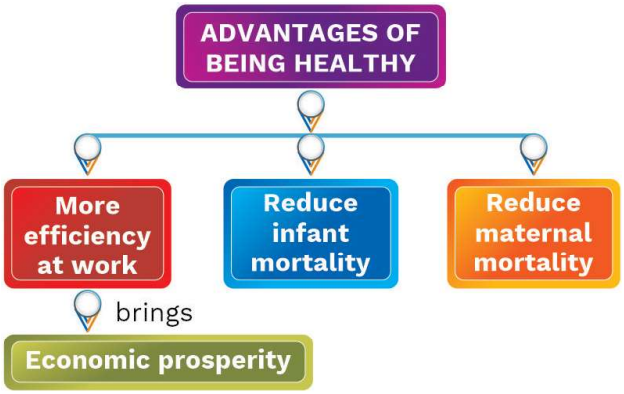
Human Health and Disease

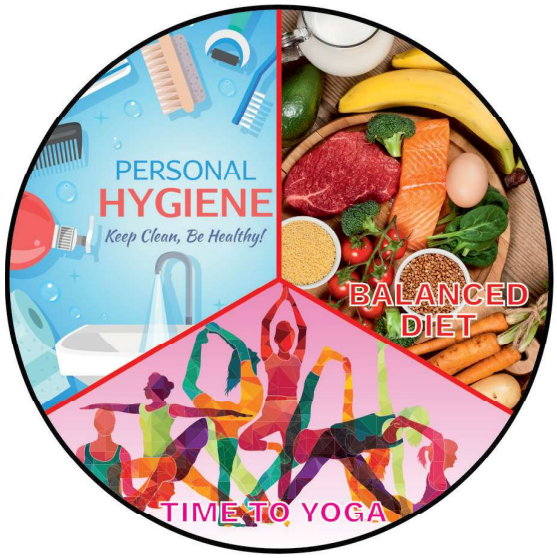
INTRODUCTION

- Health is a very important factor for the well-being of an individual. The world today is striving to maintain its immunity and to fight against the various human diseases.

HEALTH

- **It is defined as the physical, mental and social well-being of an individual.**
- Health is important for every individual. A good health of an individual has the following advantages-





Factors Affecting Health

- Pathogens
- Malfunction of an organ
- Malnutrition
- Pollution
- Genetics

Diseases

- **Dis–disturbed; ease-comfort.** Thus disease means a person is not at comfort.
- Diseases can be of the following types:

Definition

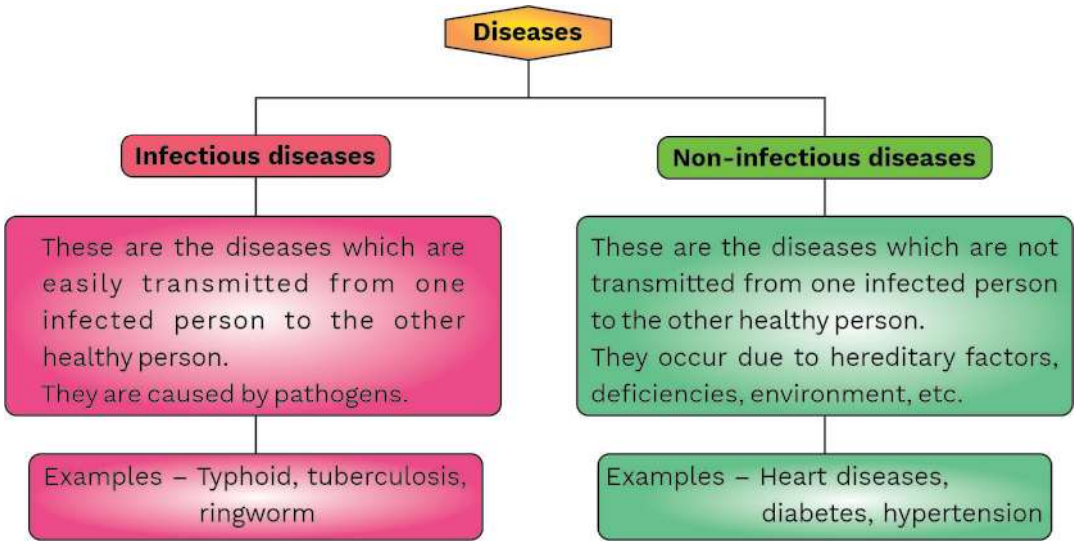
Health: The physical, mental and social well-being of an individual.

COMMON INFECTIOUS DISEASES

- The pathogens enter our body by different ways like
  - coming in contact with an infected person
  - infection by droplets
  - consuming contaminated food and water

Definition

Pathogens: : All disease causing microorganisms are known as pathogens.



Previous Year's Question

Widal test is a diagnostic test for
(1) influenza
(2) diabetes
(3) AIDS
(4) typhoid fever

Gray Matter Alert!!!

Typhoid Mary: Mary Mallon also known as Typhoid Mary, was an Irish-born cook believed to have infected many individuals with typhoid. She was the first asymptomatic carrier of the disease. The reasons that she spread the disease to many people were that she did not wash her hands properly and the raw peaches that she used for making ice cream.

Table. Bacterial Diseases of Humans

Disease	Typhoid	Diphtheria	Whooping cough (Pertussis)	Tetanus (Lock jaw)	Bacillary Dysentery (Shigellosis)
Causative Agent	*Salmonella typhi*	*Corynebacterium diphtheriae*	*Bordetella pertussis*	*Clostridium tetani*	*Shigella dysenteriae*
Mode of Transmission	Contaminated food and water	Through respiratory droplets	Droplet infection	Wound infection	Faecal oral route
Organ Affected	Small intestine	Lungs	Lungs	Muscles of the body	Intestine
Symptoms	High fever, weakness, stomach pain, constipation, headache, intestinal perforation and death may occur in severe cases	Sore throat, difficulty in breathing	Whooping sound, face becomes red during coughing, convulsions	Spasms of muscles of the jaw and face, severe pain	Abdominal pain, blood and mucus in the stool

Gray Matter Alert!!!

Widal Test: It is a test for typhoid. The causative bacteria of typhoid is mixed with serum containing the specific antibodies obtained from an infected individual.

Previous Year's Question

The causative agent of _____is bacteria
(1) Typhoid and smallpox
(2) Herpes and influenza
(3) Tetanus and mumps
(4) Cholera and tetanus

Table. Viral Diseases of Humans

Disease	Causative agent	Symptoms	Mode of Spread	Organ affected
Influenza (Flu)	*Orthomyxovirus*	Sore throat, headache, fever, sneezing, pain in the body	Droplet Infection	Nose, throat, lungs
Measles (Rubeola Disease)	*Rubeola virus*	Reddish rash appears	Droplet infection	Body
SARS–Severe Acute Respiratory Syndrome	SARS-Coronavirus	High fever, chills, headache, dizziness, sore throat, running nose, vomiting, trouble in breathing	Respiratory droplets	Lungs
Chikungunya	Chikungunya virus	Joint pain, muscle pain, fever, headache	*Aedes aegypti*	Body
Dengue	Flavi ribo virus	Fever, weakness, rashes	*Anopheles* mosquito	Platelets in the blood

PROTOZOAN DISEASES

Malaria

- Different species of *Plasmodium*, which are *P. malaria, P. vavax* and *P. falciparum* cause the disease.
- ***Plasmodium falciparum*** causes the malignant malaria and malaria caused by this pathogen is fatal at times.

- **Vector of the disease-** Female *Anopheles* mosquito transfer the sporozoites of *Plasmodium* from a sick to healthy person .
- The life cycle *Plasmodium* is digenetic i.e completes in two host.Primary host is the female *Anopheles* mosquitoe human and the secondary host is the human
- **Mosquito-Sexual phase of *Plasmodium***
- **Human-Asexual phase of *Plasmodium***
- Following is the life-cycle of the pathogen::
  - The sporozoites from the salivary gland of the mosquitoes enter the body of the humans when they bite the human.
  - From the blood stream the sporozoites reach the liver and multiply within the liver cells and form crytomerozoites.
  - The parasites are released into blood when the liver cells burst.
  - These cryptomerozoites then attack the RBCs, multiply in the RBC and form merozoites and finally cause the rupture of RBC's.
  - With the rupture of RBCs there is the release of toxin called hemozoin, which is main reason for the high recurring fever with chills.
  - Merozoites enter into the new RBC's and develop into micro and megagametocytes.
  - The gametes along with the blood of the human enters into the body of mosquitoe when it bites the human.
  - Now the development takes place in the stomach wall of the mosquito.
  - The gametes fuse and form zygote.
  - The zygote now develops in the the mosquitoes body to form sporozoites.
  - Sporozoites move to the salivary glands of mosquitoes and stored there.They are injected into a human body during the bite of the mosquito.
- Treatment by **chloroquine's** that is extracted from the bark of **Cinchona tree.**

Rack Your Brain

Name a disease transmitted by mechanical carrier.

