4. HUMAN HEALTH AND DISEASES

IMMUNITY SYSTEM

Anatomical barriers

1) **External friendly microorganisms/friendly bacteria :**
Many friendly bacteria live on skin, produce acids and secrete chemicals harmful to pathogens.

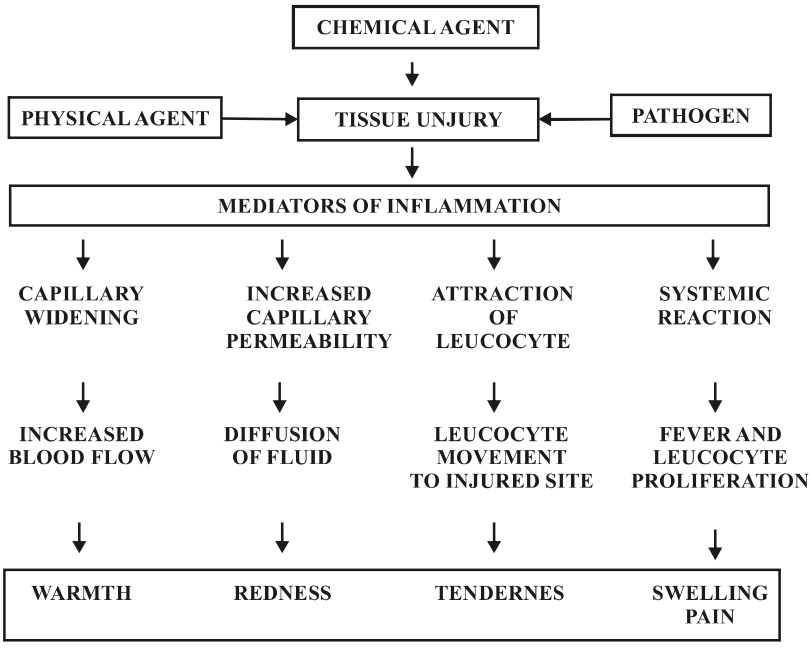
2) **Internal friendly microorganisms :**
They occur in intestine and vagina. Intestinal microorganisms secrete chemicals harmful to other microbes. Bacteria present in vagina secrete lactic acid for keeping it free from other microbes.

Physiological barriers

1) **Bile :**
It does not allow growth of microoganism.

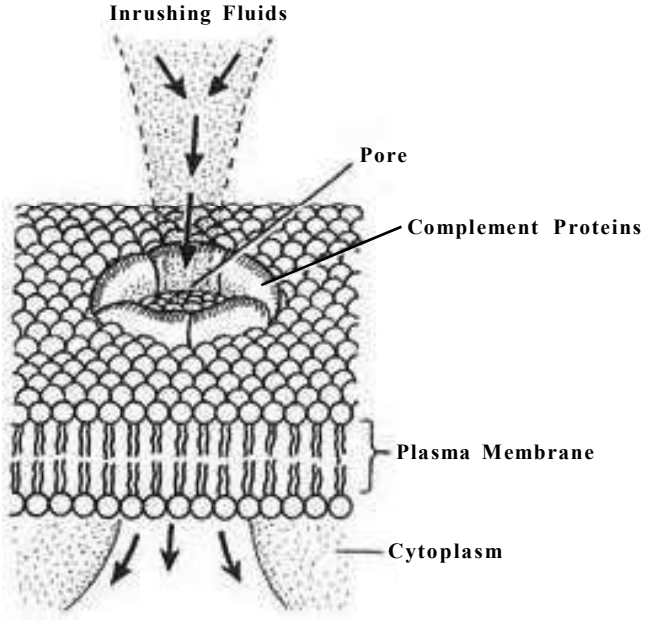
2) **Cerumen :**
It is secretion of ceruminous glands present in external auditory canal. Cerumen traps dust particles, kills bacteria and repels insects.

3) **Inflammation :**



Events in Inflammatory Reaction

4) **Complement system :**



COMPLEMENT PROTEINS PRODUCING PORE IN MICROBE

It is a system of over 30 proteins which participate in both innate and aquired immunities in a cascade fashion for protecting the individual from pathogens. Many of the proteins of complement system function as enzyme precursors. In acquired immunity the system complex is also called **classical pathway**. In innate immunty, the complement system is activated directly in response to bacterial endotoxins, microbial polysaccharides, cell wall and other components of invading microorganisms. It is called **alternate pathway** as well as properdin system. The pathway helps in dealing with invading microorganisms even before a person becomes sensitised against them. Certain proteins of this system cleave and form two components, membrane attack complex and biologically acitve fragments. Membrane attack complex functions as lytic complex which produces transmembrane pores in the microbes. Water enters the microbes. The latter burst and die. Biologically active fragments produce opsonins, anaphylotoxins and chemotactic factors. They form a coat over the invading microbes and attract phagocytes (neutrophils and macrophages) for engulfing them. Complement system also causes agglutination of microbes, neutralisation of viruses, activation of mast cells and basophils and has some direct inflammatory effect.

5) **Interferons :**

They were discovered by Issacs and Lindemann in 1955.

Lymphocytes, macrophages and fibroblasts infected by virus (virus infected cells) produce interferons. Interferons have anti-viral activity and protects other cells from damage.

Interferons have quick but temporary action.

They have been effective against influenza and hepatitis.

Types of immune responses

Primary and secondary immune responeses :

Primary immune response is the first immune response developed during the first encounter with the antigen. It is feeble but relatively longer. It usually consists of IgM antibodies.

Secondary immne response is a quick heightened immune response against a subsequent encounter with the same antigen. It is due to the presence of memory cells against that antigen. It persists for long while the primary response declines rapidly. A person having caught chicken pox or measles only one becomes immune to subsequent attack of the pathogen due to it. It usually consists of IgG antibodies.

Lymphoid organs :

They are those organs having lymphatic tissues where maturation and proliferation of lymphocytes occur. The sites where T-lymphocytes and B-lymphocytes mature and develop antigen-specific receptors are called primary lymphoid organs, viz., thymus for T-lymphocytes and bone marrow for B-lymphocytes. Secondary lymphoid organs are those organs having lymphatic tissues where B and T-cells are settled after maturation and where they undergo proliferation/differentiation on being activated by specific antigens, e.g., lymph nodes, spleen, tonsils. MALT is mucosal lymphoid tissue. It constitutes more than 50% of the total lymphoid tissue.

Types of antibodies

There are 5 different type of antibodies

lgG = γ immunoglobulin, lgA - $\propto$ immunoglobulin, IgM - μ immunoglobulin,

lgE - $\in$ immunoglobulin and IgD - δ immunoglobulin.

Immunoglobulin class	Functions
IgA	Called secrtory immunoglobin because it it present in all body secretions including colostrum and mother's milk. Functions as first line of defence against inhaled and ingested pathogens by activating alternate pathway of complement system.
IgD	Along with IgM occurs over B-lymphocytes as antigen receptors, activation of B-cells, also present in serum tissue and effective against toxins and allergens.
IgE	Present in mucous membranes, skin and lungs. Attaches to mast cells and basophils for releasing histamine and other substances that mediate hypersensitive response to allergens.
IgG	Constitute 75% of the total Ig, present in all body parts including milk and can pass through placenta providing passive immunity to neonates, stimulate complement system and phagocytes against toxins, viruses, bacteria and fungi.
IgM	Largest Ig with 10 binding sites, activates B-cells over which it is present along with IgD, also first to reach site of infection and activate classical pathway of complement system.

1) **Monoclonal antibodies :**

The monoclonal antibodies are pure, high affinity, antigen specific proteinaceous bodies developed outside the body from clonal cultures of hybrid cells called Hybridomas.

Monoclonal antibodies were first discovered by **George Kohler** and **Cesar Milstein (1974)** who proposed that normal antibody producing cells can be used to fuse and inhibit cells from cancerous tumours called Myelomas.

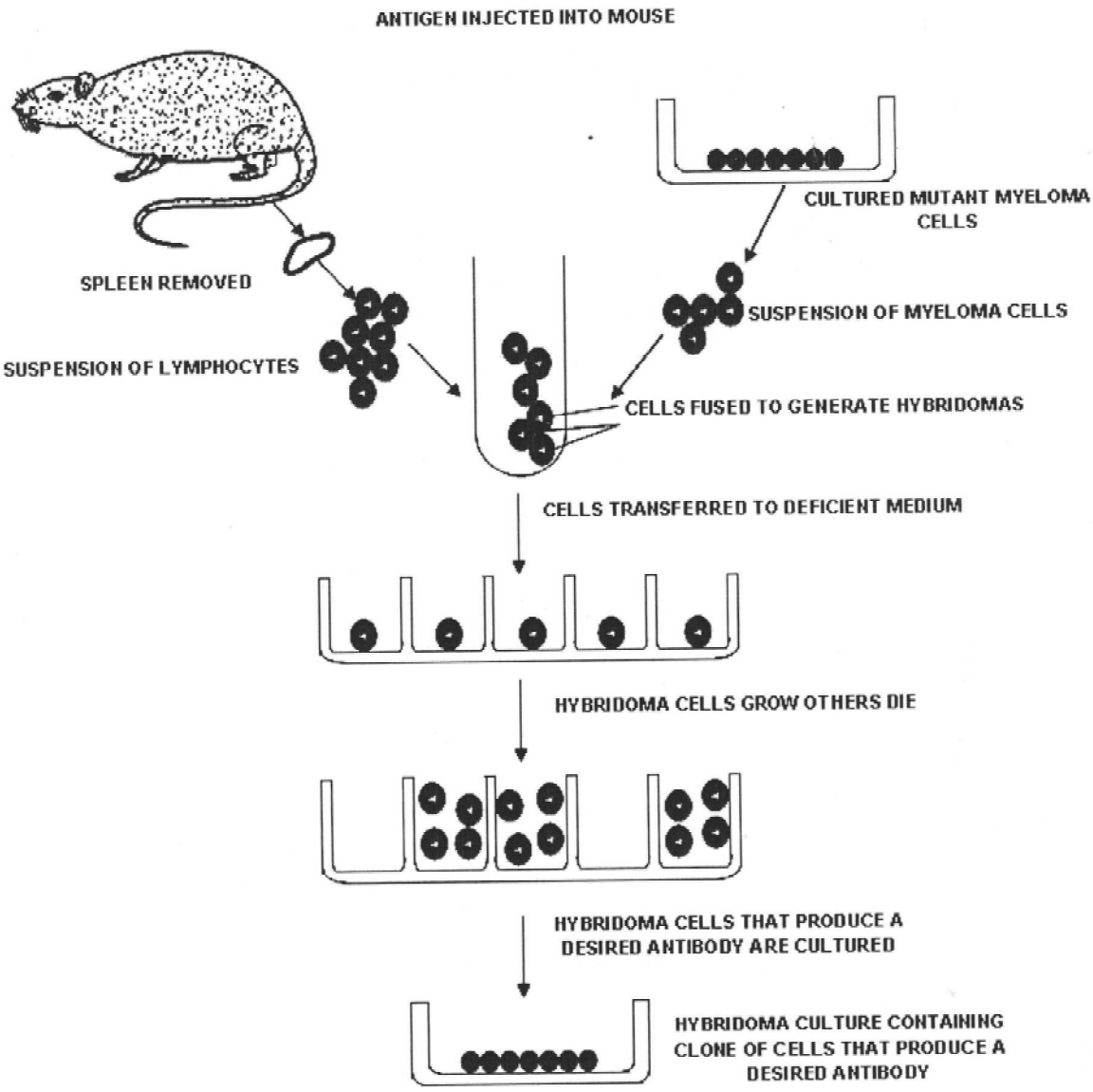
2) **Uses of monoclonal antibodies :**

i) These are more specific and reproducible, so these are used for differentiating diseases caused by pathogens.

ii) Being specific, these can be conjugated to toxic drugs (e.g. cancer drugs) and injected to kill or inhibit specific cells without harming others. So, these can be used in cancer treatment.

iii) These can be used to develop immune defence system against microbial diseases.

iv) These are used for immune suppression for kidney transplantation. The immune cells which mediate rejection of graft are suppressed by these antibodies.



