



Human Health and Diseases



CONCEPT OF HEALTH



1. Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity.(WHO 1948)

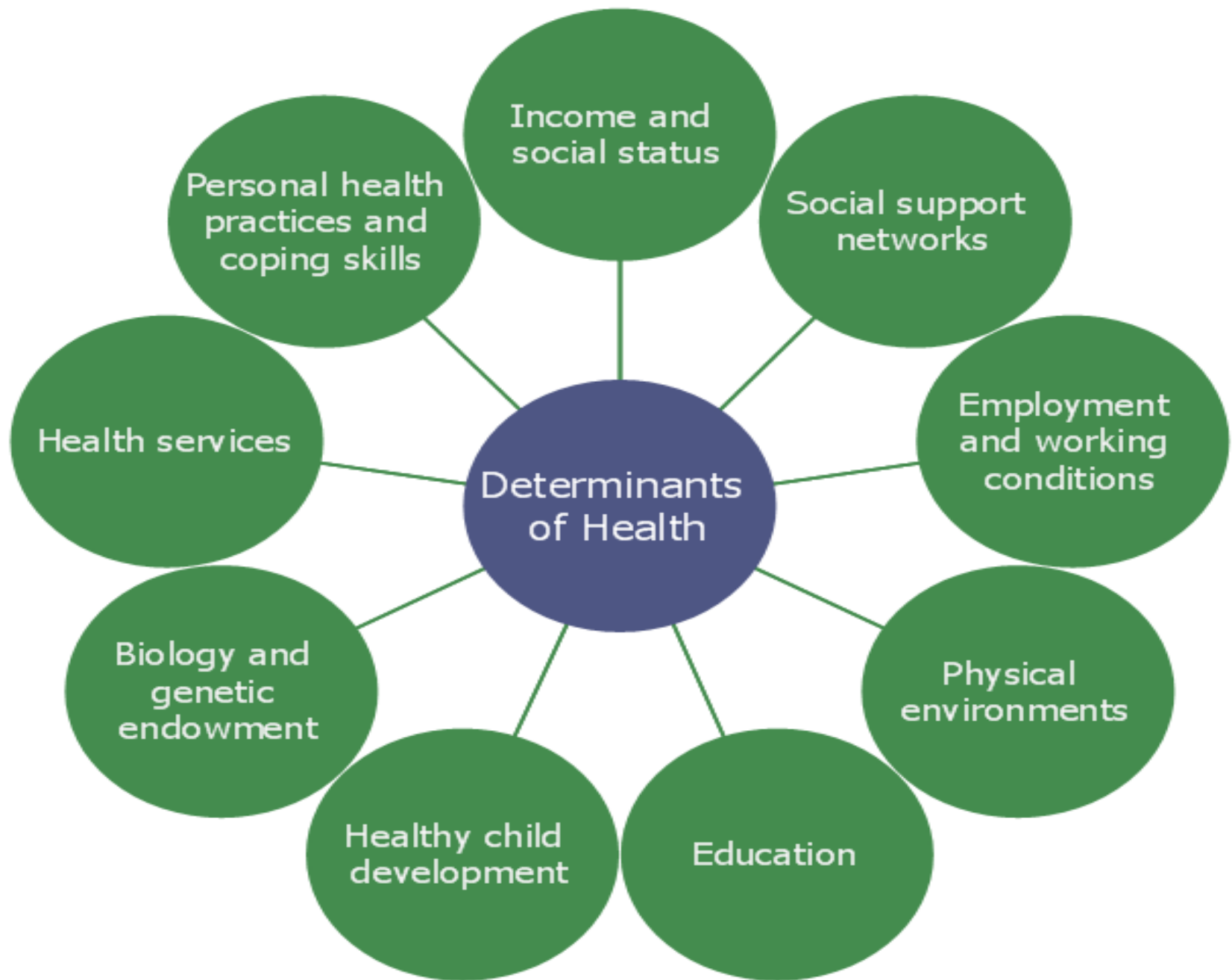
2. Operational definition of Health by WHO – a condition or quality of the human organism expressing the adequate functioning of the organism in given conditions, genetic or environmental.

- Health does not simply mean 'absence of disease' or physical fitness.
- World Health Organization, health is defined as the state of complete **physical, mental and social** wellbeing and not merely the absence of disease or infirmity
- Health is birth right of humans.
- Reflects the metabolic and functional efficiency of living organisms.
- Hygiene is a science of rules of health.



To achieve good health

- hygienic balanced diet**
- clean drinking water**
- personal and community hygiene**
- regular physical exercise**
- knowledge about diseases and their effect on body**
- proper disposal of waste and control of vectors.**



IMMUNE SYSTEM



The system which protects us from various infectious agents, is called **IMMUNE SYSTEM**

Resistance is the ability to prevent the damage or disease, through our defense mechanism

In spite of constant exposure to a variety of pathogens and infectious agents like bacteria, viruses, etc, most of us remain healthy.

- The term **IMMUNITY** has traditionally referred to as the resistance exhibited by the host towards injury caused by pathogens and their products.

Immunity is in fact the **“freedom” or “exempt”**.

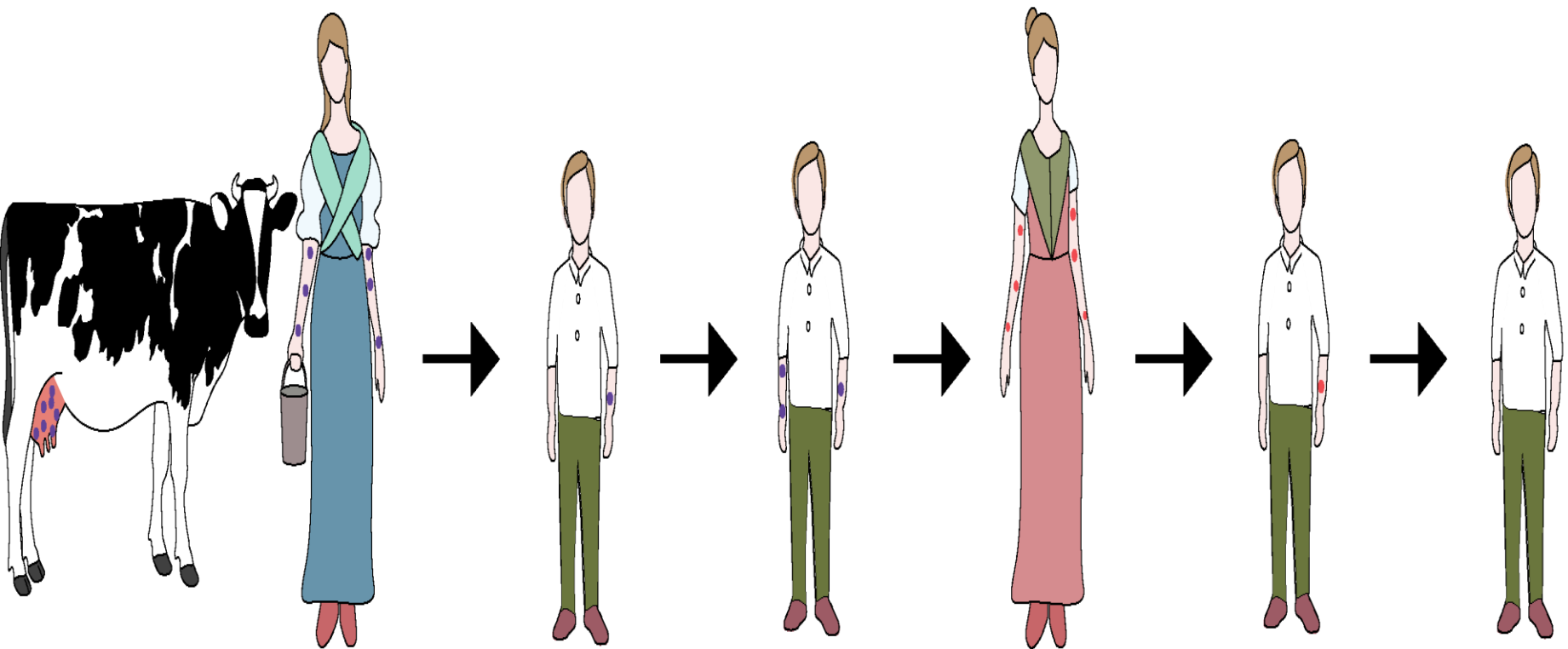
Definitions

- What do we mean when we say...
 - **Immunology** = the study of the immune system
 - **Immune system** = the cellular and molecular components responsible for immunity
 - **Immunity** = the protection from infectious disease (historical definition)
 - “The physiologic function of the immune system is defense against infectious microbes. However, even non-infectious foreign substances can elicit immune responses.”
 - **Immune responses** = collective and coordinated responses to foreign substances
- More specifically, immunology is the study of the cellular & molecular immune mechanisms that allow the body to:
 1. Distinguish between self and non-self
 2. Eliminate non-self

The concept of immunity started by Edward Jenner in England.

He developed cowpox vaccine for the protection against the attack of small pox (virus).

- Immunology is a branch of science which deals with the study of immune system, immune responses to foreign substances and their role in resisting infection by pathogens
- Protection against infectious diseases is only one of the many consequences of immune response, which is entirely concerned with the reaction of the body against any foreign antigen.



Sarah Nemes,
a milkmaid
infected with
cowpox

James Phipps
is inoculated
with fluid
from cowpox

James develops
a mild case
of cowpox

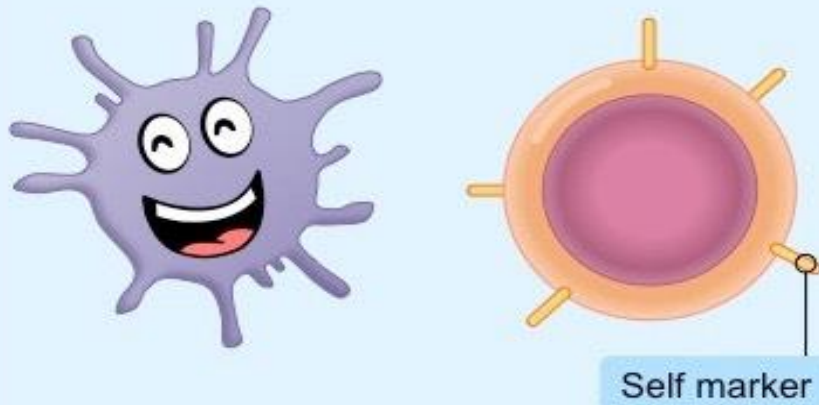
Scabs are
collected from
a smallpox
patient

A few weeks later
James is inoculated
with material from
smallpox scabs

James is
unaffected.
Protection
is complete

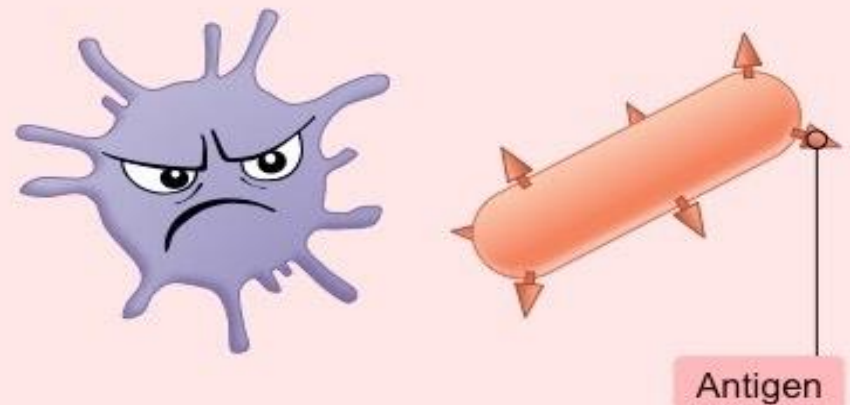
- The most important characteristic of immune system is that it distinguishes **self** (body's own cells) and **non-self** (foreign molecules or invading cells).
- Any foreign substance invading body and capable of stimulating an immune response, is called an **antigen**.
- The protective chemicals produced by immune cells in response to antigens are called **antibodies**.

IDENTIFYING SELF

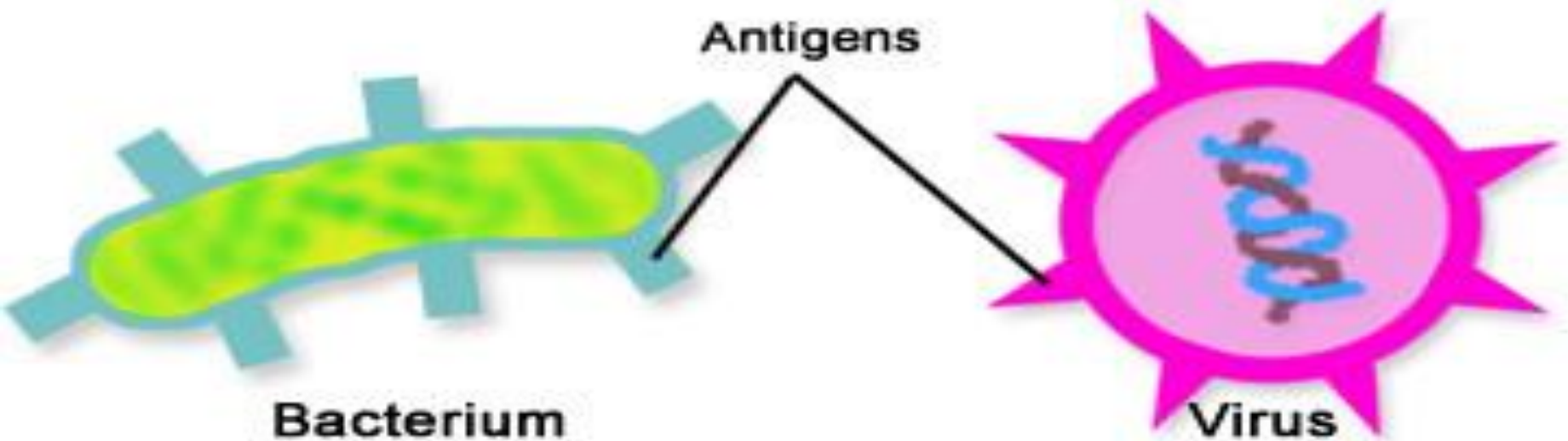


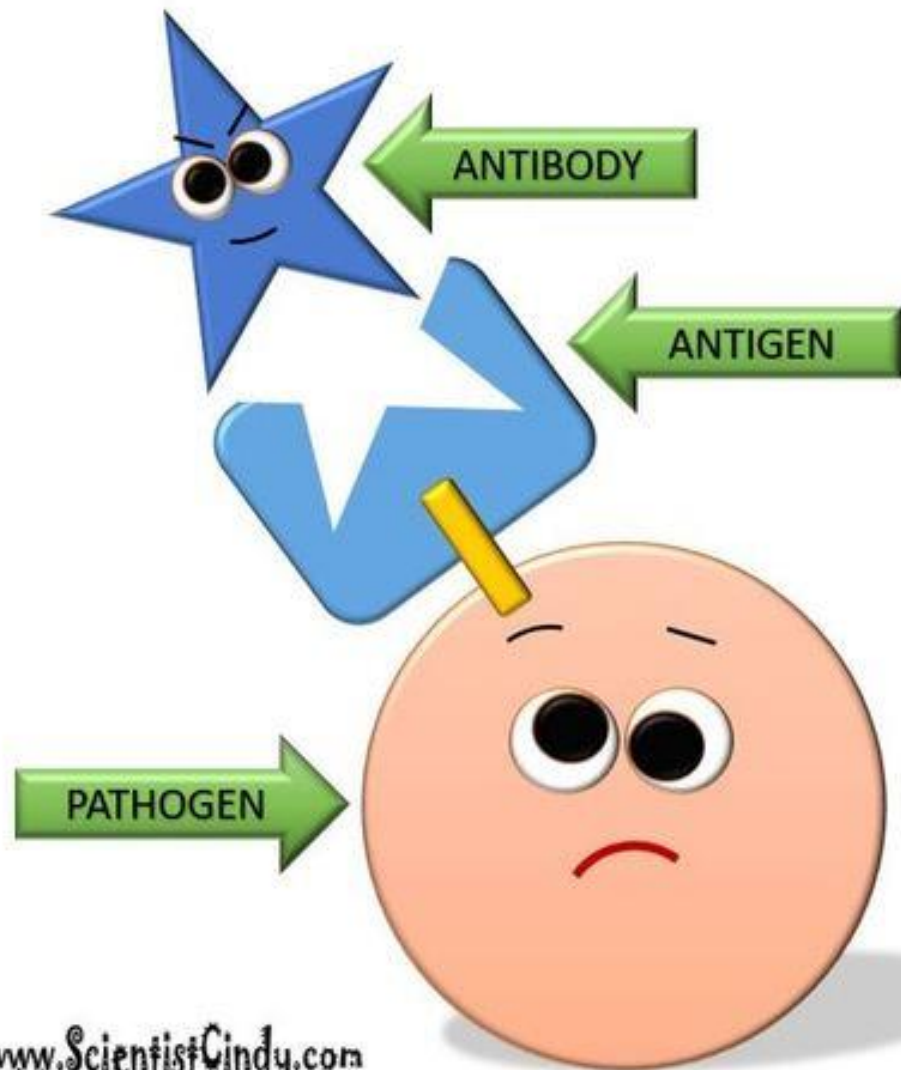
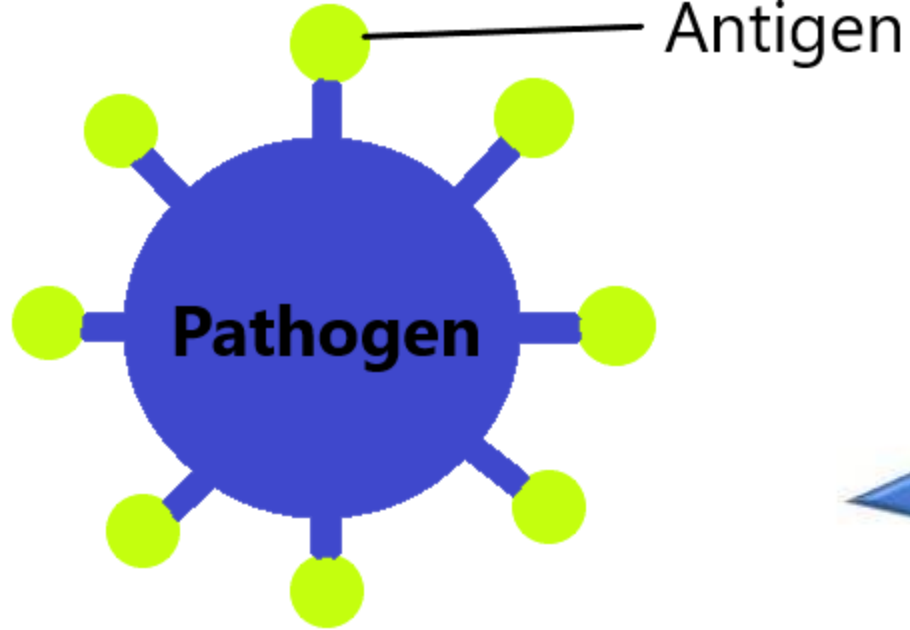
A **self marker** (MHC) labels the body's cells as a *'friend'* and are tolerated by the immune system.

IDENTIFYING NON-SELF



An **antigen** is a molecule that the immune system recognises as foreign (non-self) and treats as a *'foe'*





IMMUNITY

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graph TD; IMMUNITY --> INNATE; IMMUNITY --> ADAPTIVE; INNATE --> INNATE_NATURAL[NATURAL IMMUNITY]; INNATE --> INNATE_ARTIFICIAL[ARTIFICIAL IMMUNITY]; ADAPTIVE --> ACTIVE; ADAPTIVE --> PASSIVE; ACTIVE --> ACTIVE_NATURAL[NATURAL IMMUNITY]; ACTIVE --> ACTIVE_ARTIFICIAL[ARTIFICIAL IMMUNITY]; PASSIVE --> PASSIVE_NATURAL[NATURAL IMMUNITY]; PASSIVE --> PASSIVE_ARTIFICIAL[ARTIFICIAL IMMUNITY];
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INNATE

1. ANATOMICAL BARRIER
2. PHYSIOLOGICAL BARRIER
3. PHAGOCYTIC BARRIER
4. INFLAMMATORY BARRIER

ADAPTIVE

ACTIVE

PASSIVE

NATURAL
IMMUNITY

ARTIFICIAL
IMMUNITY

NATURAL
IMMUNITY

ARTIFICIAL
IMMUNITY

INNATE-

- Inborn (inherited) **By Birth**
- by virtue of his or her genetic make-up.
- natural (inborn) defense system of the body.
- not affected by prior contact with microorganisms or immunization.
- **nonspecific**
- innate immunity comprises the various types of barriers which prevent entry of foreign agents into the body

Innate immunity



Epithelial
barriers



Phagocytes

Dendritic cells



Complement



NK cells

Innate immunity

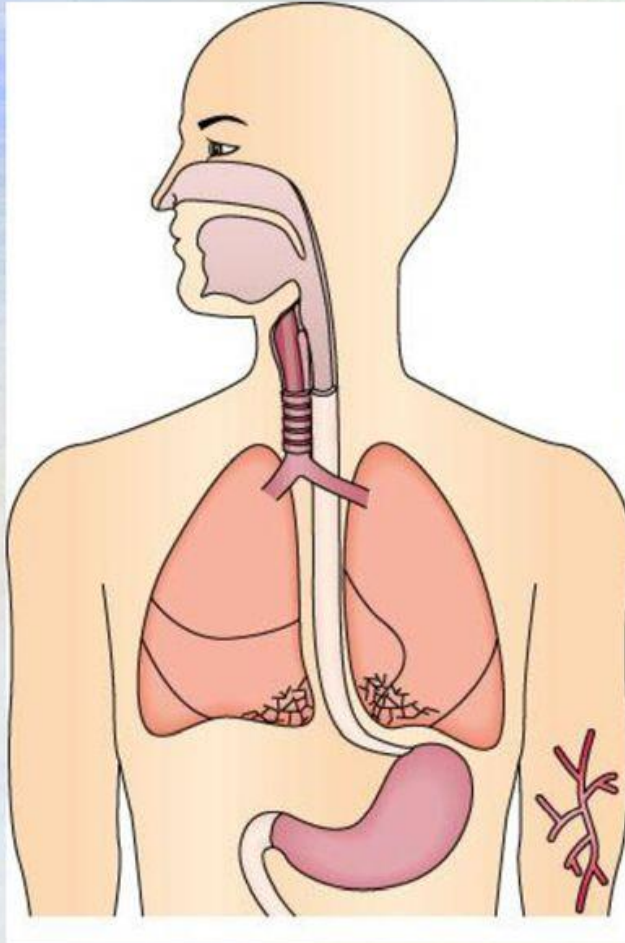
BARRIERS OF INNATE IMMUNITY

A) EPITHELIAL :

- The intact **skin** and **mucous** covering the body, protect it considerably against invasion by microorganism(s).
- The healthy skin possesses bactericidal activity due to the presence of high concentrations of salt in drying **sweat**.
- **Sebaceous** secretions and long chain of fatty acids have bactericidal and fungicidal properties.
- The mucosa of the respiratory tract has several innate mechanisms of defense.
- The nose prevents entry of microorganisms to a large extent, the inhaled particles being arrested through **hair** at or near the nasal orifices.
- that pass beyond are held by mucus lining the epithelium and are swept back to pharynx by **cilia** where they tend to be swallowed or coughed out.
- The **cough reflex** is an important defence mechanism of respiratory tract.

- The mouth is constantly bathed in **saliva** which has inhibitory effect on microorganisms.
- The **acidity** of gastric secretions in the stomach destroys microorganisms.
- The flushing action of **urine** eliminates bacteria from the urethra
- . Spermine and zinc present in **semen** are antibacterial
- The conjunctiva is freed of foreign particles by the flushing action of **lacrymal** secretions
- . Eyes become susceptible to infection when lachrymal secretion is absent.
- Tears** contain the antibacterial substance Lysozyme (A. Fleming).
- is a thermolabile, low molecular weight, basic protein which acts as a muramidase.
- Lysozyme is active only against some pathogenic Gram +ve bacteria

Chemical barriers

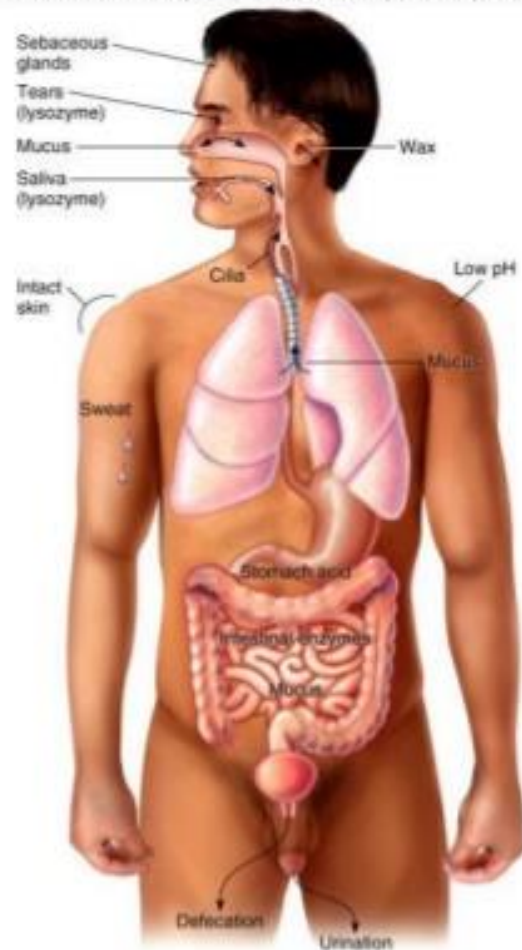


Other secretions

- kill or stop the growth of pathogens
- examples
 - sweat and oils
 - saliva
 - tears
 - mucus

Physical and Chemical Barriers

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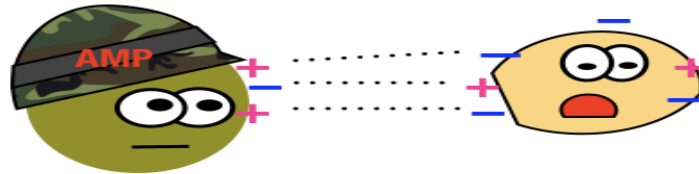
- Skin, mucus membranes
- Cilia, mucus, reflexes
- pH, lysozyme, fatty acids, defensins
- Normal flora
- Genetic resistance
 - species differences
 - individual differences

B) ANTIMICROBIAL substances in blood and tissues:

- The complement system contains more than 30 serum proteins, circulating in the blood in an inactive state.
- The presence of microbial pathogens activates the 'Complement cascade' to eliminate pathogens.
- The **interferons** are a class of cytokines (soluble proteins) released by cells infected with viruses and certain white blood cells to stimulate other cells to protect themselves from viral infection

AMP Pore Formation

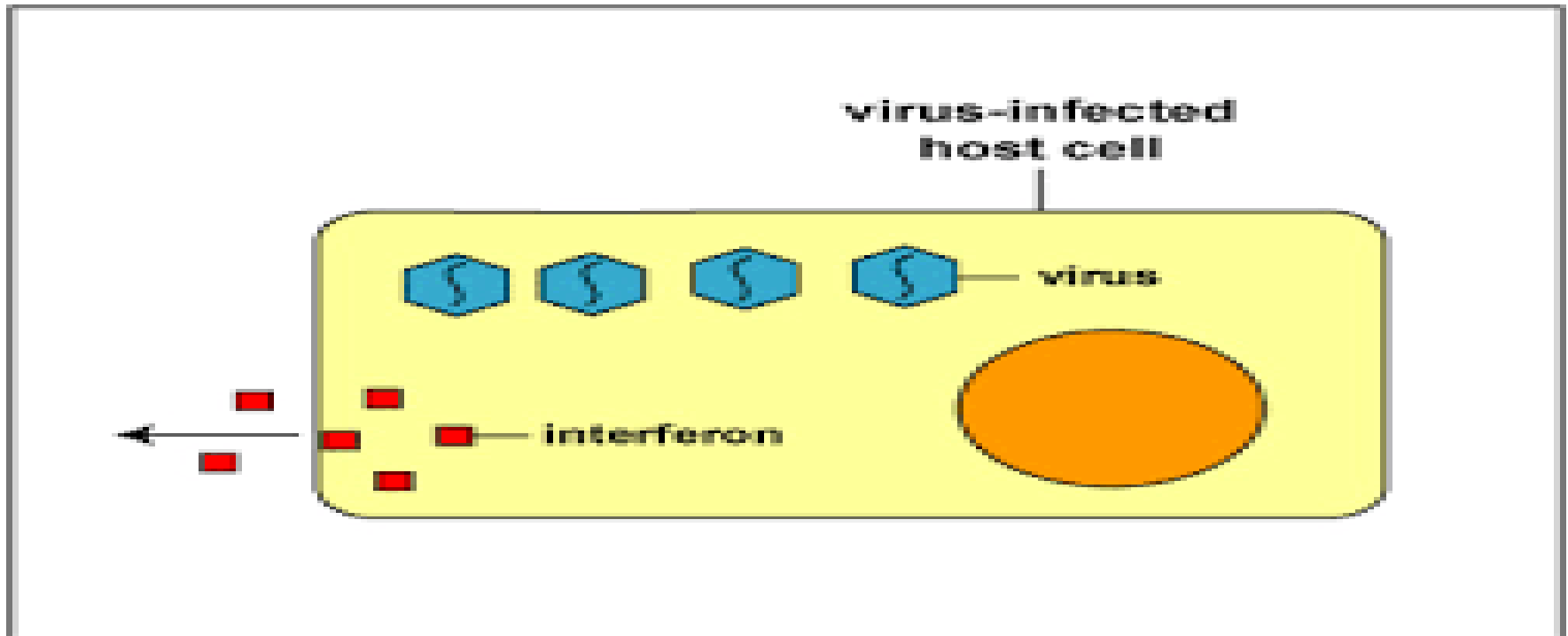
Step One: Attract the Pathogen



Step Two: Attach to the Pathogen



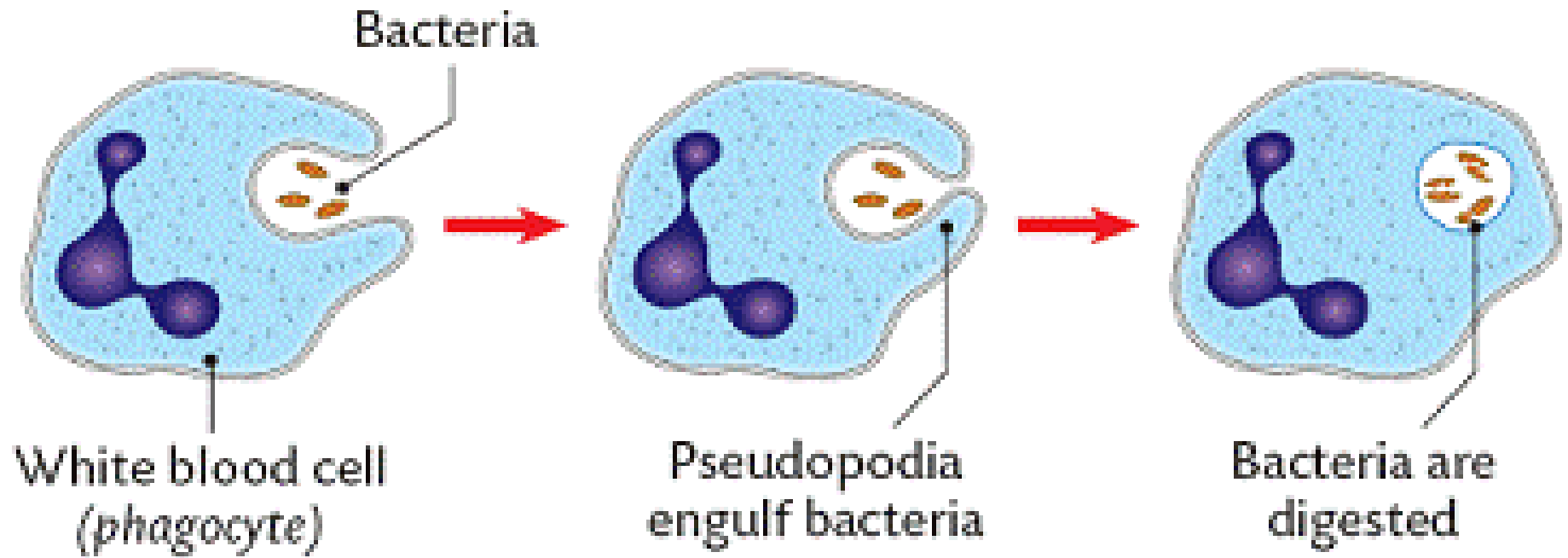
Step Three: Create the Pore



C)CELLULAR FACTORS:

PHAGOCYtic CELLS- Natural defence

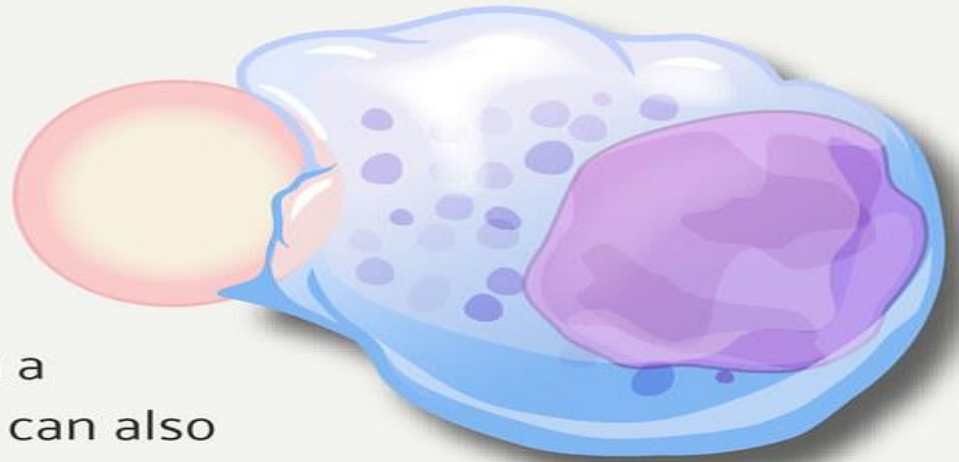
- ingest and destroy foreign particles and micro organisms
- remove foreign particles that enter the body
- Phagocytic cells (discovered by Metchnikoff in 1882) are grouped as microphages and macrophages.
- A class of lymphocytes called **Natural killer (NK) cells** is important in nonspecific defence against viral infections and tumors.