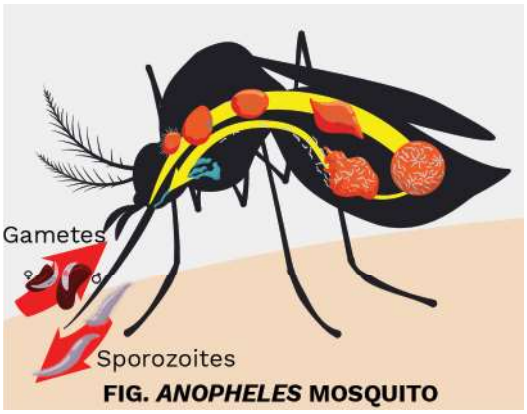


FIG. *ANOPHELES* MOSQUITO

Previous Year's Question

The causative agent of _____ is a virus?
(1) Rabies, mumps
(2) Cholera, tuberculosis
(3) Typhoid, tetanus
(4) AIDS, gonorrhea

Rack Your Brain

Why does the malarial parasite needs two host?

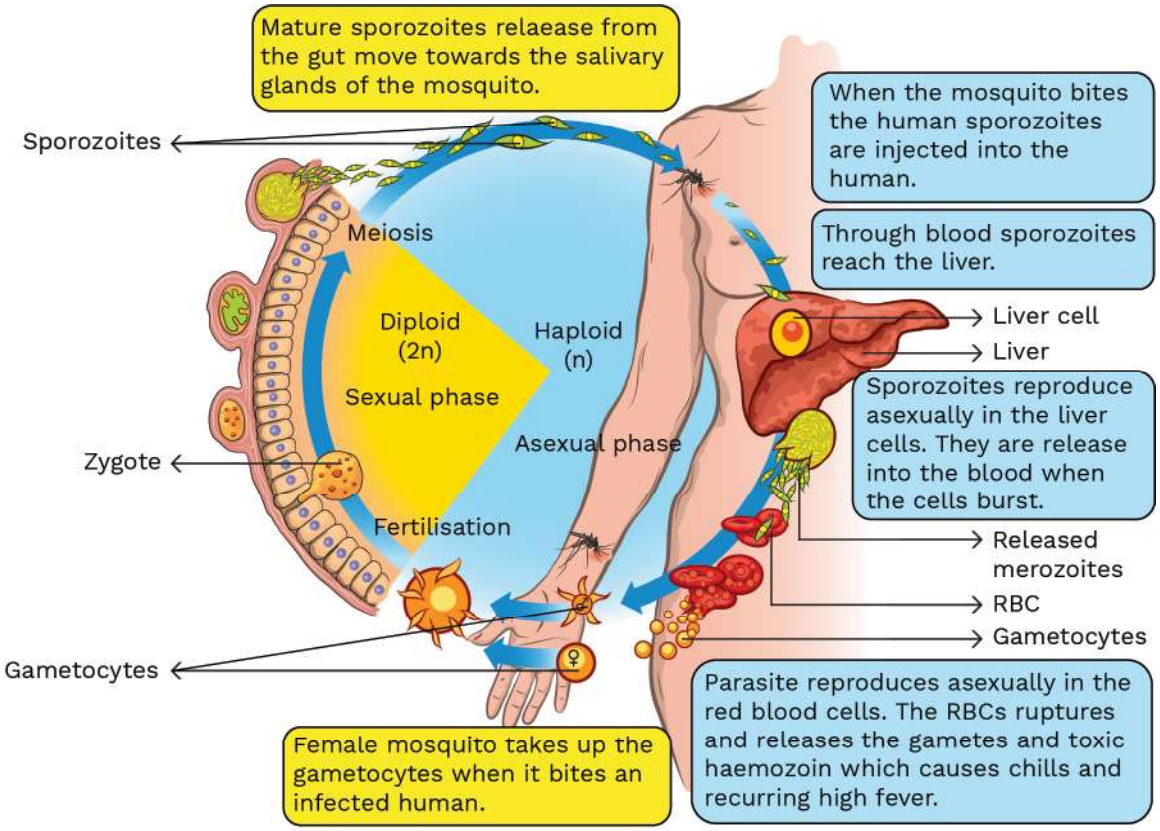


FIG. LIFE CYCLE OF PLASMODIUM

Prevention of Malaria

- Using mosquito repellent lotion and spray
- Close the water reservoirs and drain them regurlarly
- Prevent stagnation of water
- Regular cleaning of cooler
- Windows should be provided with wired mesh
- Use bed nets
- *Gambusia* fish should be introduced in ponds that feed on mosquito larvae

Previous Year's Question

Where will you look for the sporozoites of the malarial parasite?

(1) Saliva of infected female *Anopheles* mosquito
(2) Red blood corpuscles of human suffering from malaria
(3) Spleen of infected humans
(4) Salivary glands of freshly moulted female *Anopheles* mosquito

Table. Other Protozoan Diseases of Human

Disease	Causative Agent	Mode of Spread	Symptoms	Organ Affected
Amoebiasis Amoebic Dysentry	*Entamoeba histolytica*	Through contaminated food and water	Abdominal pain and cramps. Stools with excess mucus and blood Constipation alternating with diarrhoea	Large intestine
Giardiasis	*Giardia intestinalis*	Through contaminated food and water	Abdominal pain, diarrhoea, headache	Intestine
Trypanosomiasis	*Trypanosoma gambiense*	Tse-tse fly (*Glossina palpalis*)	Lethargy, unconsciousness	Brain
Kala Azar	*Leishmania donovani*	Sand fly (*Phlebotomus argentipes*)	Fever, anaemia, enlargement of liver, spleen	Liver, spleen

FUNGAL DISEASE OF HUMAN

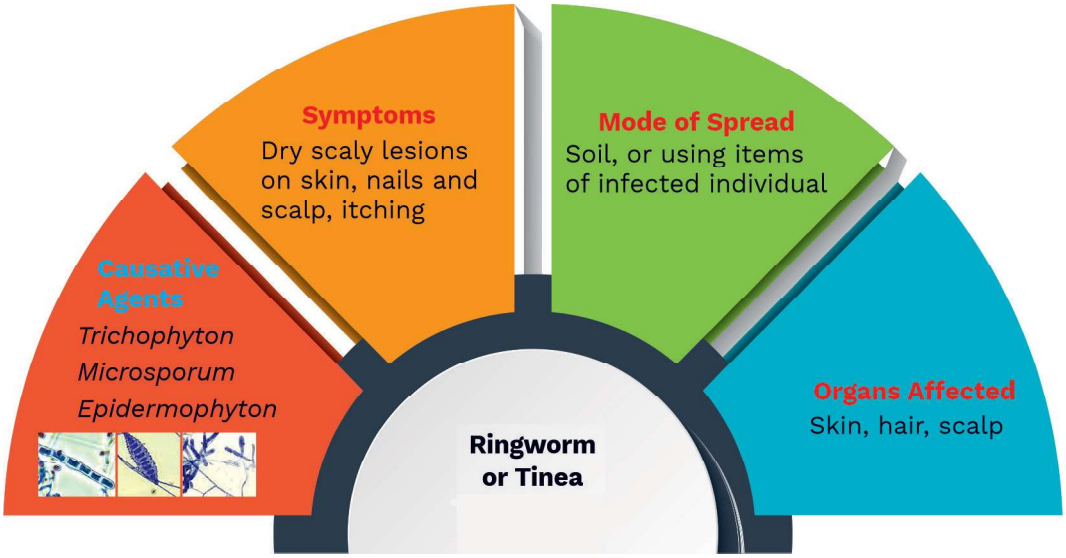


Table. Helminth Diseases of Human

Disease	Causative Agent	Modes of Spread	Symptoms	Organ Affected
Fasciolopsiasis	*Fasciolopsis buski*-The Intestinal Fluke	Metacercariae on aquatic plants	Intestinal inflammation, ulcer, diarrhoea	Small Intestine of humans
Schistosomiasis	*Schistosoma haematobium* (Blood fluke)	Cercariae in water penetrates the skin	Fever, abdominal pain, bloody diarrhea	Veins of man
Taeniasis	*Taenia solium* (Pork tapeworm)	By eating ill cooked measly pork	Intestinal disorders	Small intestine of man
Taeniasis	*Taenia saginata* (Beef tapeworm)	By eating ill cooked beef	Intestinal disorders and anaemia	Small Intestine cooked
Ascariasis	*Ascariasis lumbricoides*	Indigestion, vomiting, diarrhoea	Internal bleeding, muscular pain, fever, anaemia	Intestine
Elephantiasis or Filariasis	*Wuchereria bancrofti* *W.malayi*	*Culex* mosquito	Swelling of legs and genital organs	Lower limbs and genital organs

Previous Year's Question

Ringworm in humans is caused by
(1) viruses
(2) nematodes
(3) fungi
(4) bacteria

Rack Your Brain

What causes swelling of the lower limbs in filariasis?