Hybridoma Culture

Organ Transplantation

The replacement of diseased tissue or organs by healthy ones is called transplantation. When foreign tissue from donor, for example skin, is inserted onto another individual it is usually rejected by the recipient because it acts as an antigen. This foreign tissue stimulates the immune response in the recipient.

Types of Transplant :

The following terms are used for the different kinds of transplant :

1) **Autograft** tissue grafted from one area to another on the same individual. Rejection is not a problem. This can be used in skin grafting.
2) **Isograft** a graft between two genetically identical individuals such as identical twins. Again, rejection is not a problem.
3) **Allograft** a tissue grafted from one individual to a genetically different individual of the same species.
4) **Xenograft** a graft between individuals of different species such as from pig to human.

Prevention of Graft Rejection :

There are several means of preventing graft rejection currently in use.

1) **Tissue matching** is an obvious and necessary precaution to take before any surgery. The major histocompatibility complex is relevant here. Tissue matching is much more likely to occure between close relatives than between non-relatives.
2) **Exposure of bone marrow** and lymph tissues to radiation by X-rays tends to inhibit production of white blood cells and therefore, slows down rejection. Unpleasant side-effects occur and there is an increased risk of infection during the treatment.
3) **Immunosuppression** is based on the principle to use chemicals which inhibit the entire activity of the immune system. When this occurs, graft rejection is delayed, but the main problem with this technique is that the patient becomes susceptible to all kind of infections. It has also been shown that immunosuppression may make the patients more prone to develop cancer.

Vaccination and Immunization

Louis Pasteur coined the term vaccine and vaccination for the first time. A vaccine is either a cell suspension or a by-product excreted by the cell. These vaccines, when introduced into the body, stimulate the production of antibodies. This introduction of harmless antigenic material into healthy person for providing acquired immunity against the disease is known as immunization or vaccination. The first vaccination was carried out by a British physician, Edward Jenner (1796) to protect people from smallpox. The first true vaccine against chicken cholera was developed in 1880 by Louis Pasteur.

The principle of immunization or vaccination is based on the property of 'memory' of the immune system. In the process of vaccination, a preparation of antigenic proteins of pathogens or inactivated/weakened pathogens (vaccine) is introduced into the body. These antigens produce the primary immune response, and the memory B and T-cells. When the vaccinated person is attacked by the same pathogen, the existing memory T or B-cells recognize that antigen quickly and flood the invaders with a massive production of lymphocytes and antibodies.

Principal Vaccines Used to Prevent Bacterial Diseases in Human :

Sr. No.	Disease	Vaccine	Recommendation	Booster
1.	Cholera	Crude fraction of Vibrio cholerae	For people who work and live in endemic areas	Every 6 months as needed
2.	Diphtheria	Purified diphtheria toxoid	For children 2 months to 16 years	Every 10 years for adults
3.	Meningococcal meningitis	Purified polysaccaride from Neisserio meningitidis	For people with substantial risk of infection	Need not established
4.	Pertussis (whooping cough)	Killed whole or fragments of Bordetella pertusis	Children prior to school age	For high-risk adults
5.	Plague	Crude fraction of Yersinia pestis	For people who come in regular contact with wild rodents in endemic areas	Every 6 to 13 months for continuing exposure
6.	Pneumococcal pneumonia	Purified polysaccharide from Streptococcus pneumoniae	For adults with certain chronic diseases, people over 65	Normally not recommended
7.	Tetanus	Purified tetanus toxoid	For both children and adults	Every 10 years for adults
8.	Typhoid fever	Killed or attenuated Salmonella typhi	For people in endemic areas or areas having outbreak	Every 3 years with killed, every 5 years with attenuated
9.	Hemophilus influenzae, B. meningitis	Polysaccharide from Hemophilus influenzae B conjugated with protein to enhance effectiveness	Depending on patients	None recommended

Principal Vaccines Used to Prevent Viral Diseases in Human :

Sr. No.	Disease	Vaccine	Recommendation	Booster
1.	Influenza	Killed	For chronically ill people, especially with respiratory diseases, or for healthy people over 65 years old	Annual
2.	Measles	Attenuated virus	For infants 15 months old	At high risk condition
3.	Mumps	Attenuated virus	For infants 15 months old	(Duration of immunity not known)
4.	Rubella	Attenuated virus	For infants 15 months old, for females childbearing age who are not pregnant	(Duration of immunity not known)
5.	Poliomyelitis	Attenuated or killed virus (enhanced potency type)	For children, for adults, as risk to exposure warrants	(Duration of immunity not known)
6.	Rabies	Killed virus	For field biologists in contact with wildlife in endemic areas, for veterinaries	Every 2 years
7.	Yellow fever	Attenuated virus	For people travelling to endemic areas, for military personnel	Every 10 years
8.	Hepatitis-B	Antigenic fragments virus	For children, for adults, especially health care workers, homosexual males, injecting drug users, heterosexual persons with multiple partners and household contacts of hepatitis-B carriers	Duration of protection at least 7 years, need for boosters uncertain

Types of Vaccines :

Vaccines are of following types :

1) **Toxoids :**
Certain orgaisms such as diphtheria and Tetanus bacilli produce toxins. The toxins produced by these organisms are detoxicated and are used in the preparation of vaccines. These vaccines provide passive immunity for short period.

2) **Live vaccines or attenuated vaccines :**
These vaccines are prepared from live (generally attenuated-the pathogen is made weakened to make it non-virulent) organisms. For example, OPV (Oral Polio Vaccine), BCG (Bacillus Calmette Guerin), small pox, yellow fever, and influenza vaccines. These vaccines provide active life long immunity.

3) **Killed vaccines or inactivated vaccines :**
Such vaccines are prepared by killing the pathogenic organis by heat/ultraviolet rays/alcohol/formalin/phenol. For example, typhoid vaccine, salk polio vaccine, typhus vaccine, chloera vaccine, rabies vaccine, plague vaccine.

4) **Combinations :**
If more than one kind of immunizing agent is included in the vaccine, it is called a mixed or combined vaccine. Some of the well known combinations are as follows : DPT (Diphtheria + Pertussis + Tetanus), DT (Diphtheria + Tetanus), DP (Diphtheria + Pertussis), Tetanus + Influenza, DPT and typhoid vaccine, MMR (Measles + Mumps + Rubella), Measles + Rubella.

DISEASES OF THE IMMUNE SYSTEM

Immunodeficiency

It is the state of the body in which there is decrease in immunity

1) **Causes :**

i) **Malnutrition :**
There is deficiency of proteins (globulins).
Hence, antibodies can't be formed.

ii) **Genetic :**
Mutation in long arm of chromosome 20 leads to hereditary deficiency of enzyme adenosine deaminase required for maturation of T-cells and B cells. This causes severe combined immune deficiency (SCID).
SCID shows deficiency of both B and T cells.
SCID is the first hereditary disease to be successfully treated by gene therapy.

iii) **Acquired :**
Diseases like AIDS caused by human immunodeficiency virus which reduce T-lymphocytes.
Clinical symptoms of AIDS develop when T-lymphocyte count is below 200/mm^3 of blood.

2) **Hypersensitivity (Allergy) :**

The term allergy was coined by **Von Pirquet**.
About 10% of human population suffers from some kind of allergy.

Definition :

Allergy is defined as an acquired, abnormal, hyper immune response to an agent during second or subsequent exposure.
Thus, for allergic reactions, body must be previously sensitized by an allergen.

Allergens

Any substance that evokes allergy is called Allergen. Common allergens are :

i)	Food substances	:	wheat, egg, milk, vegetable oils and chocolate.
ii)	Inhalants	:	pollen grains, fungi, dust, smoke and perfumes.
iii)	Contactants	:	chemical substances and metals, venoms.
iv)	Infectious agents	:	parasites, viruses, bacteria, fungi and moulds.
v)	Drugs	:	antibiotics, aspirin and vaccines.
vi)	Physical agents	:	cold, heat, light and radiations.

3) **General Mechanism :**

It involves three steps :

i) **Sensitization :**
Allergen acts as a mild antigen which stimulates the formation of IgE antibodies which bind to mast cells of connective tissue. This process is called sensitization.

ii) **Second stimulation :**
During subsequent exposure, allergens combine with antibody-bound mast cells which rupture and release a large amount of histamine.

iii) **Histamine reaction :**
Histamine has the following effects :

a) Capillary dilation.
b) Increase in the capillary permeability. This cause leakage of body fluids.
c) Closure of bronchial tubes.
d) Increase in mucous secretions.
e) Pain and swelling.

During allergies, eosinophils increase as they have to remove antigen antibody complex. This condition is called eosinophilia.
Eg. Asthma, Hay fever etc.

Prophylaxis (preventive measures) :
The specific allergens should be identified and avoided.

4) **Therapy :**
   i) By using antihistamine drugs.
   ii) By using glucocorticoids (steroids). Steroids reduce the immunity and thus cause relief from allergy.

BLOOD GROUPS

Karl Landsteiner (Father of blood groups) in 1900 discovered that agglutination (clumping) of RBC takes place by antigen - antibody reactions (Mismatched blood transfusion). Distribution of blood groups in Indian population
A = 22% , B = 33% , AB = 5%, O = 40%.

Combining ABO and Rh systems together :

Blood group	Can recieve blood from
A^+	A^+, A^-, O^+, O^-
A^-	A^-, O^-
B^+	B^+, B^-, O^+, O^-
B^-	B^-, O^-
AB^+	$A^+, A^-, B^+, B^-, AB^+, AB^-, O^+, O^-$
AB^-	A^-, B^-, AB^-, O^-
O^+	O^+, O^-
O^-	O^-

Haemolytic disease of the new born (HDN) :
If Rh-ve woman marries a Rh+ve man and gets pregnant with a Rh+ve foetus in the uterus, Rh+ve RBC from the foetus may enter mothers circulation during child birth and anti Rh antibodies are developed in mother's blood. The first child thus escapes any damage.

During subsequent pregnancies,
Maternal blood has already developed antibodies.

These antibodies can pass through the placenta and reach the child's blood. If the child's blood is Rh+ve, maternal antibodies would destroy RBC's of foetus and lead to foetal death.
This disease is called erythroblastosis foetalis or haemolytic disease of newborn (HDN)
Thus, the first Rh+ve child escapes but all subsequent foetus will suffer from HDN.

To prevent HDN, Rh-ve mothers are injected with Rh antibody (Rh immunoglobulins or anti-D) within 72 hours after delivery, so that these injected Rh antibodies destroy Rh-antigen from child. Thus the immune system of the mother does not get any time for antibody formation. This Rh-immunoglobulin is called Coomb's serum.

DISEASES

Types of disease agents

1) **Pathogens/Biological Agents :**
These are those micro-organisms or biological entities which cause infection, multiply inside the body and cause disease. These include bacteria (e.g. cholera, tetanus), viruses (mumps, chicken pox, small pox), mycoplasma, chlamydia (e.g. trachoma), fungi (ringworm, thrush, moniliasis, pulmonary aspergillosis), protozoa (eg. Giardiasis, sleeping sickness), helminthes (eg. Filariasis, ascariasis, taeniasis), other organisms (eg. Scabies).

