Biology Class 04

2nd June, 2023 at 9:00 AM

DISCUSSION ON UPSC PRELIMS 2023 (09:04 AM)

FUNGAL DISEASES (09:20 AM)

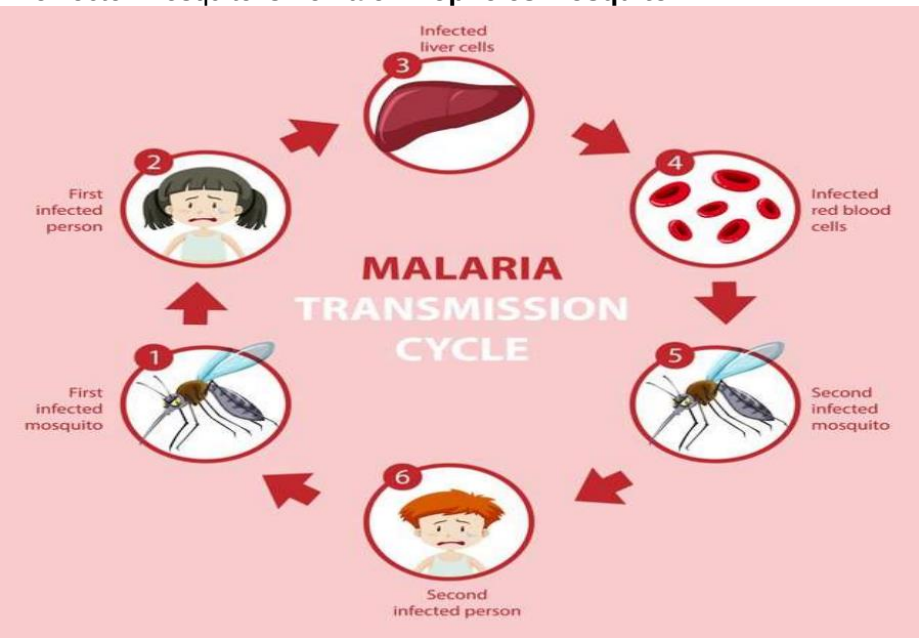
- **Candidiasis:**
- This fungus is commonly found in the mouth and inside the cheeks of humans.
- However, in a person with low immunity or bad hygiene, this may turn into a disease.
- **Ring Worm**
- **Athletes Foot**

HELMINTHIC DISEASES

- 1. Ascariasis
- 2. Taeniasis
- 3. Lymohatic Filariasis
- 4. Hookworm Infection
- These worms prevent the absorption of nutrients in the body.
- These diseases are especially **harmful to children** compared to adults as it impacts the growth of children.
- National De-worming Day is celebrated by the government of India to prevent such diseases.

PROTOZOAN DISEASES (09:29 AM)

- Protozoa are **unicellular eukaryotes**.
- **Diseases:**
- **Amoebiasis**: It is commonly known as Food Poisoning
- **Giardiasis**
- **Malaria:**
- It is a vector-borne disease.
- To tackle Malaria we have **National Vector Borne Disease Control Programme and National Malaria Control Programme (NMCP).**
- The name of the pathogen is **Plasmodium** (Vivax and Falciparum).
- The vector mosquito is **Female Anopheles Mosquito.**



- **Type of Reproduction:**
- **Asexual**
- Only one parent.
- It is also called an intermediate host.
- **Sexual**
- Two parents are needed.
- It is also called a definitive Host.