PREVENTION AND CONTROL OF INFECTIOUS DISEASES

IMMUNITY

- It is the ability of the body to fight against the disease-causing pathogens.
- Immunity is of the following types:
  - Innate Immunity
  - Acquired Immunity

Definition

Immunity: The ability of a body to fight against the pathogens.

Innate Immunity

- It is all the barriers an individual is born with which protect the individual.
- It is non-specific.
- It consists of the following:

Definition

Innate immunity: Immunity that is present at the time of birth of an individual.

Physical Barrier

- It includes the
  - skin
  - the mucus-coated epithelium that helps in trapping the microbes.
- Example- Mucus in the respiratory, gastro-intestinal and urino genital tracts helps in trapping the microbes.

Physiological Barrier

- It includes
  - acid in the stomach
  - **lysozyme** in saliva and tear.Lysozyme prevents the microbial growth.

Cellular Barrier

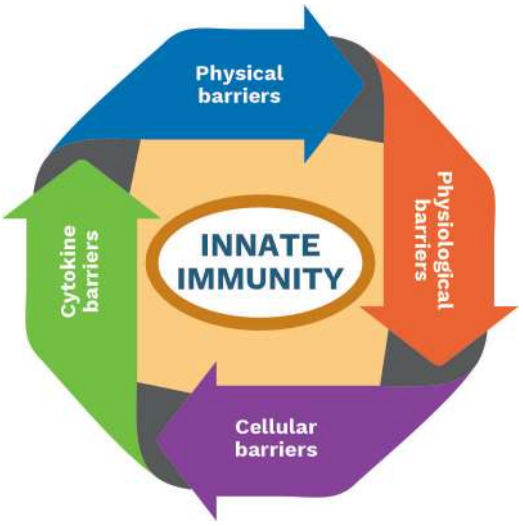
- It includes natural killer cells lymphocytes, monocytes, macrophages, neutrophils and PMNL **(Polymorphonuclear leucocytes)**

Cytokine Barriers

- Viral-infected cells produce Interferons that protect the non-infected cells from viral infection.

Acquired Immunity

- It refers to the immunity a person acquires after birth.
- It can be acquired by either suffering from the disease or artificially i.e by vaccination.
- It is specific as it is pathogen specific.
- It has the following features:
  - It has the ability to distinguish between different foreign molecules.
  - When any immune system is attacked by the pathogens for the first time, it evolves a reaction whereupon the pathogen is attacked and killed.
  - This response is the first response. Some memory cells retain the memory of the first encounter with the pathogen .



Rack Your Brain

In what way is monocyte a cellular barrier?

Previous Year's Question

Immunodeficiency makes a person highly susceptible to infection. It is caused by
(1) lack of B-cells
(2) lack of T-cells
(3) lack of both B and T-cells
(4) none of the above

- This helps the immune system of the body to give rise to an intensified immune response in further encounters with same pathogens.This is secondary or anamnestic response.

CELLS OF THE IMMUNE SYSTEM

- Lymphocytes are agranulocytes.In the foetus they are produced by the liver and spleen andin the adults they are produced by the bone marrow and lymph nodes.
- There are two types of lymphocytes:
  - B lymphocytes
  - T lymphocytes
- Both the lymphocytes need stimulation by specific antigens to trigger them to respond.

B Lymphocytes

- They differentiate in the gut associated lymphoid tissue in vertebrates. In mammals they are differentiated in the **tonsils, peyers patches and appendix.**
- The B-lymphocytes come in contact with an antigen and produce plasma cells. These plasma cells produce antibodies.
- These antibodies are called as immunoglobulins and are of various types like **IgA, IgD, IgE, IgM, IgG,** etc.

T Lymphocytes

- T lymphocytes differentiate into different cells on coming in contact with the antigens. They are
  - **Natural killer T cells-**They show phagocytotic activity.
  - **Helper T-cells-**They stimulate the B-cells to produce antibodies and enhance the activity of the killer-T-cells.
  - **Suppressor T-cells-**They protect the whole immune system from its own body cells.
- Acquired immunity is of two types:
  - Humoral or Antibody-mediated Immunity
  - Cell-mediated Immunity (CMI).

Rack Your Brain

Which immune response is stronger and why?

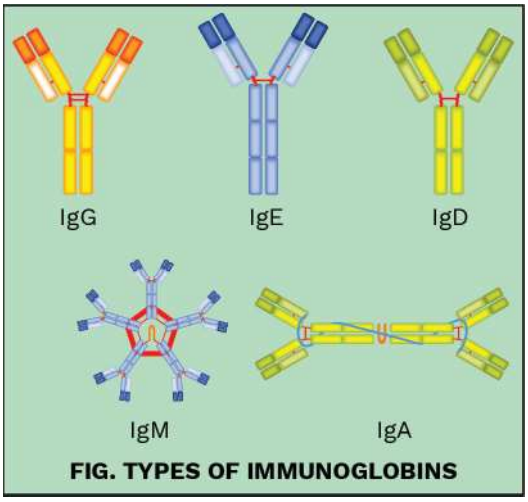


FIG. TYPES OF IMMUNOGLOBINS

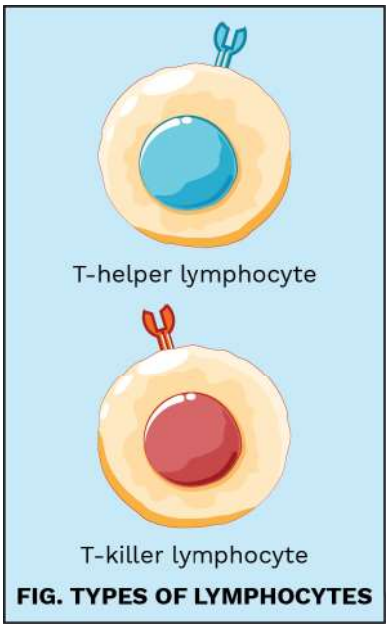


FIG. TYPES OF LYMPHOCYTES

Humoral Immunity

- Antibodies are produced circulate in the **humors** that is in the **body fluids.**
- Antibodies are proteins which are produced by the body in response to the antigens is known as antibodies.
- Four polypeptide chains are present in each antibodies.They are held together in the form of Y.Two are short polypeptide chains and known as light chains(L_2), while two polypeptide chains are long and known as heavy chain(H2) and thus are together written as H_2L_2.
- At the tips of the two upper arms the antigens bind to it in a lock and key manner and form **antigen-antibody complex.**
- Light chain consists of two parts-varaible (V) of 1-180 amino acids and the Constant (C) having 109-214 amino acids. Each light chain has two intrachain disulphide bonds, one in the variable and one in the constant part.
- The heavy chain consists of varaible (V) of 1-118 amino acids and the Constant (C) having 119-440 amino acids.
- The constant region has three intrachain disulphide chains and the variable chain has only one disulphide loop.
- The two light and heavy chains are linked together with four disulphide bonds.

Cell-mediated Immunity

- It is controlled by T-lymphocytes.
- Sometimes the human organs do not work well and need to be transplanted.
- Tissue matching, blood group matching is done before the process of transplant.
- The the patient has to take immuno–suppresants all his or her life.
- The body is able to differentiate 'self' and 'nonself' .The reason for graft rejection is cell-mediated immune response.