2) **Nutrient Agents :**
Deficiency of vitamins (eg. Beriberi, scurvy, night blindness), minerals (eg. Anaemia, rickets), carbohydrates, fats and proteins (eg. Kwashiorkar, marasmus), or excess of food (eg. Obesity).

3) **Chemical Agents :**
Some chemical compounds are also causative agents of certain diseases. These are of two types on the basis of their source.
   i) **Endogenous Chemical Agent :**
   These are formed inside the body. These include urea, uric acid, enzymes, reduced secretion of ADH (diabetes insipidus) or insulin (diabetes mellitus).
   ii) **Exogenous :**
   These enter the human body from outside by ingestion, inhalation or inoculation. These include pollutants like gases, dust, metals, fumes etc. (pneumoconiosis) and allergens like spores, pollen etc. (allergy).

4) **Physical Agents :**
These include heat (eg. Stroke), cold (frost bite), sound (impaired hearing), pollens etc. (allergy).

5) **Mechanical Agents :**
These include fractures, sprains, dislocations injury, chronic friction.

6) **Genetic Agents :**
Excess or deficiency of chromosomes, mutations, harmful alleles eg. Colour blindness, albinism, haemophilia, Turner's syndrome, sickle-cell anaemia etc.

Modes of transmission

Communicable diseases are those diseases which can be transmitted from reservoir of infection or an infected person to the healthy but susceptible persons. There are two modes of transmission :

1) **Direct Transmission :**
In this, the pathogens are transmitted from reservoir of infection or an infected person to the healthy but susceptible persons without an intermediate agent.
   i) **By Direct Contact with an Infected Person :**
   The contagious diseases like chickenpox, small pox, athlete's foot, measles, leprosy, ringworm, gonorhoea, syphilis etc. are spread by actual contact between an infected person and a healthy person. *Entaemoeba gingivalis*, is transmitted by direct mouth to mouth kissing.
   ii) **Droplet Infection :**
   The diseases like diptheria, influenza, common cold, measles, tuberculosis, pneumonia, mumps, whooping cough etc. are spread by droplet infection (Germs in tiny droplets of mucus) from sneezing, coughing, spitting or even talking to infected persons.
   iii) **Contact with Soil :**
   The bacterial cysts of tetanus disease enter the human body from the soil through injuries.
   iv) **Animal Bites :**
   The rabies viruses are injected in the human body by the bite of rabid animals like dogs, monkeys, cats etc.
   v) **Transplacental Transmission :**
   The viruses of German measles and bacteria of syphilis can be transmitted from the maternal blood to the foetal blood through placenta.

2) **Indirect Transmission :**

When the pathogens can be transmitted from the reservoir of infection to a healthy person through some intermediate agents. It occurs in following ways :

i) **Vector Borne Diseases :**

These are spread through the agency of some vectors eg.

Vector	Disease
Tse Tse fly (*Glossina*)	African sleeping sickness
Sand fly (*Phlebotamus*)	Kala-azar and oriental sore
Female Mosquito (*Anopheles*)	Malaria
Rat flea (*Xenopsilla*)	Bubonic plague
Aedes mosquito	Yellow fever
Culex mosquito	Filariasis (Elephantiasis)
House fly (*Musca*)	Typhoid, cholera, amoebic dysentery, ophthalmia, conjuctivitis etc.
Head louse	Typhus.

ii) **Vehicle Borne :**

Pathogens of cholera, dysentery, typhoid etc. are transmitted by agencies like food, water etc. AIDS is spread by blood of suffering donors.

iii) **Air Borne :**

In this, the pathogens are spread by wind currents, aerosol sprays and dust eg. epidemic typhus.

iv) **Fomite borne :**

In this, the pathogens are spread through contaminated articles like handkerchiefs, towels, crockery, toys, soap, utensils, surgical instruments etc.

v) **Unclean Hand :**

The germs of diseases like Ascariasis (*Ascaris lumbricoides*) and Enterobiasis (*Enterobius vermicularis*) are spread by unclean hands so these must be properly washed before taking meals.

Types of diseases

On the basis of period of their **occurrence,** the diseases are classified in **2 categories.**

1) **Congenital diseases :**

These are **inborn diseases** which are present from the birth. These involve anatomical or physiological defects and are generally **inheritable**. These are generally caused by **gene** or **chromosomal mutations**.

Diseases caused by gene-mutations :

These include : haemophilia, colour blindness, alcaptonuria, sickle cell anaemia etc.

Diseases caused by chromosomal mutations :

These include: Down's syndrome, Klinefelter's syndrome, Turner's syndrome etc.

Diseases caused by environmental factors :

These include cleft palate, hare lip, etc. these are non-inheritable.

2) **Acquired diseases :**

These occur only after birth and are non-inheritable. On the basis of their communication, acquired diseases are of two types:

i) **Communicable diseases :**

These **can be transmitted** from an infected person to a healthy person. These are caused due to infection and multiplication of some kind of micro-organisms, so also called infectious diseases.

Depending upon the causative agent, communicable diseases are of four types :

Bacterial diseases e.g., diphtheria, tetanus, typhoid, tuberculosis, cholera, etc.

Viral diseases e.g., mumps, measles, polio, smallpox, chickenpox, rabies, etc.

Protozoan diseases e.g., malaria, amoebiasis, kala azar, sleeping sickness, etc.

Helminth diseases e.g., taeniasis, ascariasis, filariasis, trichinosis, liver rot, etc.

Fungal diseases e.g., ring worm, athlete's foot, etc.

Rickettsial diseases e.g., typhus fever, trench fever, Q-fever, Rocky mountain spotted fever, etc.
Spirochaetal diseases e.g., syphilis.

On the basis of their mode of transmission, the communicable diseases are of two types:
Contagious diseases. These communicable diseases can spread from an infected person to healthy person by actual contact between them e.g., STDs, smallpox, chickenpox, measles, leprosy etc.
Non -contagious diseases. These can spread from an infected person to healthy person with food, air or water e.g., **taeniasis, ascariasis, cholera, tuberculosis, typhoid** etc; or micro-organisms are injected inside the human body by some carrier or vector hosts e.g., **malaria, filariasis, plague** etc.

ii) **Non-communicable diseases :**
These do not spread from an infected person to a healthy person. These are of four types on the basis of their **causative agents :**
Deficiency diseases. These occur either due to deficiency of some nutrients in the diet or some hormones due to hypoactivity or damage to endocrine gland.

3) **Dietary deficiency diseases :**

	Diet Deficiency	**Diseases**
i)	Protein	Kwashiorkor
ii)	Protein-energy malnutrition (PEM)	Marasmus
iii)	Vitamin – A	Xerophthalmia, Night-blindness
iv)	Vitamin – D	Rickets (in children) and osteomalacia (in adults)
v)	Vitamin – K	Bleeding diseases (Hypothrombinemia)
vi)	Vitamin – C	Scurvy
vii)	Vitamin – B_1	Beri - beri
viii)	Vitamin – B_2	Cheilosis
ix)	Vitamin – B_5 (Niacin)	Pellagra
x)	Vitamin – B_{12}	Pernicious anaemia
xi)	Iron	Anaemia
xii)	Iodine	Goitre
xiii)	Fluorine	Dental caries

Degenerative or Organic diseases. These occur due to degenerative changes in some vital organs of the body e.g., **cardiovascular diseases** like heart attack, arteriosclerosis etc., **brain diseases** like stroke, epilepsy etc.
Allergic diseases. In these diseases, body becomes hypersensitive to some foreign agents **allergens,** which cause inflammation when come in contact with the body or enter inside the body e.g., **hay fever, asthma.**
Cancerous diseases. These include the diseases characterized by uncontrolled growth of certain body tissues forming **tumours**.

Common Genetic Disorders in Humans :

Sr. No.	Name of disorder	Type of Disorder	Result of Disorder	Symptoms of Disorder
1.	Down's syndrome	Autosomal aneuploidy	Trisomy of chromosome 21	Mongolian eyelid fold, ever open mouth, protruding tongue, short neck, projecting lowerlip
2.	Klinefelter's syndrome	Sex chromosomal aneuploidy	XXY sex chromosomes	Sterile male, unusually long legs, obesity, sparce body hair, breasts, mental retardation.
3.	Turner's syndrome	Sex chromosomal aneuploidy	XO sex chromosomes	Sterile female, underdeveloped breasts, short stature, neck with heavy muscles and loose skin, narrow hips
4.	Alkaptonuria (Black urine disease)	Autosomal gene mutation	Lack or inactivity of enzyme homogentisate oxidase	Blackening of urine on exposure to air, darkening of cartilage
5.	Phenylketonuria (PKU)	Autosomal gene mutation	Lack of enzyme phenylalanine hydroxylase	Extreme mental retardation
6.	Albinism	Autosomal gene mutation	Lack of enzyme tyrosinase	Absence of dark pigment in skin, hair and iris.
7.	Sickle-cell Anaemia	Autosomal gene mutation	Formation of haemoglobin S in R.B.C.s	Rupturing of red corpuscles, blocking of O_2 supply to tissues, jaundice.
8.	Haemophilia	Sex chromosomal gene mutation	Lack of blood coagulant	Blood does not clot, more common in males
9.	Red-green colour blindness	Sex chromosomal gene mutation	Lack of red & green colour vision pigments in cone cells of retina	Inability to distinguish red from green colour
10.	Muscular dystrophy	Sex chromosomal gene mutation	Lack of protein dystrophin	Muscle degeneration, most sufferers are males
11.	Erythroblastosis foetalis	Incompatibility of Rh factors	Destruction of RBCs	Anaemia of baby, damage to brain.

Common bacterial diseases :

Sr. No.	Disease	Pathogen	Habitat	Main symptoms	Mode of Infection	Incubation Period
1.	Cholera	*Vibrio comma* (*V. Cholerae*)	Intestine	Severe diarrhoea and vomiting	By contaminated food and water	2 to 3 days
2.	Pneumonia	*Diplococcus pneumoniae*	Lungs	Difficulty in breathing	By patient's sputum	1 to 3 days
3.	Typhoid	*Salmonella typhi*	Intestine	Constant fever	By contaminated food and water	1 to 3 weeks
4.	Tetanus (Lockjaw)	*Clostridium tetani*	Tissues	Painful muscular spasms and paralysis	Through wounds and burns	4 days to 3 weeks
5.	Diphtheria	*Corynebacterium diphtheriae*	Mucous Membrane of nose, throat & tonsils	Sore throat, difficulty in breathing	By oral & nasal discharges	2 to 5 days
6.	Whooping cough (Pertusis)	*Bordetella pertussis*	Respiratory tract	Severe coughing, characteristic gasping 'whoop'	By throat discharges and contact	10 to 16 days
7.	Tucerculosis	*Mycobacterium tuberculosis*	Lungs	Cough, bloody sputum, chest pain	By patient's sputum	Variable
8.	Plague	*Yersinia* (*pasteurella pestis*)	Blood and lymph	Painful bubo of lymphatic nodes	By rat–flea bite	2 to 6 days
9.	Leprosy	*Mycobacterium leprae*	Skin, mucous membranes, peripheral nerves	Hypopigmented skin patches, ulcers, deformity of digits	Long and close contact with patients	2 to 5 years
10.	Syphilis	*Treponema pallidum*	Oral, genital, rectal mucosa	Lesions	By contact	3 weeks
11.	Gonorrhoea	*Neisseria gonorrhoeae*	Urinogenital mucosa	Burning sensation in micturition	By sexual contact	2 to 5 days
12	Diarrhoeal Diseases	*Shigella dysenteriae, Salmonella, Escherichia coli, Campylobacter*	Intestine	Diarrhoea	By contaminated food, water, hands, fomite	–
13.	Trachoma	*Chlamydia trachomatis*	Eye	Inflammation of conjunctiva & cornea leading to blindness	Contagious, formitc-borne and flies (vectors)	5 to 12 days