Natural Killer Cell

White Blood Cell

Function: These immune cells can recognize and kill the cells of someone's body that have been infected with a pathogen. Natural killer cells can also recognize and destroy tumor cells.



Disease: People who have deficient natural killer cells, usually because of an inherited immune disorder, may be more prone to certain viruses.

Location: Natural killer cells, or NK cells, are present in the blood and can move into other tissues to find targets.



National Institute of
Allergy and
Infectious Diseases

D) FEVER :

- Increase in the body temperature following the infection**
- It helps to accelerate the physiological processes to destroy the invading pathogens.**
- Fever stimulates the production of interferon**
 - helps in recovery from viral infections.**

Fever

- When a local response is not enough
 - ◆ system-wide response to infection
 - ◆ activated macrophages release interleukin-1
 - triggers hypothalamus in brain to readjust body thermostat to raise body temperature
 - ◆ higher temperature helps defense
 - inhibits bacterial growth
 - stimulates phagocytosis
 - speeds up repair of tissues
 - causes liver & spleen to store iron, reducing blood iron levels
 - ◆ bacteria need large amounts of iron to grow



E. ACUTE PHASE PROTEINS- (APPs):

- Infection on injury leads to a sudden increase in concentration of plasma proteins, called acute phase proteins.**
- APPs are believed to enhance host resistance**
- prevent tissue injury**
- promote repair of inflammatory lesions**
- Like C Reactive Protein (CRP), Mannose binding protein, Alpha-1- acid glycoprotein, Serum Amyloid P, etc**

Acute phase proteins/reactants

- ⊙ **The level of certain proteins in blood may increase 50 to 1000 folds in various inflammatory and neoplastic conditions.**
- ⊙ **Such proteins are acute phase proteins.**
- ⊙ **C-reactive protein (CRP):**
- ⊙ **CRP is a major component of acute phase proteins.**
- ⊙ **Produced in the liver and its concentration is <1 mg/dl (C-stands for carbohydrate).**

Cellular components of innate immunity

	<i>Basophils and mast cells</i>	<i>Neutrophils</i>	<i>Eosinophils</i>	<i>Monocytes and macrophages</i>	<i>Dendritic cells</i>	<i>NK Cells</i>
						
Primary function(s)	Release chemicals that mediate inflammation and allergic responses	Ingest and destroy invaders	Destroy invaders, particularly antibody-coated parasites	Ingest and destroy invaders Antigen presentation	Recognize pathogens and activate other immune cells by antigen presentation	<i>Recognize and destroy cancer and virally infected cells</i>

INNATE IMMUNITY

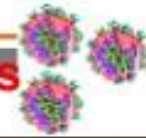
Pathogenic invasion



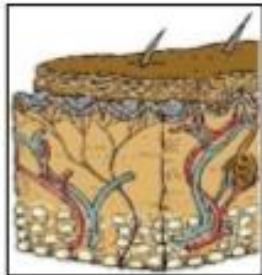
Bacteria



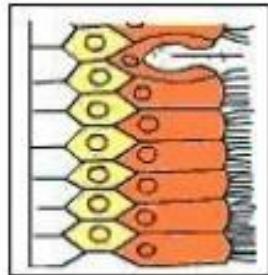
Viruses



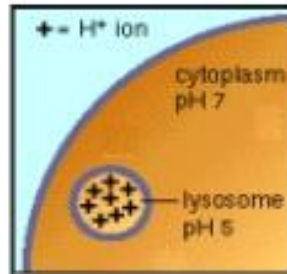
1st Line Defense



Skin



Ciliated cells



Lysozyme



Coughing

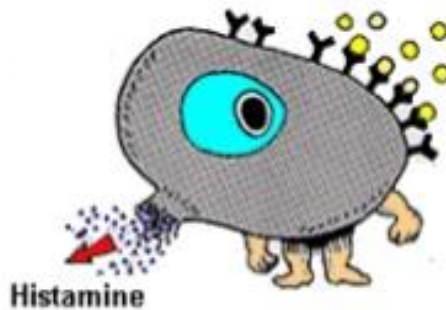


Vomiting

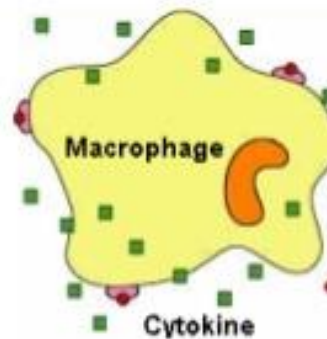
2nd Line Defense



Blood clot



Mast cell



Cytokines



Leukocytes⁷⁵

Designed by Dr.T.V.Rao MD

ACQUIRED IMMUNITY

- resistance that an individual acquires during life is known as “Acquired immunity”
- also known as Adaptive or Specific immunity
- It involves the formation of antibodies in the body, which neutralize the antigens.

Adaptive immune system

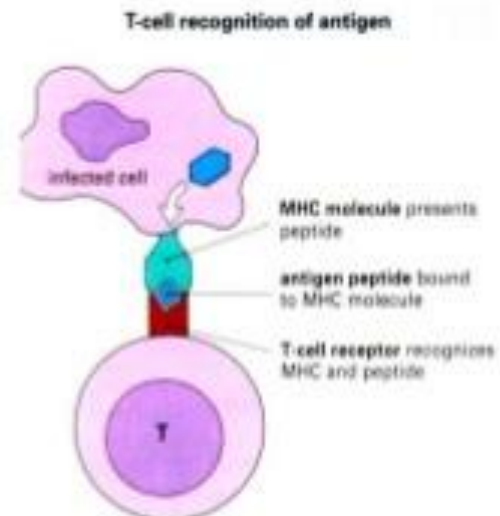
- Four characteristics

- _diversity-in recognizing structure of antigens

- Antigenic Specificity – ability to recognize and respond to particular targets.
 - Memory – second exposure to the same organism produces a larger and more rapid response than occurred at the primary exposure.
 - Self/non self recognition

Adaptive Immunity (Specific immunity)

- **Specificity**
- **Memory**
- **Ability to distinguish b/w self vs non-self**
- **T and B cell**



UNIQUE FEATURES-

- a. Specificity: It can produce specific antibody or T-lymphocyte against a particular antigen/pathogen.
- b. Diversity: It can recognize a vast variety of diverse pathogens or foreign molecules.
- c. Discrimination between self and non-self: It differentiates between own body cells (self) and foreign (non-self) molecules.
- d. Memory: When the immune system encounters a specific foreign agent for the first time, it generates an immune response and eliminates the invader. This is called first encounter. The immune system retains the memory of the first encounter. As a result, a second encounter with same pathogen brings about quicker and stronger immune response

Specific immunity (the immune response)

Acquired immunity

Natural

Active

Antibodies produced in the body eg after recovery from disease

Passive

Antibodies from outside source eg mother to fetus via placenta / colostrum

Artificial

Active

Antibodies produced in the body after vaccination

Passive

Antibodies from outside source after antiserum introduced into body by injection

a. Active immunity: Adaptive immunity”

It is the resistance developed by individuals as a result of an antigenic stimulus or encounter.

1. Natural Acquired Active immunity:

Immunity acquired due to infection is called natural active immunity.

-after entry of pathogens in the body.

- is long-lasting immunity. e.g. person who has recovered from attack of measles develops natural acquired active immunity to measles, for the life time.

2. Artificial Acquired Active immunity:

It is the resistance induced by vaccines.

Vaccine - introduced- body stimulate the formation of antibodies.

e.g. Polio vaccine,

BCG vaccine etc.

such immunity may be temporary or permanent

b. Passive immunity:

- ready-made antibodies are received by the body cells.
- Body cells do not take any active part in the production of immunity.
- no encounter with antigen.

1. Natural Acquired Passive immunity:

- maternal antibodies are transferred from mother to foetus through placenta.
- antibodies are transferred from mother to infant through **colostrum** (first milk of mother) and continue throughout the period of breast feeding.

The antibodies received by baby from mother remain in the body for a short time.
-so is short lived.

2. Artificially Acquired Passive immunity:

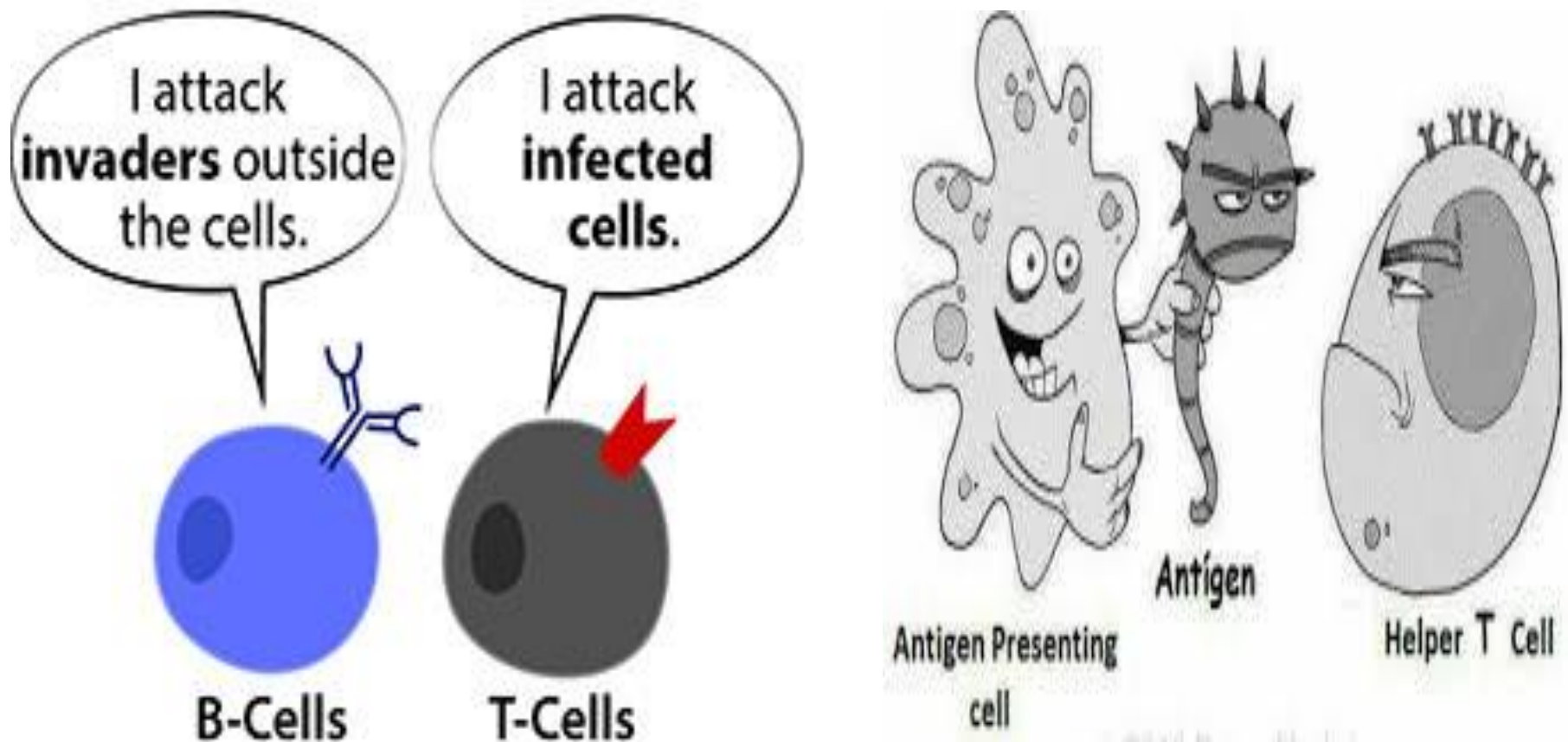
- injecting previously prepared antibodies using serum from humans or animals.
- Antibodies obtained from hyper immunised horses are injected to humans against Rabies.

Cells of Immune System:

Two main types of cells

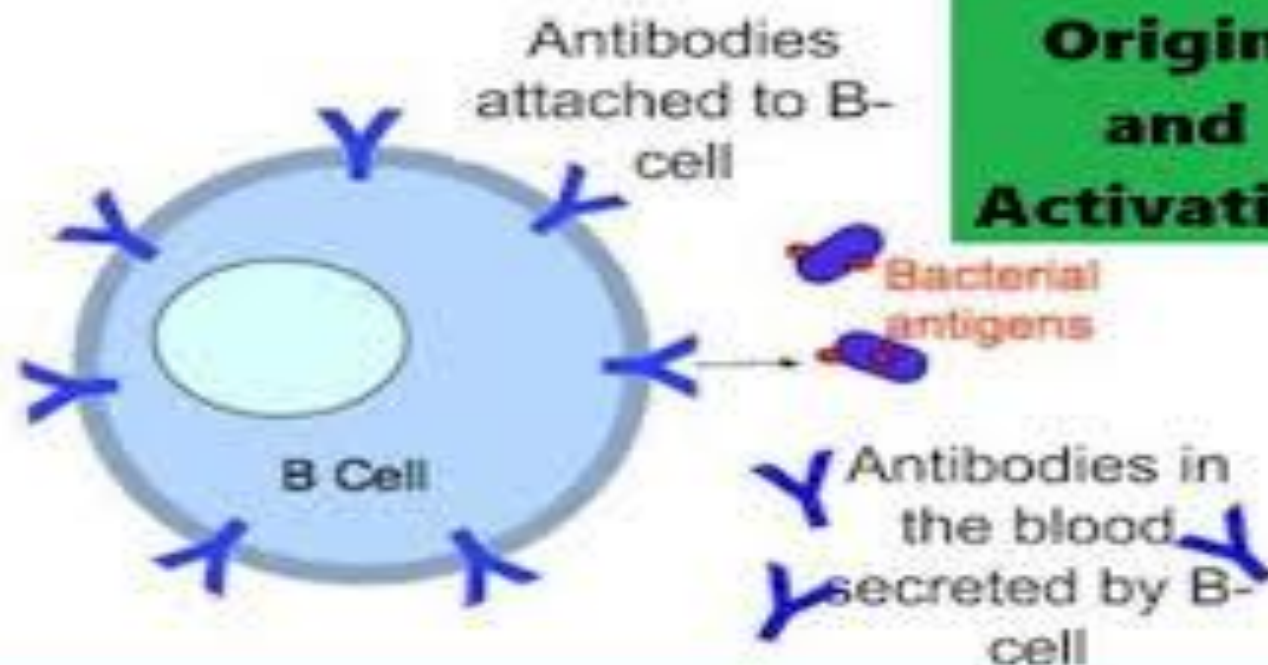
(a) Lymphocytes

(b) Antigen Presenting cells.



a. Lymphocytes:

- main cells of the immune system.
- blood corpuscles, arise from the stem cells, the haemocytoblasts, present in liver of the foetus and in the bone marrow in adult.
- B-lymphocytes**
 - Those undergo differentiation in the gut –associated bursal lymphoid tissues (Tonsils, Peyer's patches) and are called **Bursal** or B
 - **humoral** or antibody-mediated immune system (**AMIS**)



Origin and Activation

B Lymphocytes (B cells)

- T- lymphocytes -are differentiated in the thymus gland and are termed as T
- cell-mediated immune system (CMIS)

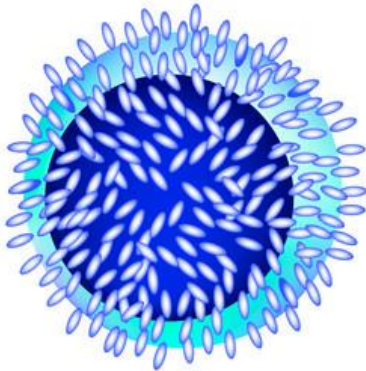
- The mature lymphocytes pass into body fluids (blood and lymph) and circulate in body.

TYPES OF T- CELLS

- i. Helper T-cells: Sensitized helper T-cells produce lymphokines
- proliferation of other T-cells, -stimulation of B-lymphocytes, macrophages.
- ii. Killer T-cells or Cytotoxic T-cells: They directly attack and destroy invading microbes, infected body cells and cancer cells.
- bind to infected cell and secrete perforins.
- perforins form a hole in infected cell and releases substances that kill the cell so cytotoxic T-cell.
- iii. Suppressor T-cells:
-cells suppress entire immune system against attack on the own body cells.
- iv. Memory T-cells:
-previously sensitized cells which retain the memory for future.

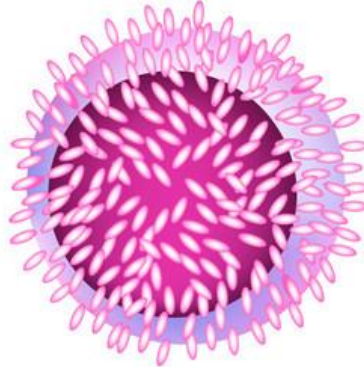
Types of Lymphocytes

T - Lymphocytes



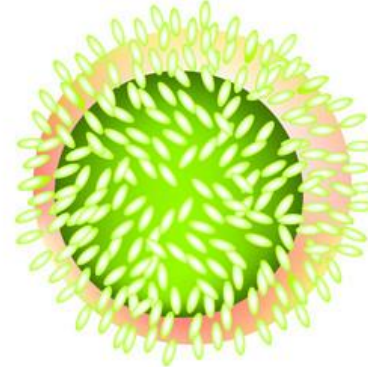
**PARTICIPATE IN THE PROCESSES
OF CELLULAR IMMUNITY**

B - Lymphocytes



**PARTICIPATE IN THE PROCESSES
OF HUMORAL IMMUNITY**

NK - Lymphocytes



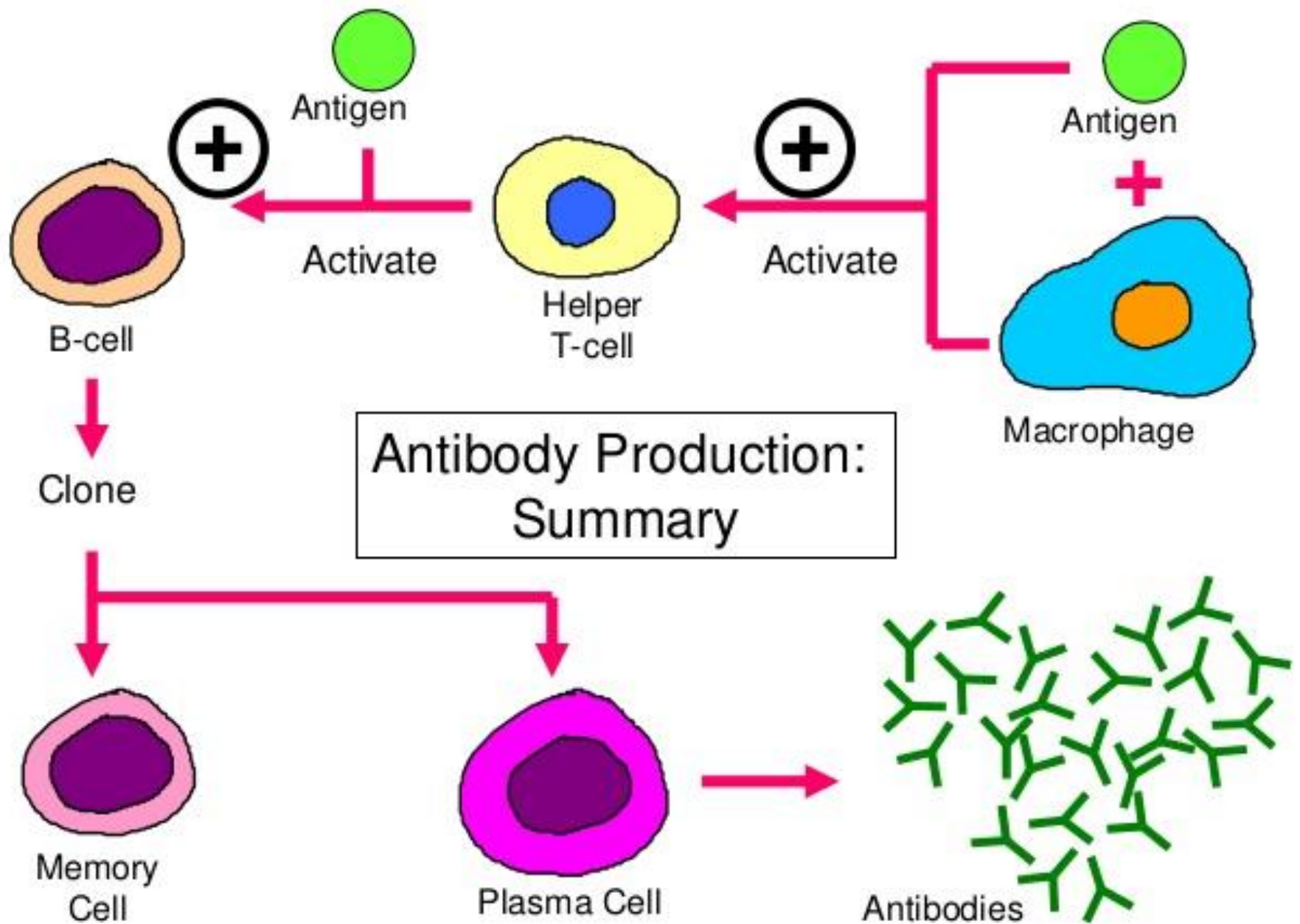
**NATURAL CYTOTOXICITY AGAINST
CANCER CELLS AND VIRUS INFECTED CELLS**

Types & Functions of Lymphocytes

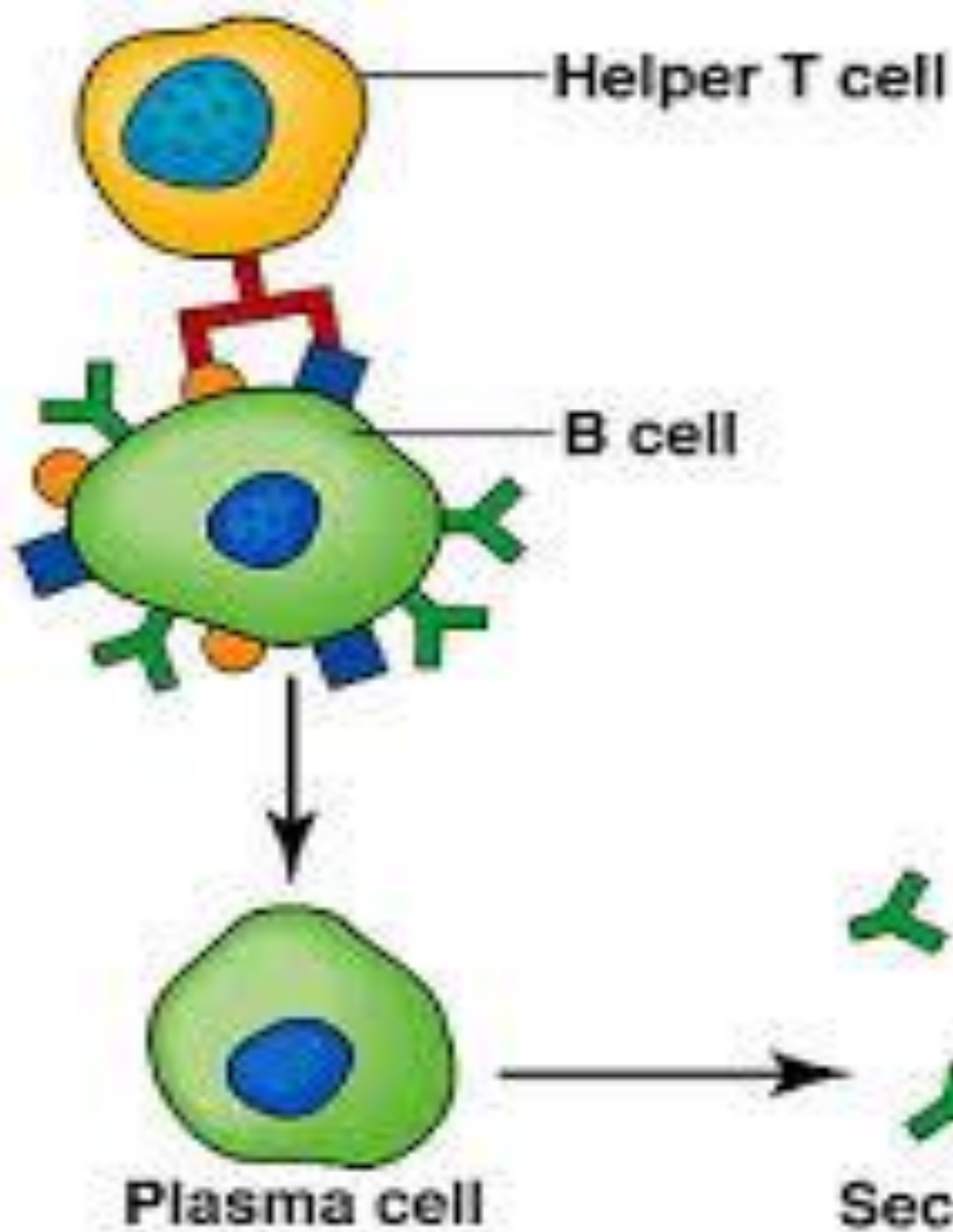
- ❑ T-lymphocytes (T-cells)
 - ❑ B-lymphocytes (B-cells)
 - ❑ Natural Killer cells (NK-cells)
- 
- Types of Lymphocytes
- ❑ Migrate through the lymphatic tissues & engulf the micro-organism (antigens).
 - ❑ Identified according to tissue or organ where they mature:
 - T-lymphocytes mature in Thymus
 - B-lymphocytes mature in Bone marrow

Mechanism of action of B-lymphocytes

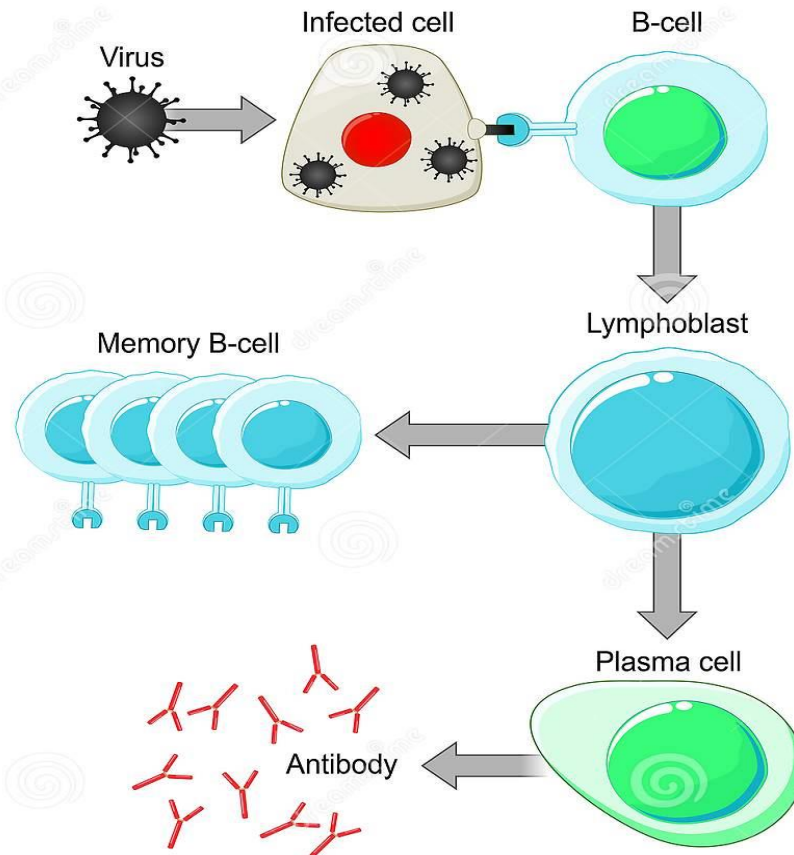
- are sensitized directly by antigens or helper T-cells.**
- Activated B-lymphocyte multiplies very fast**
- produce clone of plasma cells and memory B-cells.**
 - plasma cells produce specialized glycoproteins (Ig), called antibodies which circulate with blood and lymph.**
- The antibody molecules may bind to a cell membrane or they remain free**