Definition

Antigens: They are foreign molecules which when enter the body of an organism, activate the specific immune system to generate antibodies.

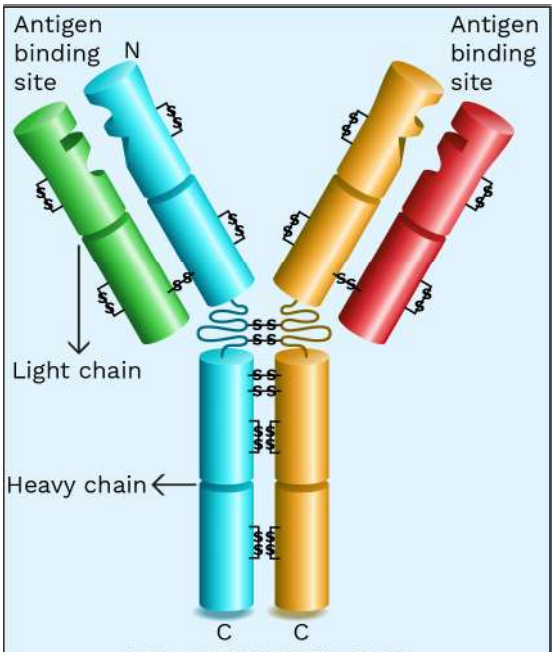
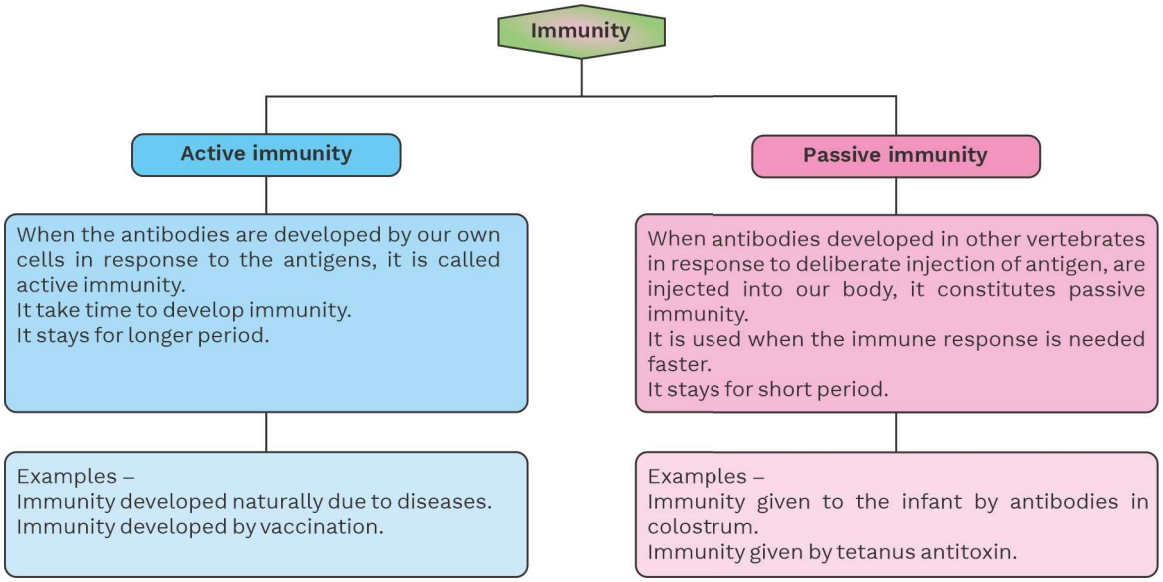


FIG. STRUCTURE OF AN ANTIBODY MOLECULE

Previous Year's Question

Which of the following immunoglobulins does constitute the largest percentage in human milk?

(1) IgA (2) IgG
(3) IgD (4) IgM



- Acquired immunity can be of the following two types:

VACCINATION AND IMMUNISATION

- The principle of vaccination and immunisation is the memory of the immune system.
- Vaccine is dead or weakened pathogen or the weakened protein produced by the pathogens inserted into a person to induce an immune response.
- The vaccine produces antibodies that nullify the toxin or pathogen and also produces memory B-cells and T-cells.These cells recognise the pathogen in later encounters and produce antibodies. Vaccination provides active immunity.
- If a fast immune response is needed, prepared antibodies or antitoxin is injected into the patient,as in tetanus infection This type of immunisation is called passive immunisation.
- **Colostrum** given to the child through the first lactation provides antibodies IgA from the mother to the child to protect from any pathogens till the immune system of the child is well developed.

Previous Year's Question

If you suspect major deficiency of antibodies in a person, to which of the following would you look for confirmatory evidence?
(1) Haemocytes
(2) Serum globulins
(3) Fibrinogen in plasma
(4) Serum albumins

Definition

Vaccination: The process of introducing a preparation of the proteins of the pathogens or killed or inactivated pathogens into the body, to generate the antibodies.

- **Recombinant DNA (rDNA) technology** has been used for the production of proteins of the pathogen with the help of other microbes like yeast and bacteria.Yeast cells are used for the production of Hepatitis-B vaccine.

ALLERGY

- The reaction of the immune system to some antigens in the surrounding is known as allergy.
- Allergens are the agents that causes the exaggerated reaction of the immune systeme.g., dust mites, pollen grains, animal dander,wool,nail polish
- **Antibodies are produced in response to allergens. They are IgE type.**
- Common symptoms of allergy are:
  - sneezing
  - watery eyes
  - rashes
  - running nose
  - asthma
- Release of histamine and seroton from the mast cells produce the symptoms of allegry.
- Drugs i.e steroids,antihistamine and adrenaline swiftly reduce the symptoms.

AUTO IMMUNITY

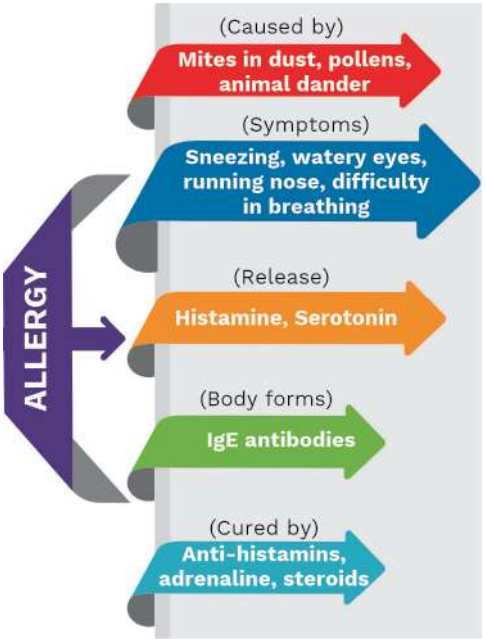
- These are the disorders caused when the body's immune system starts destroying 'self' cells and molecules.
- E.g., **Rheumatoid arthritis** and multiple sclerosis.

IMMUNE SYSTEM

- The main function of immune system is to recognise the antigens and respond to them.
- Immune system plays a role in organ transplantation, allergic reactions and auto-immune diseases.
- Lymphoid organs, tissues and cells are a part of the immune system

Gray Matter Alert!!!

Colostrum: It is the yellow and thick nutrition-filled first milk secreted by the female. It contains fats, proteins, lactoferrin and IgA,IgG and IgM immunoglobulins.



Rack Your Brain

Breastfed babies are more immune to diseases in the early years of their development than the bottlefed. Why?

- The organs where the origin, and maturation and proliferation of lymphocytes take place are known as the lymphoid organs.
- Lymphoid organs are of two types:
  - Primary lymphoid organs
  - Secondary lymphoid organs

Primary Lymphoid Organs

- Organs where the immature lymphocytes mature into antigen-specific lymphocytes
- e.g., Thymus and bone marrow.

Bone Marrow

- Main lymphoid organ .Here different types of blood cells and lymphocytes are formed.

Thymus

- It is located near the heart beneath the chest bone.

Secondary Lymphoid Organs

- Organs where the lymphocytes interact with the antigen and multiply to form clones. E.g., lymph nodes,spleen, tonsils, appendix and payer's patches of small intestine.

Spleen

- It has the phagocytes and lymphocytes.
- It traps the blood borne microbes and acts as a filter.
- It is the reservoir of erythrocytes.

Lymph Nodes

- Small solid structures present in the lymphatic system.
- They trap the microbes that have entered the lymph in the body.
- An immune response is produced by the anntigens trapped in the lymphocytes present in the lymph nodes.