Summary of human viral diseases :

Sr. No.	Disease	Pathogen	Epidemology	Incubation	Symptoms	Prophylaxis	Therapy
1.	Chickenpox (Varicella)	Herpes-zoster virus (DNA-virus)	Contagious	12-20 days	Dark red coloured rash or pox changing into vesicles, crusts & falling	Now vaccine available	Zoster immunogl obalins (ZIG)
2.	Smallpox	Variola-virus (DNA-Virus)	Contagious and droplet infection	12-days	Appearance of rash changin into pustules, scaps & falling Pockmarks are left	Smallpox vaccine	No cause reported after 1978
3.	Poliomyelitis	Polio-virus (RNA-virus)	Direct and oral	7-14 days	Damages motor neurons causing stiffness of neck, convulsion, paralysis of generally legs	'Salk' vaccine & Oral Polio vaccine	Physiotherapy
4.	Measles (Rubeolla disease)	Rubeolla-virus (RNA-virus)	Contagious and Droplet infection	10 days	Rubeolla (skin eruptions), coughing sneezing etc	Edmonston -B-vaccine isolation	Antibiotics & sulpha drugs
5.	Mumps	Mumps-virus (RNA-virus)	Contagious & Droplet infection	12-26 days	Painful enlargement of parotid salivary glands	Mumps-vaccine, isolation	Antibiotics
6.	Rabies (Hydrophobia)	Rabies-virus (RNA-virus)	Indirect & inoculative (vectors are rabid animals especially dogs)	10 days to 1-3 months	Spasm of throat & chest muscles. Fears from water, paralysis & death	Immunization n of dogs	Pasture-treatment
7.	Influenza (Flu)	Myxovirus influenzae (RNA-virus)	Air borne & is pandemic	24-48 Hours lasts for 4-5 days	Bronchitis,sneezing, bronchiopneumonia, leucopenia,coughing, etc	Isolation	Antibiotic therapy
8.	Hepatitis (Epidemic jaundice)	Hepatitis-B virus	Direct and oral (with food and water)	20-35 days	Damage to liver cells releasing bilirubin which causes jaundice	Proper sanitation, proper coverage of food, water, milk etc; use of chlorinated or boiled water, etc	Hepatitis B vaccine

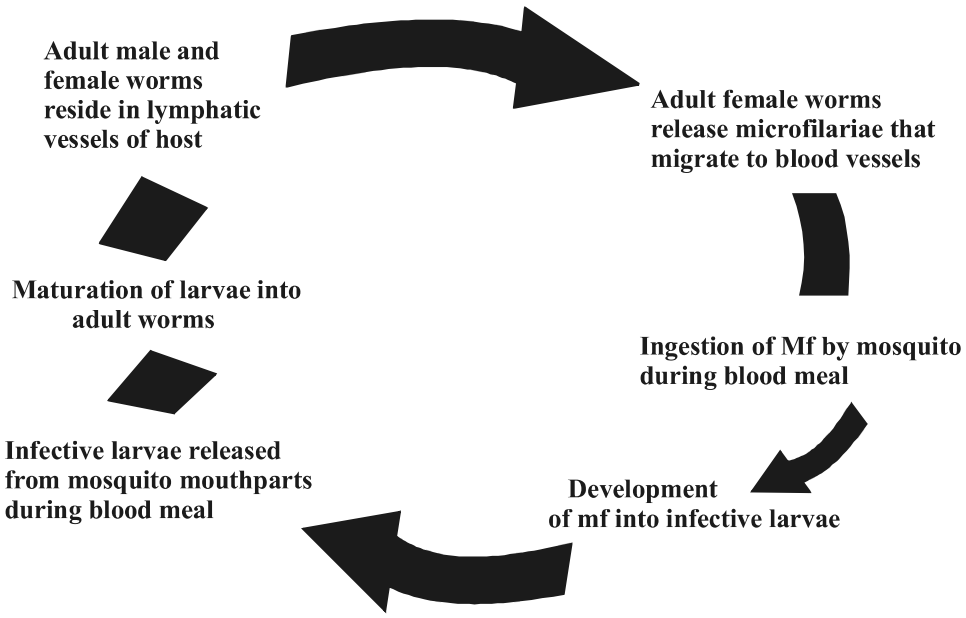
Important Protozoan Diseases of Humans :

Sr. No.	Disease	Pathogen	Habitat	Mode of Infection
1.	Amoebic dysentery	*Entamoeba histolytica*	Large intestine and lower part of small intestine	By taking contaminated food and water containing cysts
2.	Flagellate diarrhoea	*Giardia intestinalis*	Small intestine (duodenum, jejunum)	By taking contaminated food and water containing cysts
3.	Ciliary dysentery	*Balantidium coli*	Large intestine (colon)	By taking contaminated food and water containing cysts

Important Helminth diseases in Humans :

Sr. No.	Disease	Pathogen	Habitat	Mode of infection
1.	Taeniasis & Cysticercosis	*Taenia solium* -the pork tapeworm	Intestine	By taking raw or undercooked measly pork
2.	Ascariasis	*Ascaris lumbricoides*	Small intestine	By taking egg with food and water
3.	Filariasis (Elephantiasis)	*Wuchereria bancrofti*-the filarial worm	Lymphatics and connective tissue	By bites of *Culex* mosquitoes
4.	Ancylostomiasis (Hook-worm disease)	*Ancylostoma duodenale* -the hookworm	Small intestine	By boring through the skin, usually of feet.

Filariasis :



LIFE CYCLE OF FILARIAL NEMATODES

MALARIA

Introduction :
Malaria is one of the most common diseases of mankind. It is more common in tropical and subtropical countries, especially in Africa and Asia, where millions are infected. It is responsible for the death and reduced resistance in large number of persons every year, the heaviest toll being the children under 4 years of age.
Due to **WHO** and **NMEP** of India, the malaria was effectively reduced but partly owing to socio-economic factors and partly because of unexpected proliferation of DDT - resistant mosquitoes and drug resistant parasites, the attempts to eradicate the infection have failed & the malaria is again on increase.

Cause :
Malaria is caused by a toxic pigment **haemozoin** formed from Hb or RBC when RBCs are destroyed by developing stages (**merozoites**) of the malarial parasite, *Plasmodium*.

Life cycle :
Life cycle of *Plasmodium* is **digenetic** (two hosts) and **triphasic**. Two hosts are man (**secondary host**) and female Anopheles **(primary host)**. Three phases are asexual **schizogony** (in the liver and RBCs of man), sexual **gamogony** (started in RBCs of man but completed in stomach of mosquito) and sexual **sporogony** (formation of sporozoites in oocysts on stomach wall of mosquito).
Types of Malaria. Four species of Plasmodium cause malaria in man.
Types of Plasmodium sp. and malaria

Plasmodium sp. Type of malaria Period of attack Distribution :

Plasmodium sp.	Type of malaria	Period of attack	Distribution
1. P. vivax	Benign tertian malaria	After 48 hours (every 3rd ay). Not fatal.	Tropical and temperate. Most common form
2. P. ovale	Mild tertian malaria	After 48 hours	West Africa and South America.
3. P. malariae	Quartan malaria (also called sub-clinical malaria)	After 72 hours (Every 4th day)	Tropical and temperate
4. P. falciparum	Quotidian (cerebral malaria) or Malignant tertian or Irregular malaria	Daily After 36 hours Not fixed	Tropical

Incubation period :
About 12 days in *P.vivax.*

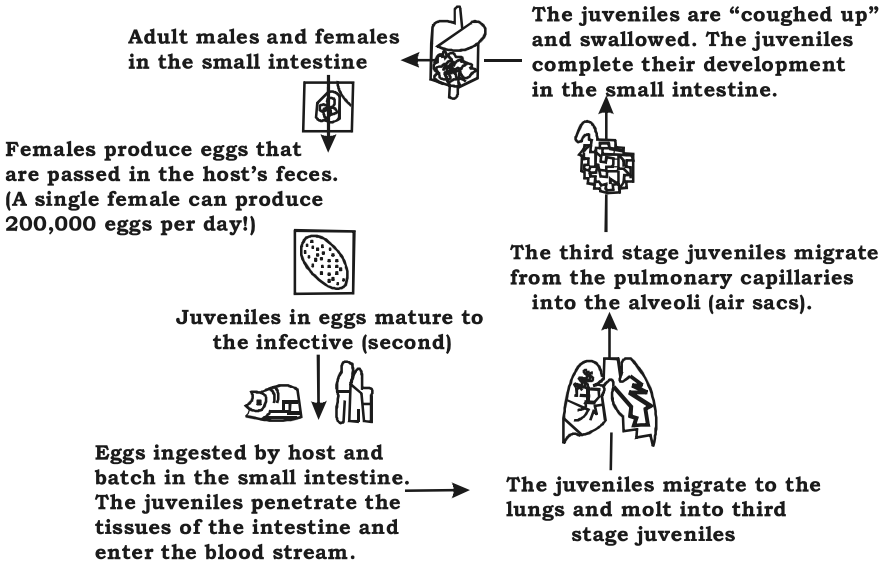
Symptoms :
Malarial attack is preceded by : headache, nausea and muscular pain. Total period of malarial attack is of 6-10 hours and can be divided into 3 stages:
1) **Cold stage** characterized by chilling and shivering.
2) **Hot stage** characterized by high fever (106°F), faster respiration and heart beat etc.
3) **Sweating stage** and temperature goes down to normal.
After the malarial attack, the patient feels weak, exhausted and anaemic. The malaria may secondarily cause enlargement of spleen and liver.

Prophylaxis :

1) Wire-gauzing of doors, windows etc. to check entry of the mosquitoes.
2) Use of insect-repellents to prevent mosquito-bite.
3) Sleeping under mosquito-nets.
4) Killing of mosquito-larvae by filling small sized ditches etc. with soil; or sprinkling kerosene oil on large sized water body; or introducing larvicidal fishes (e.g. *Gambusia*, minnows, trouts, Sticklebecks), birds (ducks) and plants (e.g. Utricularia) etc.
5) Killing of adult mosquitoes by spraying insecticides like D.D.T. (Dichloro diphenyl- trichloroethane,) and B.H.C. (Benzene Hexa-Chloride).

Therapy. A number of anti-malarial drugs are available e.g., **quinine** (extracted from the bark of Cinchona tree), **chloroquin, paludrine, atabrine, daraprim** etc. Most effective drug is daraprim which kills the parasite stages present in both liver cells and RBCs of blood. Latest anti-malarial drug is **mefloquin**.

Ascariasis :



THE LIFE CYCLE OF ASCARIS LUMBRICOIDES

Typhoid

It is an acute infectious disease caused by Gram (–) anaerobic flagellate bacillus called Salmonella typhi. Typhoid spreads through foood, milk and water contaminated with intestinal discharges and urine either directly or through flies and faulty personal hygiene. Some 2.5 million persons suffer from it annually. Certain humans function as carriers without suffering from it. Mary Mallon, popularly called typhoid Mary was one such carrier. She was a cook who continued to spread the disease for several years through her food preparations.