T-Helper Cells



B-cell activation



- Antibodies have three main

Each antibody is specific for a particular antigen

Functions or roles

**i. Agglutination- of particulate matter,
bacteria and viruses.**

**-immobilized mass is then engulfed by
phagocytes.**

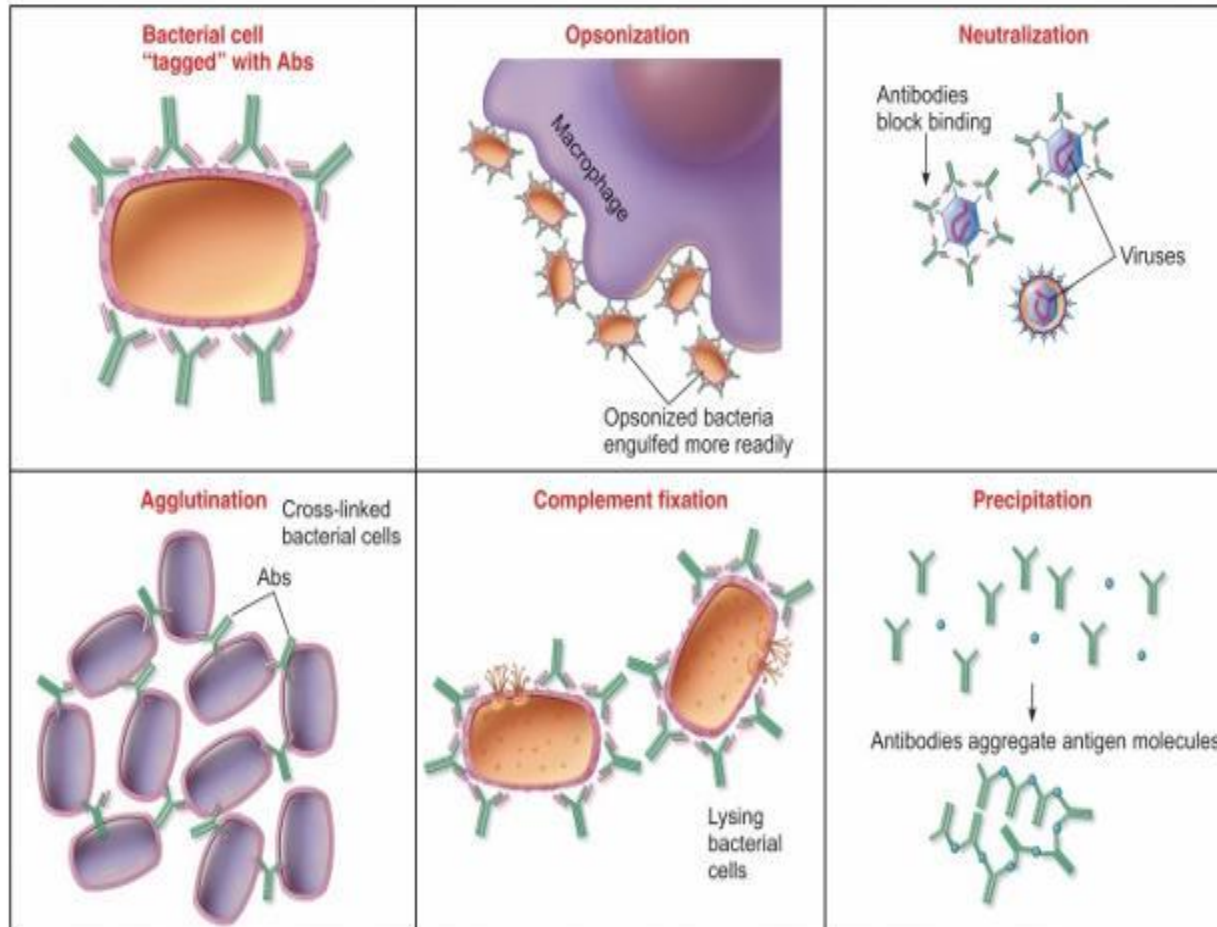
ii. Opsonisation

**- coating of bacteria to
facilitate their subsequent phagocytosis by
macrophages.**

**iii. Neutralization of toxins released by bacteria
e.g. tetanus toxin.**

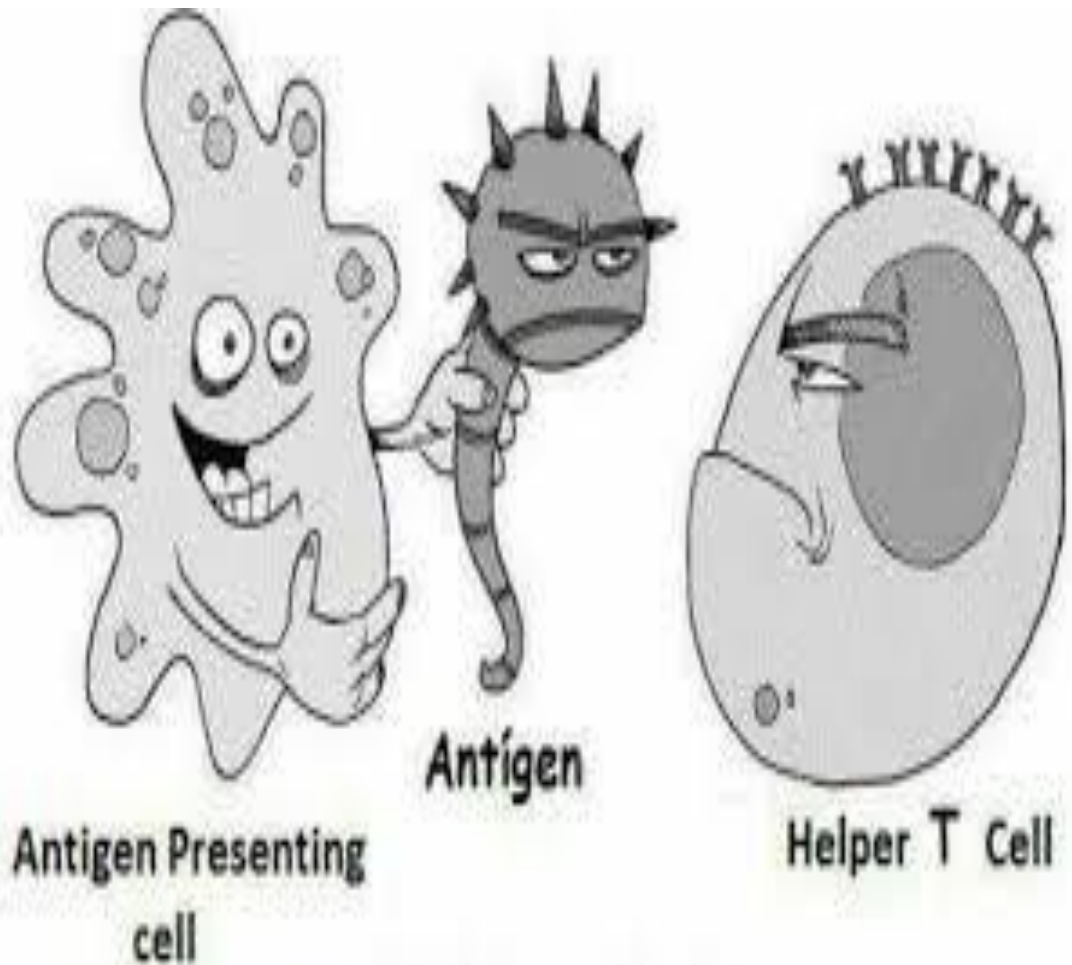
- Produced antibodies bind antigens and stop their destructive behavior in one of several ways

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Antigen Presenting cells:

- engulf invading pathogens and process the antigens.
- the processed antigens are presented on their own surface.
- cells are able to deliver a stimulatory signal for activation of helper T-cells





:ANTIBODIES:

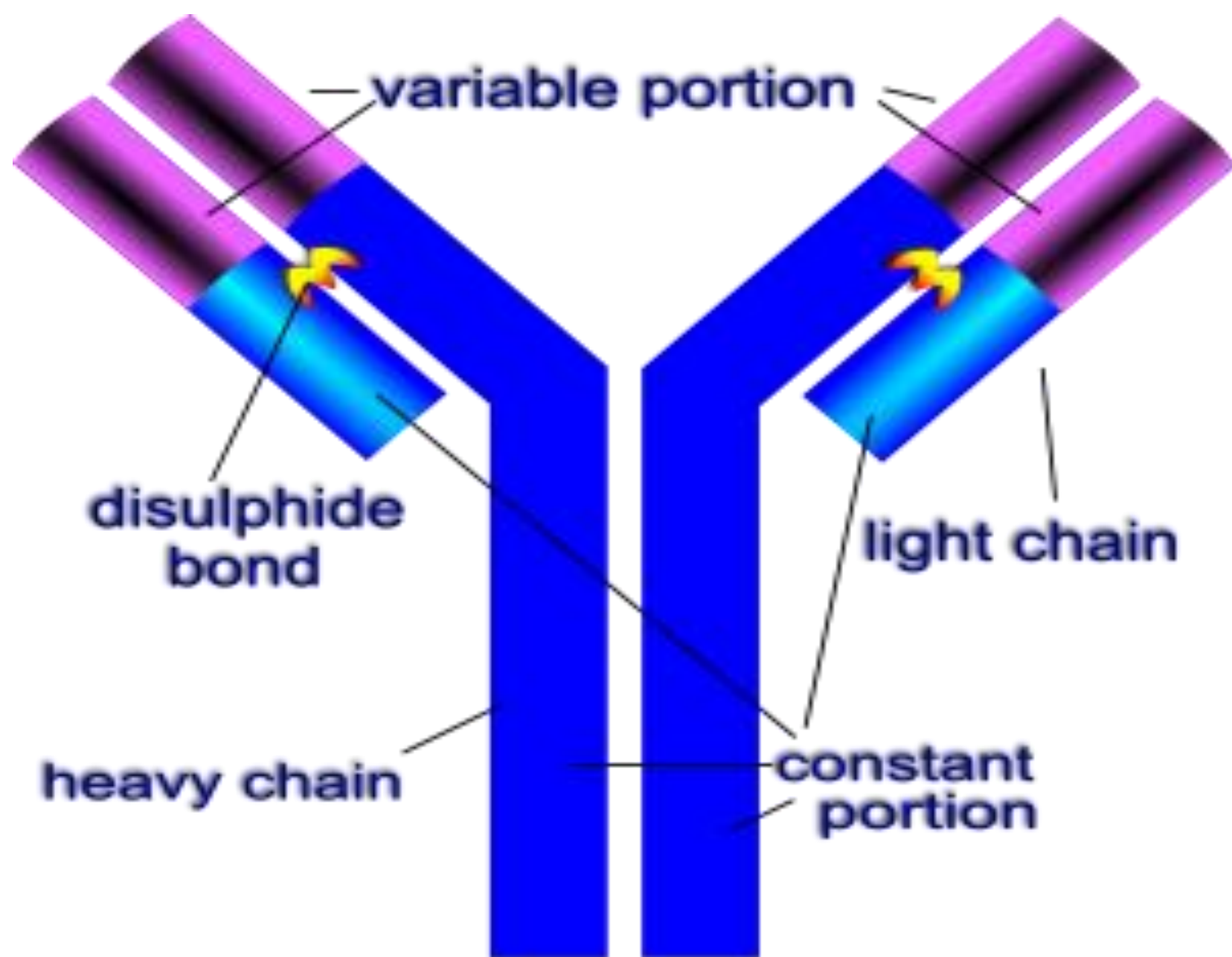
- Antibodies are **glycoproteins**
- highly specific to specific antigens.
- known as **Immunoglobulins (Igs)**
- produced in response to antigenic stimulation.
- Antibodies are produced by plasma cells which are formed by B-lymphocytes.
- mature plasma cells produce antibodies
- rapid rate i.e. about **2000** molecules per second

STRUCTURE OF ANTIBODIES:

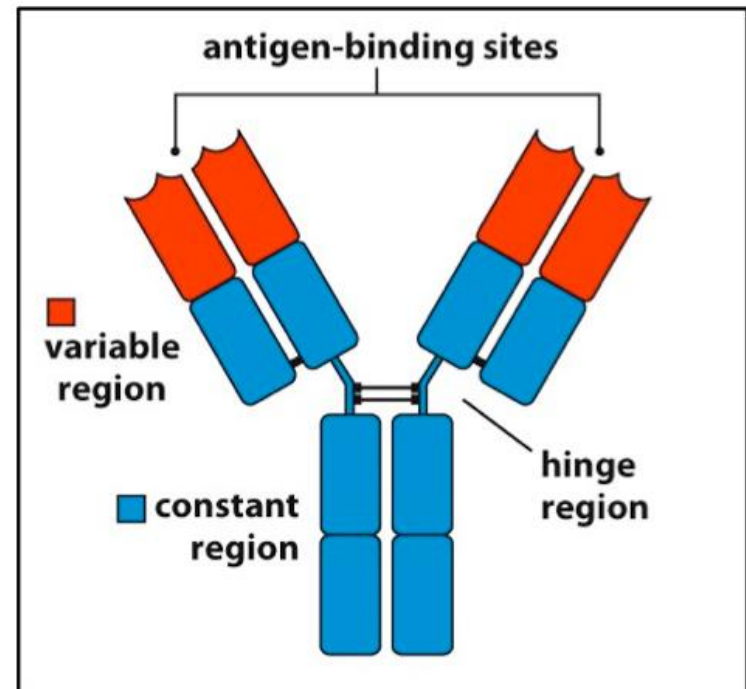
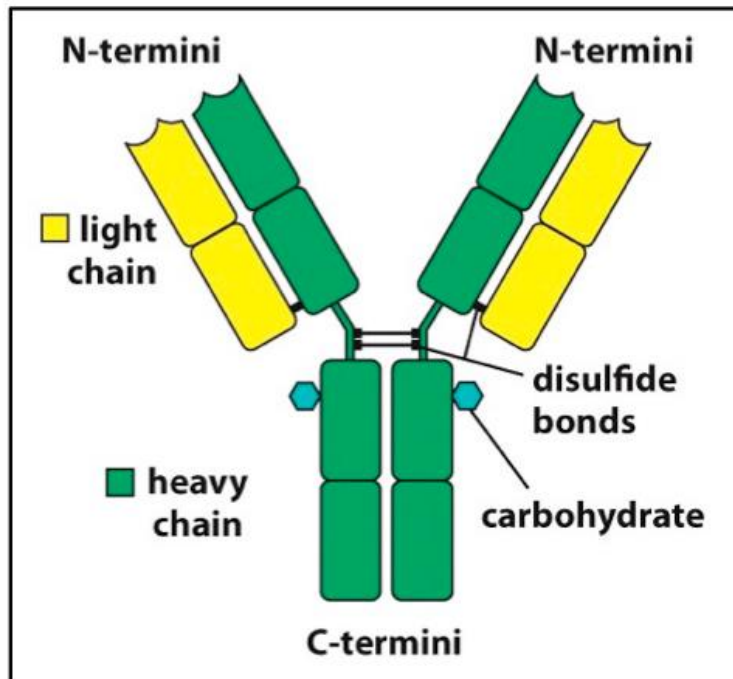
- Antibody is a 'Y' shaped molecule.
- Each immunoglobulin molecule is made up of **four** polypeptide chains.
- two heavy or H-chains and two light or L-chains.(**2H2L**)
- The four polypeptide chains are held together by **disulfide bonds** (-s-s-) to form a 'Y' shaped structure.
- The region holding together arms and stem of antibody, is termed as **hinge**.

Each chain has two distinct regions, the variable region and the constant region.

- Variable regions constitute the **antigen-binding site (paratope)**.
- Most **Bivalent**-two antigen binding sites.

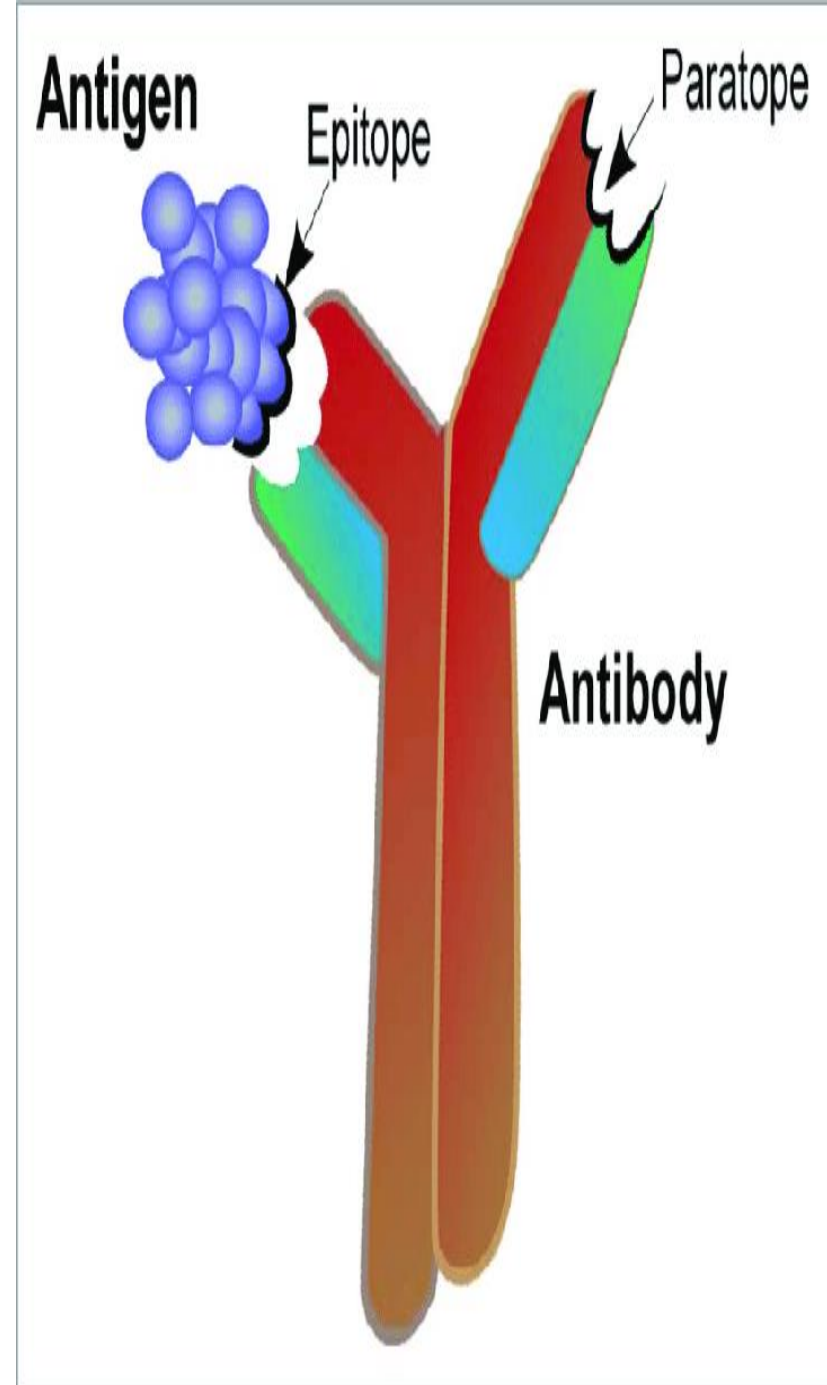


Basic Structure of Antibody Molecules

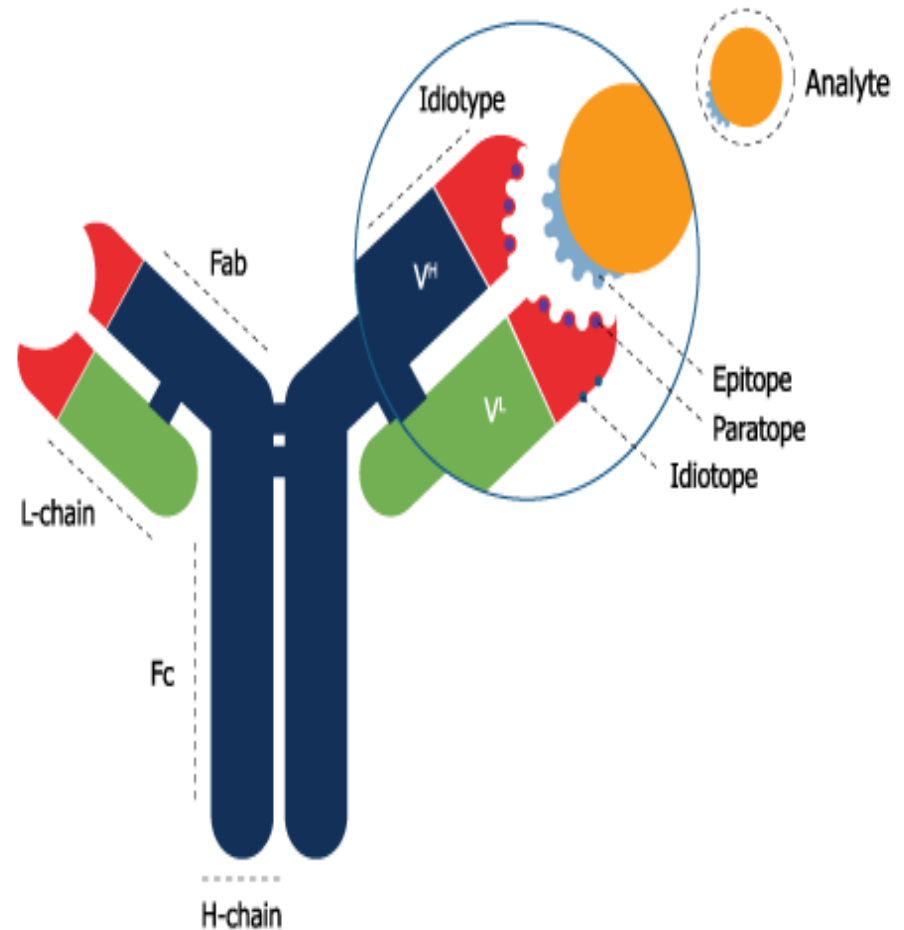


Formation of antigen-antibody complex:

- Study of antigen-antibody interactions is called **serology**.
- Each antibody is specific for a particular antigen.
- Combining sites of antigen, called antigenic determinants (**epitopes**) react with the corresponding antigen binding sites of antibodies called paratopes.
- antigen binding sites(**paratopes**) are located on the variable regions of the antibody.

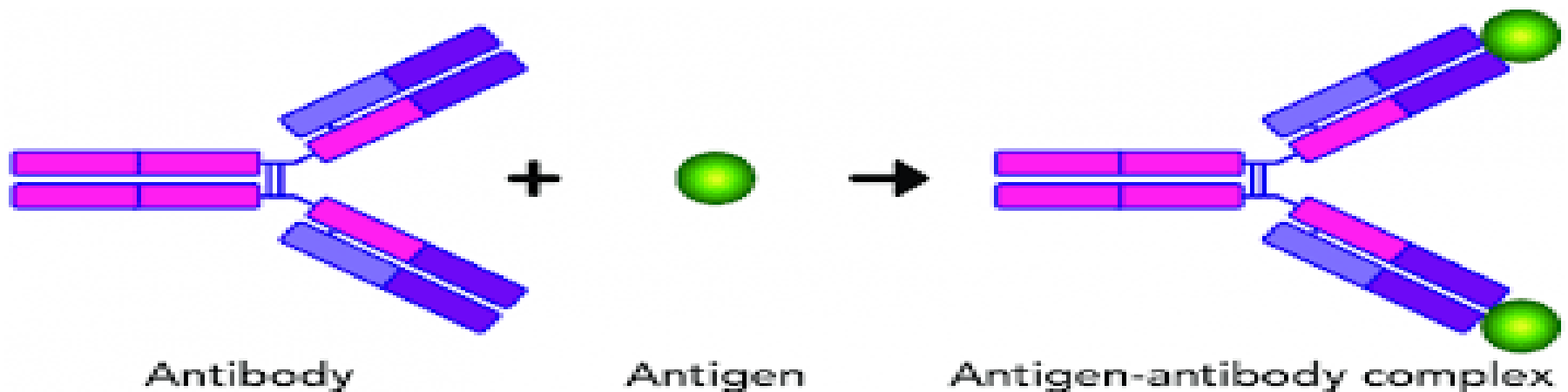
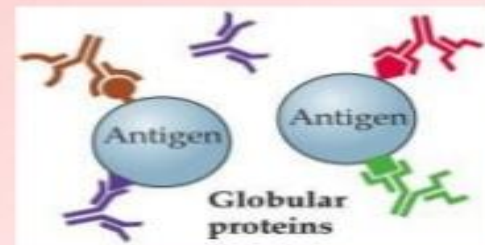
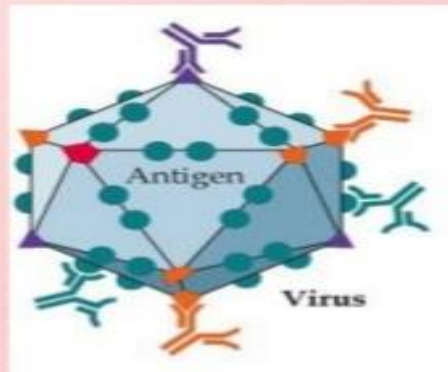


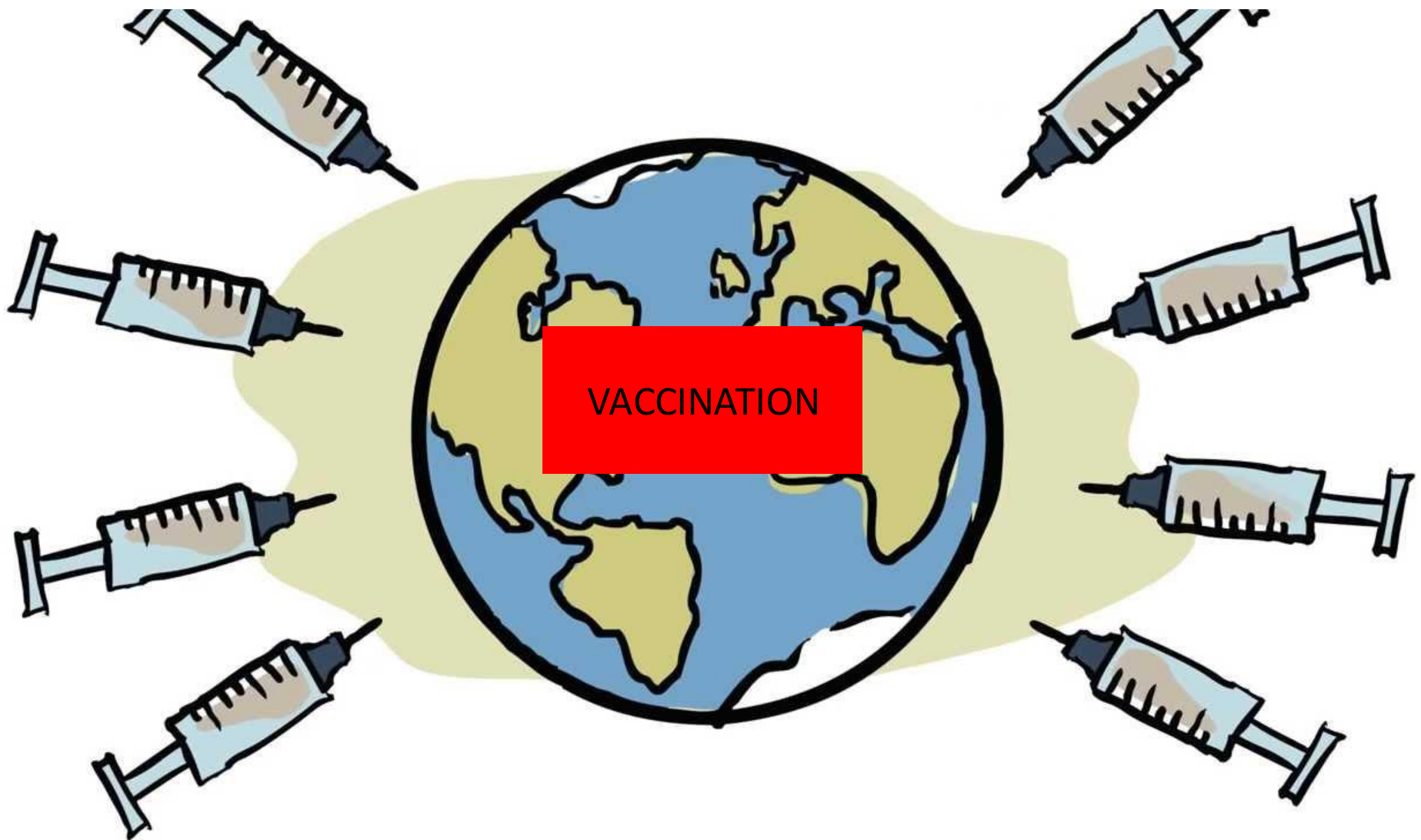
- Small variations in the variable regions make each antibody highly **specific** for a particular antigen.
- The variable region enables the antibody to recognize the specific antigen and bind to specific antigen
- in a **lock and key** manner forming an antigen antibody complex.



Antibodies

- Antibodies fit together with and bind with antigens like a lock and key.
- The body does not produce antibodies that bind to its own (self) antigens. Therefore all particles that are bound to antibodies are foreign.





: Vaccination :

-Administration of vaccine (i.e. inactivated pathogen or antigenic protection of particular pathogen) to protect against a particular pathogen, is called vaccination.

-The body's immune system protect against pathogens. It's an efficient system.

- keeps microorganisms out or gets rid of them.

BUT

some pathogens, the ones the body doesn't recognize can overwhelm the immune system.

-can cause serious illness.

Vaccination is a way to “teach” the immune system as to how to recognize and eliminate pathogenic organism.

-prepared if body is exposed to pathogen.

Vaccination is an important

-primary prevention

-can protect people from getting sick.

-to control life threatening diseases like measles, polio, tetanus and whooping cough.

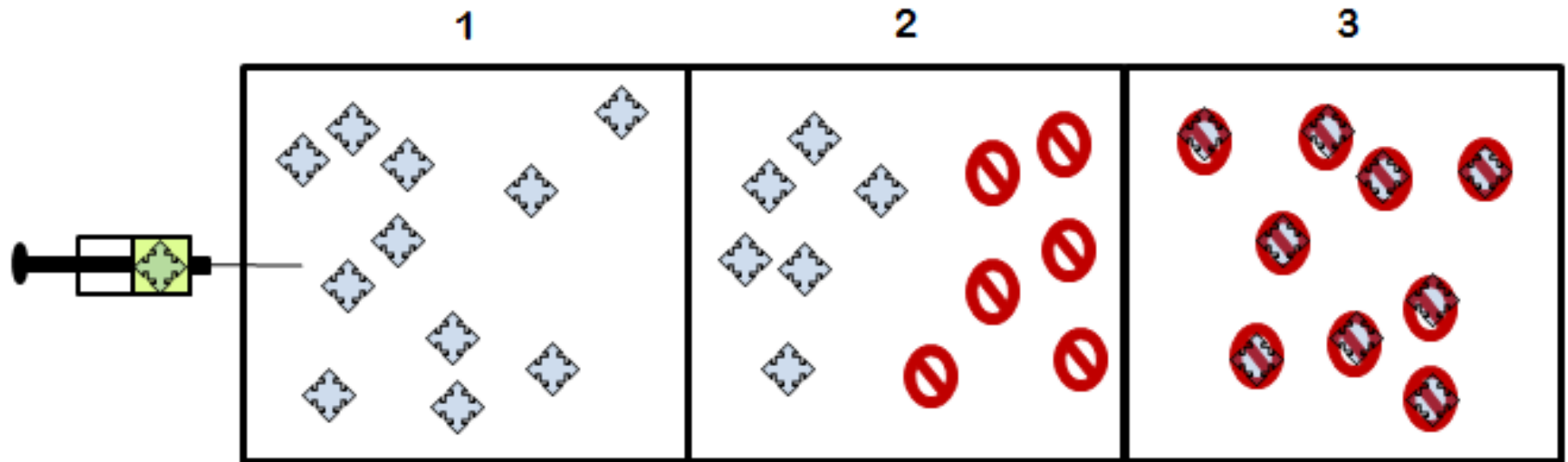
- It also helps to protect the society

What is a Vaccine?

- **A preparation of the causative agent of a disease, specially treated for use in vaccination, in order to induce or increase immunity**
- **Typically contains an agent that resembles a disease-causing microorganism, and is often made from Weakened or killed microorganisms or subunits (purified protein subunits, polysaccharides).**

HOW A VACCINE WORKS

Creating Immunity



A weakened form of a disease antigen – that may be dead or living – is injected into the body.

The body reacts to the antigen by creating antibodies to attack it.

If the certain antigen ever enters the body again, the body's immune system antibodies will be able to fight against it.



IMMUNIZATION

Any process by which a person becomes protected from a disease.



VACCINE

A product that produces immunity from a disease.



VACCINATION

Injection of a killed or weakened organism that produces immunity in the body against that organism.

www.who.int/immunization/global_vaccine_action_plan/partners_stakeholders/en/index6.html
www.historyofvaccines.org/content/articles/careers-vaccine-research

MPH@GW

DIFFERENCE BETWEEN VACCINATION AND IMMUNIZATION



VACCINATION

VACCINATION IS THE ADMINISTRATION OF ANTIGENIC MATERIAL (A VACCINE) TO STIMULATE AN INDIVIDUAL'S IMMUNE SYSTEM TO DEVELOP ADAPTIVE IMMUNITY TO A PATHOGEN.



IMMUNIZATION

IMMUNIZATION IS THE PROCESS WHEREBY A PERSON IS MADE IMMUNE OR RESISTANT TO AN INFECTIOUS DISEASE, TYPICALLY BY THE ADMINISTRATION OF A VACCINE.

Vaccinations are safe:

Vaccines are considered to be safe.

- are rigorously tested and go through many rounds of study, examination, and research**
- before they are used for the general public.**
- their side effects are rare and typically mild.**

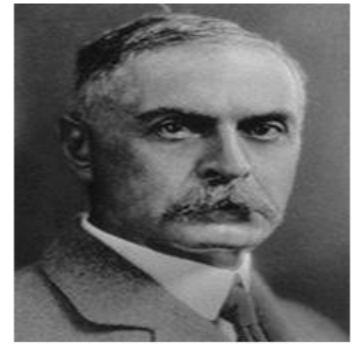
Antigen on Blood Cells:

There are many **antigens** on the surface of human **red blood cells**.

-antigens give rise to different blood groups.