Previous Year's Question

MALT constitutes about _____ percent of the lymphoid tissue in human body.

(1) 20% (2) 70%
(3) 10% (4) 50

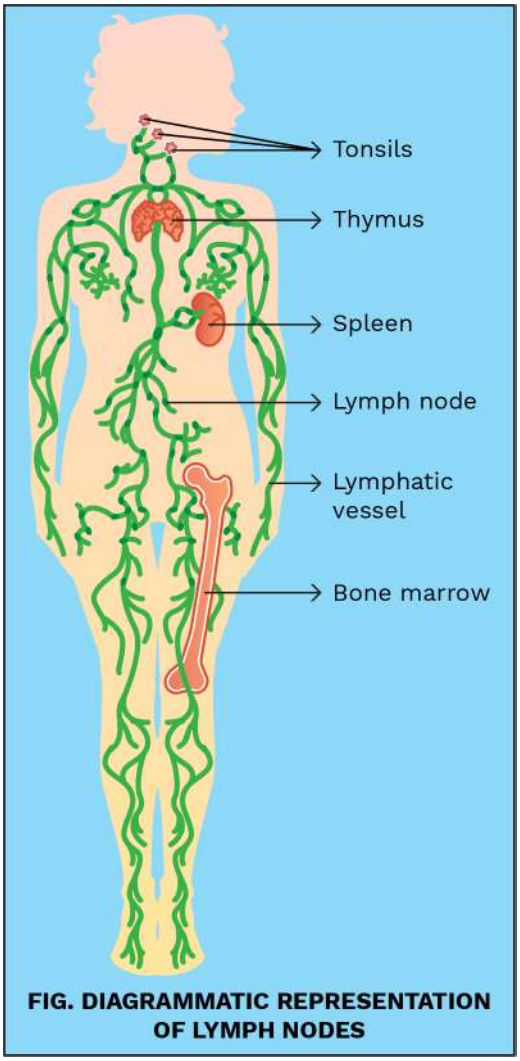


FIG. DIAGRAMMATIC REPRESENTATION OF LYMPH NODES

MALT(Mucosal-Associated Lymphoid Tissues)

- Lymphoid tissue of the the mucosal lining of the digestive tract ,respiratory tract and urinogenital tracts, is called **mucosal-associated lymphoid tissue.**
- It is about 50percent of the lymphoid tissue in a human body.

AIDS (ACQUIRED IMMUNODEFICIENCY SYNDROME)

- It was first reported in 1981.
- It is caused by a retro Virus i.e Human Immunodeficiency Virus (HIV)
- Transmission of the disease can take place through.
  - Coitus with the infected person.
  - Transfusion of contaminated blood
  - Infected needles sharing.
  - The placenta from infected mother to the developing foetus
  - The following are at a greater risk of suffering from the disease:
  - People having sex with multiple partners.
  - Drug addicts taking drugs through injections
  - Individuals who undergo repeated blood transfusion due to some disease.
  - Children born to infected women.
- The following individuals are at high risk of getting the disease:
  - Those who have multiple sexual partners.
  - Drug addicts who take the drugs intravenously.
  - Individuals who require repeated blood transfusion.
  - Children born to an infected women.

Life Cycle of HIV

Rack Your Brain

A person is suffering from an allergy due to pollens, which antibodies will be found in high number in his blood test?

Previous Year's Question

The symptoms of AIDS appear at which stage of HIV infection?

(1) When the viral DNA is produced by reverse transcriptase

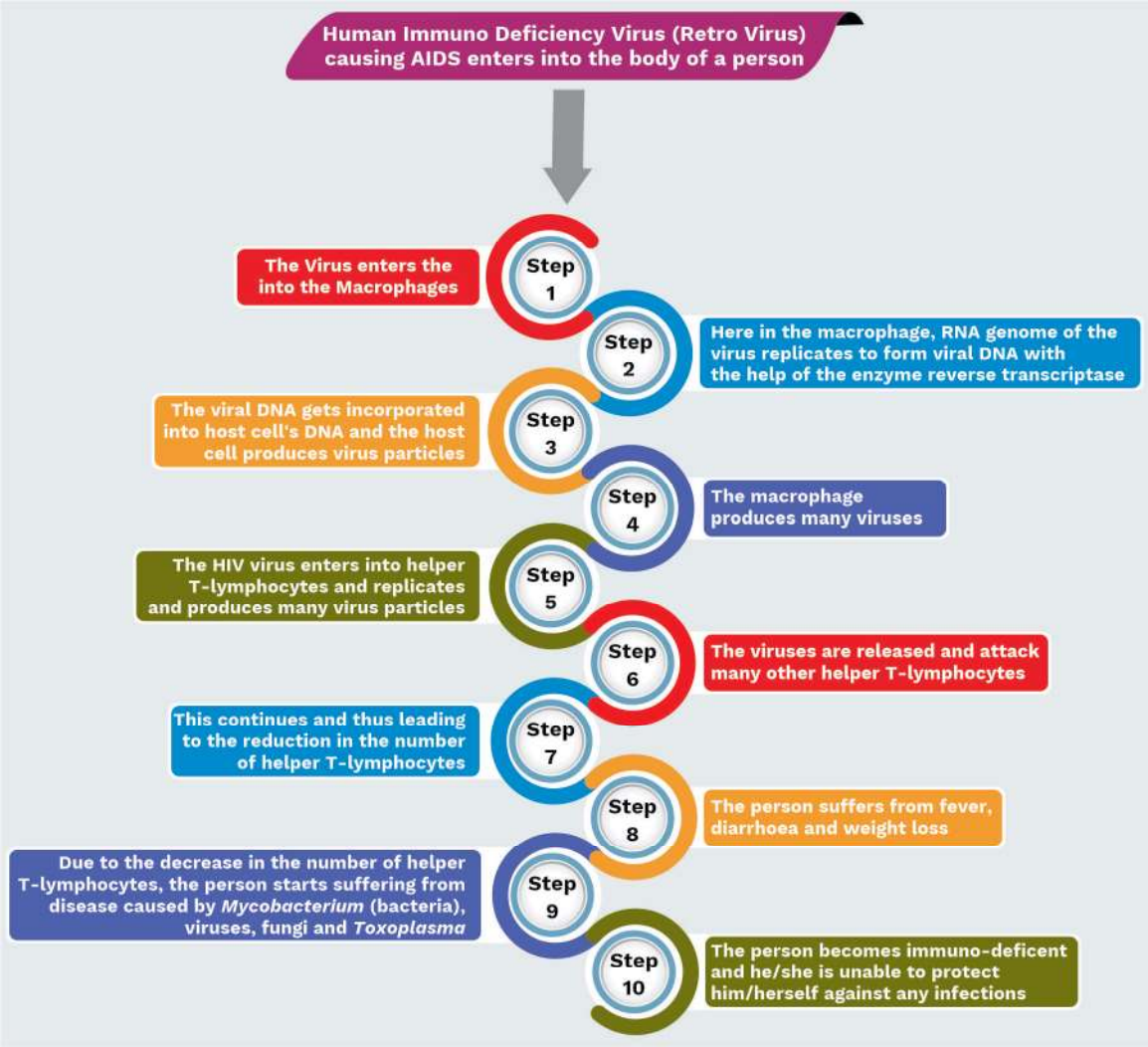
(2) Within 15 days of sexual contact with an infected person

(3) When HIV damages large number of helper T lymphocytes

(4) When the infected retro virus enters host cells

Rack Your Brain

Name the disease in which the immune system of a person is suppressed.



Prevention of AIDS

- NACO i.e National AIDs Control Organisation and NGO's are trying to educate people about AIDS.
- Some such steps to prevent spread of AIDS are:
  - use of disposable needles and syringes.
  - routine blood check ups
  - use of contraceptive measures like condoms and supporting safe sex.
  - preventing drug abuse.
- **Diagnosis–**AIDS is diagnosed by **Enzyme-linked Immune Sorbent Assay test.**

Gray Matter Alert!!!

Retrovirus: It is a virus that inserts a copy of its RNA genome[a] into the DNA of a host cell . Once inside the host cell's, the virus uses its own reverse transcriptase enzyme to produce DNA from its RNA genome. This is known as reverse transcription or teminism.

- **Treatment–**Anti-retroviral drugs does not prevent death ,it only increases the life of the patient .

