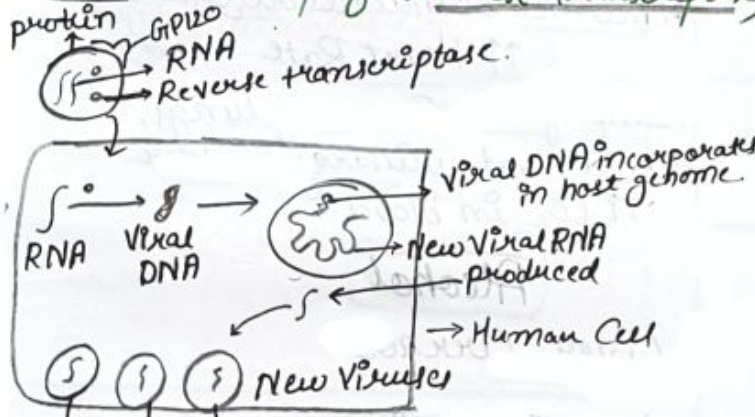
Acquired Immuno Deficiency Syndrome

- Caused by HIV group of syndrome
- Human Immuno deficiency Virus.
- First reported in 1981. Retro Virus
- Killed more than 25 million people.

Transmission of HIV

- Sexual contact with infected person.
- Contaminated blood and blood products
- Infected needles
- Infected mother to child through placenta.

→ Not spread by touch/physical contact.
 → Virus is Retro Virus, Having RNA as genetic material, but convert it into DNA with help of reverse Transcriptase.



→ Time lag between infection and AIDS is 5-10 years

↳ HIV attacks T-helper cells and macrophages simultaneously (CD4 receptors) and act as HIV factory.

→ Due to decrease in T-lymphocytes, immune response become very weak.
 → Mycobacterium, Virus, fungi, Toxoplasma easily start aggravating.

→ Diagnosis of AIDS → ELISA (Enzyme Linked Immuno Sorbent Assay)

→ Treatment - No permanent cure, antiretroviral therapies can prolong life of patient.

→ Confirmatory → Western Blot

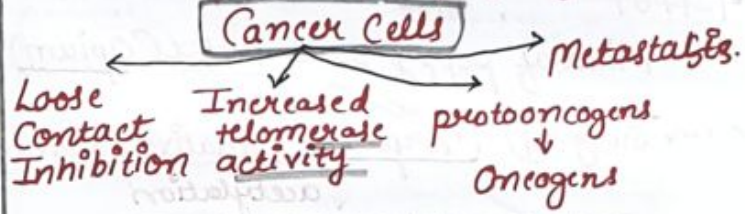
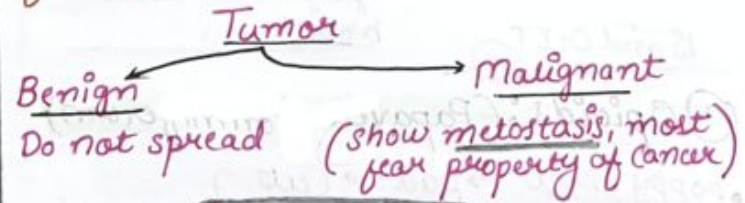
→ NACO (National AIDS Control organisation) and many NGO's.

→ AIDS day → 1 December

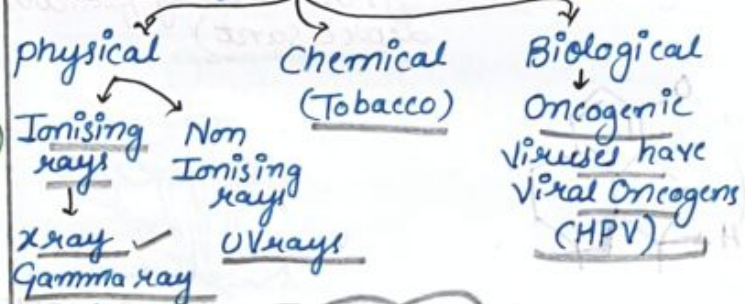


Cancer

More than 1 million Indians suffer from Cancer.