Common Cold/Rhinitis

1) It is one of the most common infectious diseases of humans which is caused by some 100 types of Rhino viruses and small bacterium Dialister pneumosintes.
2) Some persons also suffer from allergic rhinitis.
3) Common cold spreads through droplets from talking and sneezing, direct contact, hand shake and common articles of use like pens, pencils, books, cups, door handles, computer key board, computer mouse, etc. It cures automatically after 3 –7 days Medicines are taken to reduce severity of nasal irritation and clearing nasal tract.

Ring worm/Dermatophytoses

1)	Trichophyton rubrum	:	Dermatophytoses of foot (like foot ringworm, athlete's foot, tinea pedis), Onychomycosis (fungal infection of nails), Ringworm of groin (tinea cruris, dhobi itch, jockey itch).
2)	T. mentagrophytes	:	Onychomycosis, Ringworm of body (tinea corporis, tinea circinata), Ringworm of beard (tinea barbae or barber's itch).
3)	T. tonsurans, T. violaceum, Microsporum andoninii	:	Ringworm of scalp (tinea capitis)
4)	Microsporum canis	:	Cats and dogs and from there to children-tinea capitis, tinea corporis.
5)	Epidermophytion floccosum, E.cruris	:	Tinea cruris, tinea pedis, tinea manum, tinea corporis, Onychomycosis.

CANCER

It is more common in old person after 40 years and in tissues where cells undergo divisions regularly. **Neoplasm** is a new abnormal tissue that is capable of continued growth, formation of tumour, crowding and disrupting of normal cells. Tumours grow or swellings are caused by abnormal proliferation of cells They are of types, benign and maliganant. **Benigh tumour** is a large localised mass abnormal tissue which presses other tissues and causes pain but does not infiltreate adjacent tissues becouse it is encapsulated in connective tissue. **Malignant** tumour is a large mass of abnormal tissue which is not encapsulated, is capable of invading adjacent tissues and distant sites.

Leukemia (=Leukaemia) :

It is malignancy where there is unwanted and uncontrolled increase in number of while blood corpuscles (2000, 000 – 10000, 0000/ mm3) and immature myeloid stem cells. In common type of leukemia, the white blood corpuscles infiltrate bone marrow, spleen, liver,lymph nodes and other organs causing damage and increasing their size. In myelocytic leukemia (9th and 22nd chromosomes bring their jumping genes together) erythroblastic tissue of bone marrow degenerates. There is bleeding at different places. Tonsils and cervical glands enlarge.

The most common cancers in India are mouth-throat cancer in men and uterine-cervical cancer in woman.

Carcinogenic agents / Causes of cancer

The environmental agents that cause cancer are known as carcinogenic agents or carcinogens. The carcinogenic agents are responsible for causing malignant changes in a cell.

These carcinogenic agents are as follows :

1) **Radiations :**
Continuous exposure to ultraviolet rays, X-rays, alpha, beta and gamma rays, radioactive isotopes produce mutations in DNA and cause cancer. The radiations are responsible for skin cancer, leukemias and cancers of the thyroid, breasts, lungs, etc. Radium causes cancer of bone (osteosarcoma).

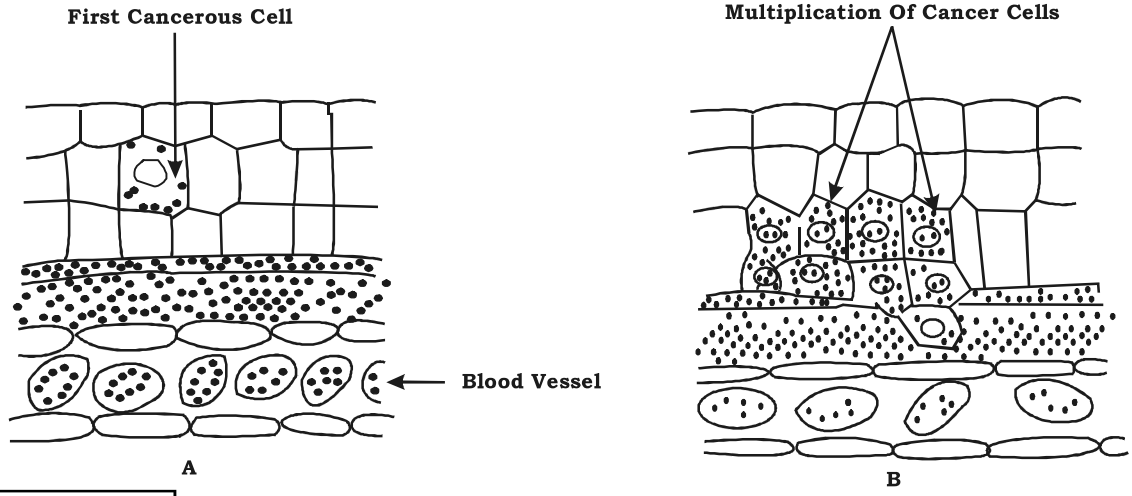
2) **Chemical :**
i) Cigarette smoking (tar) → lung cancer.
ii) Asbestos, benzene, chromium → lung cancer.
iii) Aromatic amines → urinary bladder cancer.

3) **Biological :**
i) H.B.V. (Hepatitis B Virus) and H.C.V. (Hepatitis C Virus) → liver cancer.
ii) H.P.V. (Human Papilloma Virus) → cervix cancer.
iii) H.H.V.– 8 (Human Herpes Virus type 8) → Kaposi's Sarcoma
iv) EBV (Epstein– Barr Virus) → Burkitt's lymphoma (jaw tumour) Nasopharyngeal carcinoma.
v) Schistosoma haematobium (parasite) → urinary bladder cancer.
vi) Helicobacter pylori (bacteria) → Gastric lymphoma (Causative agent of peptic ulcer).

4) **Mechanical :**
i) Chewing tobacco/betal nut→ lip and mouth cancer.
ii) Broken tooth → tongue cancer.

Co-carcinogens

They are chemicals or factors which function as cancer/ tumour promoters. Cocareinogens or epigenetic carcinogens promote neoplastic growth only after initiation by a carcinogen. Some cocarcinogens are Polonium, Nickel, Nicotine, Saccharine, Menobarbitol.



Mechanism/Carcinogenesis

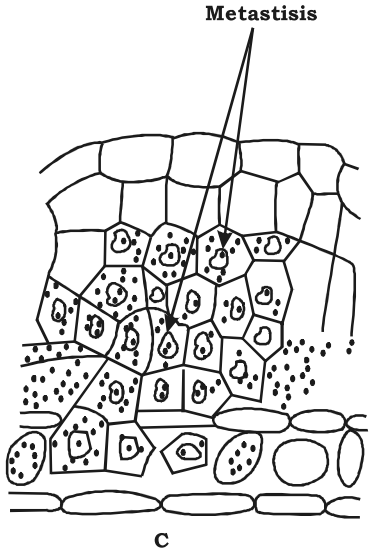
It occurs through the following stages :

1) **Initiation :**
Carcinogens produce DNA lesions. Epidemiological studies indicated that initiation of cancer occurs in childhood and youth.

2) **Promotion :**
Proto–oncogenes are changed to oncogenes. A cell with oncogene is called latent tumour cell. Promotion is reversible. Common promoters are saccharin and phenobarbitol.

3) **Loss of Adhesion or Loss of Contact Inhibition:**
Normal cells do not divide because of contact inhibition. Latent tumour cell loses contact with other cells. This changes it in to active tumour cell.

4) **Progression :**
The active tumour cell beings to divide and forms neoplasm or cell aggregate which later turns into a tumour. Progression is slow so that external symptoms do not appear till the tumour is formed. It presses adjacent organs and tissues.



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5) **Metastasis :**
Tumour cells are also called cancer cells. They become less adhesive. The cancer cells do not undergo differentiation. They release angiogenic factors which stimulate growth of blood vessels. Soon the cancer cells begin to migrate with or without secondaries. Cancer cells have irregular, hypertrophied nucleus, abundant nuclear granules, increased number of lysosomes reduced cristae in mitochondria, more melanin, mucus, fat droplets and debris in cells.

Diagnosis :
Biopsy of tissue, endoscopy (gastroscope for stomach, laparoscope for pelvic region), X–rays, ultra–sound.

AIDS

It is a fatal disease caused by a virus.
Although AIDS is not contagious, it is infections.
AIDS is a pandemic today i.e. affecting the entire world.
It is also called as modern plague.

History

In **1981**, AIDS was first found in Homosexuals in **USA** (Haiti).
In **1983**, in Paris, **Luc Moulagnier** discovered the AIDS virus and named it.
Lymphadenopathy Associated Virus **(LAV)**.
In **1984**, in USA, **Robert Gello** discovered the AIDS virus independently and named it Human T–Lymphocytotrophic Virus – 3 (**HTLV–3**).
In **1986**, in India, AIDS virus was first found in 10 prostitutes in Chennai.
In **1986**, the International Committee in Taxonomy of Virus named AIDS virus as Human Immunodeficiency Virus **(HIV)**.

How did humans get the virus :
The African green monkey contains **Simian Immunodefiency Virus** similar to HIV. It is belived that this monkey bit or scratched some human beings. Thus the virus spread to humans through the wounds. African green monkeys are resistant, while the macaques monkays are susceptible to this virus. Some people believe that in 1950's the kidney of the African monkey was used to prepare a polio vaccine. This vaccine was given to 3,25,000 African children. Maybe this vaccine is responsible for spread of HIV to humans.

Death in AIDS

Death in AIDS occurs due to untreatable or incontrolled infections like oppurtunistic infections and not HIV.
Tuberculosis is the principal killer of HIV +ve people (in India)

Investigations :
1) **Elisa test:**
This test is used to **detect antibodies** produced by the human body against HIV. After entry of HIV in the body, a period of **3 – 6 months** is required by the human body to produce the antibodies.
During this period ELISA test will be negative.
The period when the person is infected by HIV but ELISA in negative is called **window period**.

If ELISA is negative :
Either the patint does not have the disease or the person may be in window period.
If ELISA is positive :
The person may or may not have HIV.

2) **Western Blot test :**
ELISA test may shows a positive result in some other conditions like Leprosy, T.B., Malaria, Cancer, Hepatitis B, Rheumatoid arthritis, Haemophilia, Pregnancy, Kidney failure, Flu, etc. Thus it is necessary to perform a **Western Blot test** which is a **confirmatory test** for HIV.
Western Blot is more specific and more reliable but it is expensive.

3) **Other parameters :**
Low WBC (leucocyte) count
T-Lymphocyte count < 200/ cubic mm
High immunoglobulin or antibody level
} Indicate high posibility of AIDS

4) **Newer tests :**
The above tests have a window period, but the new technique called polymerase chain reaction (PCR) doesn't have window period.
It is used to detect p24 antigen. It is fastest test for HIV.
RNA–PCR is done within 48 hours after birth for children born to HIV +ve mothers

AIDS control programmes :
World AIDS day is celebrated on 1st December.
WHO launched a global programme on AIDS on 1st Feb 1987.
India started national AIDS conttrol programme in 1987 (National AIDS Control Organisation).

Adolescence

Characteristics of adolescence :
1) There is an accelerated physical growth with development of reproductive organs.
2) The physical and physiological changes are known as bodily changes. They include alterations is height, weight, reduction in fat (puppy fat) muscle distribution and development, glandular secretions and sexual characteristics.
There is a spurt in physical growth, which may be as much as 7.5 – 15 cm in a single year.
3) Adolescents consider themselves more idealistic and less materialistic, and are sceptical about the efficiency and ethics of government, business and other social institutions.
4) Values such as love, friendship, privacy, tolerance and self–expression are emphasized.