Definition

Syndrome: It refers to a group of symptoms.

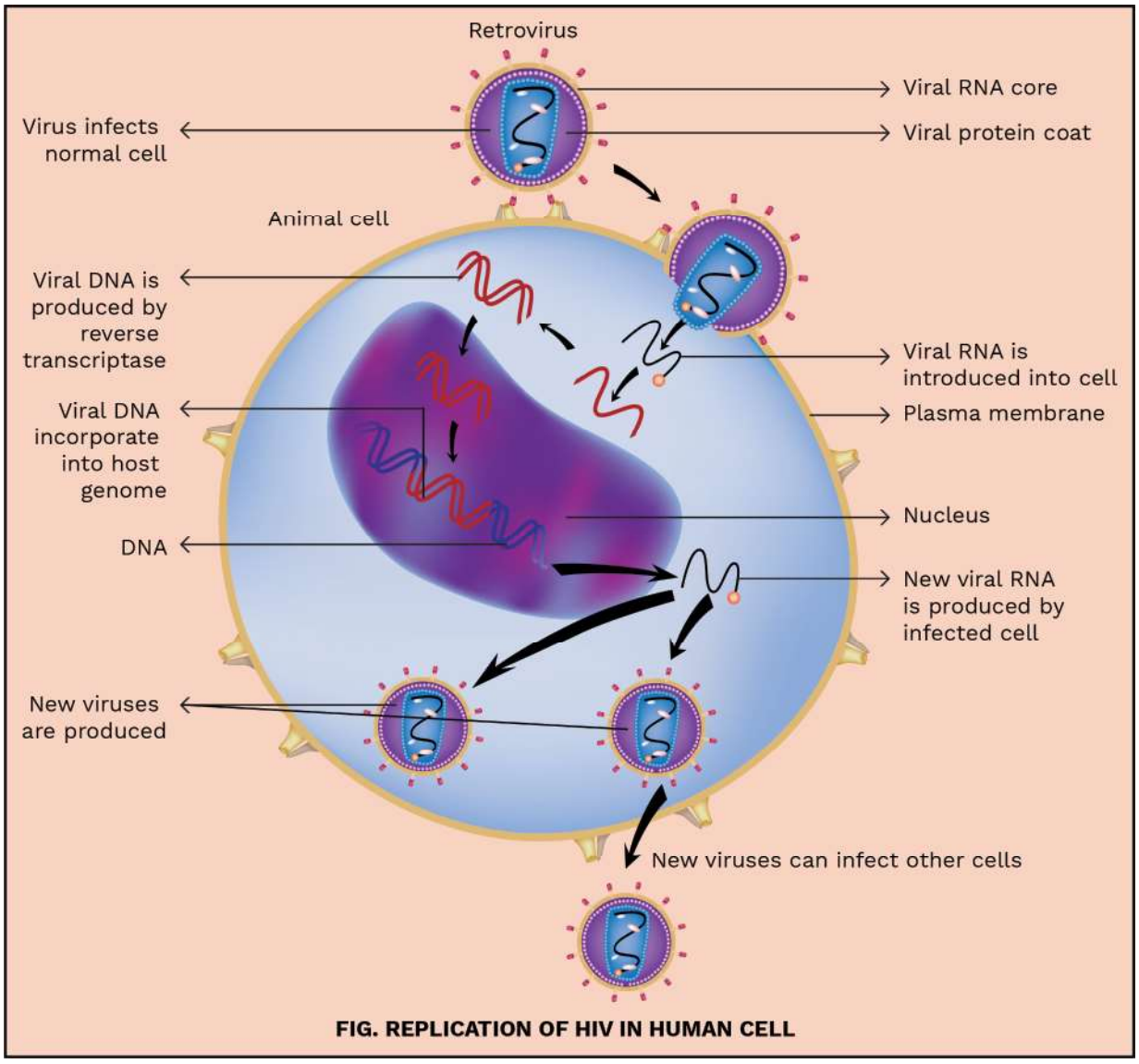


FIG. REPLICATION OF HIV IN HUMAN CELL

CANCER

- Cancer is one of the most dreadful disease and is the major cause of death of many humans.
- Contact inhibition is the property of normal cells, by virtue of which contact with other cells inhibits their uncontrolled growth; cancer cells have lost this property.
- The uncontrolled proliferation of cells or masses of cells, called tumours.
- Tumours are of two types:
  - Benign tumours
  - Malignant tumours

Benign Tumors

- They are limited to their original location and do not spread to other parts of the body.Thus they cause less damage.

Malignant Tumors

- They are masses of dividing cells,which grow rapidly.They **invade and finally damage the surrounding cells**.
- Cancerous cells take nutrients from the normal cells and so they affect the metabolism of the cells.
- These cells show metastasis.
- The cancer cells are different from the normal cell in the following charcteristics:
  - There is breakdown of the cellular machinery which control normal cell growth.
  - Cancer cells show uncontrolled growth as they have lost contact inhibition .
  - Metastasis is shown by cancer cells.They separate from the tumours and travel through the body fluids to different organs in the body and develop secondary tumours.

Causes of Cancer

- Carcinogens transform normal cells into cancerous cells.

Definition

Metastasis: It is the process by which the cancer cells spread to different sites through the body fluids.

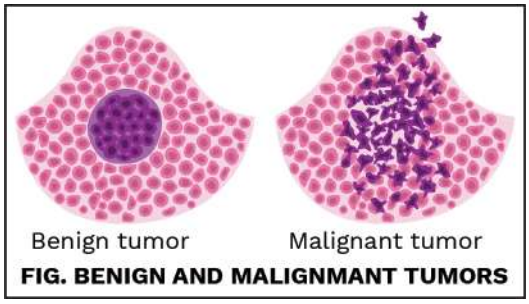


FIG. BENIGN AND MALIGNMANT TUMORS

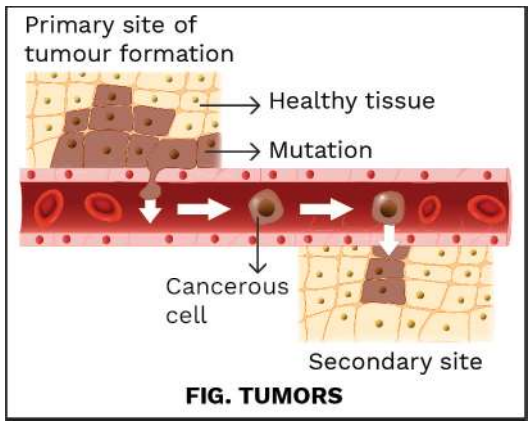


FIG. TUMORS

Rack Your Brain

Mention the most feared property of malignant tumor.

- Carcinogens can be physical, chemical and biological agents.
- Carcinogens are:
  - **Physical** carcinogens, e.g., X rays,UV rays, gamma rays.
  - **Chemical** carcinogens, e.g., Chemicals present in the smoke of tobacco.
  - **Tumour** viruses or cancer-causing viruses (oncogenic viruses) which have viral oncogenes.

Diagnosis of Cancer

- Cancer can be prevented and cured by early detection by:
  - Biopsy and histology of the tissues.
  - For increased cell counts (i.e in leukaemia) blood and bone marrow tests is done.
  - Radiography, magnetic resonance imaging (MRI) and computed tomography (CT)
  - In certain cancers use of antibodies against cancer-specific antigens.
  - By molecular biology to detect genes in individuals having a family history of some cancerous diseases.

Treatment of Cancer

- The following methods can treat cancer:
  - **Surgery–**Surgically the cancerous cells are removed.
  - **Radiotherapy–**The tumour cells are killed by radiations .The surrounding normal cells are not affected.
  - **Chemotherapy–**Some drugs are used to kill the cancerous cells.The drugs have certain complicacy like anaemia and hair loss
  - **Immunotherapy–**Alpha-interferon(biological response-modifiers) activate the immune system and help in destroying the tumour.

Gray Matter Alert!!!