-There are many genetically determined blood groups system like **ABO**, Rh, Duffy, Kidd, Lewis, P, MNS, Bombay blood group, etc

ABO BLOOD GROUP



History

1. Landsteiner discovered the ABO Blood Group System in 1901
2. He and five co-workers began mixing each others red blood cells and serum together and accidentally performed the ABO groupings.
3. Main Phenotypes (A, B, AB, O)
ABO gene located on long arm of chromosome 9

ABO BLOOD GROUP SYSTEM

ABO Blood Group System



A



B

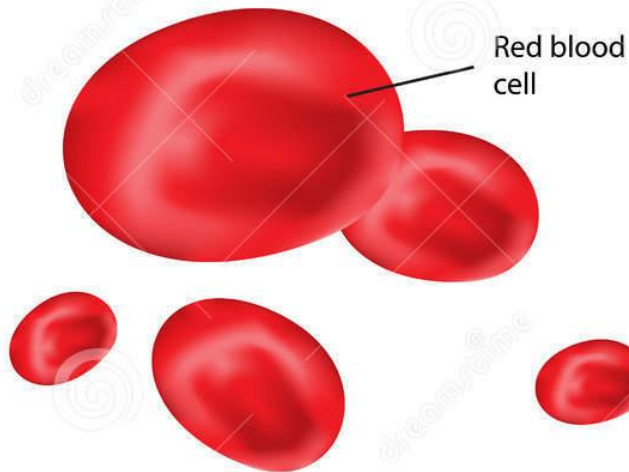


AB

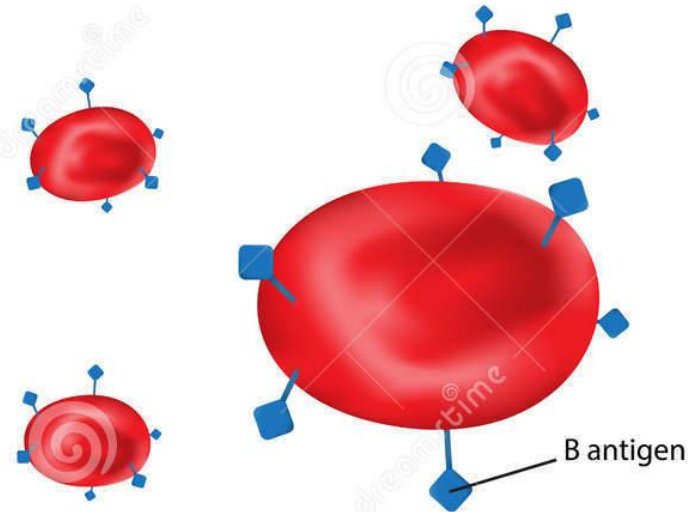


O

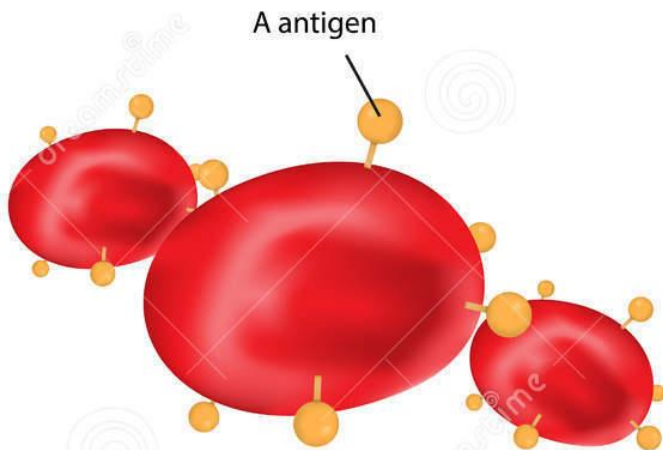
Blood Type O



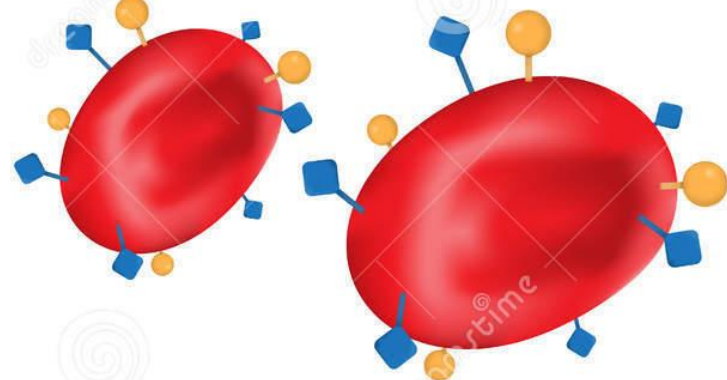
Blood Type B

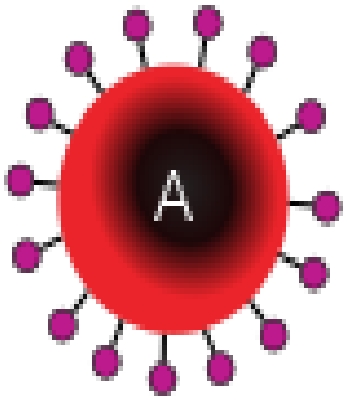
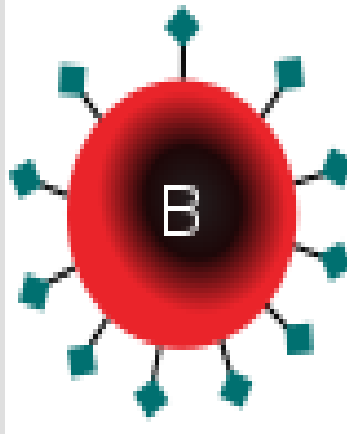
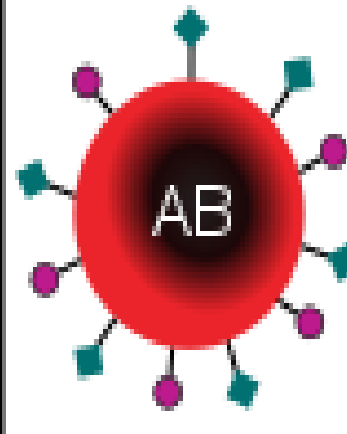
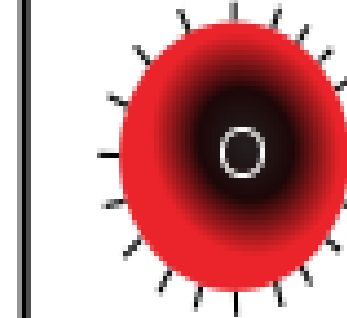
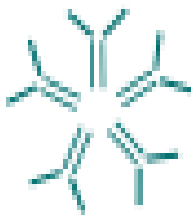
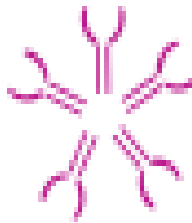
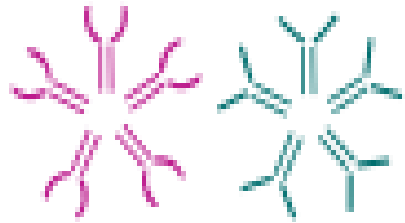


Blood Type A



Blood Type AB

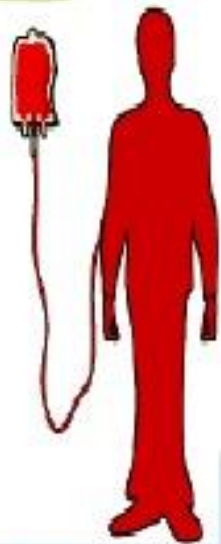


	Group A	Group B	Group AB	Group O
Red blood cell type	 A red blood cell with a red gradient center and black outline, labeled 'A' in the center. It has 12 purple circular antigens attached to its surface by short black lines.	 A red blood cell with a red gradient center and black outline, labeled 'B' in the center. It has 12 teal diamond-shaped antigens attached to its surface by short black lines.	 A red blood cell with a red gradient center and black outline, labeled 'AB' in the center. It has 6 purple circular antigens and 6 teal diamond-shaped antigens attached to its surface by short black lines.	 A red blood cell with a red gradient center and black outline, labeled 'O' in the center. It has no antigens on its surface, only short black lines representing the cell membrane.
Antibodies in plasma	 Four teal Y-shaped antibodies arranged in a circular pattern, labeled 'Anti-B' below them.	 Four purple Y-shaped antibodies arranged in a circular pattern, labeled 'Anti-A' below them.	None	 Four purple Y-shaped antibodies and four teal Y-shaped antibodies arranged in a circular pattern, labeled 'Anti-A and Anti-B' below them.
Antigens in red blood cell	 A single purple circular antigen on a short black line, labeled 'A antigen' below it.	 A single teal diamond-shaped antigen on a short black line, labeled 'B antigen' below it.	 A purple circular antigen and a teal diamond-shaped antigen on short black lines, labeled 'A and B antigens' below them.	None

Rh factor:

- Rh is the most complex of the blood group system.
- Rh –factor is an antigenic protein present on the surface of the red blood cells in the human beings.
- It was first discovered by **Landsteiner** and **Wiener** (1940), on the surface of RBCs of **Rhesus monkey**, so it is called Rh-factor (also called **D antigen**).
- Person having Rh factor (D antigen) are called Rh positive (**Rh +ve**)
- those lacking D antigen are called Rh negative (**Rh -ve**)

History



- 1939 Levine and Stetson defined D antigen (Rh factor)
- 1940 Landsteiner and Wiener discovered anti-Rh (named after Rhesus monkey)
- Agglutinated 85% human RBCs
 - 15% RBCs did not agglutinate
- The antibody was similar to guinea pig and rabbit antibodies produced when stimulated with rhesus monkey RBCs
- Although they were later shown to be different, the name remained

Rh Factors

- Scientists sometimes study **Rhesus monkeys** to learn more about the human anatomy because there are certain similarities between the two species. While studying Rhesus monkeys, a certain blood protein was discovered. This protein is also present in the blood of some people. Other people, however, do not have the protein.
- The presence of the protein, or lack of it, is referred to as the Rh (for **Rhesus**) factor.
- If your blood does contain the protein, your blood is said to be Rh **positive** (Rh+). If your blood does not contain the protein, your blood is said to be Rh **negative** (Rh-). ★

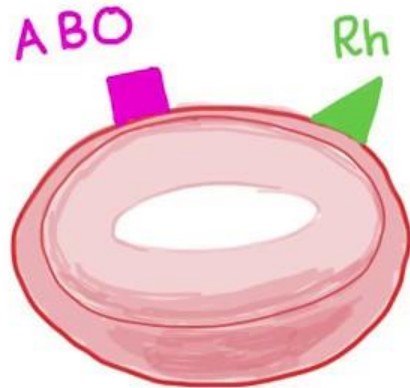


A+ A-
B+ B-
AB+ AB-
O+ O-

Rh

Hemolytic Disease of the Newborn

INCOMPATIBILITY



Rh INCOMPATIBILITY

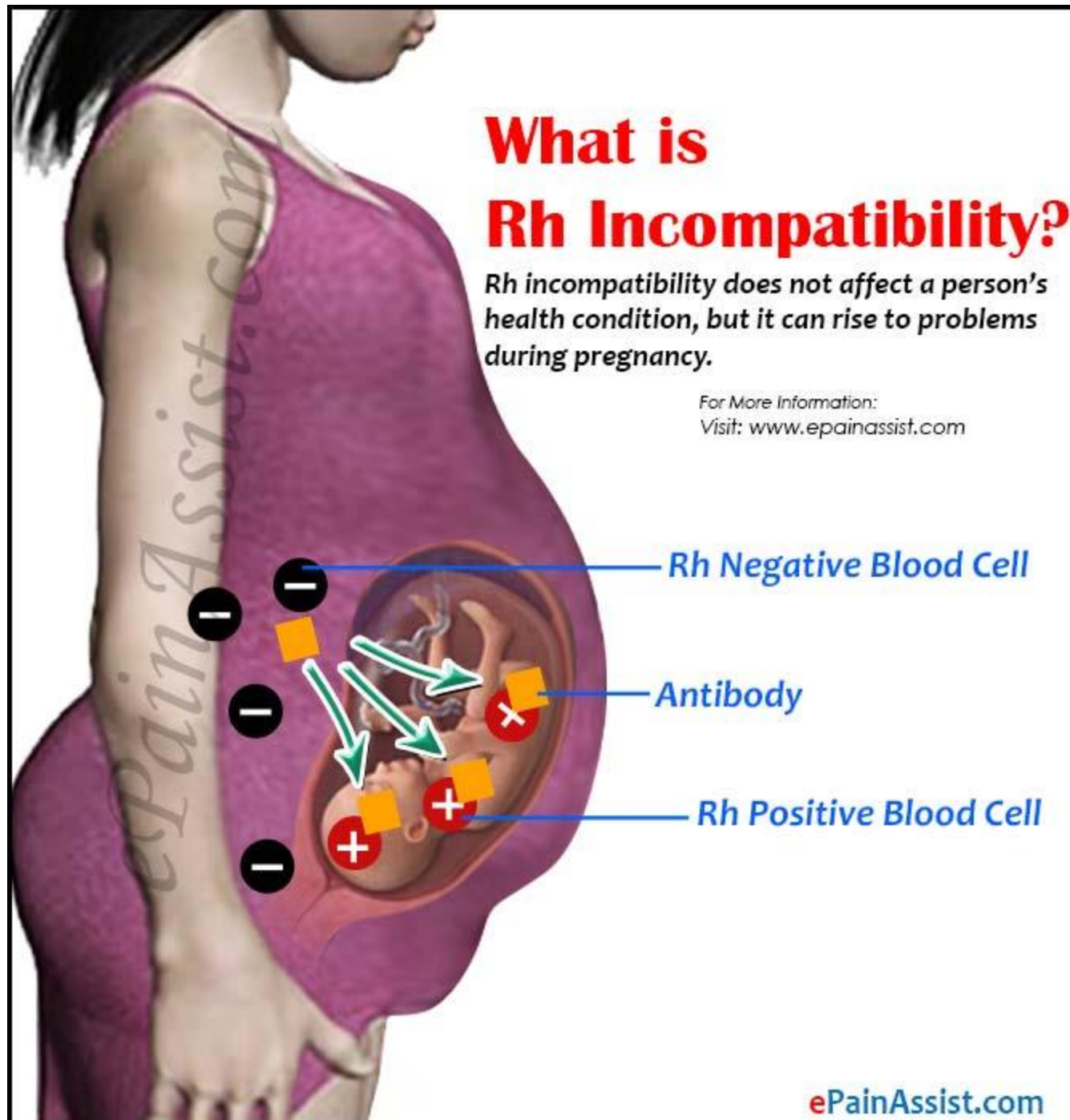
- Rh (D) antigen induces a strong immunogenic response when introduced into Rh-ve individuals.
- Rh blood group is an important factor in blood transfusion
- is involved in haemolytic diseases of the newborn (**HDN**), which is called **erythroblastosis foetalis** (destruction of the erythrocytes of the foetus).
- **It occurs when an Rh-ve mother conceives Rh+ve foetus.**

- The Rh +ve RBCs from the foetus may enter the mother's circulatory system during child birth**
- causing her to produce anti-Rh antibodies.**
- As a result, subsequent Rh+ve foetuses will be exposed to the anti-Rh antibodies produced by mother, which result in HDN.**
- to prevent HDN, Rh -ve mother is injected with the anti-Rh antibody during all pregnancies carrying Rh +ve foetus.**

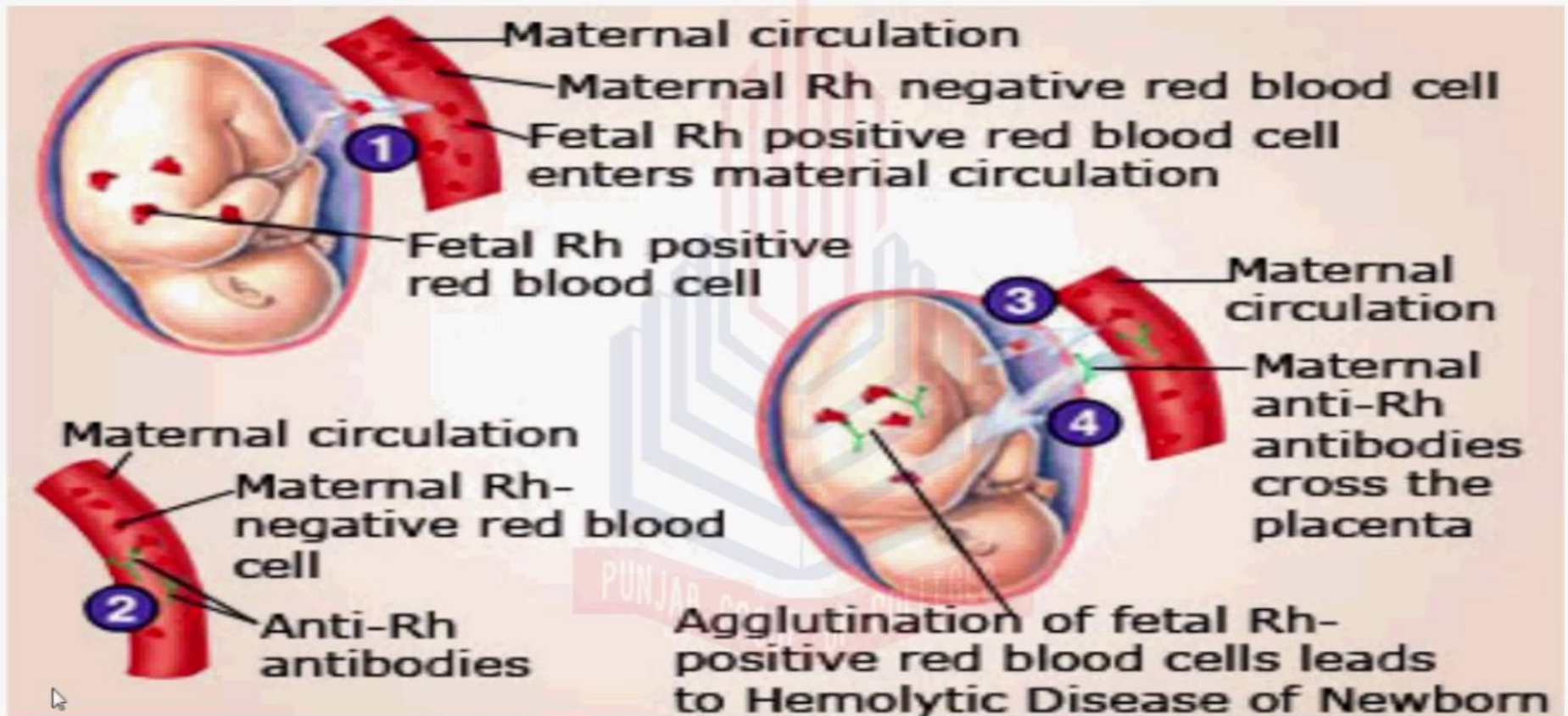
What is Rh Incompatibility?

Rh incompatibility does not affect a person's health condition, but it can rise to problems during pregnancy.

For More Information:
Visit: www.epainassist.com



Erythroblastosis foetalis:

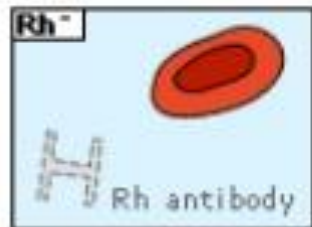


Blood Groups & Blood Typing

Rh factor blood grouping system



- Many people also have a so called **Rh factor** on the red blood cell's surface.
- This is also an antigen and those who have it are called Rh+. Those who haven't are called Rh-.
- A person with Rh- blood does not have Rh antibodies naturally in the blood plasma (as one can have A or B antibodies, for instance). But a person with Rh- blood can *develop* Rh antibodies in the blood plasma if he or she receives blood from a person with Rh+ blood, whose Rh antigens can trigger the production of Rh antibodies.
- A person with Rh+ blood can receive blood from a person with Rh- blood without any problems.



disease

DISEASE- is defined as condition of disturbed or deranged functioning of one or more organs or organ systems of the body, caused due to infections, defective diet or heredity.

PATHOGENS

they are disease causing organisms

VECTORS-

Many pathogens use another organism, the **'Vector'** to reach us.

-These vectors are parasites.

INCUBATION PERIOD-The time interval from the invasion of a pathogen to the development of clinical Manifestations.

PARASITE is an organism that lives in or on the body of another organism and derives its nutrition from that of host organism.

parasites are two types :

1. **Ectoparasite** E.g. bedbug
2. **Endoparasite**. E.g. Plasmodium is a protozoan endoparasite of the mosquito (vector) and human beings

Diseases can be broadly categorized into

CONGENITAL DISEASES

- are present from **birth**; may be caused by genetic abnormality or metabolic disorder.

- may be **permanent**

- were practically **incurable**.

- modern research has helped to cure some inborn diseases through gene therapy, enzyme replacement therapy, etc.

ACQUIRED DISEASES

develop after the birth

TWO TYPES-

**(a) Communicable or
infectious diseases**

- are transmitted from infected person to another healthy person either directly or indirectly.**
- are caused by pathogens like viruses, bacteria, fungi , helminth worms etc.**

Eg- Malaria

b)Non- Communicable or Non - Infectious

-are diseases that cannot be transmitted from infected person to another healthy one either directly or indirectly.

Eg-. Cancer and deficiency diseases

Classification of disease

- **Congenital diseases** These are inborn disease which are present since birth. They are caused either due to genetic and chromosomal abnormalities or due to metabolic disorder or malfunctioning of system e.g. colorblindness ,thalassemia
- **Acquired disease** The diseases which are acquires during one's lifetime i.e. after birth .

<u>COMMUNICABLE DISEASES</u>	<u>NON COMMUNICABLE DISEASES</u>
Communicable disease refers to diseases that can pass from one person to another.	Non-communicable diseases occur in one person and cannot be passed on to another person.
Communicable diseases are also known as infectious diseases	Non-communicable diseases are referred to as chronic
Communicable diseases are more likely to be acute, which means the disease develops quickly.	Non-communicable diseases tend to be chronic, which means they last a long time and progress slowly.
Generally involves the lower socioeconomic group	Involves generally affluent class
Vehicles of transmission and the vectors play a major role in the spread of disease.	Dietary habits, environment and lifestyle play a role in the causation of these diseases.
Ex. common cold, pneumonia and tuberculosis	Ex. Diabetes, Arthritis, High blood pressure, Scurvy

WHAT ARE DISEASES?

cold

cancer

the flu

stroke

measles

diabetes



***Plasmodium* spp. Macrogametocytes**

Plasmodium falciparum

Plasmodium ovale

Plasmodium malariae

Plasmodium vivax

MALARIA

-It is a vector
(mosquito) borne
infectious disease
-Causative agent-
protist-**Plasmodium**.



ANOPHELES MOSQUITO

**PLASMODIUM
FALCIPARUM**

9-14 DAYS

**PLASMODIUM
VIVAX**

12-18 DAYS

**PLASMODIUM
OVALE**

12-18 DAYS

**PLASMODIUM
MALARIAE**

18-40 DAYS

**PLASMODIUM
KNOWLESI**

11-12 DAYS



**INCUBATION PERIOD
FOR VARIOUS MALARIAL PARASITES**

There are **four** species of Plasmodium

P. vivax

P. ovale

P. malariae

P. falciparum.

-Only P. falciparum causes serious illness

-Rarely fatal.

**- Based on the species,
there are 4 - types of malaria**

Symptoms of **Malaria**

Central
- Headache

Systemic
- Fever

Muscular
- Fatigue
- Pain

Back
- Pain

Skin
- Chills
- Sweating

Respiratory
- Dry cough

Spleen
- Enlarge-
ment

Stomach
- Nausea
- Vomiting



SIGNS AND SYMPTOMS :-

-Symptoms of malaria begin to appear about 7 to 15 days after the bite of infective mosquito.

- **Initial symptom are fever, headache, and**

-fever, headache ,chills, may be difficult to recognize as malaria.

- **Vomiting and convulsions.**

- **Arthralgia (joint pain), aneamia due to rupturing of RBCs.**

- **Haemoglobinuria**

-Hepatomaegaly (enlargement of liver).

-retinal damage

-cerebral malaria(brain infection)

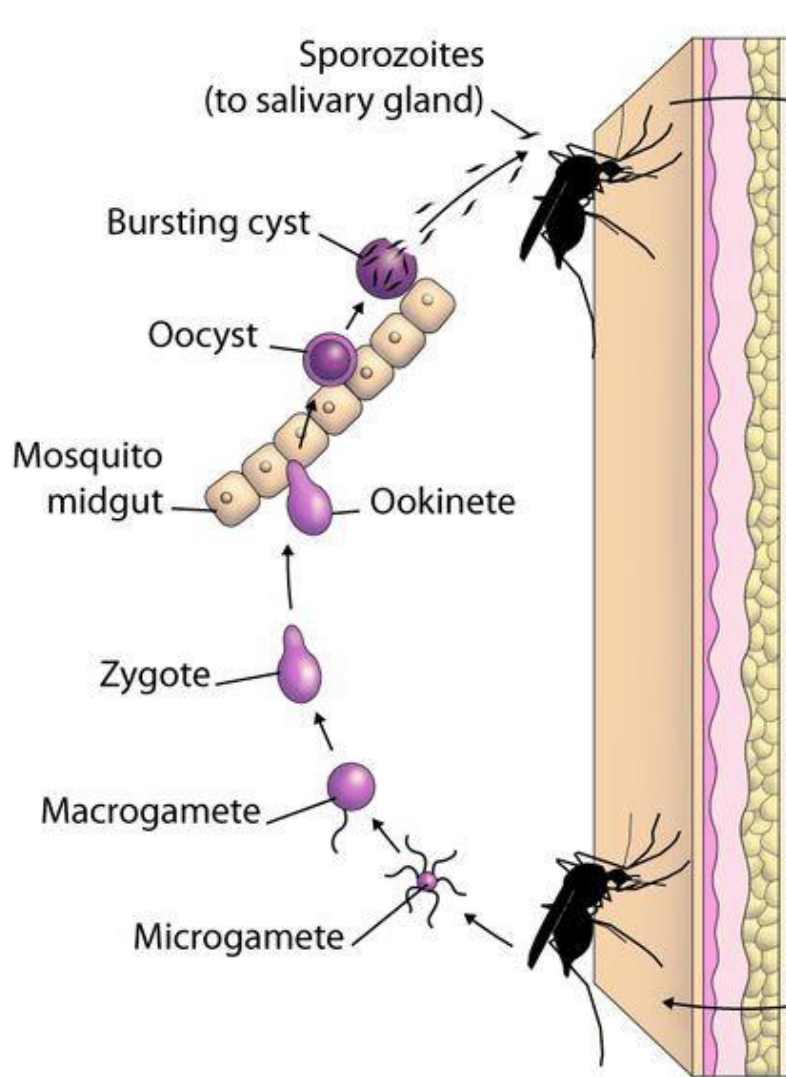
Classical symptoms of malaria is cyclic

- occurrence of high fever followed by sweating
- sudden shivering.
- entire episode lasts for four to six hours
- recurs every two days or three days.

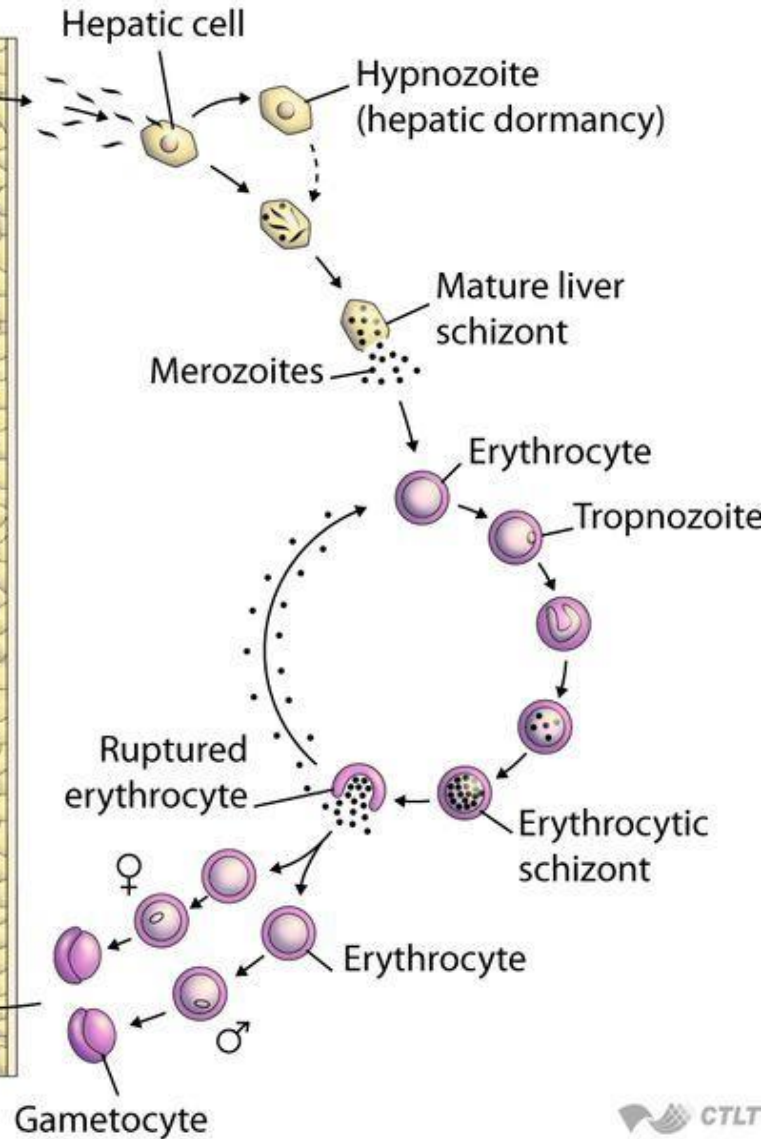
Clinical features (fever)

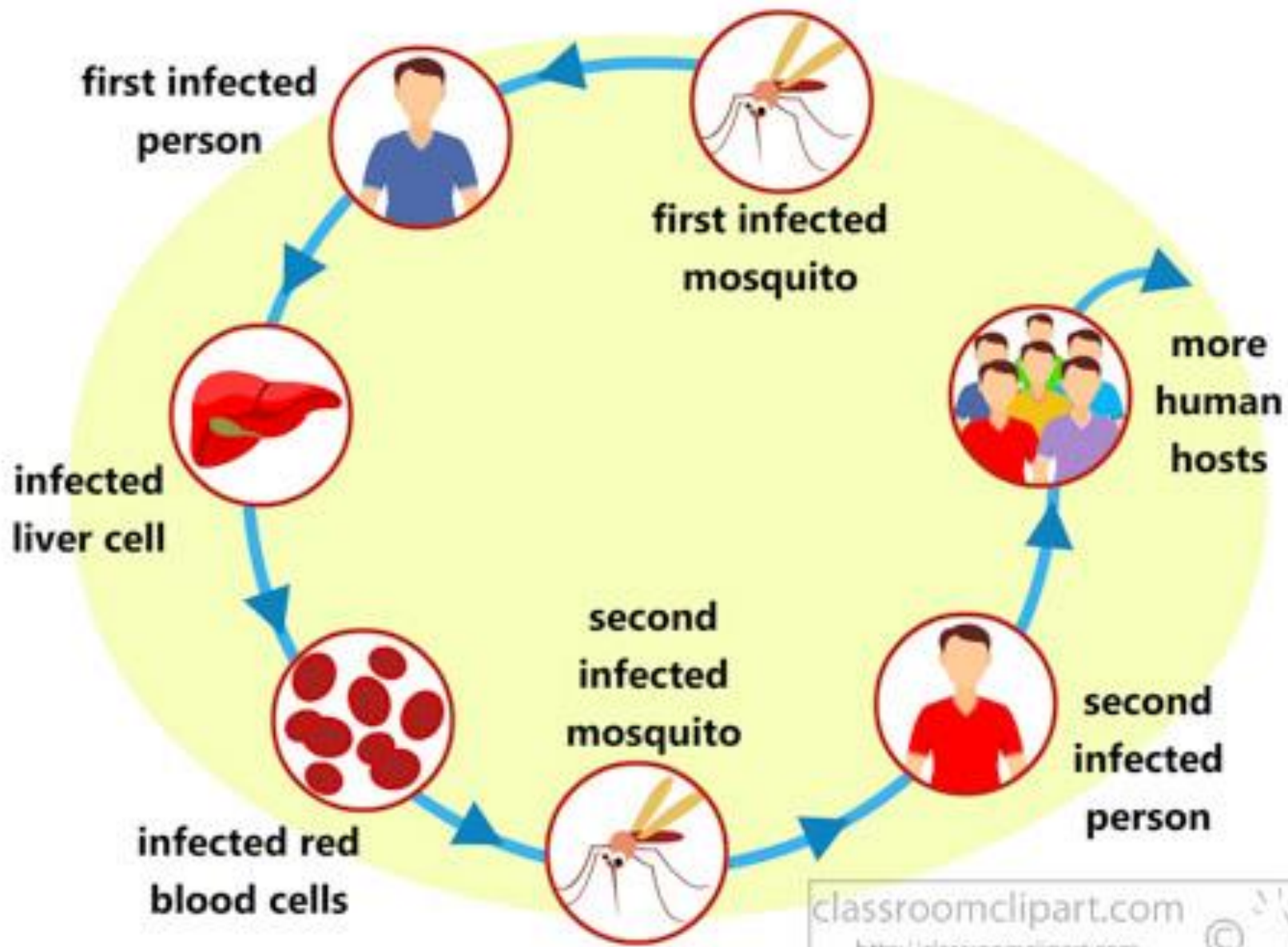
- Cold stage: rigor (cold and shivers)
headache (half-1hour)
- Fever (hot) stage:
temperature rises to maximum ,sever
headache pain in back and joints vomiting
and diarrhea (1-4h)
- Sweating stage patient perspires
temperature fall and patient relieved
until the next rigor (1-4h).
- Cold- hot- sweating - normal