Common Problems of Adolescence :
Adolescents of both sexes face various problems due to different factors. Some important problems are as follows :
1) **Acne** is the most common problem of almost all adolescents of both the sexes. It results from clogged pores of skin due to the side effect of influx of sex hormones. This is a skin problem which increases self-consciousness, especially if it appears on the face.
2) **Hypochondria** is undue concern about health. Adolescents, especially 'late developers', often suffer from anxiety and this psychosomatic disorder (hypochondria).
3) Adolescents may experience alternate periods of **loneliness** (withdrawl from social surroundings) and **gregariousness** (a tendency to be with the social surroundings).
4) Some adolescents **do not consume** proper food as they may develop a **feeling to control weight**. Some others may have an irresistable craving for food, leading to **overeating**.
5) In females sometimes, **physiological aberrations**, including absence of monthly periods or perceptual disturbances may also occur.

6) In some cases **neurasthenia** may occur. It is characterized by the inability to concentrate on or enjoy things, and may lead to irritability, fatigue, insomnia, depression and headache.
7) Different kinds of **phobias** are also common in adolescents. Phobias are intense fear of things or creatures, e.g., ophidophobia (fear of snakes), fear of situations like crowded places, vast open places, closed small chambers, etc., common problems.
8) Adolescents may also severely suffer from traumatic experiences like rape, blasts, robbery, etc.
9) **Addiction to drugs, alcohol, tobacco chewing** and **smoking** is also common among adolescents. Advertisements, curiosity, peer-pressure, depression and frustration, felling of independence, false belief of enhanced physical, mental and/or intellectual performance, may be some of the reasons for such addictions.

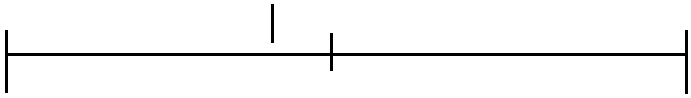
ADDICITION

The physical and mental dependence on a drug is called **addiction.** Addiction can be caused by following :

Major Groups of Drugs with Examples and Effects

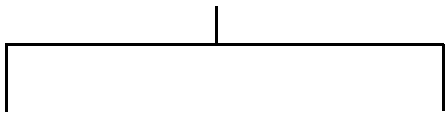
Sr. No.	Types of drugs	Examples	Effects
1.	Tranquillizers	Phenothiazenes Benzodiazepines	Lesson tension and anxiety with-out sedation and inducing sleep
2.	Sedatives and Hypnotics	Barbiturates, Benzodiazepines (e.g. valium)	Depress CNS activity, give feeling of calmness, relaxation, drowsiness. High doses induce deep sleep
3.	Opiate Narcotics	Opium, Morphine, Codeine, Heroin, Smack, Pethidine, Methadone	Suppress brain activity, relieve pain, stimulate nervous system
4.	Stimulants	Caffeine, Cocaine, Crack, Betel Nut, Amphetamines	Makc a person more wakeful, alert and active, cause excitement
5.	Hallucinogens	LSD, Mescaline, Psilocybin, Psilocin, Bhang (Hashish), Ganja, Charas, Marijuana	Alter thoughts, feeling and perceptions. Cause illusions

Types of Opiate Narcotics



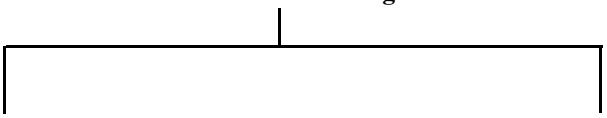
Natural Opiates	Semisynthetic Opiates	Synthetic Opiates
1. Opium	1. Heroin (Diacetyl morphine)	1. Pethidine (Meperidine)
2. Morphine	2. Smack	2. Methadone
3. Codeine		

Classification of Stimulants



Natural Stimulants	Synthetic Stimulants
1. Caffeine	1. Amphetamines
2. Cocaine	
3. Crack	
4. Betelnut	

Classification of Hallucinogens



Natural Hallucinogens	Synthetic Hallucinogens
1. Lysergic Acid Diethylamide (LSD)	1. Phencyclidine Piperidine (PCP)
2. Mescaline	2. Methylenedioxy Methamphetamine (MDMA)
3. Psilocybin	
4. Hemp products	

Plants that Provide Drugs :

Sr. No.	Name of Plant	Family of Plant	Drug-yielding Plant Part	Name of Drug and Its Type
1.	Chene or Opium Poppy plant, *Papaver somniferum*	Papaveraceae	Latex of Unripe Capsules (Frutis)	Opium and its Derivatives: Morphine, Codeine, Heroin (Narcotic, Analgesic)
2.	Hemp Plant, *Cannabis indica* *Cannabis sativa*	Moraceae Moraceae	Leaves and Flowering shoots of the plants i) Dried, Unfertilized Flowering Tops of Plant ii) Leaves and Flowering Tops of Plant iii) Dried Flowering Tops of Plant	Bhang (Hallucinogen) Ganja (Hallucinogen) Charas (Hallucinogen) Marijuana (Hallucinogen)
3.	Tea Plant, *Thea sinensis*	Theaceae	Dried Leaves	Caffeine (Stimulant)
4.	Coffee Plant, *Coffea arabica*	Rubiaceae	Dried Seeds	Caffeine (Stimulant)
5.	Cacao Plant, *Theobroma cacao*	Sterculiaceae	Dried Seeds	Caffeine (Stimulant)
6.	Coca Plant, *Erythroxylon coca*	Erythrozylaceae	Dried Leaves and Young Twigs	Cocaine (Stimulant), Crack (Intense stimulant)
7.	Peyote Cactus, *Lophophora williamsii*	Cactaceae	Mescals (Dried Tops)	Mescaline (Hallucinogen)
8.	Ergot Fungus, *Claviceps purpurea*	Ascomycetes	Fruiting Bodies	Lysergic Acid Diethylamide (LSD) (Hallucinogen)
9.	Mexican Mushroom, *Psilocybe mexicana*	Agaricaceae	Fruiting Bodies	Psilocybe (Hallucinogen)

Slang Names of Certain Drugs :

Sr. No.	Slang Name	Chemical Names
1.	Acid	Lysergic Acid Diethylamide (LSD)
2.	Angel Dust	Phencyclidine Piperidine (PCP)
3.	Brown Sugar	Diacetylmorphine hydrochloride
4.	Coke	Cocaine
5.	Downers (Sleeping Pills)	Barbiturates
6.	Grass	Marijuana
7.	Hash	Concentrated tetrahydrocannabinol
8.	Magic Mushroom	Psilocybin
9.	Speed	Amphetamines

Alcohol-Drug Interaction :

Sr. No.	Combination	Effect
1.	Alcohol + Barbiturates	Markedly increased depressant effect
2.	Alcohol + Antihistamines	Marked drowsiness
3.	Alcohol + Valium	Dramatically increased sedative effect
4.	Alcohol + Marijuana or Hashish	Decreased coordination, increased reaction time, impaired judgement
5.	Alcohol + Aspirin	Increased chances of damage to gastric mucosa

Tobacco – smoking :

Tobacco was first used by **Red Indians** in America.

It is obtained from dried leaves of plant *Nicotiana tabacum* and N. *rustica.*

Nicotine in tobacco causes addiction. It stimulates nerve impulses, causes muscles to relax and releases adrenalin thereby increases blood pressure and heart beat.

Nicotine inhibits the growth of foetus.

Tobacco smoke contains CO, polycyclic aromatic hydrocarbons and tar.

Polycyclic hydrocarbons are carcinogenic.

Harmful effects of smoking are respiratory diseases like lung cancer, bronchitis and emphysema and cardiovascular diseases like Coronary artery disease and peripheral vascular disease.

Components of Tobacco Smoke and their effect :

Smoke Constituents		Effect on body	
1.	Benzpyrene, β Naphthlamine N-nitrosonornicotine, Catechol, Trace metal like Nickle, Arsenic, Polonium 210.	1.	Carcinogenic i.e., Cancer causing
2.	Nicotine (N-nitroso dimethyl amino)	2.	Stimulate epinephrine formation, Addiction, Paralysis of nerve cell.
3.	Phenol and cresol.	3.	Carcinogenic and irritant.
4.	Carbazol and Indole.	4.	Induce tumour formation.
5.	Tar	5.	Cough, Bronchitis and emphysema.
	Gaseous		
1.	CO	1.	Low O_2 supply to body
2.	Acetaldehyde, NH_3, NO_2, Acrolein	2.	Irritant and ciliotoxic.

Alcohol :

Ethyl alcohol is colourless liquid produced by fermentation of carbohydrates by yeast

Ethyl alcohol is active constituent of alcoholic drinks such as **Beer** [5% of by volume], **Wine** [10% by volume] and **Whisky** [42.8% by volume].

In medicine, alcohol is used as antiseptic and solvent

Alcohol is not a stimulant. It acts as **sedative, depressant** and **anaesthetic.**

Alcohol is rapidly absorbed and enters the blood stream in few minutes. In the liver, alcohol is concentrated into acetaldehyde, which is toxic and used in the synthesis of fat. So liver start synthesising more fat than glycogen which leads to **fatty liver syndrome** (**Liver Cirrhosis**).

Alcohol increases LDL in high dosage and has anaesthetic effect on C.N.S.

Alcohol causes loss of judgement, will power and self control

It also causes **Tunnel vision.**

It causes inflammation of axons of neurons leading to **Neuritis**

Kidneys become hyperosmotic; large amount of water is expelled as urine, which leads to decreased glucose level in blood.

Blood Alcohol Concentration (BAC): Following three levels of BAC is recorded :

1) **Low:**
   It causes flushed face, feeling of high, talkative, drunken behaviour.
2) **Rising :**
   It resulted into dizziness, clumsy gait, loss of coordination, impaired driving, incoherent Speech.
3) **High :**
   It causes high intoxication, unconsciousness, slow metabolism, coma or death may occur.