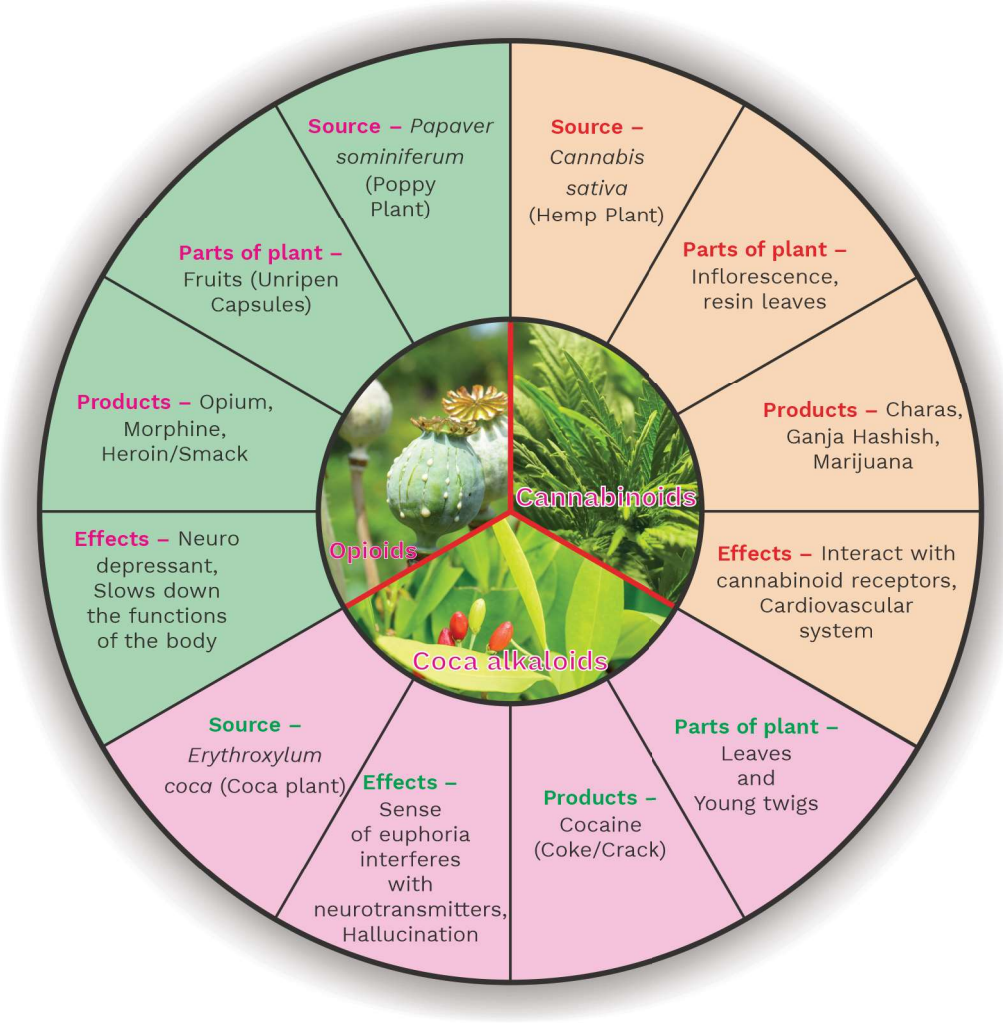
Computed tomography: It is a computerized x-ray imaging process. In this, a narrow beam of x-rays is aimed at a patient and quickly rotated around the body. This generates signals that are processed by the machine's computer to generate cross-sectional images of the body.

Definition

Carcinogens: Physical, chemical and biological agents that transform normal cells into cancerous cells.

Gray Matter Alert!!!

Magnetic Resonance Imaging: It is a type of scan that uses strong magnetic fields and radio waves to produce detailed images of the inside of the body.



DRUG ABUSE

- The drugs that are usually abused include cannabinoids,opioids, and coca-alkaloids. Other drugs like barbiturates, amphetamines, benzodiazepines and lysergic acid diethylamide (LSD) are also abused.

ALCOHOL

- Alcohol acts as a depressant.
- It acts on the central nervous system.
- It damages the liver i.e., causes **cirrhosis.**

Rack Your Brain

Indiscriminate diagnostic use of using X ray should be avoided. Justify the statement giving a reason.

Addiction and Dependence

- Causes of drug or alcohol abuse are:
  - Curiosity
  - Adventurous need
  - Excitement
  - Experimentation
  - To escape from tension
- With repeated use of drugs or alcohol, the tolerance level of receptors in our body increases and thus they respond only to higher doses of drugs or alcohol.
- If the regular does of drugs or alcohol is discontinued, the body shows withdrawal symptoms.These symptoms can be can be anxiety, nausea, sweating, etc.

Effects of Drug or Alcohol Abuse

- The effects of drug or alcohol abuse are reckless behaviour and violence.
- Excess doses can lead to coma and death, respiratory ailments and heart failure.
- Some drugs and their intake with alcohol leads to death.
- Common warning signals of drug or alcohol abuse include:
  - Academic performance being affected
  - Personal hygiene not being looked after
  - Withdrawal and isolation from family and friends.
  - Aggressive behaviour.
  - No interest in any hobbies.
  - Change in sleeping patterns and eating habits.
  - Fluctuations in weights

Definition

Drug Abuse: When drugs are taken in large amounts other than their normal clinical use and affect one's physical, physiological, and psychological functions, it is known as drug abuse.

Previous Year's Question

Select the correct statement from the ones given below.

(1) Barbiturates, when given to criminals make them tell the truth.

(2) Morphine is often given to persons, who have undergone surgery, as a pain killer.

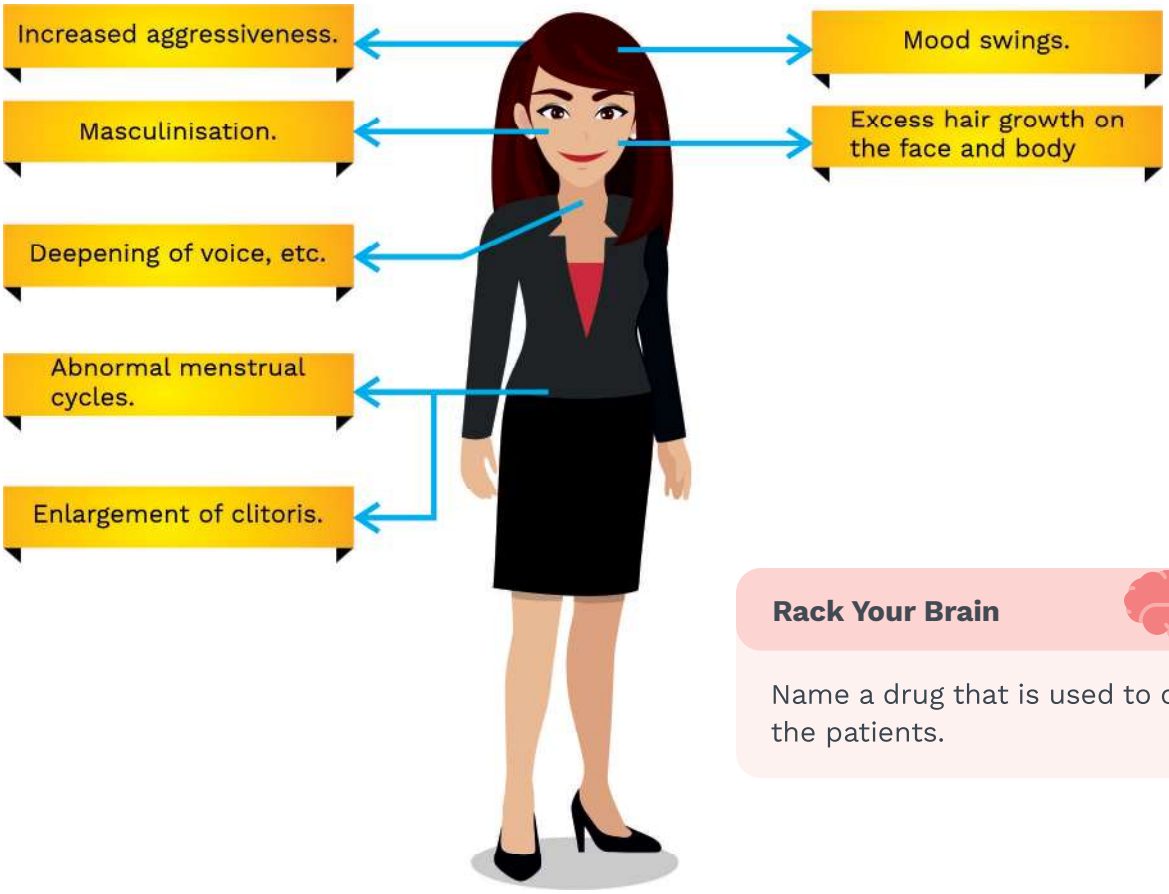
(3) Chewing tobacco lowers blood pressure and heart rate.