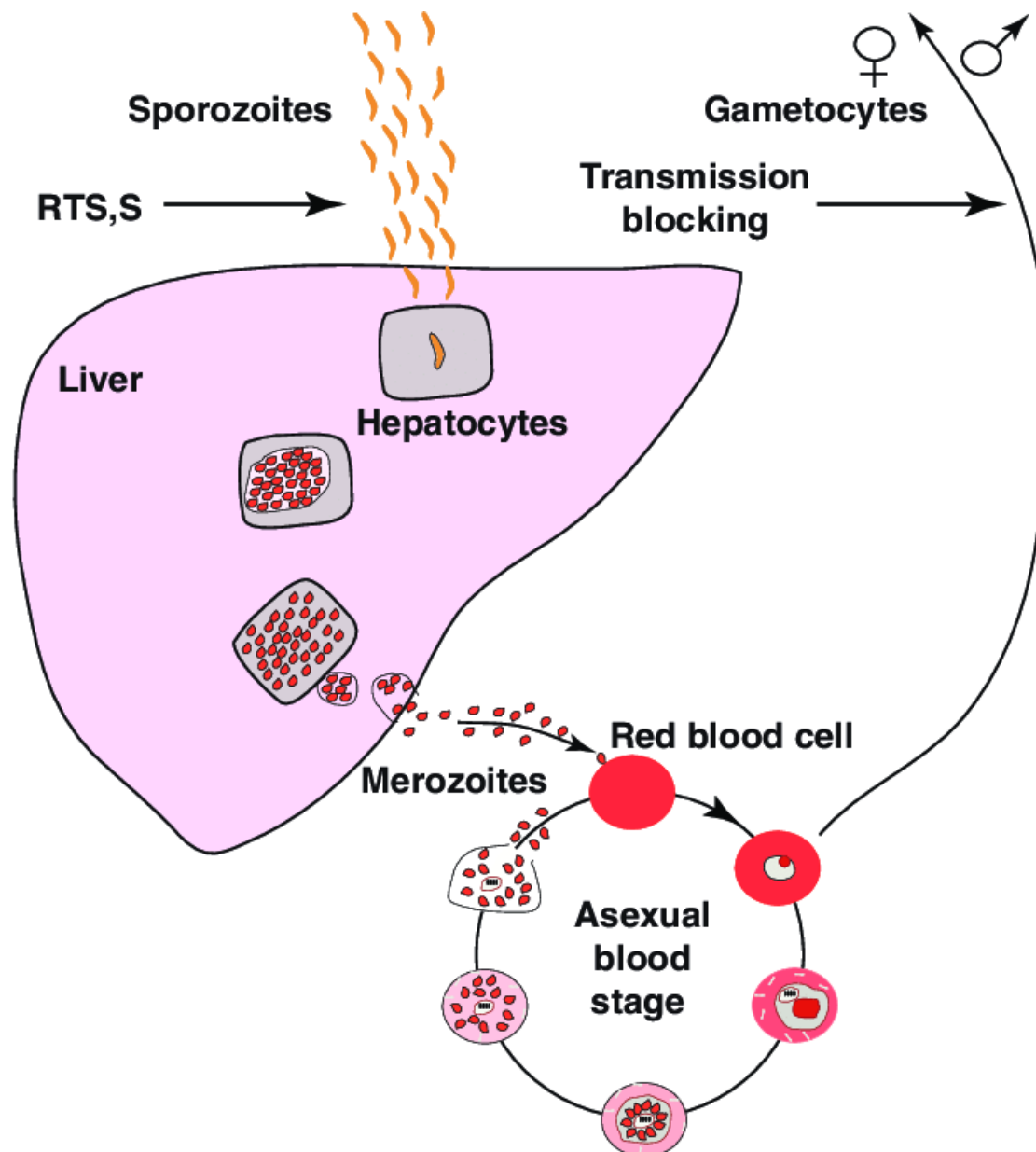
Cycle in Mosquito

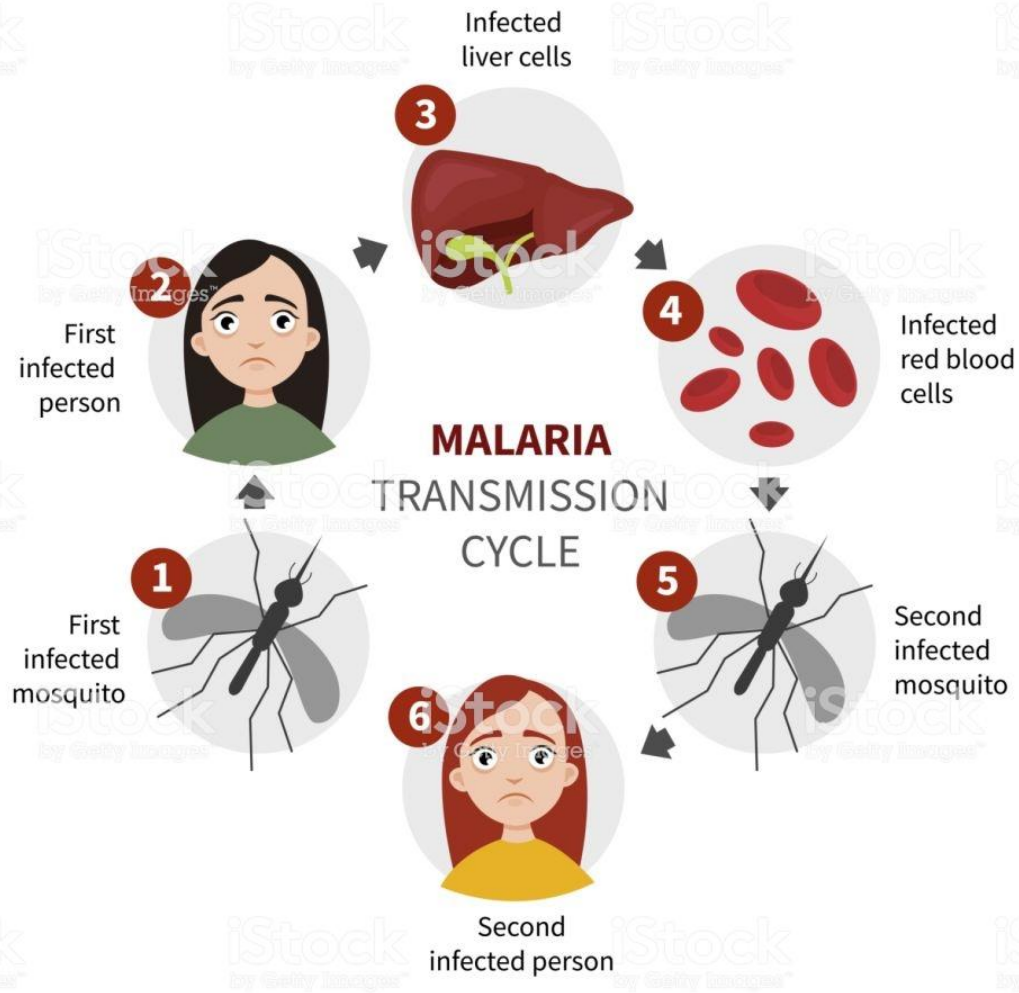


Cycle in Human









MODES OF TRANSMISSION

- Plasmodium is transmitted from one person to other through an insect vector- **female Anopheles mosquito**.
- When infected female Anopheles sucks the human blood(**bite**), it may transfer **sporozoites** to human circulation.
- Sporozoites reproduce asexually through fission (schizogony) in the liver cells or erythrocytes.
- The cells formed are now called **merozoites**.
- The cells formed within erythrocytes function as gametocytes (gamogony).

- Gametocytes if taken up by female *Anopheles*(**bite**), fertilization occurs in its gut.
- Diploid zygote is formed which transforms into **oocyst**.
- Oocyst forms large number of haploid **sporozoites** through meiosis (sporogony).
- Sporozoites migrate to salivary glands and are ready to infect new human host

DIAGNOSIS

- Malaria can diagnosed by microscopic study of blood smear.
- rapid diagnostic tests based on nucleic acid amplification techniques are also used

TREATMENT

- Artemisinin based combination therapies (ACTs).
- **Artemisinin** reduces the number of plasmodium
- Combination** drug cure
- WHO has recommended 5 different ACTs which includes various combinations of artesunate, sulfadoxine, pyrimethamine, etc.
- **Quinine** is also used

PREVENTION AND CONTROL

- Prevention of mosquito bite by using mosquito **nets and insect repellents.**
- Spraying **insecticides**
- Draining **stagnant water** where mosquito lays eggs.
- Mosquito larve can be controlled by using **Gambusia** fresh water fish (biocontrol)



AMOEBIASIS

- Amoebiasis is also known as **Amoebic dysentery.**
- infection of human gastro-intestinal tract
- affects 15 % population of India

Causative agent - Entamoeba histolytica
(protist parasite)

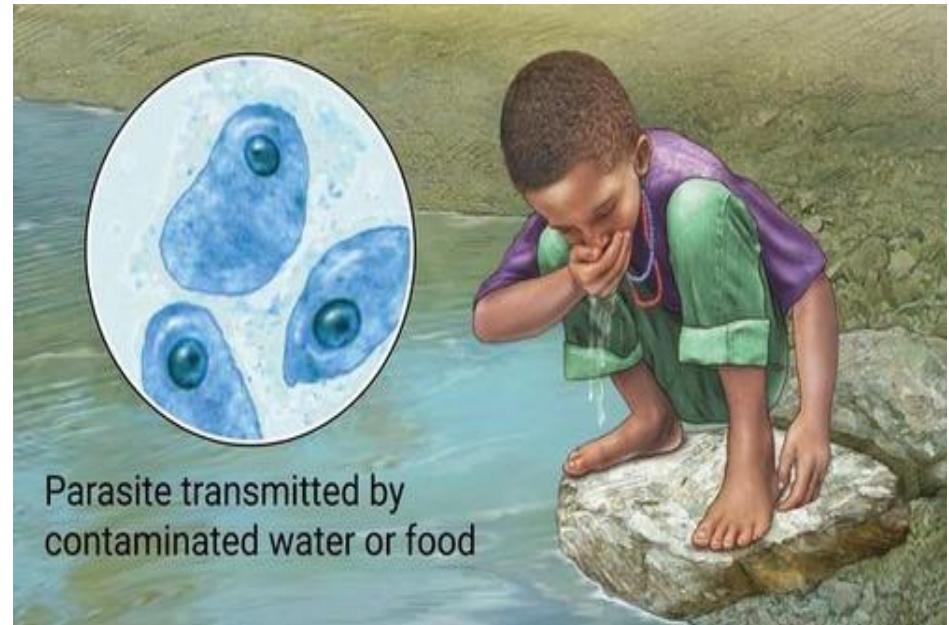
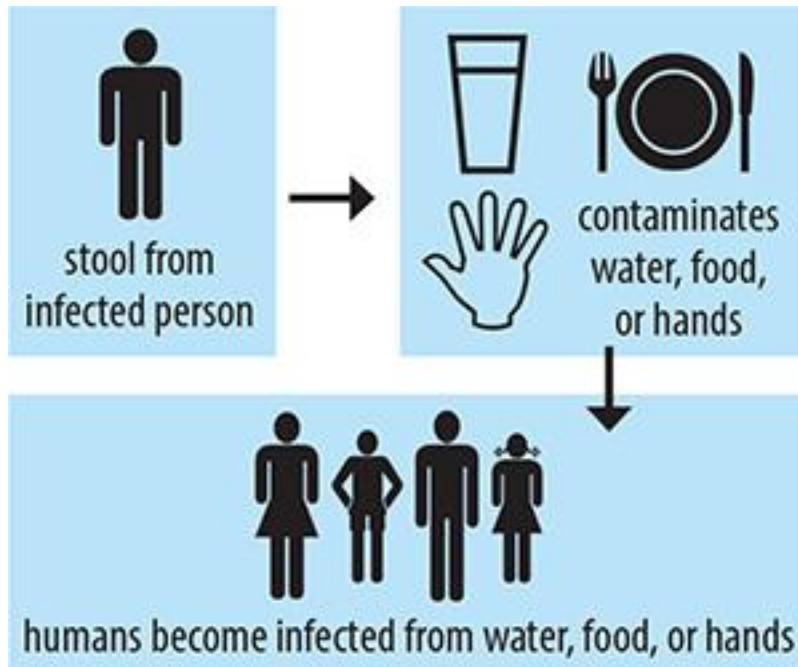
SIGNS AND SYMPTOMS:

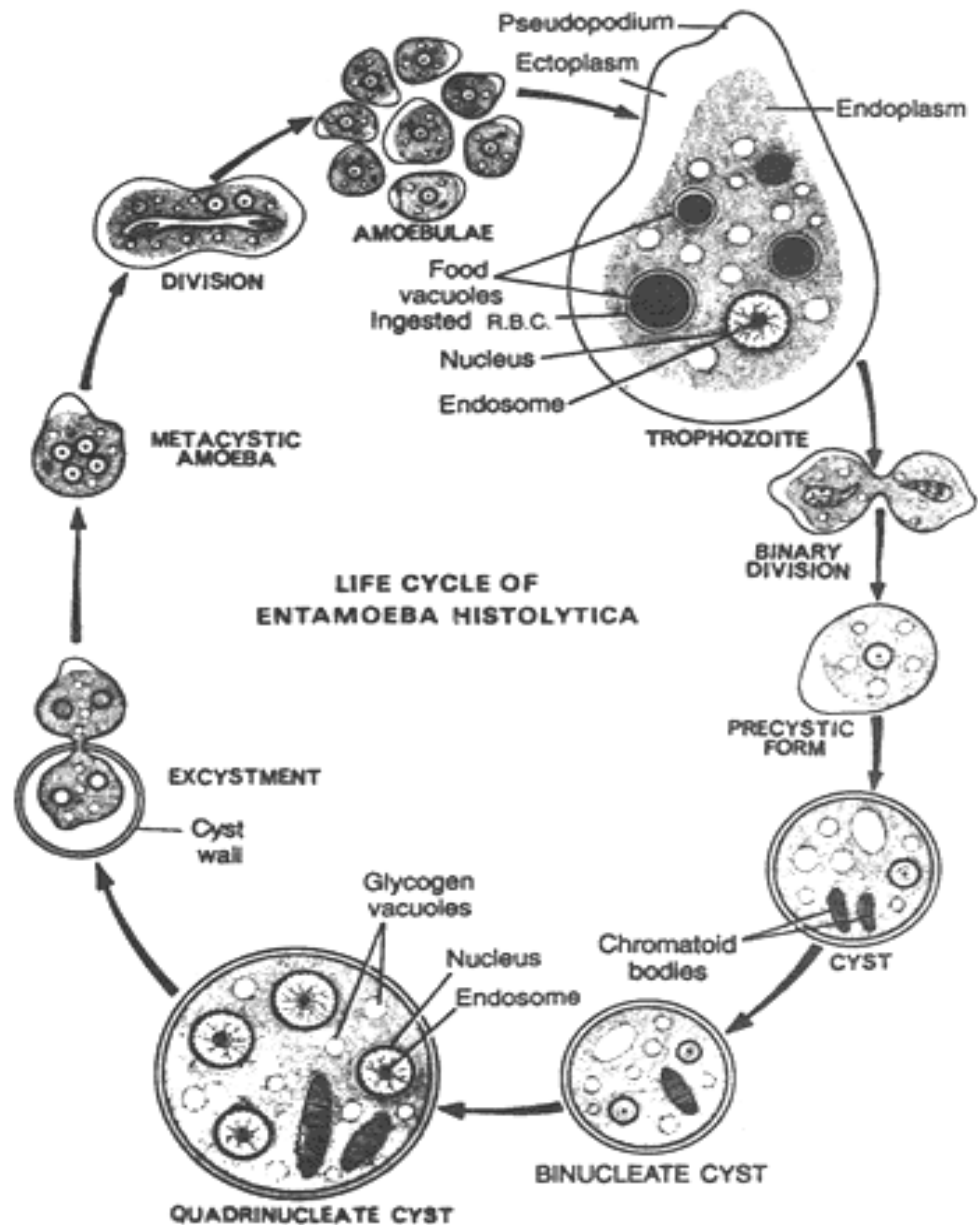
- diarrhoea, flatulance, stools with mucus**
- abdominal pains (cramps)**
- Passing of blood with stool is common**
- Hepatomegaly in liver occurs if parasite enters the**
- Liver develops amoebic liver abscess accompanied with fever and pain in right abdomen.**

MODE OF TRANSMISSION :

Faeco-oral route.

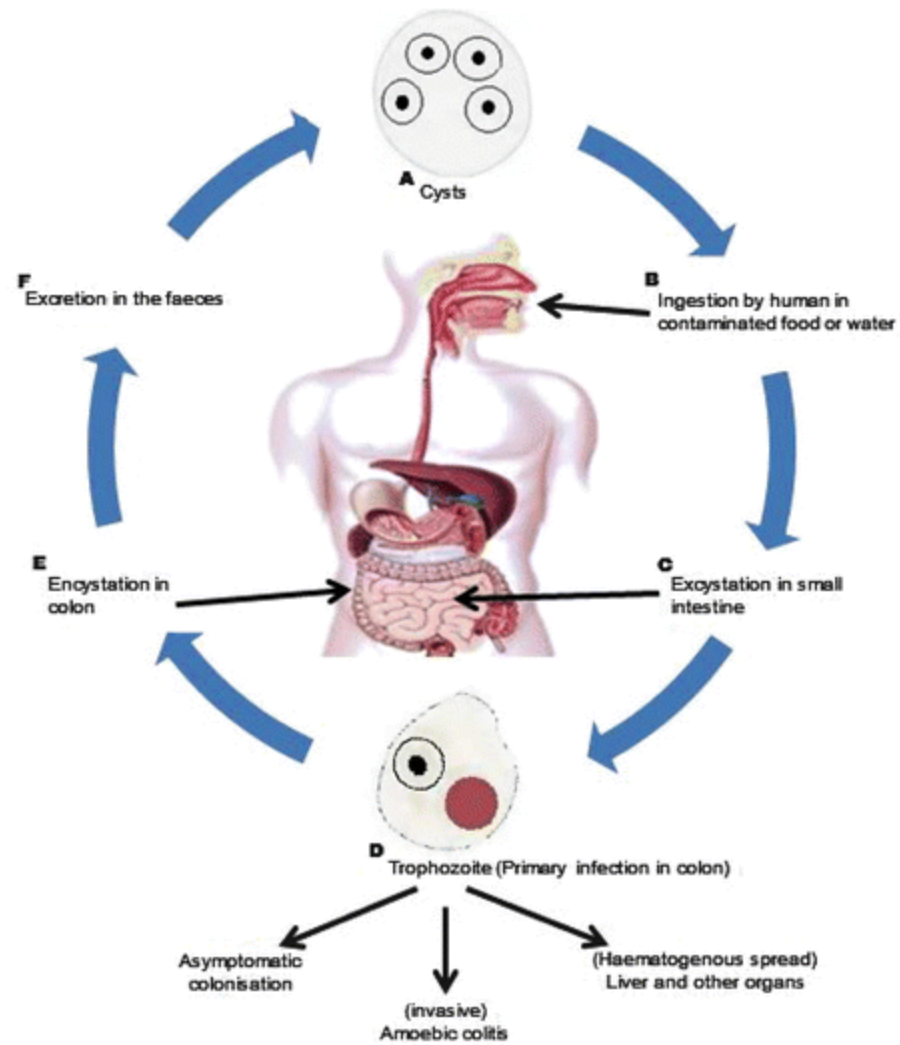
- Eating with dirty hands.
- Contaminated food and water





***Entamoeba histolytica* : Reproductive and life history**

Life cycle of *Entamoeba histolytica*



DIAGNOSIS :

-through microscopic examination of the stool sample.

TREATMENT:

- use of Metronidazole and Tinidazole which can destroy the E. histolytica in the digestive tract as well as other tissues

PREVENTION AND CONTROL :

- Wash hands** with hot water and soap after using toilets and changing baby's diaper.
- Drink **boiled water**.
- water must be **chlorinated and filtered**.
- Avoid eating unhygienic food.
 - Vegetables must be properly **washed and cooked**.
- Proper **sanitary** facilities
- Proper **sewage disposal**.

Prevention and control

Primary prevention

Sanitation

Human excreta – safe disposal

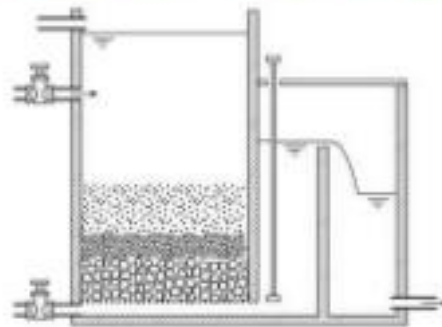


Hand washing



Water supply

Water filtration – sand filters



Water boiling



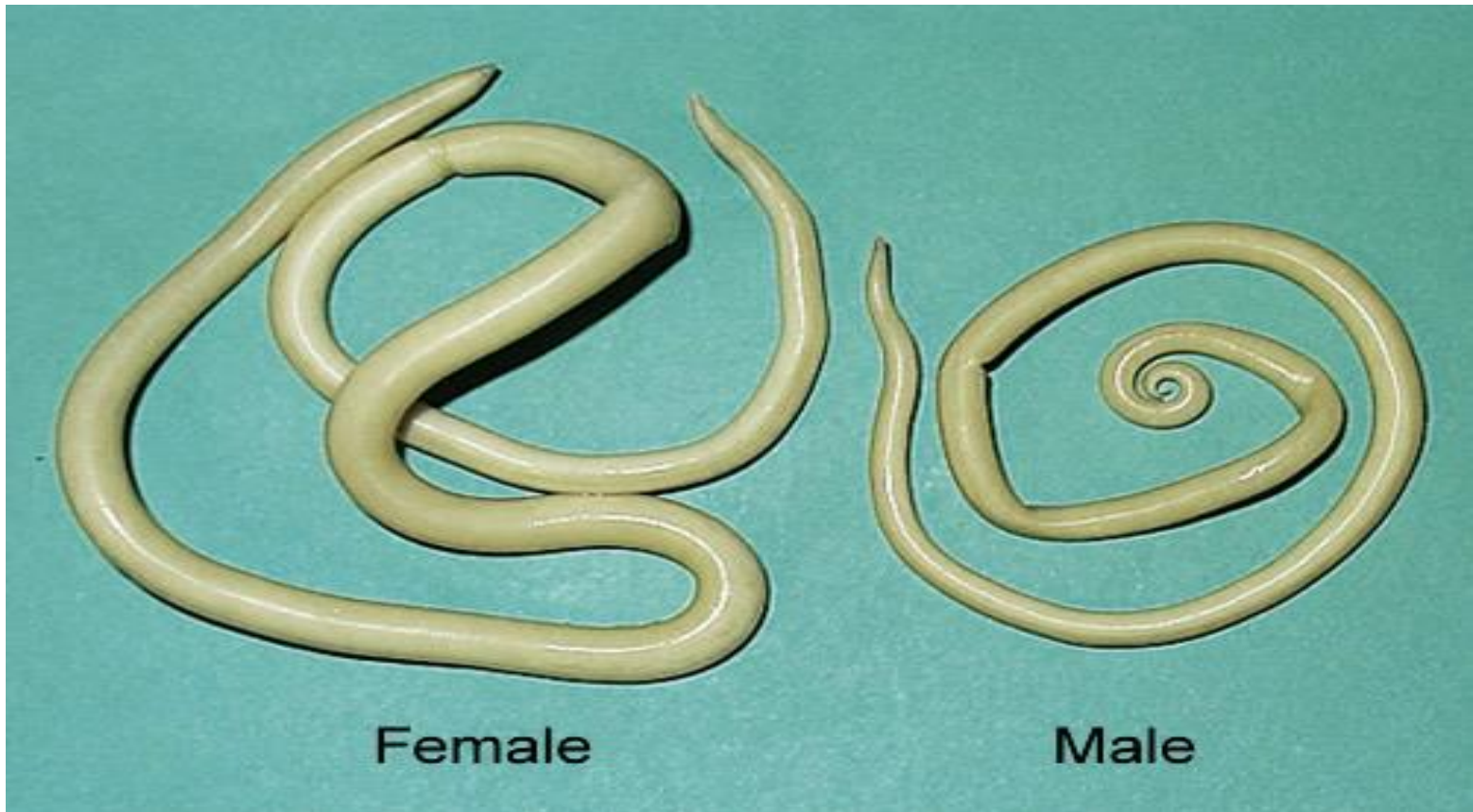
Food hygiene



Health education

ASCARIASIS :

- It is an infectious disease of human intestinal tract.
- Causative agent –roundworm
- Ascaris lumbricoides(nematode).



Symptoms of Ascariasis

- **No symptoms**

- Stage 1: worm larvae in the bowels attach to bowel walls
- Stage 2: worm larvae migrate into the lungs:
 - Fever and breathing difficulty
 - Coughing and pneumonia
- Stage 3: worms enter the small intestine and mature into worms and remain there to feed

- **Abdominal symptoms**

- Abdominal discomfort
- Intestinal blockage - may be partial or complete
 - Partial intestinal blockage
 - Total intestinal blockage
- Severe abdominal pain
- Vomiting
- Restlessness
- Disturbed sleep
- Worm in stool
- Worm in vomit

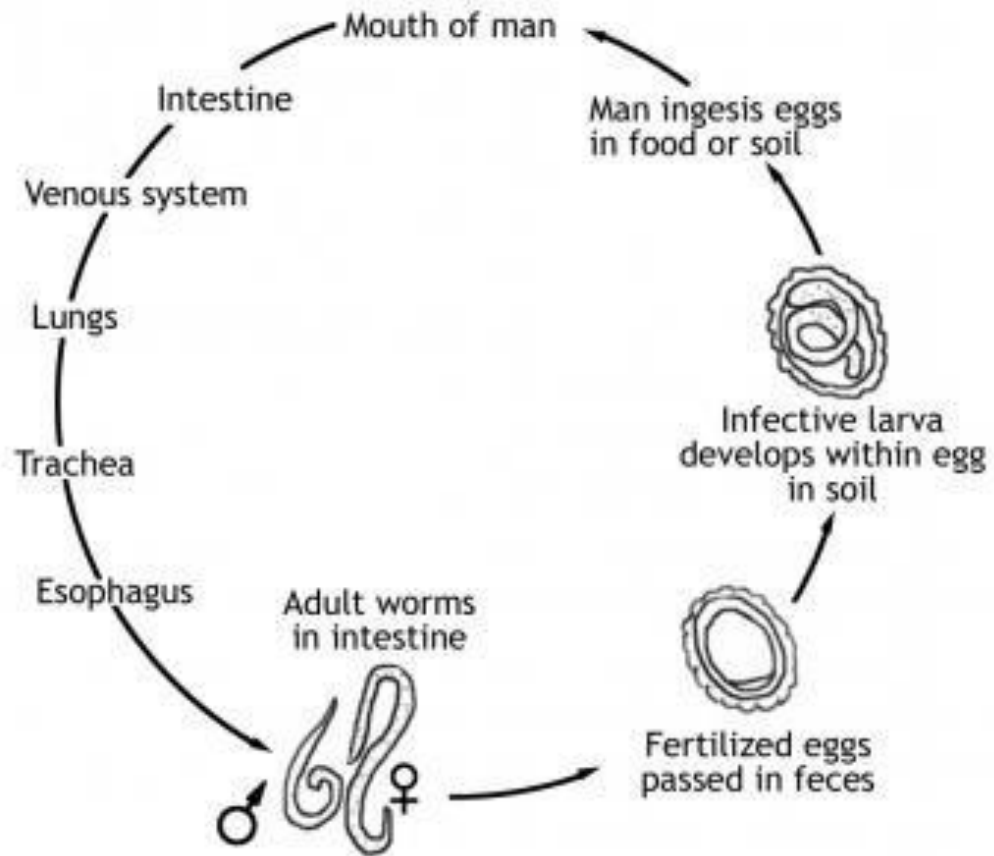
SIGNS AND SYMPTOMS :

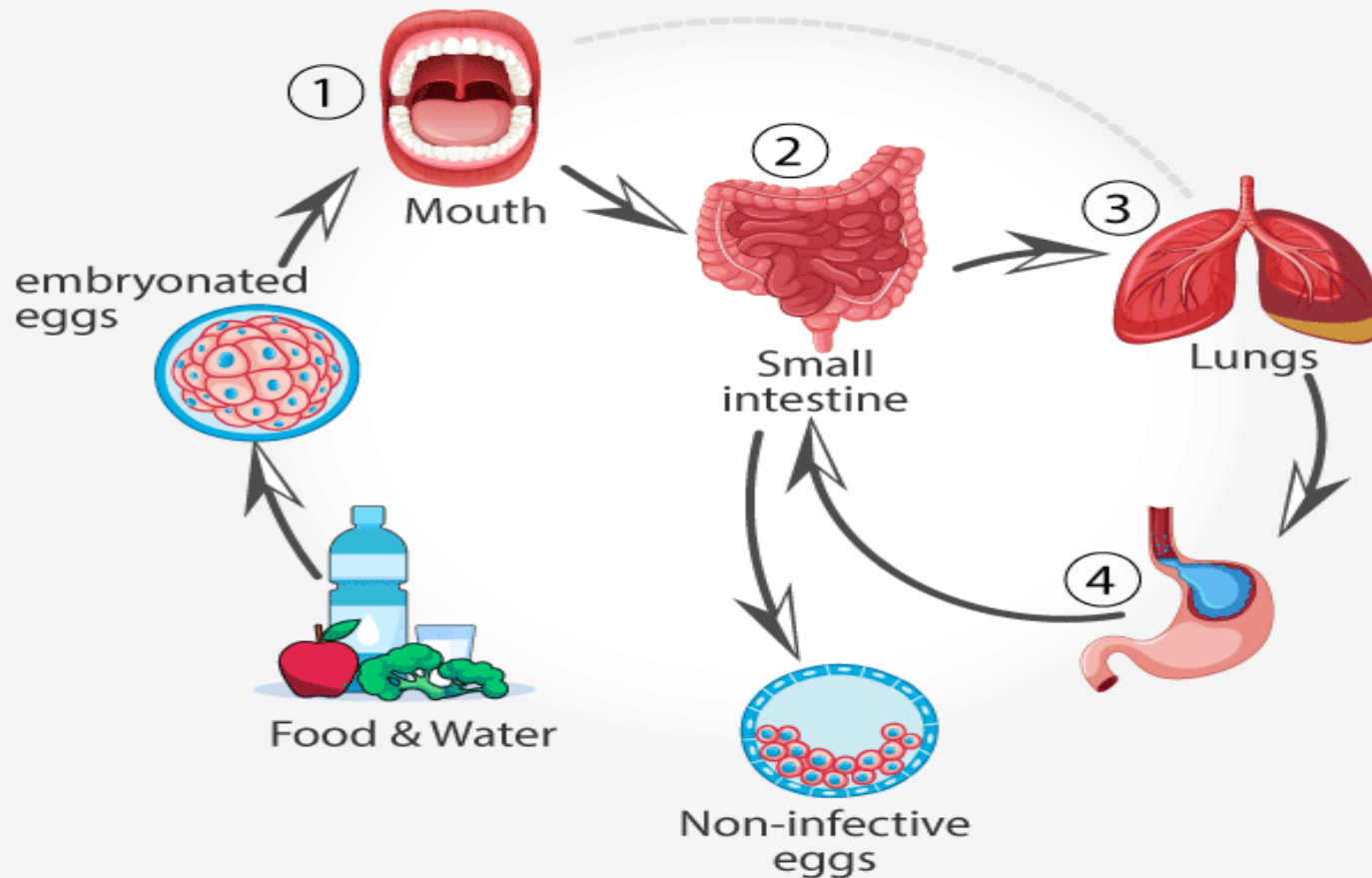
- Gastrointestinal discomfort with vomiting and fever.
- Presence of live worms in feacal matter.
- Pulmonary disorder **Pneumonitis** (inflammation in alveolar wall).
- Eosinophilia** - Eosinophilia increase in eosinophils
- Loss of appetite and weight

MODE OF TRANSMISSION:

- Food and drinks contaminated with the eggs of these worm is the main mode of transmission.**
- Eggs hatch inside the intestine of the new host.**
- The larvae pass through various organs and settle as adults in the digestive system**

Ascariasis
Ascaris Lumbricoides





① Ingestion of *Ascaris* eggs from feces

② Eggs hatch in intestines through gut wall, and migrate to the lungs via the blood

③ Larvae break into the alveoli and travel up trachea where they are coughed up and swallowed

④ Larvae pass through the stomach into the intestines for a second time where they become adult worms

DIAGNOSIS

-can be done by microscopic examination of the stool.