Effect of Alcohol on Health :

	Physical Health		Psychological		Social
1)	Neuritis	1)	Forgetfulness	1)	Neglect of family
2)	Gastritis	2)	False show of good manners.	2)	Absence from Duty
3)	Hepatitis and cirrhosis	3)	Suspiciousness	3)	Corruption, crime & accidents
4)	Pancreatitis	4)	Concealment of Drunkenness	4)	Divorces
5)	Hypertension, Tachycardia Myocardiopathy Hypoglycemia		—		—
6)	Infertility		—		—
7)	Foetal alcohol syndrome		—		—
8)	Anaemia and myopathy		—		—

EXERCISE – 1

1. At which stage of HIV infection does one usually shows symptoms of AIDS ?
(a) when viral DNA is produced by reverse transcriptase
(b) when HIV replicates rapidly in helper T-lymphocytes and damages large number of these
(c) with 15 day of sexual contact with an infected person
(d) when the infecting retrovirus enters host cells

2. Which one of the following acts as a physiological barrier to the entry of microorganisms in human body ?
(a) tears
(b) monocytes
(c) skin
(d) epithelium of urogenital tract

3. Phagocytic cell microglia is present in
(a) blood
(b) lungs
(c) brain and spinal cord
(d) liver

4. Find out odd one
(a) Helper T cells (b) Memory cells
(c) Killer T cells (d) Phagocytes

5. Your immune system helps to protect you against viruses and bacteria that can cause sickness. Which cells are part of the immune system ?
(a) White blood cells (b) Red blood cells
(c) Nerve cells (d) None of these

6. Which one of the following diseases is caused by virus ?
(a) Cholera (b) Diphtheria
(c) Measles (d) Whooping cough

7. Which of the following diseases is caused due to allergic reaction ?
(a) Leprosy (b) Typhoid
(c) Asthma (d) Tetanus

8. Vaccine for tuberculosis is known as
(a) PAS vaccine (b) BCG vaccine
(c) OPV (d) DPT

9. The immune system is made of
(a) humoral system
(b) humoral and cell mediated system
(c) humoral and fibrous system
(d) antigen induced antibodies

10. Our body has _____ lines of defence
(a) Nil (b) Many
(c) Two (d) Three

11. Which one of the following properties of acquired immunity is the basis of vaccination
(a) Diversity
(b) Specificity
(c) Memory
(d) Discrimination between self and non self

12. Memory cells are stored in
(a) kidney (b) brain
(c) spleen (d) heart

13. B cells gives rise to
(a) memory cells (b) killer cells
(c) mast cells (d) helper cells

14. The term "humor" refers to
(a) hormones (b) plasma and lymph
(c) bone marrow (d) all internal tissues

15. The term 'Vaccine' was introduced by
(a) Jenner
(b) Koch
(c) Pasteur
(d) Jointly by Koch and Pasteur

16. Identify the wrongly matched pair
(a) Typhoid - Widal test
(b) Plague - Viral disease
(c) Malignant malaria - *Plasmodium falciparum*
(d) Common cold - Rhinovirus

17. The organ related with immunity is
(a) liver (b) parathyroid
(c) thymus (d) pineal

18. A non-communicable disease is
(a) measles (b) rabies
(c) diphtheria (d) diabetes

19. How many variable segments are present in the basic structure of antibody molecules ?
(a) one (b) two
(c) three (d) four

20. The letter T in T-lymphocyte refers to
(a) thyroid (b) thalamus
(c) tonsil (d) thymus

21. A vaccine meant for protection against tuberculosis is
(a) BCG (b) DPT
(c) TT (d) BGC

22. Which one of the following statements is correct with respect to AIDS ?
(a) The HIV can be transmitted through eating food together with an infected person
(b) Drug addicts are least susceptible to HIV infection
(c) AIDS patients are being fully cured cent per cent with proper care and nutrition
(d) The causative HIV retrovirus enters helper T-lymphocytes thus, reducing their numbers

23. The immunoglobulin abundant in colostrum is
(a) IgG (b) IgM
(c) IgD (d) IgA

24. The polypeptide chains present in gamma immunoglobulin are
(a) 2 (b) 4
(c) 6 (d) 8

25. Antiserum contains
(a) leukocytes (b) antigen
(c) antibodies (d) both a and b

26. Removal or absence of thymus in early life shall bring about
(a) lack of lymphocytes (b) lack of antibodies
(c) lack of lymph nodes (d) All of these

27. Genetic material found in Human Immunodeficiency Virus (HIV) is
(a) double stranded RNA
(b) single stranded RNA
(c) double stranded DNA
(d) single stranded DNA

28. A person is suffering from frequent episodes of nasal discharge, nasal congestion, reddening of eyes asnd watery eyes. These are the symptoms of
(a) cyanosis (b) bronchitis
(c) rhinitis (d) bronchial carcinama

29. Damage to thymus in a child may lead to
(a) loss of cell–mediated immunity
(b) a reduction in the haemoglobin content in blood
(c) a reduction in the amount of plasma proteins
(d) loss of antibody–mediated immunity.

30. Match column I with column II and choose the correct answer.

Column I	Column II
A. Neoplasm	1. Haematopoietic cell tumour
B. Benign tumour	2. Bone, cartilage tissue cancer
C. Carcinoma	3. Malignant tumour
D. Sarcoma	4. Cancer of epithelial tissue
E. Lymphoma	5. Initiation of new tumour

	A	B	C	D	E
(a)	3	5	4	2	1
(b)	3	5	4	1	2
(c)	5	3	4	2	1
(d)	5	4	3	2	1

31. Passive immunity is defined as immunity
(a) inherited from parents
(b) achieved through first exposure to the disease
(c) achieved through vaccination
(d) achieved through the sera of other animal's enriched in antibodies

32. AIDS virus contains
(a) RNA with protein (b) DNA with protein
(c) DNA without protein (d) DNA only

33. Latin word immunity means
(a) destroy (b) freedom
(c) exempt (d) both c and b

34. T-lymphocytes first mature in
(a) spleen (b) pancreas
(c) thymus (d) liver

35. HIV virus affect _____ in AIDS patient.
(a) cytotoxic T–cell (b) M–N cell
(c) suppressor cell (d) helper T–cells

36. 'Mammalian thymus' is mainly concerned with
(a) regulation of body temperature
(b) regulation of body growth
(c) immunological functions
(d) secretion of thyrotropin

37. Some diseases are transmitted through contaminated articles. The method is called
(a) vehicle transmission
(b) vector transmission
(c) air borne method
(d) fomite borne method

38. _____ cells inhibit the immunity from attacking the body's own cell
(a) Memory T-cells (b) Helper T-cells
(c) Killer T-cells (d) Suppressor T-cells

39. Acquired immunity developed after vaccination or infection is found in
(a) vertebrates only
(b) invertebrates only
(c) invertebrates as well as vertebrates
(d) all of the above

40. The colostrum provides
(a) Naturally acquired active immunity
(b) Naturally acquired passive immunity
(c) Artificially acquired active immunity
(d) Artificially acquired passive immunity

41. Which one of the following pairs is not correctly matched?
(a) Vitamin-B_{12} – Pernicious anaemia
(b) Vitamin-B_6 – loss of appetite
(c) Vitamin-B_1 – Beri-beri
(d) Vitamin-B_2 – Pellagra

42. The interferons are
(a) antibacterial drugs
(b) antiviral drugs
(c) antibiotic drugs
(d) immunosuppressive drugs

43. Which Ig is produced in primary immune response?
(a) IgA (b) IgE
(c) IgG (d) IgM

44. Magic bullets are the
(a) recombinant vaccines
(b) monoclonal antibodies
(c) chemotherapy drugs for cancer
(d) anabolic steroids

45. Allergy involves
(a) IgE (b) IgG
(c) IgA (d) IgM

46. Which one of the following blood group is indicated by agglutination with anti A and anti B serums
(a) A (b) AB
(c) B (d) O

47. Rabies is caused by
(a) virus (b) bacteria
(c) Protozoa (d) All of these

48. Select the blood transfusion which is unsafe
(a) A to AB (b) AB to AB
(c) B to AB (d) A to B

49. Bacterium, which is concerned with pertussis is
(a) *Bordetella pertussis*
(b) *Bacillus*
(c) *Diplococcus*
(d) *Mycobacterium tuberculum*

50. A person with 'O' blood group is called universal donor because his blood has
(a) A and B antigens (b) 'B' antigen
(c) No antigen at all (d) 'A' antigen

51. Rh factor was discovered by
(a) Landsteiner Karl (b) Edward Jenner
(c) Weiner (d) Both a and b

52. The smallest unit of antigenicity is
(a) haptens (b) paratope
(c) epitope (d) antigen

53. The cancer of the epithelial cells is called
(a) leukaemia (b) lipoma
(c) sarcoma (d) carcinoma

54. Marriage between one of the following pairs may cause foetal death
(a) Rh^+ man and Rh^- woman
(b) Rh^- man and Rh^- woman
(c) Rh^+ man and Rh^+ woman
(d) Rh^- man and Rh^+ woman

55. Short lived immunity acquired from mother to foetus across placenta or through mother's milk to the infant is categorized as
(a) active immunity
(b) passive immunity
(c) cellular immunity
(d) innate or non-specific immunity

56. An autoimmune disease is
(a) AIDS (b) heamophilia
(c) allergy (d) Myasthenia gravis

57. Which one of the following statement is correct
(a) the universal blood donor is type AB and universal recipient is type O
(b) the universal blood donor is type O and the universal recipient is type AB
(c) the individual with blood group A can receive blood from AB
(d) the individual with blood B can receive blood from AB

58. Which of the following elements is important to maintain structure of immunoglobulin?
(a) P (b) Fe
(c) S (d) Ca

59. Study the following sentences.
I. The cells of malignant tumours divide erratically.
II. They are malignant tumours of epithelial cells.
III. They are malignant tumours of organs that originate from mesoderm.
IV. These tumours are found in organs such as spleen and lymph nodes.
Which of the above are true for angiosarcoma?
(a) I and II (b) II and IV
(c) I and III (d) II and III

60. The complexes formed during immune complex mediated hypersensitivity are removed by
(a) eosinophils and Tc cells
(b) monocytes and B–lymphocytes
(c) eosinophils and monocytes
(d) eosinophils and basophils

61. Which is a correct pair of a pathogen and its vector?
(a) *Plasmodium* and *Anopheles*
(b) *Plasmodium* and *Culex*
(c) Virus and *Anopheles*
(d) Protozoan and *Aedes*

62. What is an antigen
(a) it is a blood group
(b) it is a toxic substance
(c) it is a phospholipid
(d) it is a protein

63. The full form of SCID is
(a) Secondary Communicable Internal Disease
(b) Secondary Communicable Infections Disease
(c) Severe Combined Immuno Deficiency
(d) Severe Communicable Internal Disease

64. Antigen are also known as
(a) 'Agglutinogen' (b) Epitope
(c) Agglutinin (d) Hapten

65. AIDS virus is also known as
(a) HIV
(b) HILV-III
(c) LAV
(d) All of these

66. The process, in which antibody comes in contact with antigen and convert them in harmless insoluble matter, is called
(a) Activation (b) Agglutination
(c) Neutralization (d) Opsonization

67. Antibodies are
(a) lipids (b) carbohydrates
(c) immunoglobulins (d) antiviral particles

68. Incubation period of *plasmodium vivax* is
(a) 14 days (b) 30 days
(c) 40 days (d) 32 days

69. Anaemia is due to deficiency of
(a) Ca (b) Fe
(c) Mg (d) P

70. The site recognised by antibodies on antigen are
(a) epitopes (b) paratopes
(c) haptens (d) hinge region

71. Which one of the following is a protozoan disease?
(a) Filariasis (b) AIDS
(c) Ascariasis (d) Malaria

72. Acquired immunity is due to
(a) Physiological and inflammatory barriers
(b) lymphocytes
(c) erythrocytes
(d) NK–cells

73. The flexible region of antibody where two light chain attached to corresponding heavy chains is
(a) hinge region
(b) prong
(c) fragment crystalline region
(d) fragment antigen binding region

74. Person with blood group AB is considered as universal recipient because he has
(a) no antigen on RBC and no antibody in the plasma
(b) both A and B antigens in the plasma but no antibodies
(c) both A and B antigens on RBC but not antibodies in the plasma
(d) both A and B antibodies in the plasma

75. Which is not symptom of *Entamoeba histolytica* infection
(a) Relapsing fever (b) Abdominal pain
(c) Blood in stool (d) Irregular bowel

76. Match the following columns and choose the correct option.

Column I	Column II
A. *Leishmania donovani*	1. Malaria
B. *Wuchereria bancrofti*	2. Amoebiasis
C. *Trypanosoma gambiense*	3. Kala-azar
D. *Entamoeba histolytica*	4. Sleeping sickness
	5. Filariasis

	A	B	C	D
(a)	4	3	2	1
(b)	3	4	5	1
(c)	3	5	4	2
(d)	3	5	2	1

77. Ability of an organism to enter a host is
(a) Virulence (b) Pathogenicity
(c) Toxicity (d) All of these

78. Malarial parasite can be obtained in RBCs of patient
(a) when temperature reaches normal
(b) an hour before rise in temperature
(c) when temp rises with rigor
(d) a few hours after temperature