VIRAL DISEASES (09:48 AM)

- There is **no effective curative treatment** available against the viral diseases.
- The focus is on developing vaccines or on preventive care.
- **Hepatitis:**
- Derived from the word Hepatic.
- Hepatic refers to the Liver and -itis refers to inflammation.
- Symptoms like: Redness, Swelling, Pain, and Loss of Function.
- It is caused by a pathogen called Hepatitis Virus.
- Types of this virus and sources of transmission:
- **Hepatitis A:** Food and Water
- **Hepatitis B:** Body Fluids
- **Hepatitis C:** Blood
- **Hepatitis D:** Happend only to people with Hepatitis B
- **Hepatitis E:** Food and Water
- Vaccines are available for other Hepatitis, but there is no vaccine for Hepatitis C.
- **Other Viral Diseases:**
- Chicken Pox
- Polio
- Dengue
- ZIka
- Chikungunya
- AIDS

IMMUNITY (10:07 AM)

- It is a balanced state of an organism having adequate biological defences to fight any unwanted agents.
- **Two types:**
- **1. Innate Immunity**
- It is the non-specific response which is activated immediately on exposure to an unwanted agent forming the first line of defence of the body.
- **Physical barriers** in the body like skin, and mucous membranes (for organs).
- **Chemical Barriers** like HCl in the stomach, Saliva and Tears.
- **Cellular Defense:** Neutrophils and Monocytes
- **2. Adaptive/Acquired Immunity:**
- It is the specific immune response developed against unwanted agents after the system has been exposed to the unwanted agents.
- It is slower than innate immunity.
- **Lymphocytes:** These are a type of White Blood Cell.
- There are two types of lymphocytes: B-cells and T-cells.
- Blood cells including lymphocytes are formed in the Bone Marrow.
- **T-cells,** though formed in Bone Marrow, their maturation take place in Thymus Gland in the neck.
- **B-Cells** are an antibody-mediated immune response.
- **Antigen:** An antigen is any agent that triggers an immune response.
- Anything can be an antigen but Antibody is a protein.
- **Antibody:** It is the protein produced as a response to the antigens.
- The antibody is produced by B-Cells.
- The immune response of T-cells is a cell-mediated immune response.
- **Phagocytosis:** It is the process by which a cell uses its plasma membrane to engulf a large particle and then destroy it.

VACCINATION (10:51 AM)

- Vaccination is a process by which a person is made immune or resistant to infection typically by stimulating the **body's own immune system.**
- When an antigen, attacks a body for the first time a slow and **low-intensity immune response** is created.
- The B-cells however remain sensitised and immunological **memory** is created.
- On subsequent attacks by the same pathogen, a fastened high-intensity immune response is created by triggering the immune memory.
- This high-intensity production of antibodies destroys the antigen before causing the disease.
- **Types of Vaccines:**
- **1. Live Attenuated Vaccine:**
- The micro-organism is disabled so that it does not cause the disease but retains its capacity to grow.
- E.g. Oral Polio. MMR, BCG, Rotavirus Vaccine, etc.
- **2. Inactivates/Killed Vaccine:**
- The micro-organism is killed but certain components of its structure like Proteins are still able to create an immune response.
- E.g. Injectible Polio, COVAXIN, Influenza, etc.
- **3. Sub-unit Vaccine:**
- It uses specific parts which can act as an antigen example proteins and polysaccharides.
- E.g. Whooping Cough Vaccine
- **4. Conjugate Vaccine:**
- It used a combination of two parts of a pathogen that act as an antigen.
- E.g. Pneumococcal Conjugate Vaccine, etc.
- **5. Nucleic Acid Vaccine- DNA & RNA**

ADAPTIVE IMMUNITY (11:50 AM)

- It is of two types: Active Immunity and Passive Immunity.
- **Active Immunity:**
- It is a process in which the **production of antibodies** is done by the immune response of the person in response to the antigen.
- It is further divided into two types:
- Natural Immunity from infection
- Artificial Immunity from Vaccines
- **Passive Immunity:**
- It is the process in which antibodies are administered from **outside** to protect against a disease-specific antigen.
- E.g. Mothers Milk
- Artificial Passive Immunity is achieved through **Plasma Therapy.**

Further Reading:*Chapter 8 from Class 12th-NCERT*

The Topic for Next Class: Genetics and Biotechnology