TREATMENT

-Anti-helminthic drugs like Piperazine, Mebendazole, Levamisole, Pyrantel are effective against *Ascaris lumbricoides*

PREVENTION AND CONTROL :

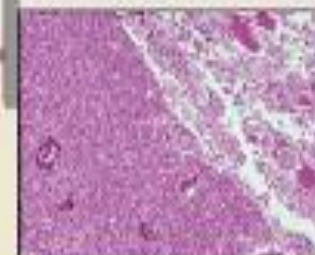
- Avoiding defaecation in open space.**
- Personal hygienic habits like washing hand with water and soap after using toilet.**
- Washing vegetables thoroughly before cooking**
- avoiding raw vegetables is important for prevention of ascariasis.**



ASCARIASIS



Parasitic infection caused by a type of roundworm *Ascaris lumbricoides*



Ascariasis is caused by ingesting eggs



Children more often infected than adults

Eggs live in soil contaminated by feces



Most prevalent in warm moist climate (as in tropics and subtropics)



Fingers or hands with contaminated dirt are put in the mouth



Risk factors:



Fruits and vegetables not properly cooked, washed or peeled

#royopath

histopathology-india.net

Filariasis

BYJU'S



FILARIASIS/ ELEPHANTIASIS

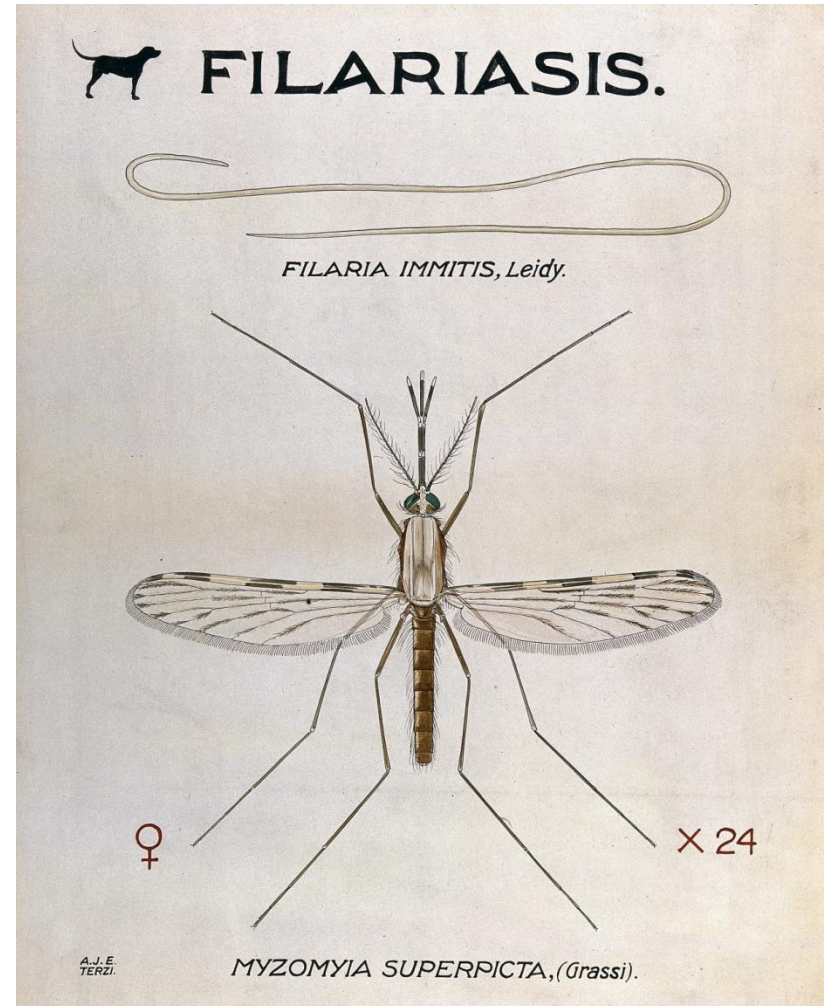
Causative agent- thread-worms-**nematodes**.

- Vector -nematode parasites are transported from person to person via mosquito bite.

- **Culex mosquito**



shutterstock.com • 1081187618



Filariasis can be divided into 3 subtypes

1) Lymphatic Filariasis

**2) Subcutaneous Filariasis (e.g. *Loa loa*,
Mansonella spp.)**

**3) Serous (abdominal)cavity Filariasis (e.g.
Mansonella spp.).**

Lymphatic Filariasis (Elephantiasis) is caused
by the worms - *Wuchereria bancrofti*, *Brugia*
malayi, *Brugia timori*



shutterstock.com • 1079414717

SIGNS AND SYMPTOMS :-

- Edema** with thickening of skin and of underlying tissues.
- affects legs, arms, breasts, scrotum, etc.
- worms infect lymphatic system and causes enlargement of lymph vessels and nodes.
- is **elephantiasis** i.e. limbs are swollen like legs of elephant.
- Lymphedema** –accumulation of lymph fluid in tissue causing swelling
- hydrocele** – due accumulation of lymph fluid testis enlarge.

MODE OF TRANSMISSION :

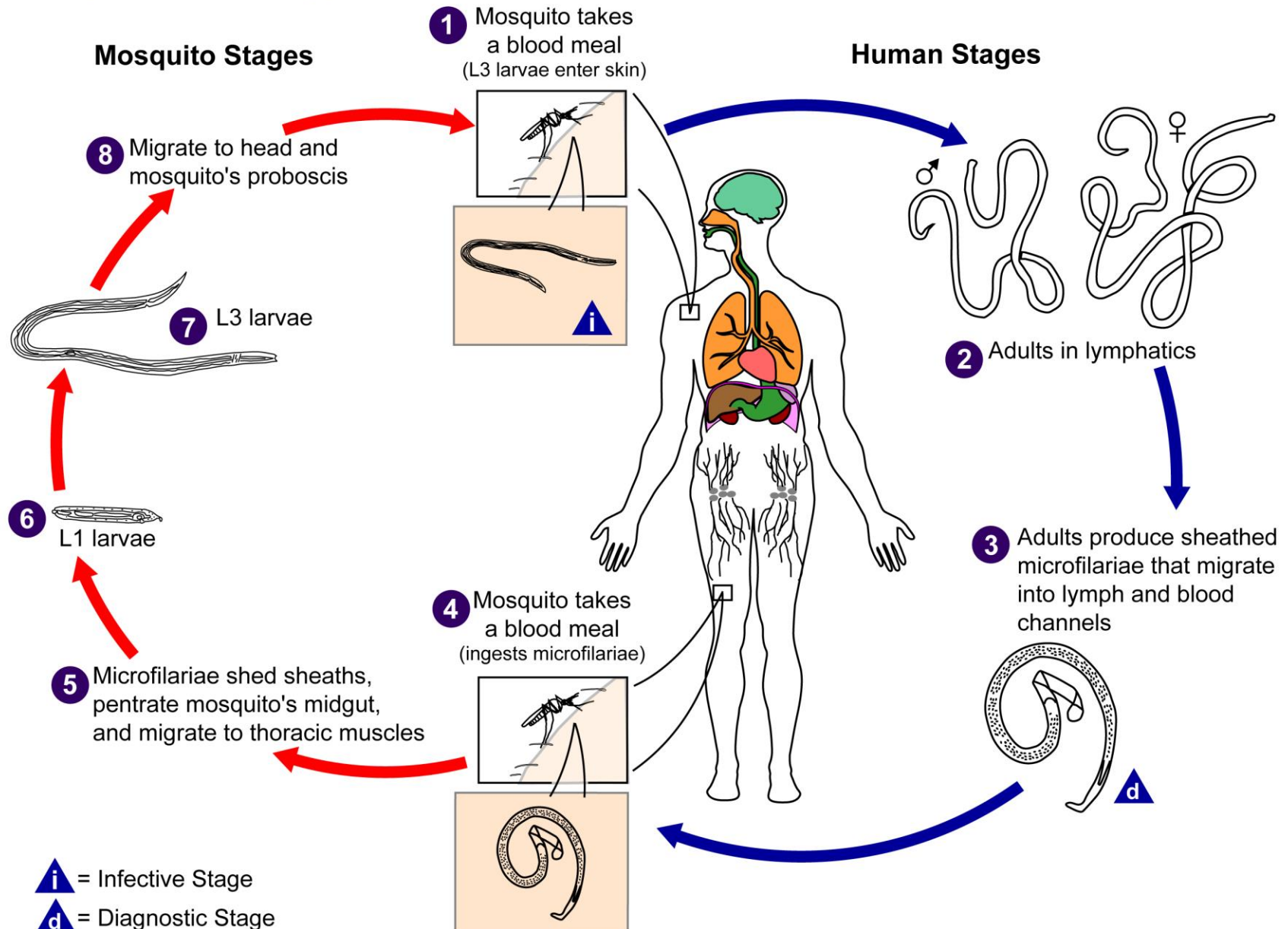
- Wuchereria bancrofti is transmitted to human body by **female Culex mosquito**.
- The larvae escape mosquito body and arrive on the human skin.
- They penetrate the skin, undergo **two moultings** before they become adults and settle in the lymphatic system.
- Incubation period can be as long as **8-16 months**.

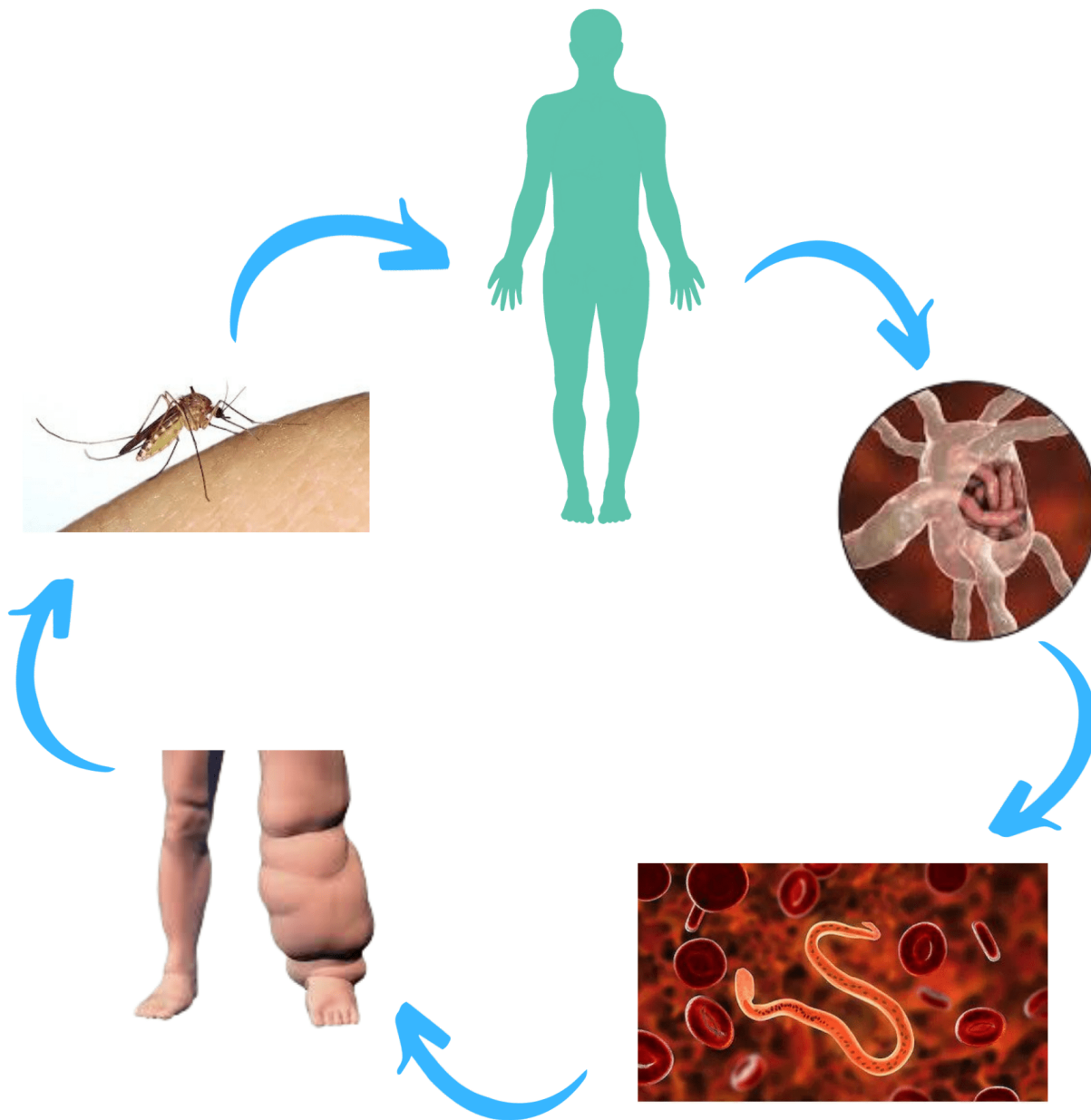
Filariasis

(*Wuchereria bancrofti*)

Mosquito Stages

Human Stages

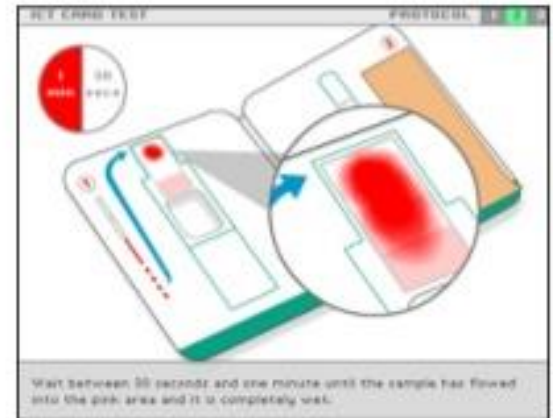




For India Lovers

Diagnosis

- Until recently, very difficult to diagnose
 - Nocturnal periodicity: The worms can only be detected in the blood of those infected around the hour of midnight.
- New specific card test: Detects parasites using only finger prick blood tests any time of day.
- Ultrasound can identify rapidly moving adult worms.



TREATMENT:

Use of **diethyl-carbamazine citrate** twice a day for three weeks and thereafter for five days every six month is effective against filarial worms.

PREVENTION AND CONTROL :

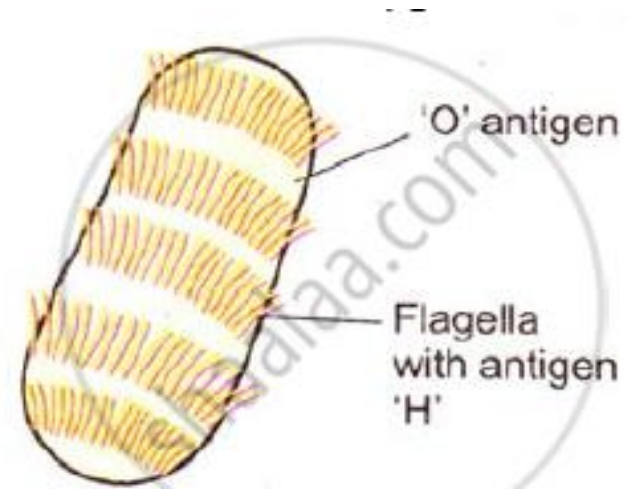
- Avoid **mosquito bite** by using mosquito nets and insect repellents.
- Eradication of mosquitoes is essential for control of filariasis.

A collection of medical supplies is arranged on a white surface. In the upper left, there are several light blue capsules and a few red round tablets. A white and blue pill bottle cap lies nearby. To the right, a clear glass vial with a blue cap is partially visible. In the lower left, a green and yellow thermometer is shown. A blue syringe with a needle is positioned diagonally across the lower half of the image. The text "Typhoid fever" is written in a black, cursive-style font across the center of the image.

Typhoid fever

TYPHOID :

- Typhoid is an acute infection of **intestine**.
- causative agent- **Salmonella typhi**.
- **Gram -ve bacteria**
- found in intestinal lumen of infected Person
- Pathogenicity is due to “**O**”- **antigen**, a lipopolysaccharide (LPS), present on surface coat.
- Flagella contains “**H**”- antigen



Structure of *Salmonella typhi*

SIGNS AND SYMPTOMS

- PROLONGED FEVER AS HIGH AS 10F.
- General nausea, fatigue, headache.
- Abdominal pain, constipation or diarrhoea.
- **Rose**-coloured rash on skin.
- White coat on tongue, cough.
- Anorexia (loss of appetite).
- If not treated- breathlessness,
irregular breathlessness, irregular heart beat,
heartbeats, haemorrhage

Typhoid fever symptoms



High fever.



Headache



Weakness



Dry cough



Stomach pain



Constipation



Rashes

TRANSMISSION :

- Contaminated Food and water**
- Insects like flies and cockroaches feeding on fecal matter, may transfer the bacteria to food material**
- poor hygiene and poor sanitation are responsible for the spread of typhoid**

DIAGNOSIS

- **Widal test is a serological test for diagnosis of Typhoid (Enteric) fever**
- Typhoid (Enteric) fever is caused by genus Salmonella

TREATMENT

- involves surgical removal of gall bladder in severe cases.
- Antibiotics like **Chloromycetin** is helpful

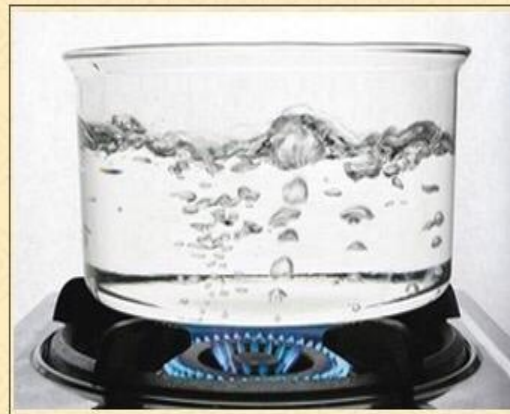
PREVENTION OF TYPHOID WHO

- recommendes two vaccines as
 - **oral -Ty21a vaccine**
 - **injectable** (Typhoid polysaccharide vaccine)

PREVENTION OF TYPHOID



WASH YOUR HANDS



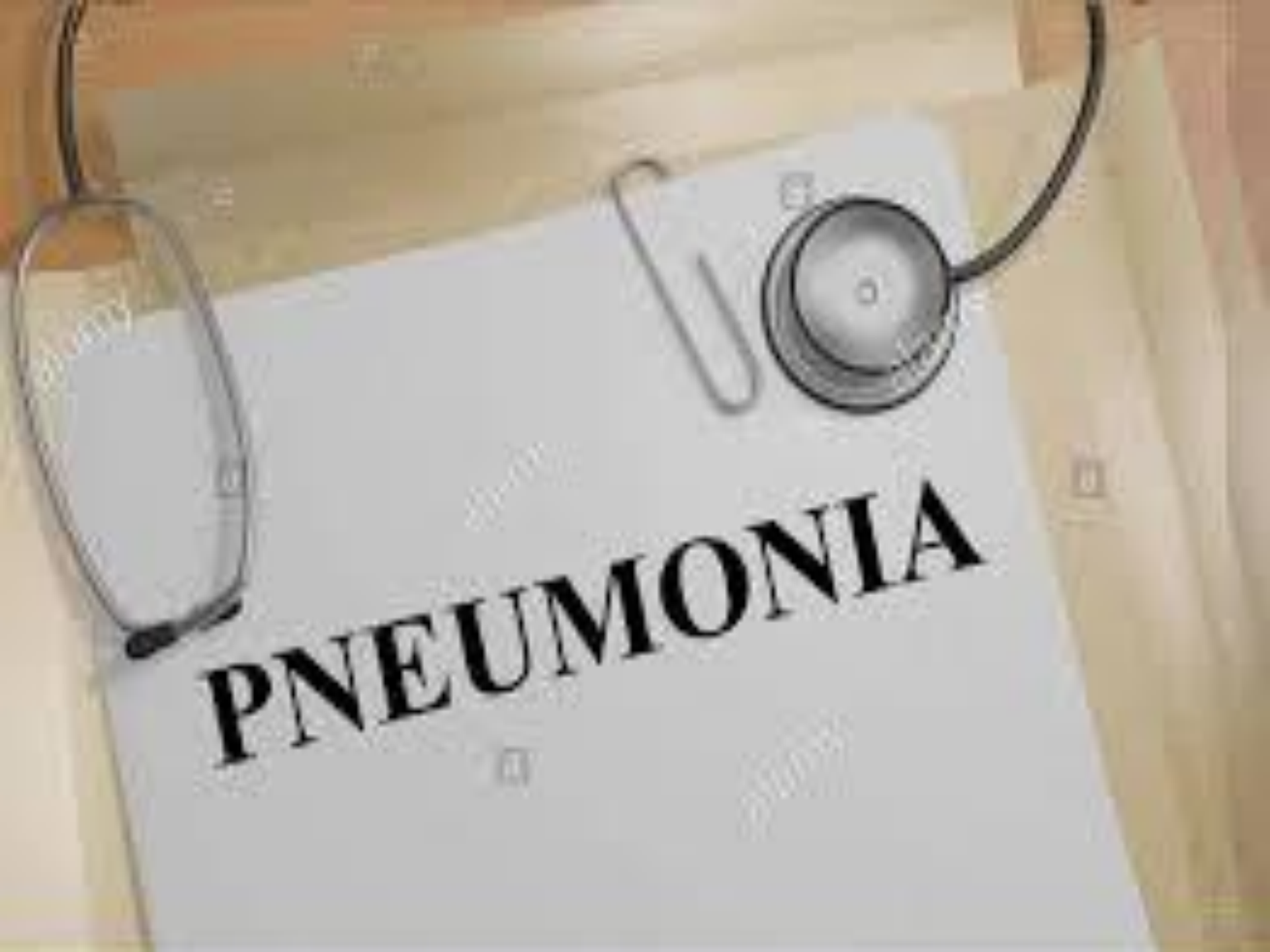
DRINK BOILED WATER



**WASH FRUITS &
VEGETABLES BEFORE USE**



GET VACCINATED

A pair of glasses, a paperclip, and a stethoscope are resting on a piece of paper. The word "PNEUMONIA" is printed in large, bold, black capital letters on the paper. The glasses are on the left, the paperclip is in the center, and the stethoscope is on the right. The background is a light-colored wooden surface.

PNEUMONIA

PNEUMONIA :

- an inflammatory condition of lungs or alveoli of lungs.
- causative agents

variety of **pathogens**

VIRUSES

influenza virus

adenovirus

para influenza

Respiratory Syncytial Virus (RSV)

BACTERIA

- Streptococcus pneumoniae

-fungal pathogens

Pneumocystis jirovecii

Pneumocystis carinii.

Chemical burns or physical injury to lungs

CAUSES



BACTERIA



FUNGI



VIRUSES



PARASITES

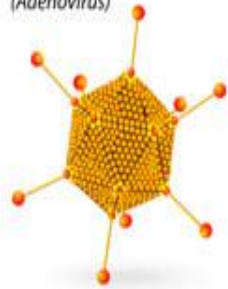


PNEUMONIA

Pathogen Causes of Pneumonia

Virus

Polyhedral
(Adenovirus)



Spherical
(Influenza)



Complex
(Bacteriophage)



Helical
(Tobacco mosaic virus)

Bacteria



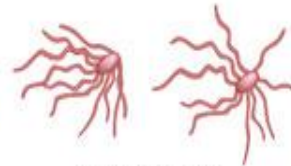
Staphylococcus aureus



Streptococcus pyogenes



Bacillus cereus



E. coli ; Salmonella



Vibrio cholerae



Bordetella pertussis



Corynebacterium diphtheriae



Streptococcus pneumon

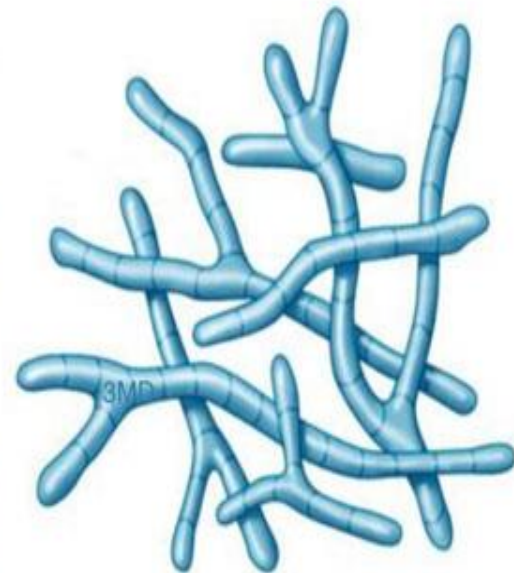


Klebsiella pneumon



Helicobacter pylori

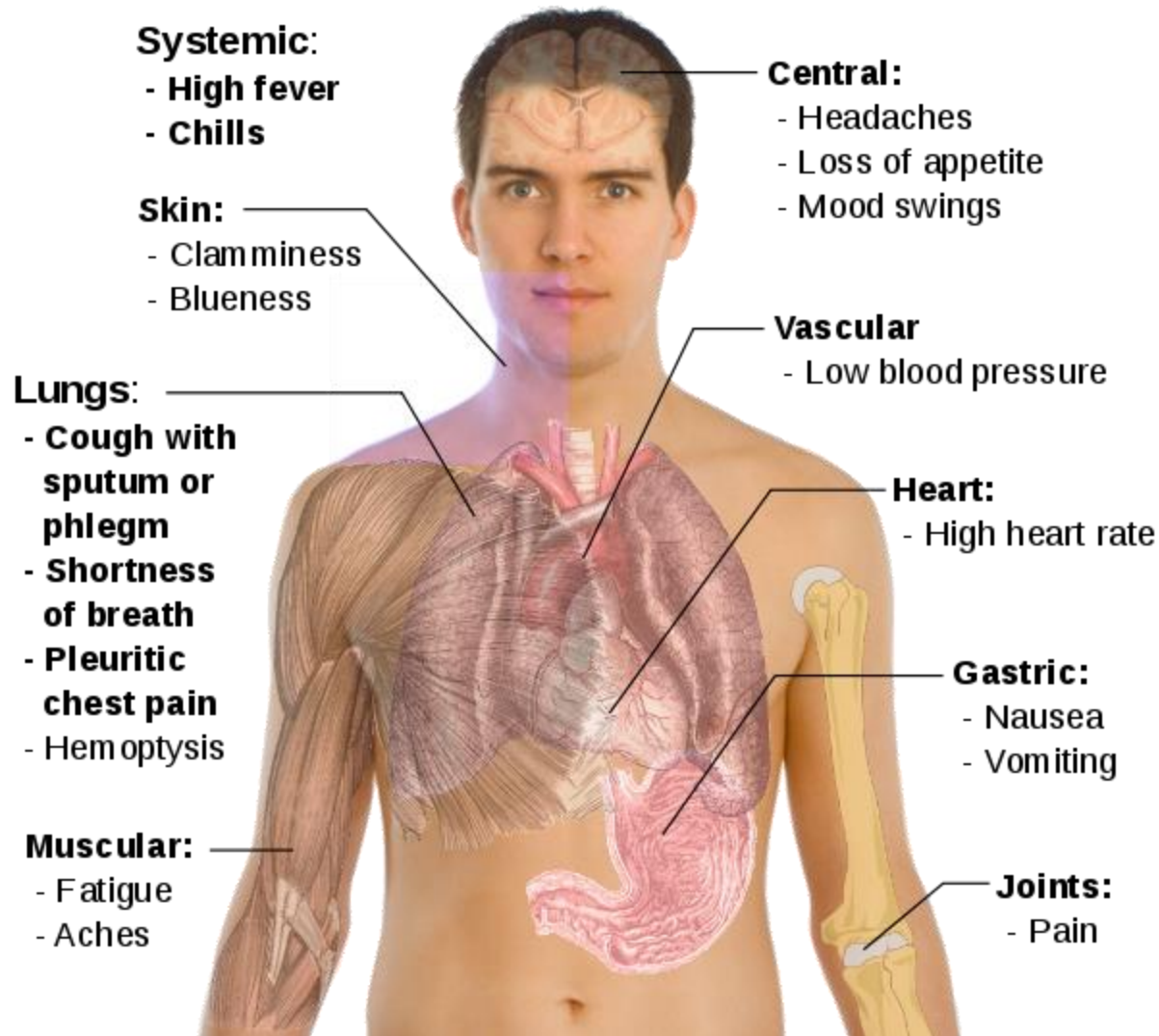
Fungi



SIGNS AND SYMPTOMS :-

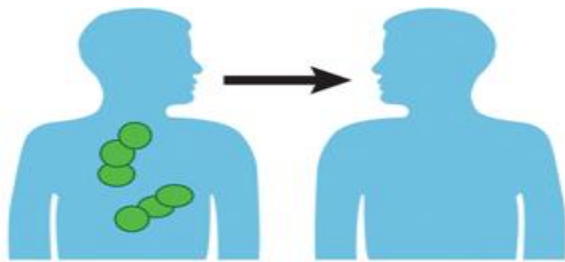
- **Cough** produces yellow or greenish sputum or phlegm.
- High fever.
- Shortness of breath (**Dyspnea**).
- **Chest pain** during deep breath or coughing.
- Loss of appetite, fatigue, headaches, vomiting, joint pains and muscle aches

Main symptoms of infectious Pneumonia

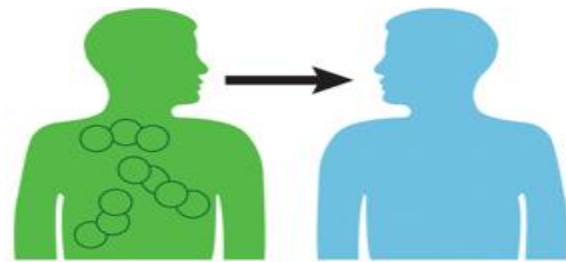


MODE OF TRANSMISSION :

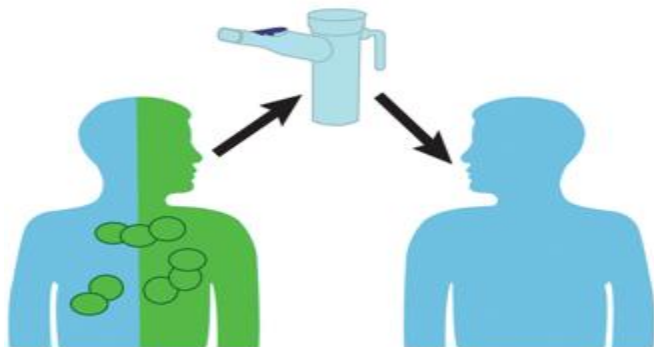
- spreads by direct person to person contact
- It can also spread via droplets released by infected person or even by using shared clothes and utensils.



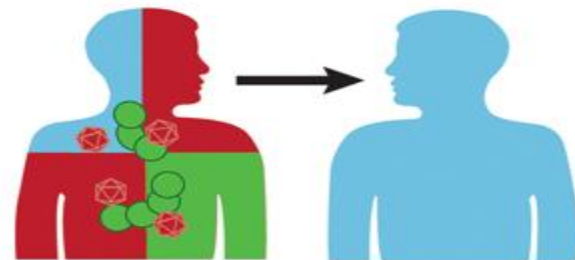
Direct Carrier Transmission



Direct Infectious Transmission



Device-associated Transmission



Co-infection Transmission

DIAGNOSIS AND TREATMENT

-treatment depends upon pathogen of the disease.

**-bacterial pneumonia,
antibiotics like Benzyl penicillin,
Ampicillin and Chloramphenicol are
effective**

PREVENTION AND CONTROL :-

- **Vaccination is important prevention**
- **Vaccines against *Haemophilus influenzae* and *Streptococcus pneumoniae* in first year of life, help greatly to reduce the chance of pneumonia**

World Pneumonia Day

12th November 2018

Hygienic practices that can help prevent Pneumonia



Wash hands
often.



Disinfect
frequently
touched
surfaces.



Cover nose with
hands, tissue or
hankie while
coughing or
sneezing.



Limit exposure
to any smoke,
such as smoke
from solid fuel,
cigarette,
automobile
exhaust etc.



The Common Cold

COMMON COLD :

-It is a viral infectious disease of upper respiratory region.

–also known as nasopharyngitis, acute viral rhinopharyngitis, acute coryza or a cold .

-caused by a group of viruses known as Rhinoviruses and Coronaviruses

SIGNS AND SYMPTOMS :

- Cough , sore throat, running nose and fever.
- Nasal congestion , sneezing
- Conjunctivitis(**red eyes**)
- muscle rash
- fatigue, headache, shivering
- loss of appetite

SYMPTOMS OF COLD



SNEEZING



SORE THROAT



MILD COUGH



RUNNY NOSE



LOW-GRADE FEVER



WATERY EYES

Symptoms of Common Cold



Runny nose



Sore throat



Cough



Sneezing



Loss of appetite



Low-grade fever



Watery eyes



Headache



Earache



Nausea



PREVENTION AND CONTROL :

- **Staying away from person suffering from common cold.**
- **Washing hands with soap and water.**
- **Use of handkerchief to cover the nose and mouth during coughing and sneezing.**
- **Alcohol based hand sanitizer can also be used**

PREVENTION OF COMMON COLD



VACCINATION



WASH HANDS



GAUZE MASK



VITAMINS

RINGWORM

RingWorm DERMATOPHYTOSIS :

- **funga**l infection of skin.
- causative agents
fungal species
genera **Trichophyton** and
Microsporum.
- The fungi feed on keratin in skin,
hair and nails

Causes Of Ringworm

Ringworm

The fungus lives on dead tissue of the skin

Microscopic ringworm

Ringworm lesion



SIGNS AND SYMPTOMS :

- Infected skin shows enlarged, **red ring** caused due to ringworm.
- Appearance of dry, scaly lesions on various parts of the body. These red patches cause **intense itching**.
- Infection to nails is termed as **onychomycosis**, in which nails become thick, discoloured and disfigured.
- **Athlete's foot** is the fungal infection that usually begins between the toe



MODE OF TRANSMISSION :-

**Ringworm spreads by
sharing of clothes, comb of infected person, etc.
Close contact with infected person**



**dermatophyte
fungi**



**not washing
hands**



**close contact with
those infected**



**damp skin for
extended time**



DIAGNOSIS

- is by physical examination

TREATMENT

- drugs like nystatin,
fluconazole, itraconazole,
etc

PREVENTION AND CONTROL :

- Avoid close contact,
- sharing of clothes, sport equipments.
- Washing clothes in hot water with fungicidal soap help to destroy fungal pathogen.