79. Which of the following is a viral disease ?
(a) Typhoid (b) Polio
(c) TB (d) Leprosy

80. African sleeping sickness is caused by
(a) *Trypanosoma* (b) *Leishmania*
(c) *Latimeria* (d) *Plasmodium*

81. Malignant malaria is caused by
(a) *Plasmodium falciparum*
(b) *Plasmodium ovale*
(c) *Plasmodium vivax*
(d) *Plasmodium malariae*

82. Which of the following is quartan in periodicity
(a) *P.vivax* (b) *P.ovale*
(c) *P.malariae* (d) *P.falciparum*

83. Which one is carrier of microfilariae ?
(a) *Culex* (b) *Aedes*
(c) *Anopheles* (d) *House fly*

84. *Salmonella* is related with
(a) typhoid (b) polio
(c) TB (d) tetanus

85. Which of the following is an example of carcinoma ?
(a) Melanoma cancer of skin
(b) Cancer of lymph gland
(c) Cancer of muscle
(d) Cancer of blood

86. The primary host of *Plasmodium* is
(a) man (b) male *Culex*
(c) sheep (d) female *Anopheles*

87. *Wuchereria bancrofti* is
(a) a Platyhelminthes
(b) only host in man
(c) causing blockage of lymphatic vessel
(d) None of the above

88. BCG vaccine is used against
(a) TB (b) leprosy
(c) flood poisoning (d) None of these

89. Disease caused by deficiency of vitamin-C is
(a) beri beri (b) scurvy
(c) pellagra (d) night blindness

90. The infective stage of *Entamoeba histolytica* is
(a) spore (b) egg
(c) trophozoite (d) cyst.

91. Which one of the following stage of amoebiasis is known as fulminant amoebiasis
(a) symptomatic stage
(b) initial stage
(c) severe stage
(d) isoymptomatic stage

92. 'Lock jaw' is another name of
(a) malaria (b) kala-azar
(c) tetanus (d) dipheheria

93. Carriers of *Entamoeba histolytica* are
(a) mosquito of genus *Anopheles*
(b) mosquito of genus *Culex*
(c) *Musca domestica* (housefly)
(d) healthy human host

94. Which one of the parasitic stage of *E.histolytica* is resistant to chlorination
(a) cyst form
(b) non encysted amoeba
(c) mature amoeba
(d) trophozoites form

95. *E.histolytica* resides in liver and it shows symptoms like
(a) dysentery (b) abscesses
(c) colitis (d) all these symptoms

96. In malaria, which of the following is released in blood to cause chills and fever ?
(a) hematin (b) haemozoin
(c) Schuffner's dot (d) hematocrin

97. Man in the life cycle of plasmodium is
(a) primary host (b) secondary host
(c) intermediate host (d) both b and c

98. All stages of *Plasmodium* get digested in stomach of female *Anopheles* except
(a) sporozoite (b) gametocyte
(c) erythrocyte (d) None of these

99. Which of the following disorders is not hereditary ?
(a) Haemophilia (b) Cataract
(c) Sickle cell anaemia (d) Colour blindness

100. Fever in malaria is due to
(a) entry of sporozoites into blood capillaries
(b) entry of merozoites into liver cells
(c) release of merozoites from red blood cells
(d) entry of cryptomerozoites into red blood cells

101. Pre erythrocytic phase of malarial parasites completed in
(a) stomach (b) erythrocytes
(c) lungs (d) liver

102. Tetanus disease is caused by
(a) virus (b) bacteria
(c) fungi (d) mycoplasma

103. Human immunodeficiency virus causes
(a) acquired immuno deficiency syndrome
(b) anthrax
(c) tuberculosis
(d) polio

104. DPT vaccine is given for
(a) tetanus, polio, plague
(b) diphtheria, whooping cough and leprosy
(c) diphtheria , pneumonia, tetanus
(d) diphtheria, whooping cough, tetanus

105. The first antibiotic was discovered by
(a) Alexander Fleming (b) W Flemming
(c) R Koch (d) Louis Pasteur

106. The pathogen and the vector of the malarial parasite respectively are
(a) *Plasmodium* and *Anopheles*
(b) *Trypanosoma* and *Culex*
(c) *Leishmania* and sand fly
(d) *Wuchereria* and *Culex*

107. Who developed vaccine against smallpox ?
(a) Louis Pasteur (b) Selman Waksman
(c) Edward Jenner (d) Alexander Flemming

108. Which is not cancer ?
(a) Leukaemia (b) Trachoma
(c) Carcinoma (d) Sarcoma

109. Which one of the following diseases is a sexually transmitted disease ?
(a) Cancer (b) Syphilis
(c) Diphtheria (d) Myocarditis

110. Malarial parasite is introduced into the blood of man as a
(a) metacryptozoite (b) schizont
(c) oocyte (d) sporozoite

111. Immunoglobulins are made up of
(a) two polypeptide chains
(b) four polypeptide chains
(c) three amino acids only
(d) five nucleotides

112. Which one the following is a bacterial disease ?
(a) Measles (b) Chicken pox
(c) Rabies (d) Tuberculosis

113. In hepatocytes of liver, malaria parasite changes from
(a) sporozoites into merozoites
(b) sporozoites into trophozoites
(c) trophozoites to merozoites
(d) trophozoites to schizonts

114. The classic symptoms of malaria is
(a) slowly progressive fever
(b) coldness with rigor then fever
(c) edema with thickening of skin
(d) gastro-intestinal discomfort

115. The disease filariasis transmitted by
(a) tse-tse fly (b) sand fly
(c) Culex (d) Anopheles

116. Identify the site where *Wuchereria bancrofti* is normally found on human body
(a) skin between the fingers
(b) lymphatic vessels of the lower limbs
(c) muscles of the legs
(d) blood vessels of the thigh region

117. Cancerous cells spread through
(a) lymph
(b) blood
(c) secondary growths of malignant tumour
(d) All of the above

118. Hepatitis is a
(a) viral disease (b) bacterial disease
(c) fungal disease (d) protozoan disease

119. A disease caused by nematode parasite is
(a) Leprosy (b) Filariasis
(c) Amoebiasis (d) Poliomyelitis

120. Ingestion of food and water contaminated with infective eggs is the primary route of infection for
(a) *Taenia solium* (b) *Wuchereria bancrofti*
(c) *Trichinella sp* (d) *Ascaris lumbricoids*

121. The sites of the first, second and third moulting of the *Ascaris* larva are respectively
(a) liver, lung and intestine
(b) liver, stomach and intestine
(c) soil, alveoli and lung
(d) soil, intestine and lungs

122. Life cycle of *Ascaris* consists of
(a) two hosts human and monkey
(b) one host human
(c) two hosts human and female *Anopheles*
(d) one host female *Anopheles*

123. Larva of which one of the following pathogen cause neurological disorder during its migration
(a) *Wuchereria* (b) *Plasmodium*
(c) *Entamoeba* (d) *Ascaris*

124. Acute viral rhinopharyngitis is caused mainly by
(a) HIV (b) Corona viruses
(c) Rhino viruses (d) Both b and c

125. Alcoholism may leads to
(a) skin cancer (b) liver cirrhosis
(c) viral disease (d) eye infections

126. *Microsporum* is most *common* causative agent of _____.
(a) Filariasis (b) Ringworm
(c) Amoebiasis (d) Common cold

127. Addiction to alcohol causes
(a) cirrhosis (b) epilepsy
(c) neurosis (d) psychosis

128. Amphetamines are the drugs of which category
(a) narcotics (b) sedatives
(c) stimulants (d) hallucinogens

129. Which one of the following is the correct statement regarding the particular psychotropic drug specified ?
(a) Hashish causes altered thought perceptions and hallucinations
(b) Opium stimulates nervous system and causes hallucinations
(c) Morphine leads to delusions and disturbed emotions
(d) Barbiturates cause relaxation and temporary euphoria

130. _____ is derived from ergot fungus
(a) Cocaine (b) LSD
(c) Morphine (d) Heroin

131. Which of the following diseases is not caused by virus ?
(a) Mumps (b) Rabies
(c) AIDS (d) Tuberculosis

132. Marriageable age for girls and boys is
(a) 21 and 24 (b) 18 and 21
(c) 15 and 18 (d) 18 and 24

133. Harmful effect of cigarette smoking is
(a) baldness (b) yellowing of eyes
(c) lung cancer (d) None of these

134. Which one of the following is a stimulant ?
(a) LSD (b) Cocaine
(c) Opium (d) Heroin

135. The synthetic drugs structurally similar to adrenaline are
(a) amphetamies (b) barbiturates
(c) hallucinogens (d) nicotinic derivatives

136. Foetal abnormalities are caused by
(a) LSD (b) opium
(c) nicotine (d) alcohol

137. Drugs that cause malformations in embryo during pregnancy are called
(a) tranquilizer (b) teratogens
(c) alcoholic beverages (d) nicotine

ANSWER KEY

EXERCISE – 1

1. (b)	**2.** (a)	**3.** (c)	**4.** (d)	**5.** (a)	**6.** (c)	**7.** (c)	**8.** (b)	**9.** (b)	**10.** (d)
11. (c)	**12.** (c)	**13.** (a)	**14.** (b)	**15.** (a)	**16.** (b)	**17.** (c)	**18.** (d)	**19.** (d)	**20.** (d)
21. (a)	**22.** (d)	**23.** (d)	**24.** (a)	**25.** (c)	**26.** (d)	**27.** (b)	**28.** (c)	**29.** (a)	**30.** (a)
31. (d)	**32.** (a)	**33.** (d)	**34.** (c)	**35.** (d)	**36.** (c)	**37.** (d)	**38.** (d)	**39.** (a)	**40.** (b)
41. (d)	**42.** (b)	**43.** (d)	**44.** (b)	**45.** (a)	**46.** (b)	**47.** (a)	**48.** (d)	**49.** (a)	**50.** (c)
51. (d)	**52.** (c)	**53.** (d)	**54.** (a)	**55.** (b)	**56.** (d)	**57.** (b)	**58.** (c)	**59.** (c)	**60.** (a)
61. (a)	**62.** (d)	**63.** (c)	**64.** (a)	**65.** (d)	**66.** (b)	**67.** (c)	**68.** (a)	**69.** (b)	**70.** (a)
71. (d)	**72.** (c)	**73.** (a)	**74.** (c)	**75.** (a)	**76.** (c)	**77.** (b)	**78.** (c)	**79.** (b)	**80.** (a)
81. (a)	**82.** (d)	**83.** (a)	**84.** (a)	**85.** (a)	**86.** (d)	**87.** (c)	**88.** (a)	**89.** (b)	**90.** (d)
91. (c)	**92.** (c)	**93.** (d)	**94.** (a)	**95.** (b)	**96.** (b)	**97.** (d)	**98.** (b)	**99.** (b)	**100.** (c)
101. (d)	**102.** (b)	**103.** (a)	**104.** (d)	**105.** (a)	**106.** (a)	**107.** (d)	**108.** (b)	**109.** (b)	**110.** (d)
111. (b)	**112.** (d)	**113.** (a)	**114.** (b)	**115.** (c)	**116.** (b)	**117.** (d)	**118.** (a)	**119.** (b)	**120.** (d)
121. (c)	**122.** (b)	**123.** (d)	**124.** (d)	**125.** (b)	**126.** (b)	**127.** (a)	**128.** (c)	**129.** (a)	**130.** (b)
131. (d)	**132.** (b)	**133.** (c)	**134.** (b)	**135.** (a)	**136.** (a)	**137.** (b)			

Dream on !!