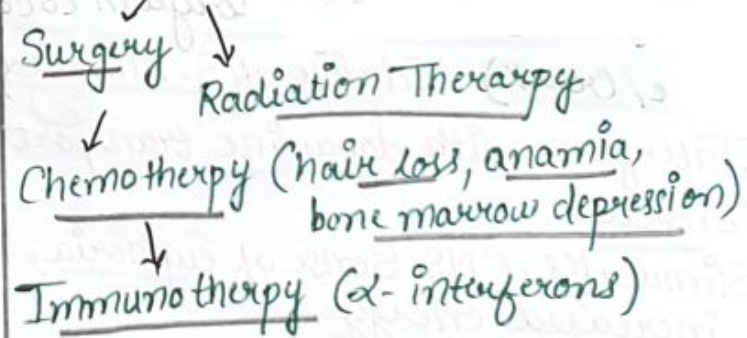
Causes of Cancer (Carcinogen)



Cancer Detection

- Biopsy and Histopathological series
- Radiography (2D image with x-rays)
- Computed tomography (3D image with x-rays)
- Antibodies
- MRI (Safest) (Use magnetic field and non ionising radiations)
- Magnetic Resonance Imaging

Treatment of Cancer



NEET SLAYER

Drug Abuse

Opioids → receptor in CNS and GIT*
Cannabinoids → receptor in brain
Cocaine alkaloids

① Opioids: (Papaver Somniferum)

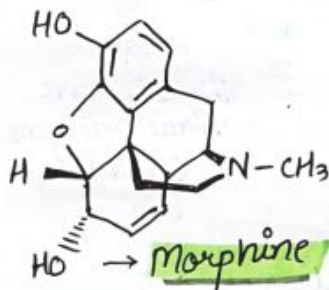
• poppy plant → pod → Cut ↓

Milk of poppy pods - latex (Opium)

(after surgery) Morphine (Sedative, pain killer)

↓ acetylation

Diacetyl morphine (Heroin) (Smack)
 (taken by snorting, slows body functions, depressant)



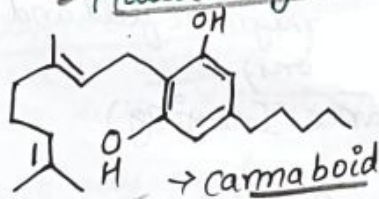
② Cannabinoids: (Cannabis Sativa)

• Marijuana, hashish, ganja, bang, Charas

• Taken by inhalation and oral ingestion

Effect on Cardiovascular system

Hallucinogens



③ Cocaine: (Erythroxylum coca) (Coke, Crack) (Native of S. America)

• Interferes with dopamine transport

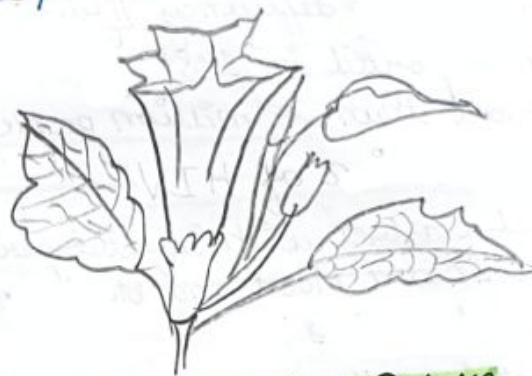
• Snorted

• Stimulates CNS, Sense of euphoria, increased energy

Excessive dosage - Hallucinogens

④ Datura, Atropa belladonna (Hallucinogen)

⑤ Barbiturates, amphetamines, benzodiazepines →
 Used in mental illnesses like depression and insomnia.



Smoking →

- Tobacco - More than 400 years
- Nicotine stimulates adrenal gland
- ↑↑ BP, ↑↑ Heart Rate
- Emphysema, Cancer of lungs, throat and urinary bladder
- ↑↑ CO in blood

Alcohol

• Liver Cirrhosis

Addiction

Psychological attachment to certain effects of drug.
 e.g. - Euphoria

Dependence

Tendency of body to manifest unpleasant withdrawal syndrome if regular dose of drug is abruptly discontinued.

withdrawal symptoms →
Anxiety, nausea, sweating, Shakiness and sometimes may be lethal.

Effects of Alcohol/Drug Abuse.

- Immediate effect - Vandalism,
- Violence and reckless behaviour.
- High risk of diseases. e.g. - AIDS and hepatitis-B.
- Damage to nervous system and liver cirrhosis.
- Coma and Death - prolonged use.

Preventing Alcohol/Drug Abuse.

- Avoid peer pressure.
- Education and Counselling.
- Help from parents and peer.
- Identifying danger signals
- Seeking medical help.



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