DENGUE FEVER

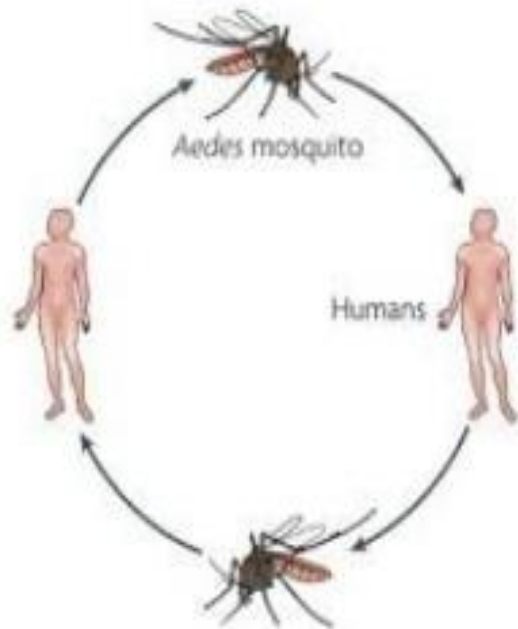


DENGUE FEVER

- is a painful, debilitating
- vector borne disease,
- Causative agent- virus **4 types**
- transmitted through the bite of **female Aedes mosquito.**
- mosquito takes up the dengue virus when it sucks blood of a person suffering from dengue.
- can not spread directly from one person to another person

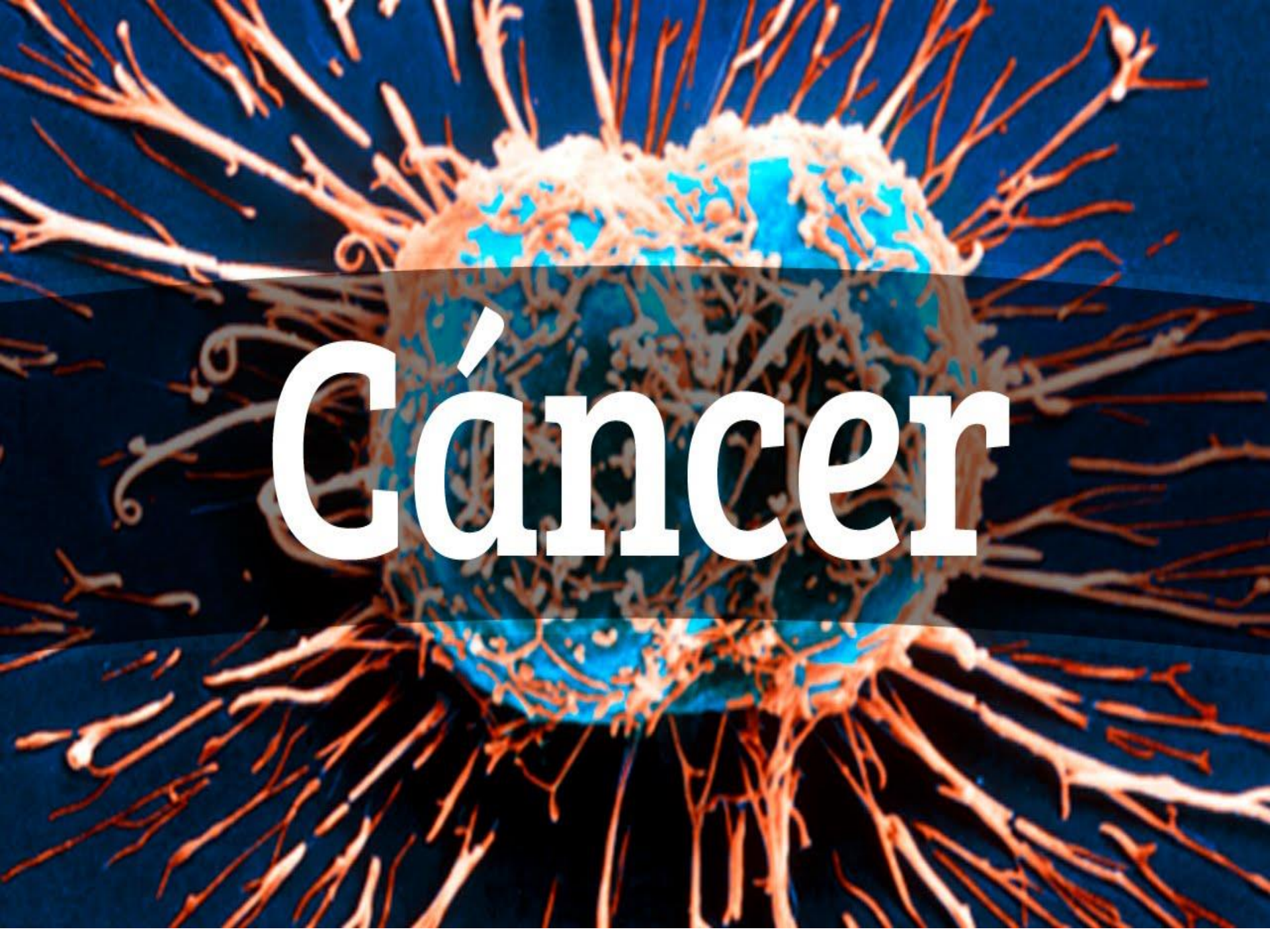
Causes of Dengue

The prime cause is the bite of a mosquito that flourishes during rainy season and breed in the water filled potholes and puddles.





**If you don't get bitten by
Aedes MOSQUITO
you won't get DENGUE**



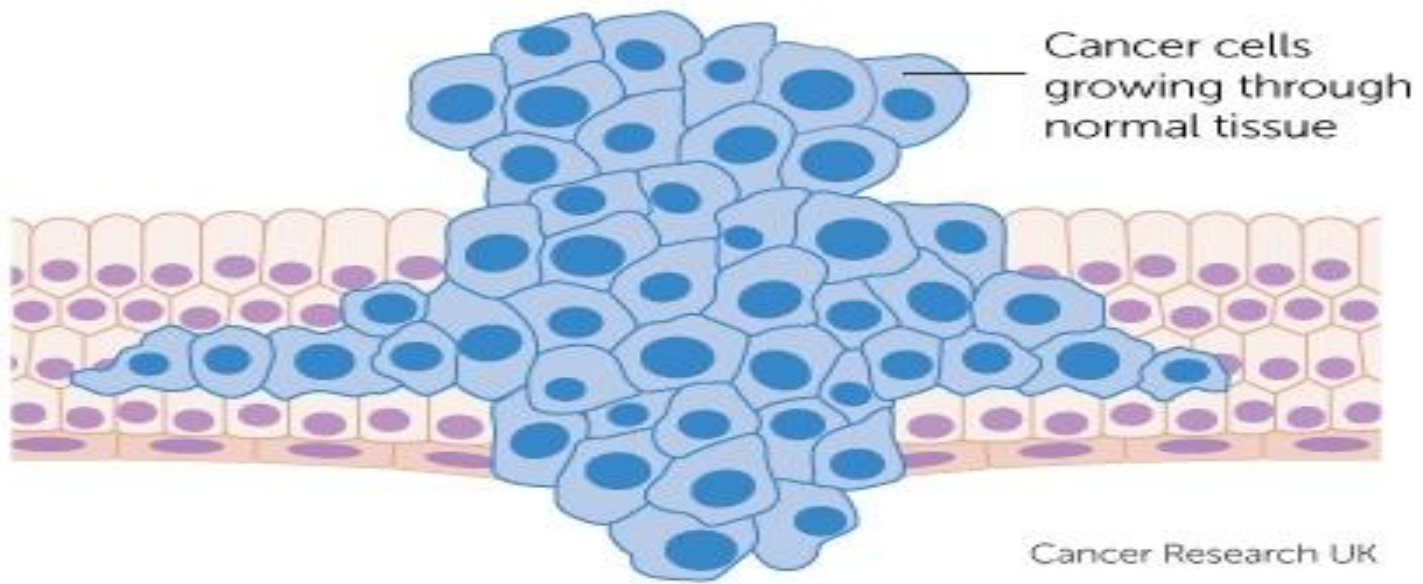
Cáncer

CANCER

TUMOUR-Abnormal, uncontrolled and purposeless division of cells lead to the formation or development of mass of undifferentiated cells -TUMOUR

Definition

- “Cancer is an abnormal growth of cells which has ability to involve adjacent tissues and even distant organs and eventual death of the affected patient if the tumor has progressed to the stage where it cannot be treated.”



CANCER -When tumor is **malignant**, it is described as cancer and has ability to invade other tissues.

- Cancer harms the body

- cancerous cells divide uncontrollably to form new lumps or masses of tissue called **neoplasm**

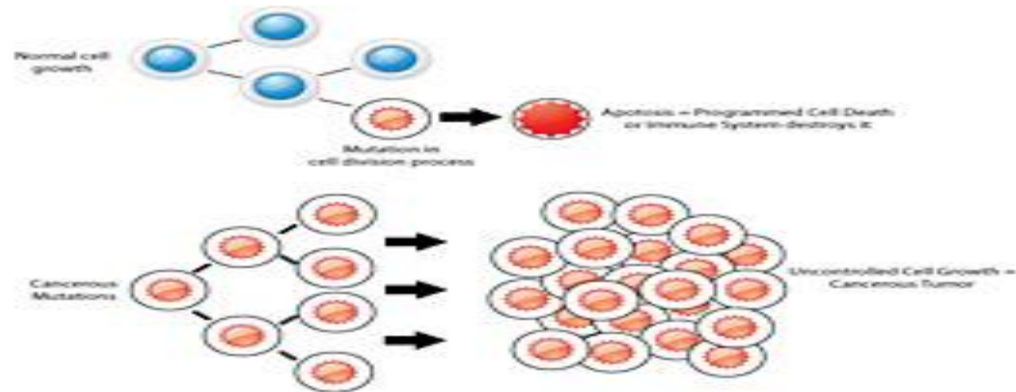
- except in leukemia**

- Tumors can grow and interfere with the normal functioning of various organs.

- release secretions which alter body function(s).

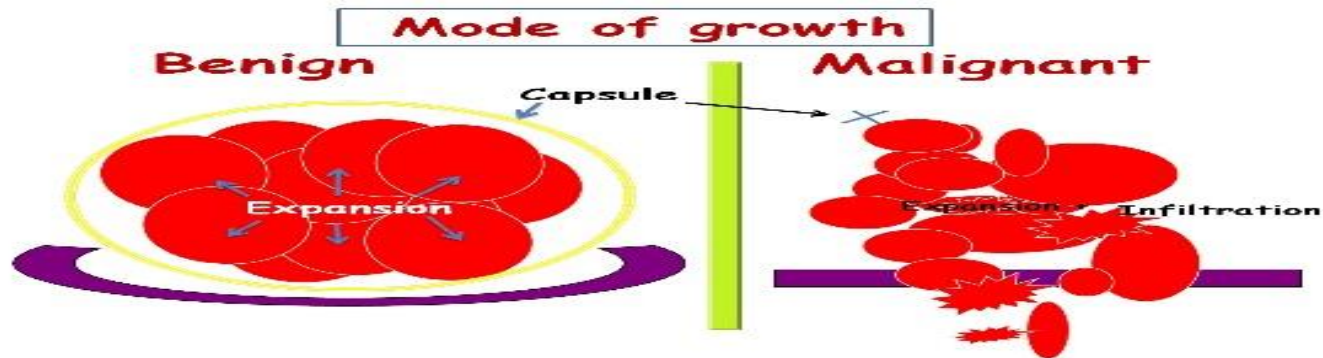
- It is one of the main killer diseases nowadays

Normal Cell Growth vs. Cancerous Tumor Growth



Rate of Growth

- ❖ Benign tumors are slow growing, whereas malignant tumors generally grow faster.



ONCOLOGISTS - Physicians and researchers who specialize in the study, diagnosis, treatment and prevention of cancer.

- Tumors may develop anywhere in the body.

- all tumors are not cancerous.

There are two types of tumors:

- Benign or nonmalignant

- Cancerous or malignant

BENIGN OR NON MALIGNANT TUMOR :

- It grows **slowly**
- may attain quite a large size
- it remains restricted to the site of its origin (**localized**)
- does not spread to other part of the body.
- Some benign tumors are harmful and **fatal** e.g. **brain tumor** (A brain tumor may cause death because the brain is squeezed against the hard skull).
- the benign tumors may sometimes become malignant. e.g. Adenoma and Fibroid

The term " **benign** " implies mild and non-progressive

A **benign tumor** is a tumor that lacks all three of the malignant properties of a cancer.

Thus, by definition, a benign tumor does not grow in an unlimited , aggressive manner, does not invade surrounding tissues , and does not **metastasize**

MALIGNANT TUMOR OR CANCER :

- The growth rate of this tumor is **rapid** and **mortality** rate is comparatively more than benign tumor.
- Rapid growth of tumors causes overcrowding and disruption of normal cells.
- The cancerous cells **compete** with the normal cells for nutrients and finally kill them
- These cells are spread from one organ to other via blood or lymph and form new tumors called secondary tumors.
- This migratory process is called **METASTASIS**

Definitions

Benign Tumors	Malignant Tumors
• Small • Slow-growing • Non-invasive • Well-differentiated • Stay localized • Stay where they are. • Can't invade or metastasize.	• Large • Fast-growing • Invasive • Poorly-differentiated • Metastasize • Infiltrate, invade, destroy surrounding tissue. • Then metastasize to other parts of body.

TYPES OF CANCER

FIVE TYPES of cancers according to the **TYPE OF TISSUE** affected.

Cancers are named according to the tissue from which they arise to the type of tissue affected.

CARCINOMA:

-Cancer that arise from **EPITHELIAL TISSUE** covering or lining the body organs is known as carcinoma.

-breast cancer, lung cancer, cancer of stomach, skin cancer. etc

SARCOMA: Cancer that arises from **CONNECTIVE TISSUE** is called sarcoma.

-bone tumors (osteosarcoma)

- muscle tumors (myosarcoma)

-cancer of cartilage (chondrosarcoma)

-cancer of adipose tissue (liposarcoma)

LYMPHOMA: Cancer that arises from **LYMPHATIC TISSUE** is called lymphoma.

- occurs in the lymphatic nodes, spleen and tissues of immune system

LEUKEMIA: It is a type of **BLOOD CANCER** in which there is excessive formation of white blood cells (WBCs) or leucocytes in the bone marrow.

- People suffering from leukemia have very **high leucocyte count**.

- The blood contains millions of abnormal immature WBCs or leucocytes that are incapable of fighting infections.

- types of leukemia such as monocytic leukemia, lymphoblastic leukemia etc

ADENOCARCINOMA:

- cancer arises in thyroid, pituitary adrenal and other **GLANDULAR TISSUES**

Types of Cancers

Carcinomas, the most common types of cancer, arise from the cells that ***cover external and internal body surfaces***.

Lung, breast, and colon are the most frequent cancers of this type in the United States.

Sarcomas are cancers arising from ***cells found in the supporting tissues*** of the body such as bone, cartilage, fat, connective tissue, and muscle.

Lymphomas are cancers that ***arise in the lymph nodes and tissues*** of the body's ***immune system***.

Leukemias are cancers of the ***immature blood cells that grow in the bone marrow*** and tend to accumulate in large numbers in the bloodstream.

ADENOCARCINOMA:

-cancer arises in thyroid, pituitary adrenal and other **GLANDULAR TISSUES**

CAUSES OF CANCER

- still not very clear as to how the cancer is caused
- several factors are now known to be cancer- causing

CARCINOGENIC

CHEMICALS :

- chemicals are known to induce cancer.
- nicotine, caffeine**, products of combustion of coal and oil.
- polycyclic hydrocarbons**, some sex hormone
- steroids**, if given or secreted in large amounts, may cause cancer.
- Breast cancer** seems to have hormonal relationship.
- in women who avoid **breast feeding**.

VIRUSES :

- Viruses causing cancer have genes called **viral ONCOGENES** (v-onc genes).
- These viruses are also called **oncogenic viruses**. e.g. EBV (Epstein-barr virus), HPV (**Human papiloma virus**) etc

ONCOGENES :

- **cellular oncogenes (c-onc genes)**
- **proto-oncogenes**
- **when activated under certain condition could lead to oncogenic transformation of cells.**



MUTATION



Mutation



DEREGULATED CELL DIVISION

RADIATION :

-The x-rays, gamma-rays cosmic rays, ultra-violet rays etc. are carcinogenic.

-Incidence of skin cancer is higher in the people working in very sunny areas due to UV radiation in the sunlight

ADDICTION :

- addictions likes **smoking**, chewing of **tobacco** lead to cancer of mouth, lips and lungs.
- Alcohol** consumption may result in cancer of oesophagus, stomach, intestine and liver.
- Drugs** also cause cancer e.g. Marijuana, anaerobic steroids etc



Causes of Cancer



Standard **CANCER TREATMENT**



SURGERY



RADIATION



HORMONE
THERAPY



CHEMO-
THERAPY



TARGETED
THERAPY

LOCAL

SYSTEMIC

TREATMENT OF CANCER

CHEMOTHERAPY:

- comprises administration of certain anticancer drugs.
- anticancer drugs check cell division by inhibiting DNA synthesis
- are more toxic to cancerous cell than to normal cells.
- side effects hair loss or anemia but get corrected after the treatment is stopped.

RADIOTHERAPY:

- in addition to chemotherapy.
- principle is to bombard the cancerous tissue or cells with the **rays from radioactive materials**.
- cancer tissue or cells are exposed to radiations from radioactive materials such as **cobalt, iridium and iodine**.
- X-rays ,gamma rays** and charge particles are used to destroy the cancerous tissue or cells but cause minimum damage to the surrounding normal tissue or cells

SURGERY:

- entire cancerous tissue or cells are removed surgically.
- limited utility.
- **breast tumor or uterine tumor**, the surgery is most effective
- but along with other treatments are also given to kill any cancerous cell that may have been escaped in surgery

IMMUNOTHERAPY:

Tumor cell avoid detection and destruction by immune system.

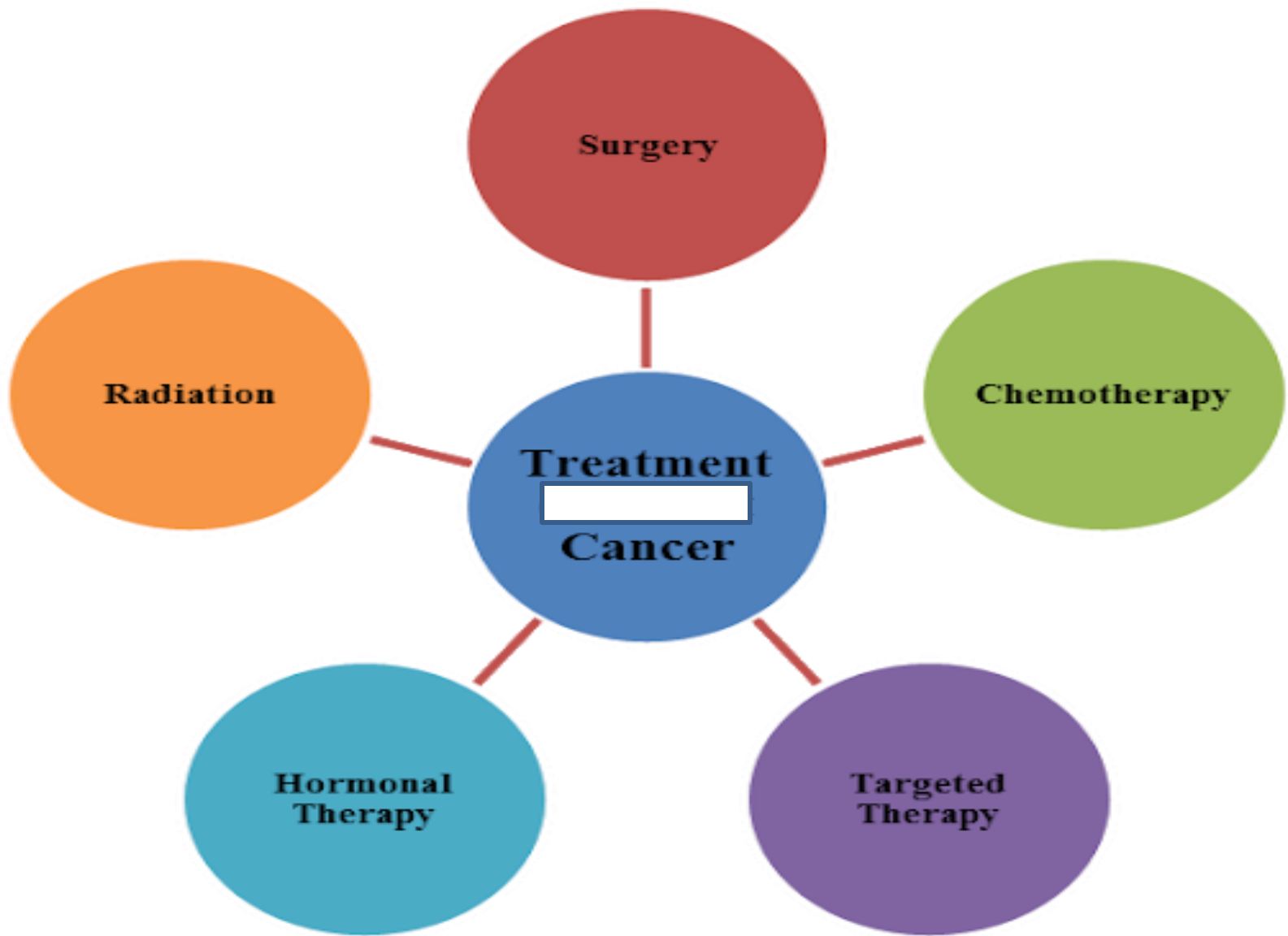
- the patients are given substances called biological response modifiers such as α -interferon**
- activates their immune system**
- helps in destroying the tumor**

SUPPORTIVE THERAPY:

-is used to treat symptoms of cancer and side effects of cancer treatments.

-to improve the quality of life of cancer patient.

- therapy varies depending upon condition of individual patient



LOCALLY
GLOBALLY

1 OUT OF 6 DEATHS
 is due to **cancer**

Pain relief improves the quality of life of patients with cancer



World Health
Organization

#Cancer #PalliativeCare

9 Easy Ways to Reduce Your Cancer Risk



Eat a
heart-healthy diet.



Limit your
alcohol intake.



Be physically
active.



Don't smoke – or use
any form of tobacco.



Make your home
smoke-free.



Avoid too much sun
and use protection.



Breastfeed to
reduce mother's
cancer risk.



Ensure your children
get hepatitis B and
HPV vaccines.

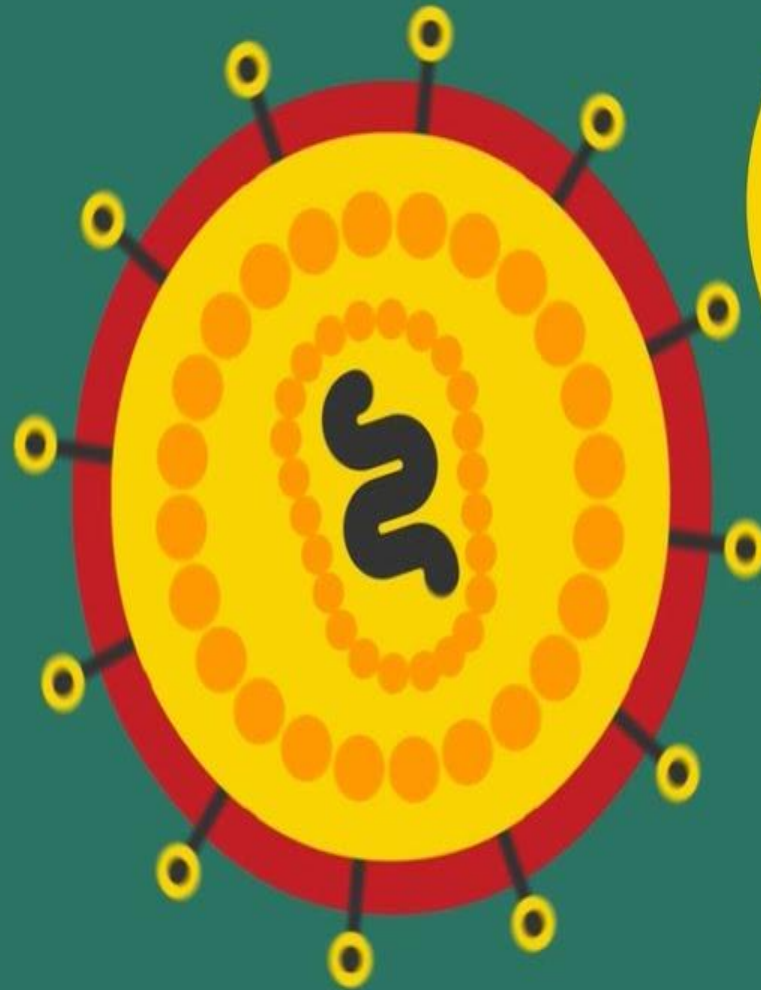


Take part in
cancer-screening
programs.

Source: World Health Organization

[#worldcancerday](#)

Brought to you by:  **everyday HEALTH**



AIDS

A large, stylized red ribbon is draped across the left side of the image, forming a loop. The background is a solid, vibrant red.

**WORLD
AIDS** 1 DECEMBER
DAY

AIDS- Acquired Immuno Deficiency Syndrome

- is a usually **fatal** illness
- causative agent-retrovirus (ss RNA) known as **Human Immuno deficiency Virus (HIV)**
- weakens the body's immune system,
- the victim vulnerable to life-threatening opportunistic infections, neurological disorders and unusual malignancies.

AIDS can be called a modern **pandemic** (world wide)

- affecting both industrialized and developing countries.

FULL FORM OF AIDS.

- **A= ACQUIRED**
- **I= IMMUNO**
- **D= DEFICIENCY**
- **S= SYNDROME.**



WHAT IS HIV?

HIV is the virus that causes AIDS. The acronym HIV stands for:

- H** - Human
- I** - Immuno- deficiency
- V** - Virus

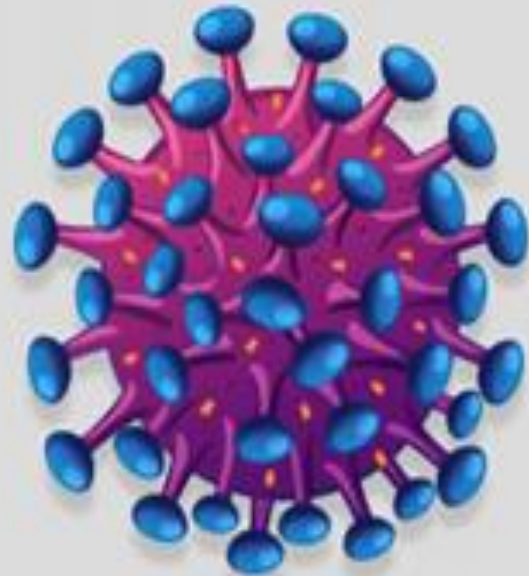
DIFFERENCE BETWEEN AIDS AND HIV



AIDS

ACQUIRED IMMUNE
DEFICIENCY SYNDROME

AIDS IS A MEDICAL CONDITION
(IMMUNE SYSTEM IS TOO
WEAK TO FIGHT INFECTIONS)



HIV

HUMAN
IMMUNODEFICIENCY VIRUS

HIV IS A VIRUS WHICH
ATTACKS IMMUNE SYSTEM
IN HUMANS

AIDS HISTORY

- was first noticed in **USA in 1981**.
- **India**, first confirmed case of AIDS was in **April 1986** from **Tamil Nadu**

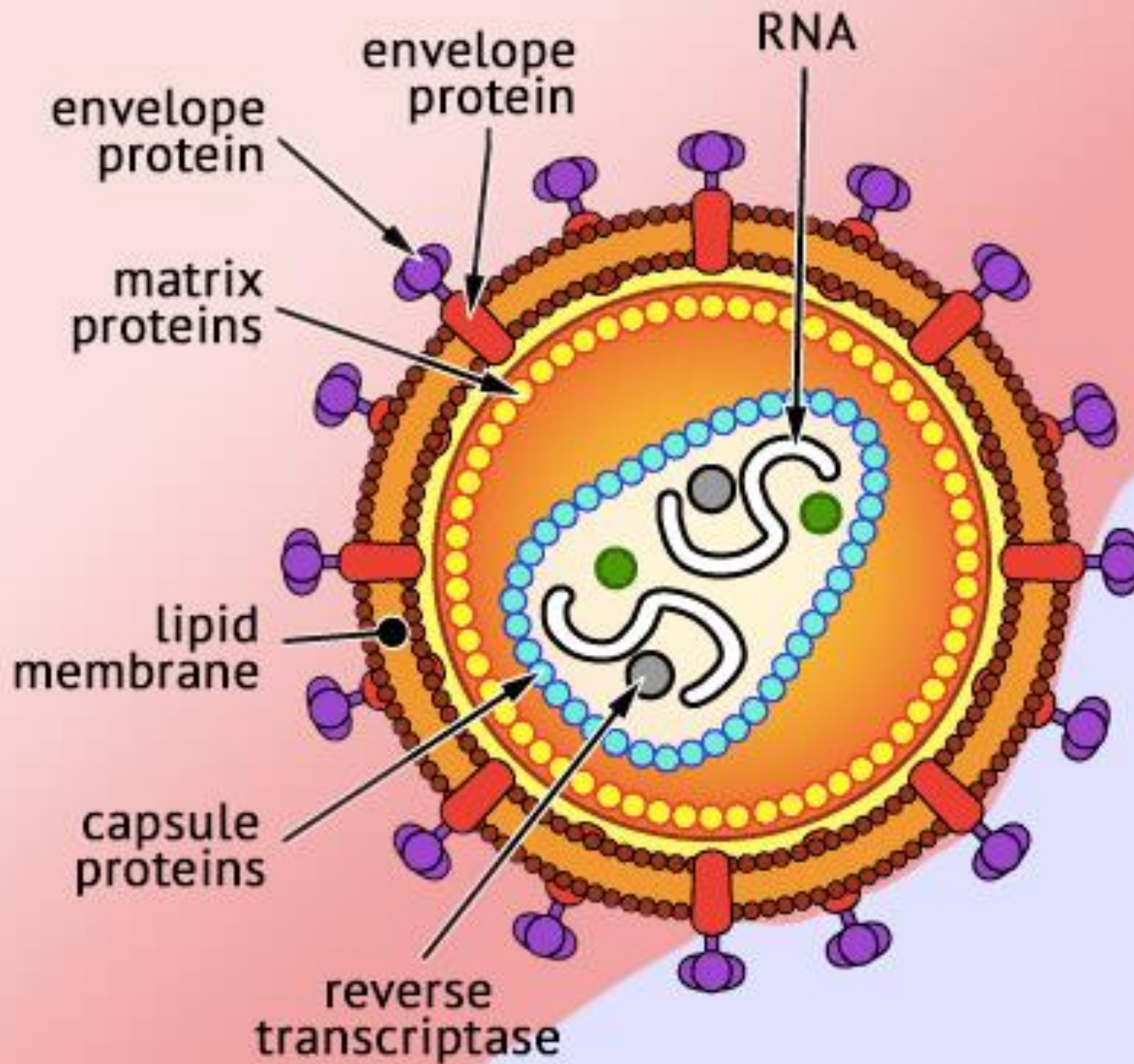
S.1 Origin and prevalence of HIV

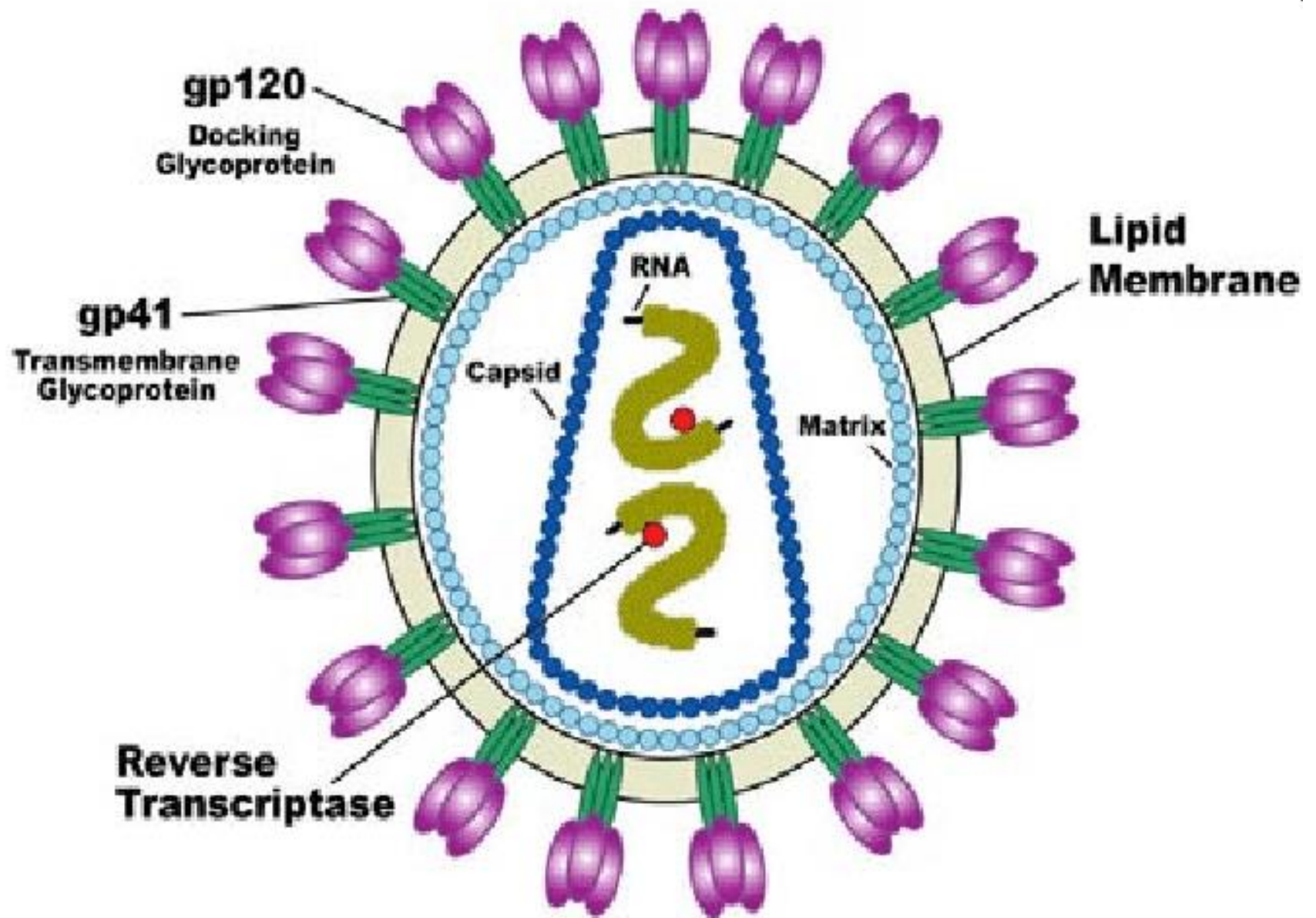
History of HIV

- Originated in Africa in the late 1950's
- Originally found in nonhuman primates and may have mutated
- First documented in the US in 1969
- HIV was found to be the cause of AIDS in 1983-1984

STRUCTURE OF HIV

- 100 to 140 nm in diameter.
- spherical.
- shows centrally located TWO ss RNA molecules
 - with REVERSE TRANSCRIPTASE enzymes.
- covered by two layers of proteins.
 - outer layer is of matrix protein (p17)
 - inner layer is capsid protein
 - Over the matrix protein layers there is an additional layer of lipids.
- Impregnated with glycoprotein GP120 and GP 41





- virus replicates in actively dividing **T4 lymphocytes****
- remain in a latent state/stage in the lymphoid cells.**
- has unique ability to destroy human T4 lymphocytes**
 - found in greatest concentration in blood, semen and cerebrospinal fluid (CSF)**
- lesser extent in tears, milk, urine, saliva, cervical and vaginal secretions.**

MODES OF TRANSMISSION

- 1. Unsafe sexual contact:** Including oral, vaginal and anal sex.
- 2. Blood :** Via blood transfusions or needle sharing.
- 3. From mother to child**

- **Transplacental-**

A pregnant woman can transmit the virus to her **foetus** through their shared blood circulation

- a nursing mother can transmit it to her baby from her **breast milk**

RARELY

- accidental needle injury,
- artificial insemination with infected donated semen
- transplantation with infected organs.
- AIDS virus has been found in urine, tears, saliva, breast milk and vaginal secretions but it seems not to be transmitted by these fluids unless it gets into injuries

The most common methods of transmission of HIV are:

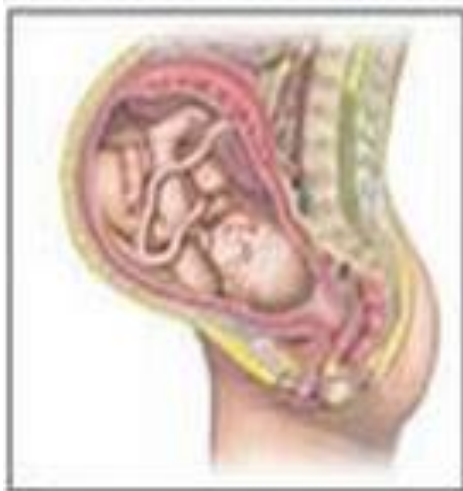


Unprotected sex with an infected partner



Sharing needles with infected person

Almost eliminated as risk factors for HIV transmission are:



Transmission from infected mother to fetus



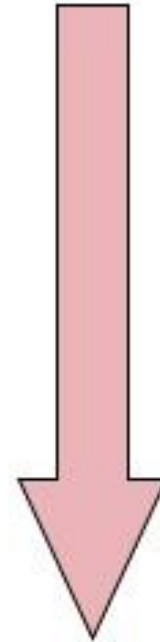
Infection from blood products

HIV infection is **NOT spread by**

- Causal contact such as hugging**
- insect bite (mosquitoes)**
- participation in sports,**
- touching items previously touched
by a person infected with the virus**
- hand shake,**
- sharing clothes, swimming pools etc.**

Clinical manifestations

1. Initial infection and development of antibodies
2. Asymptomatic carrier stage
3. AIDS related complex
4. AIDS



SYMPTOMS

The clinical manifestations of AIDS have been classified into four broad categories.

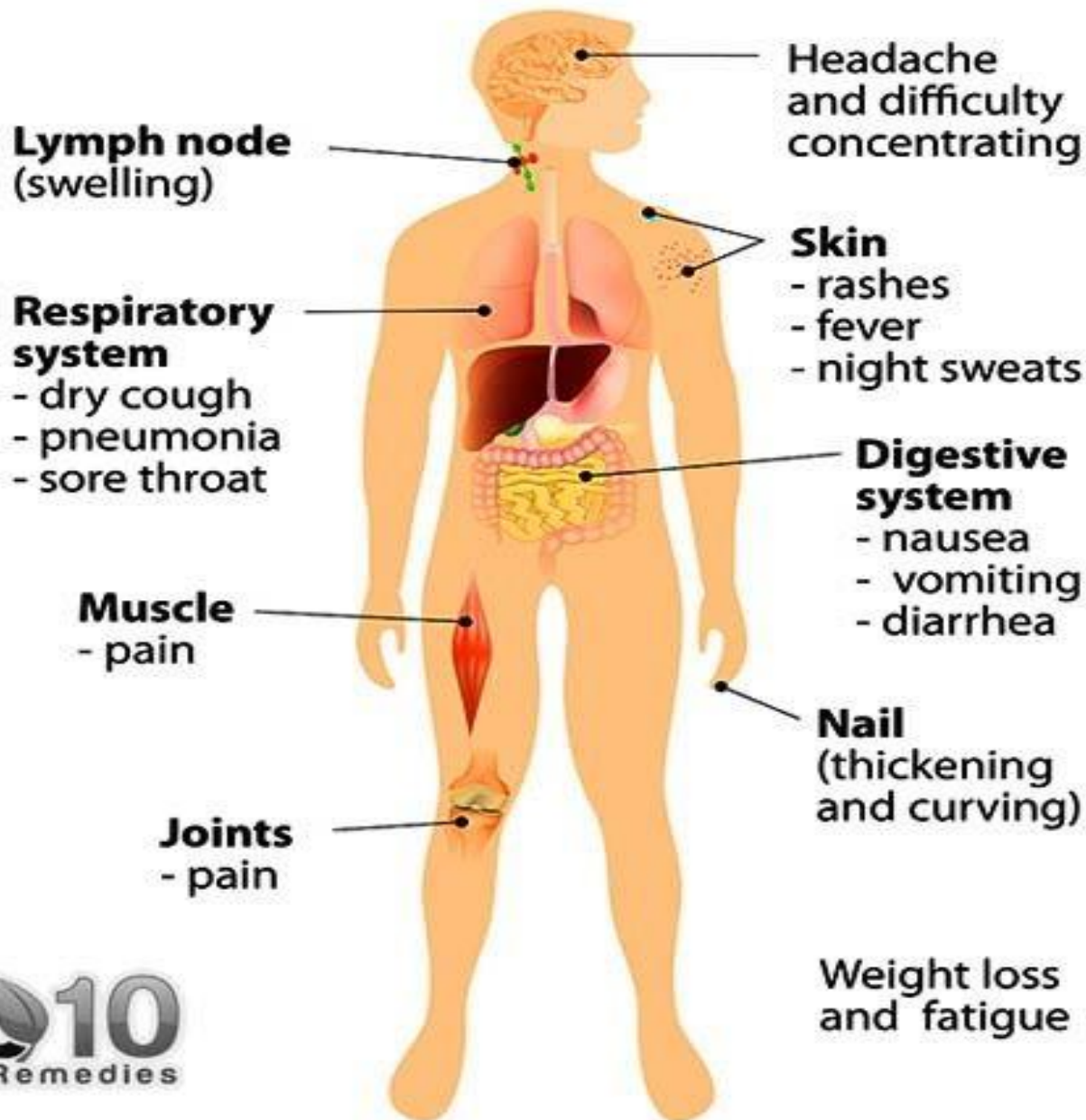
i. **Initial infection** with the virus and formation of antibodies, usually **2-8 weeks** after initial infection.

ii. **Asymptomatic carrier** state in which no signs of disease, are seen. Incubation period ranges for **6 months to 10 years**.

iii. **AIDS related complex (ARC)** with one or more of the following clinical signs: recurrent fever for longer than one month, fatigue, unexplained diarrhea, night sweats, shortness of breath, **loss** of more than **10 per cent body weight**.

iv. **AIDS** is the **end stage** of HIV infection. It is characterised by life threatening opportunistic infections
tuberculosis, kaposi sarcoma

Symptoms Of HIV Infection



PREVENTIVE MEASURES:

AIDS has no cure, hence prevention is the best choice.

i. People, particularly those in high -risk group, should be educated about HIV transmission.

ii. Disposable needles and syringes should be used and disposed off properly and immediately.

iii. Sexual habits should be changed immediately.

iv. High-risk groups should refrain from donating blood.

v. Tooth brushes, razors, other articles that can become **contaminated** with blood should not be shared.

vi. Before receiving **blood**, ensure that it has been **screened** for not containing HIV infections.

vii. **Routine screening** must be done for –

- **Blood** donors.
- Organ **donors** (kidney, liver, lung, cornea).
- Donors of **semen** and growth hormone.
- Patients undergoing **hemodialysis** and females in high risk group who are **pregnant** or contemplating pregnancy

LABORATORY DIAGNOSIS:

ELISA (Enzyme-Linked ImmunoSorbent Assay

-first a test is used to detect the HIV

Antibodies

Western Blot Technique- a second confirmatory test is used to weed out any false positive results.

-is a highly specific test.

- is based on detecting specific antibody to viral core protein and envelope glycoprotein.

HIV ELISA

3rd Generation



Detects antibodies to HIV



**Incubation
Time : 105 Minutes**

**Pack
96T**

Oscar Medicare is a GMP & ISO: 13485 certified organization engaged in R & D, manufacturing and marketing in- vitro diagnostics



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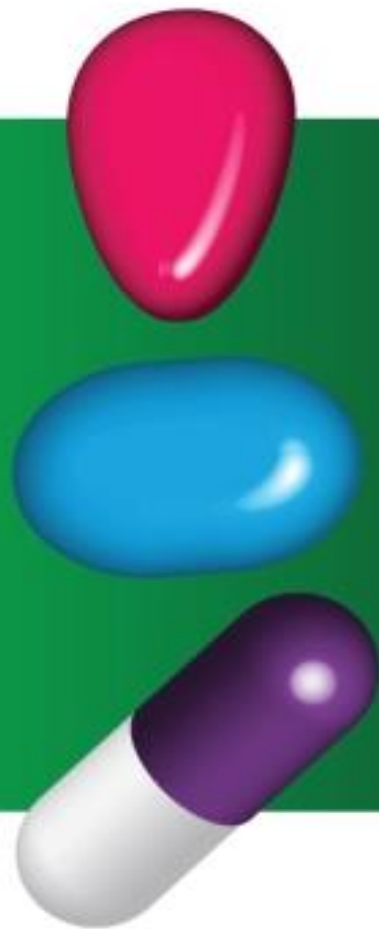
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TREATMENT OF AIDS :

- **NO CURE**
- **Antiretroviral drugs** help in reducing the viral load and prolong the life of HIV patient.
- drugs used in Antiretroviral therapy (ART) are TDF (tenofovir), EFV(Efavirenz), Lamivudine (3TC), etc

Antiretroviral Therapy...

What does it do?



Antiretroviral therapy (ART) is the daily use of a combination of HIV medicines to treat HIV. ART saves lives, but does not cure HIV.

Reduces the amount of HIV in the body

Reduces the risk of HIV transmission

Prevents HIV from advancing to AIDS

Protects the immune system

HIGHLY ACTIVE ANTIRETROVIRAL THERAPY

HAART-The Heart of HIV Management.



ADVANCEMENT IN BIOLOGY

- helps us to deal effectively with many infectious diseases
- use of **vaccines and immunization** programmes enables us to eradicate completely the dreadful diseases like small pox.
- large number of other **infectious diseases** like polio, diphtheria, pneumonia and tetanus have been **controlled**
- **Biotechnology** is making newer and safer vaccines.
- Discovery of antibiotics and various drugs has also enabled us to treat effectively infectious diseases like tuberculosis

ADOLESCENCE



Adolescences

11 — 18 years



What is Adolescence?

- **Adolescence is the time period of physical, cognitive and social development between childhood and adulthood.**



ADOLESCENCE

- It is the period of beginning with the appearance of **secondary sexual characters** and the termination with **ceassation** of somatic i.e. **body growth**.
- a transitional stage of physical and mental development of child occurring between **puberty and the legal adulthood between 10 to 19 years of age**

Individual is no longer a child but not yet an adult.

Adolescence is a phase of development on many fronts like sexual and reproductive maturity, mental development -adult identity and transition from socio-economic and emotional dependant to relative independence

STAGES OF ADOLESCENCE :

Adolescents are defined as individual

-10 to 19 year age group.

- The government of India in its

National youth policy defines adolescents as 13-19 years.

-Adolescents is divided in THREE stage

-early stage

-middle stage

- late stage

Three stages of adolescence

Stage	Age range	Characteristics
Early	~11-14 years	Hormone-regulated rapid pubertal growth and changes
Middle	~14-17 years	Peer social relationships and heterosexual interests
Late	~17-20 years	Adult roles to some extent incorporated

1. Early period (10 to 14 years) :

- begining of the appearance of secondary sexual characters**
- growth reaches to its peak**
- rapid physical growth**
- concrete thinking**
- defining boundries of dependence/independence**
- self exploration**
- developing body image**
- development of intense friendship**
- seeking to counter instability and evaluation**

2. **Middle period** (15 to 17 years) :

- almost complete full development of secondary sexual characteristic
- growth slows down
- approximately **95 % of the adult stature** is attained
- thinking is more abstract
- concrete thinking under stressful condition
- reestablishing of **body image**
- capable of long range thinking
- sense of leadership and all powerfulness
- preoccupied
- with **romantic fantasy**
- ability testing to **attract opposite sex**
- peer group** help defining behavioral code.

3. Late period (18 to 19 years) :

- characterized by establishment of total physical maturity
- established abstract thinking
- **intellectual and functional identity**
- peer group recedes in favor of individual relationship,
- **stable relationship** and change from childhood to adulthood relationship

PHYSICAL CHANGES OF ADOLESCENCE :

-Growth spurt occurs in both boys and girls.

BOYS

- muscles develop**
- skin become oily**
- broadening of shoulders**
- cracking of voice**
- development of underarm and chest hair, pubic hair, facial hair, enlargement of penis and testis.**

Skin gets oilier

Shoulders get wider

Facial hair

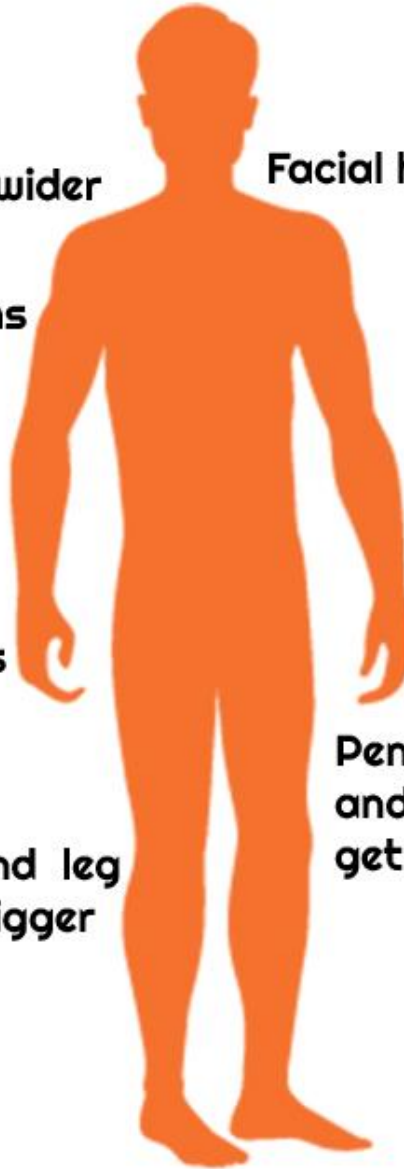
Hair under the arms

Pubic Hairs

**Neck, chest and leg
muscles get bigger
and Stronger**

**Penis get longer
and wider and testes
get larger**

MALE



GIRLS

- development of breast**
- widening of hip**
- development of underarm and pubic hair**
- enlargement of uterus and ovaries.**

Whole body gets Curvier

Skin gets oilier

**Breasts starts
to develop**

Hair under the arms

Hip bones wider

Pubic hairs

Weight gain on hips

**leg muscles get bigger
and stronger**



FEMALE

SEXUAL DEVELOPMENT :

- Sex organs mature and enlarge**
- sexual desire**
- errection of penis in boys**
- sperm production,**
- ejaculation**
- ovulation, menstruation**
- initiation of sexual behaviour.**

Skin gets oilier

Shoulders get wider

Facial hair

Hair under the arms

Pubic Hairs

Neck, chest and leg
muscles get bigger
and Stronger

Penis get longer
and wider and testes
get larger

MALE

Whole body gets Curvier

Skin gets oilier

Breasts starts
to develop

Hair under the arms

Hip bones wider

Pubic hairs

Weight gain on hips

leg muscles get bigger
and stronger

FEMALE



EMOTIONAL AND SOCIAL CHANGES :

- establishing own identity**
- fantasy, day dreaming**
- attention seeking behavior**
- emotional instability**
- full of energy**
- sexual attraction.**
- rapid mood changes**
- conflicts with family**
- behavioural code (influence by peer group)**
- self exploration and evaluation**
- formation of new relationship**
- peer pressure.**

AVOID LOOKING AT YOUR PARENTS AS THE ENEMY.

- Try to understand that your parents are human beings, with their own needs and feelings.
- **Listen** to your parents with an open mind,
- try to see their point of view.
- **Share** your feelings with your parents so
- they can **understand** you better.
- Live up to your **responsibilities** at home and in school so that your parents will be more inclined to grant you the kind of independence you want and need.
- Bolster your criticisms of family, school and government with suggestions for practical **improvements**.
- Be as courteous and considerate to your own parents as you would be to the parents of your friends

[illegible]

MENTAL HEALTH

- affected by emotional and social changes
- Most of the mental health issues that people confront as adults begin to appear in adolescence .
 - includes confusion irritation, moodiness, frustration, nausea, less concentration, hyper activities, anger
- effects on life styles like obesity, addictions, accidents, leading to ill health etc.
- mental illness is in terms of different forms of depression like insomnia and loss of energy

MENTAL ILLNESS

(disorders or unfavourable changes)

- is associated with psychological or behaviour manifestation.

- PSYCHOSES

-NEUROSES.

PSYCHOSES

- delusions, hallucinations, disturbance in the thinking process
- lead to Alzheimer's disease schizophrenia, depressive psychosis
- Amnesia- loss of memory
- Bulimia -extreme over indulgence in food
- Anxiety- fear or apprehension
- Anorexia nervosa -emotional aversion to food
- Depression -sadness, inactivity
reduced to enjoy life

NEUROSES

-schizophrenia, illusions, hallucination

PSYCHOSIS

- INSIGHT IS ABSENT
- JUDGEMENT & REASONING IS IMPAIRED
- REALITY CONTACT IS LOST
- DELUSIONS USUALLY PRESENT
- TRUE HALLUCINATIONS USUALLY PRESENT
- CHANGE IN PERSONALITY MAY BE THERE

NEUROSIS

- INSIGHT IS PRESENT
 - JUDGEMENT & REASONING IS INTACT
 - REALITY CONTACT IS PRESENT
 - DELUSIONS ARE ABSENT
 - TRUE HALLUCINATIONS ARE USUALLY ABSENT
 - CHANGE IN PERSONALITY IS USUALLY ABSENT.
-



NEUROSIS

- Mild functional neuro-psychical disorders that manifest themselves in specific clinical phenomena in the absence of psychical phenomena.
- The causing factor for neurosis are biological, socio-psychic climate, psychological, pedagogical, and socio-economic

PSYCHOSIS

- A severe mental illness characterised by loss of contact with reality and relationship with other people causing social maladaptation.
- The causing factors for psychosis are genetic, biochemical and environmental.

TREATMENT :

Treatment of such disorders

- with non-pharmacological approach with due respect to rights of children.**
- WHO has recommended evidence based guidelines under mental health**

Gap Action Programme (mhGAP).

- may lead to various kinds of addictions like smoking, taking drugs, etc**

ADDICTION



ADDICTION :

This is a complex condition characterised by compulsive use of substance despite of its harmful consequences.

- involve the use of substances (drugs) such as alcohol, opioids, cocaine, nicotine**
- or behaviours such as gambling.**

ALCOHOL: HOW DRINKING AFFECTS YOUR BODY

BRAIN

AFTER ABOUT AN HOUR, MOST WILL NOTICE THAT THEIR JUDGMENT AND CONCENTRATION HAS BEEN IMPAIRED.

MENTAL HEALTH

THE INTOXICANT CAN CAUSE MOOD SWINGS AND BECAUSE OF THE REMOVAL OF INHIBITION.

SPEECH

SPEECH MAY START TO BECOME SLURRED AFTER AN HOUR OF DRINKING

EYES

PEOPLE WHO ARE DRUNK WILL OFTEN FIND THEIR EYES ARE IMMEDIATELY AFFECTED BY BLURRED OR DOUBLE VISION.

LUNGS

WHEN YOU ARE DRUNK YOUR RISK OF PNEUMONIA IS INCREASED

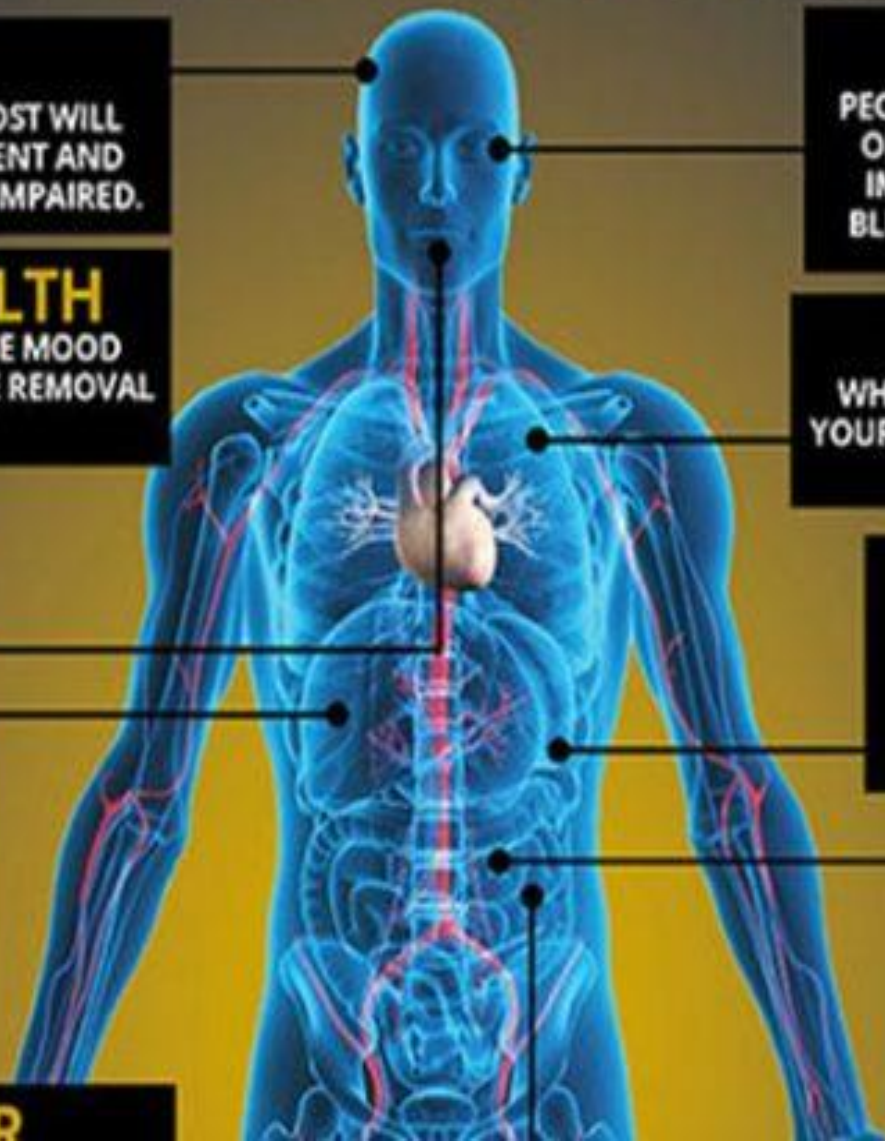
STOMACH

DRINKING CAN CAUSE VOMITING, NAUSEA, DIARRHOEA, HEARTBURN AND LOSS OF APPETITE.

PANCREAS

DRINKING CAN LEAD TO LOW BLOOD SUGAR WHICH CAN LEAD TO SHAKING OR DIZZINESS

LIVER



- scientific evidence says that the addictive behaviours share key neurobiological features.
- They intensely involve brain pathways of reward and reinforcement, affecting motivation
- involve the neurotransmitter dopamine.
- is important to know that the neurological changes are reversible after the substance-use or behaviour is discontinued.
- Addiction result in
- impairment of physical, physiological and psychological functions of the body.

Causes of substances abuse during Adolescence

- Insufficient **parental supervision** and monitoring.
- **Lack of communication** between child and parents.
- Poorly defined rules.
- **Family conflicts.**
- Favorable parental **attitudes** towards alcohol and drug uses.

METHODS /MEASURES TO CONTROL DRUG ABUSE :-

- 1. Always remember ‘Prevention is better than cure’.**
- 2. Avoid undue pressure**
 - A child should not be forced to perform beyond his /her capacities in studies, sports and other activities.**
- 3. Education and Counselling of child to face problems and stress**
 - to accept disappointments and failures as a part of life.**
 - Channelize the energy of child in sports, studies and other constructive activities**

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DRUGS ABUSE :

- Surveys and statistics show that use of drugs and alcohol has been on the rise**
- among the youth.**
 - result in many harmful effects.**
 - Proper education and guidance**
 - enables youth to safeguard themselves**
 - from dangerous behaviour pattern**
 - follow healthy lifestyle**

OPIOIDS :

- binds to opioid receptors present in **CNS and gastro-intestinal tract**.
- **Heroin, called smack** is chemically **di-acetyl morphine**.
- extracted from latex of poppy plant **Papaver somniferum**.
- is depressent and slows down the activity of body.



b. **CANNABINOIDS :**

- Interact with receptors present in **brain**.
- Inhalation and ingestion of these substances affect the **cardiovascular** system
- from inflorescences and the parts of **Cannabis sativa**.
- Marijuana, hashish, charas and ganja are other different forms of drugs obtained from this plant.



COCAINE :

- is an alkaloid obtained from coca plant- **Erythroxylum coca**.
- increases level of neurotransmitter-dopamine.
- excessive dosage causes extreme happiness, irritability, paranoia.
- HALLUCINOGENS** (mind expanding drugs) : -Hallucination are unreal perceptions of unreal object due to the disorder of nervous system
- are alkaloids causing day-dreaming.
- Lysergic acid and cannabis are hallucinogenic substances.
- Atropa bellodona and Datura spp.** also have hallucinogenic properties.



Addiction and Dependence :

ADDICTION

is a psychological attachment to certain effects such as euphoria and a temporary feeling of well-being associated with drugs and alcohol.

- the perceived benefits leads to drugs use repeatedly.**
- is the inherent addictive nature of alcohol and drugs.**
- people take them even when these are not needed**
- even when their use becomes self-destructive.**
- repeated use of drugs, the tolerance level of the receptors present in our body increases.**
- thus the receptors respond only to higher doses of drugs or alcohol leading to greater intake and addiction.**

- use of these **drugs even once**, can lead to addiction.
- **absence of any guidance** or counselling, the person gets addicted and becomes dependent on their use.
- **Dependence** is tendency of the body to manifest a characteristic and unpleasant withdrawal syndrome if regular dose of drugs/ alcohol is abruptly discontinued.
 - is characterized by anxiety, trembling, nausea and sweating, which may be relieved when use is resumed

Effects Of Drug Addiction

- Drowsiness
- Slurred speech
- Lack of coordination
- Memory problems
- Confusion
- Slowed breathing and decreased blood pressure
- Dizziness
- Depression
- Insomnia
- Weight loss
- Irritability
- Restlessness

EFFECTS OF DRUG/ ALCOHOL ABUSE :

- The immediate adverse effects of drugs and alcohol abuse are manifested in the form of reckless behaviour, vandalism and violence**
- Excessive doses of drugs may lead to coma and death due to respiratory failure, heart failure or cerebral hemorrhage.**
- A combination of drugs or their intake along with alcohol results in overdose and even deaths.**

Common warning signs

- drop in academic **performance**
- unexplained **absence** from school/college
- **lack of interest** in personal hygiene, withdrawal, isolation, depression,
- fatigue, aggressive and **rebellious behaviour**
- deteriorating **relationships** with family and friends
- loss of interest in hobbies
- **change** in sleeping and eating habits, fluctuations in weight, appetite.

some far-reaching implications

-abuser is unable to get money to buy drugs/alcohol he/she may turn to **crime.**

-addict becomes the cause of mental and **financial distress to his/her entire family and friends.**

-Those taking drugs intravenously (direct injection into the vein using a needle and syringe) are likely to acquire serious **infections like HIV and hepatitis B.**

- Use of alcohol during adolescence may also have **long-term** effects
- like loss balance, **liver cirrhosis**, pancreatitis.
- lead to heavy drinking in adulthood.
- Chronic use of drugs and alcohol damages **nervous system** and liver (cirrhosis).
- Use during pregnancy adversely affects the **foetus**.

- certain **SPORTS** persons use drugs to enhance performance.
- (mis)use narcotic analgesics, anabolic steroids, diuretics and certain hormones to increase **muscle strength** and bulk
- to promote **aggressiveness**
- overall improvement in their **performance**.

-Side-effects of the use of anabolic steroids

FEMALES

- masculinization (features like males)**
- increased aggressiveness, moodswings, depression, abnormal menstrual cycles,**
- excessive hair growth on the face and body**
- enlargement of clitoris**
- deepening of voice.**

MALES

- it includes acne
- increased aggressiveness
- mood swings
- depression
- reduction of size of the testicles
- decreased sperm production
- kidney and liver dysfunction
- breast enlargement, premature baldness,
- enlargement of the prostate gland.
- may be permanent with prolonged use.

PREVENTION AND CONTROL :

- 'prevention is better than cure' holds true for all addictions

- It is also true that habits such as smoking, taking drug or alcohol are more likely to be taken up at a young age, more during adolescence.

-It is best to **identify** the situations that push an adolescent towards use of drugs or alcohol

-to take **remedial** measures well in time.

- the **parents and the teachers** have a special responsibility



Withdrawal symptoms,

the various physical and psychological effects of detoxification, can occur after reducing or ceasing drugs or alcohol.

WITHDRAWAL SYMPTOMS



HEADACHE



NAUSEA



ANXIETY



SWEATING



INSOMNIA



DECREASED
APPETITE

SLOW
DOWN

KEEP
CALM

BE
POSITIVE

TAKE
IT
EASY

UNPLUG

ENJOY
LIFE

HAVE
FUN

BREATHE

RELAX

GO
OUTSIDE



MEDITATE

Prevention of Drug Abuse?

- Educate
- Responsibility of Teachers and Parents
- Discuss how harmful and danger of Drug Abuse?
- Awareness program
- Encourage Sports & other Activities
- Well defined School with Boundaries
- Watch over activities close to school and your children