(4) Cocaine is given to patients after surgery as it stimulates recovery.

Definition

Withdrawal syndrome: It refers to the symptoms manifested by the body of an addict, if regular dose of drug or alcohol is discontinued.

- Misuse of anabolic steroids causes the following in females:



Rack Your Brain

Name a drug that is used to cure the patients.

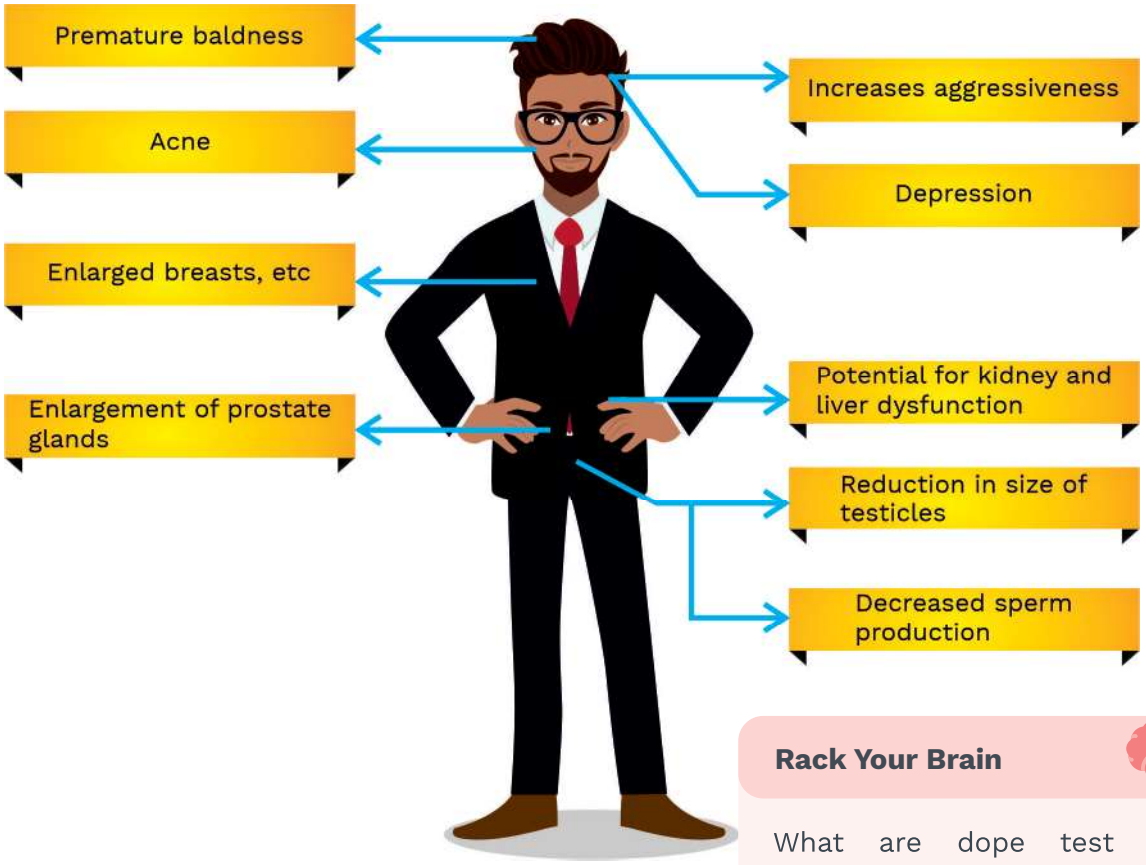
Previous Year's Question

The morphine obtained from opium is a/an
(1) pome
(2) alkaloid
(3) latex
(4) none of these

Previous Year's Question

Which is the particular type of drug that is obtained from the plant whose one flowering branch is shown here?
(1) Hallucinogen
(2) Depressant
(3) Stimulant
(4) Pain killer

- Misuse of anabolic steroids causes the following in males:



Rack Your Brain

What are dope test being conducted on sports persons?

Prevention and Control

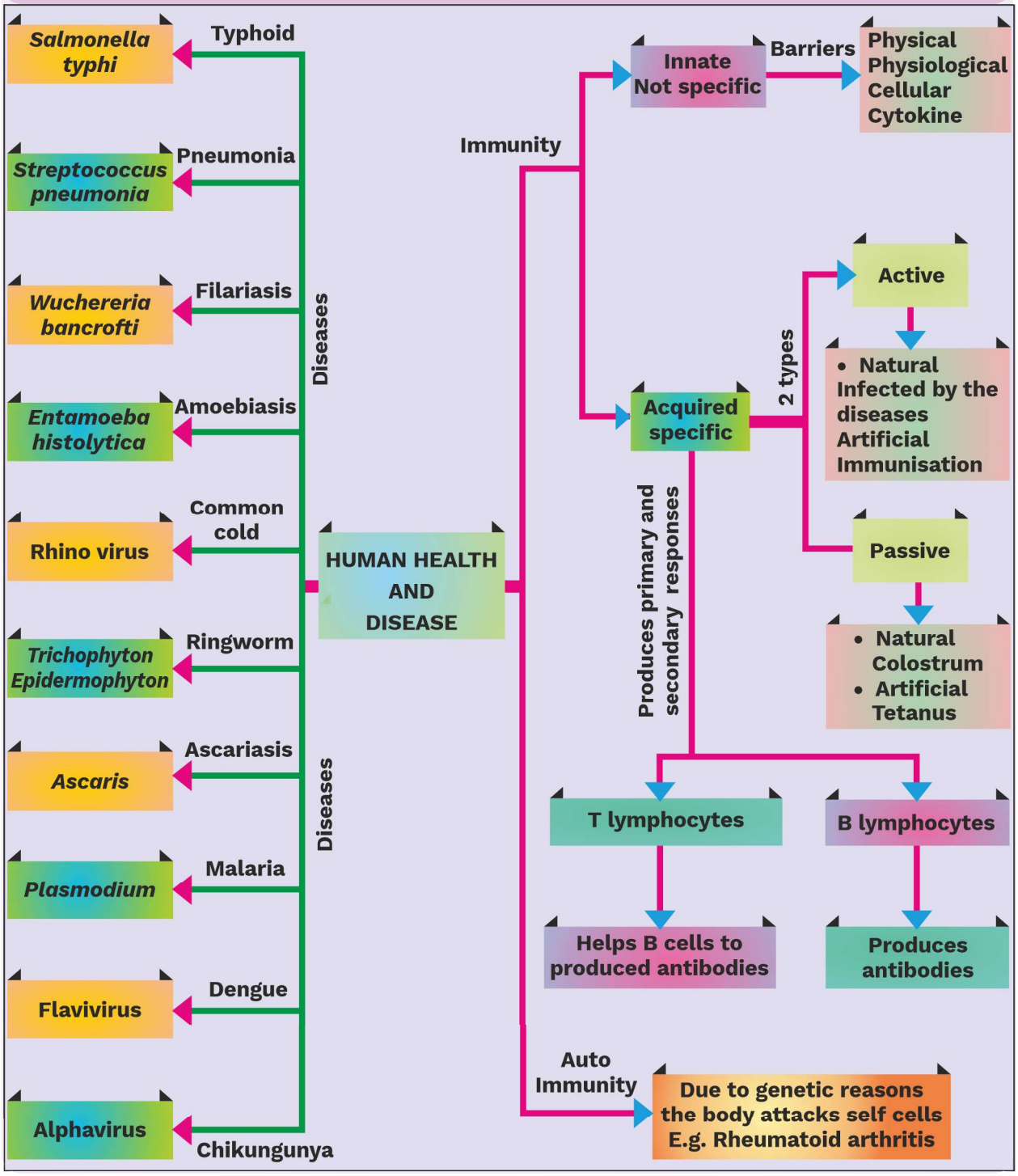
- Following are the measures for prevention and control of alcohol or drugs:
  - avoid undue peer pressure to perform more than ones ability in different spheres of life.
  - educating and counselling people to face problems and failures.
  - seeking help from parents and peers to vent out feelings of anxiety and guilt.
  - looking for signs would help intimely initiation of treatment.
  - look out for professional or medical help for de-addiction and rehabilitation.

Previous Year's Question

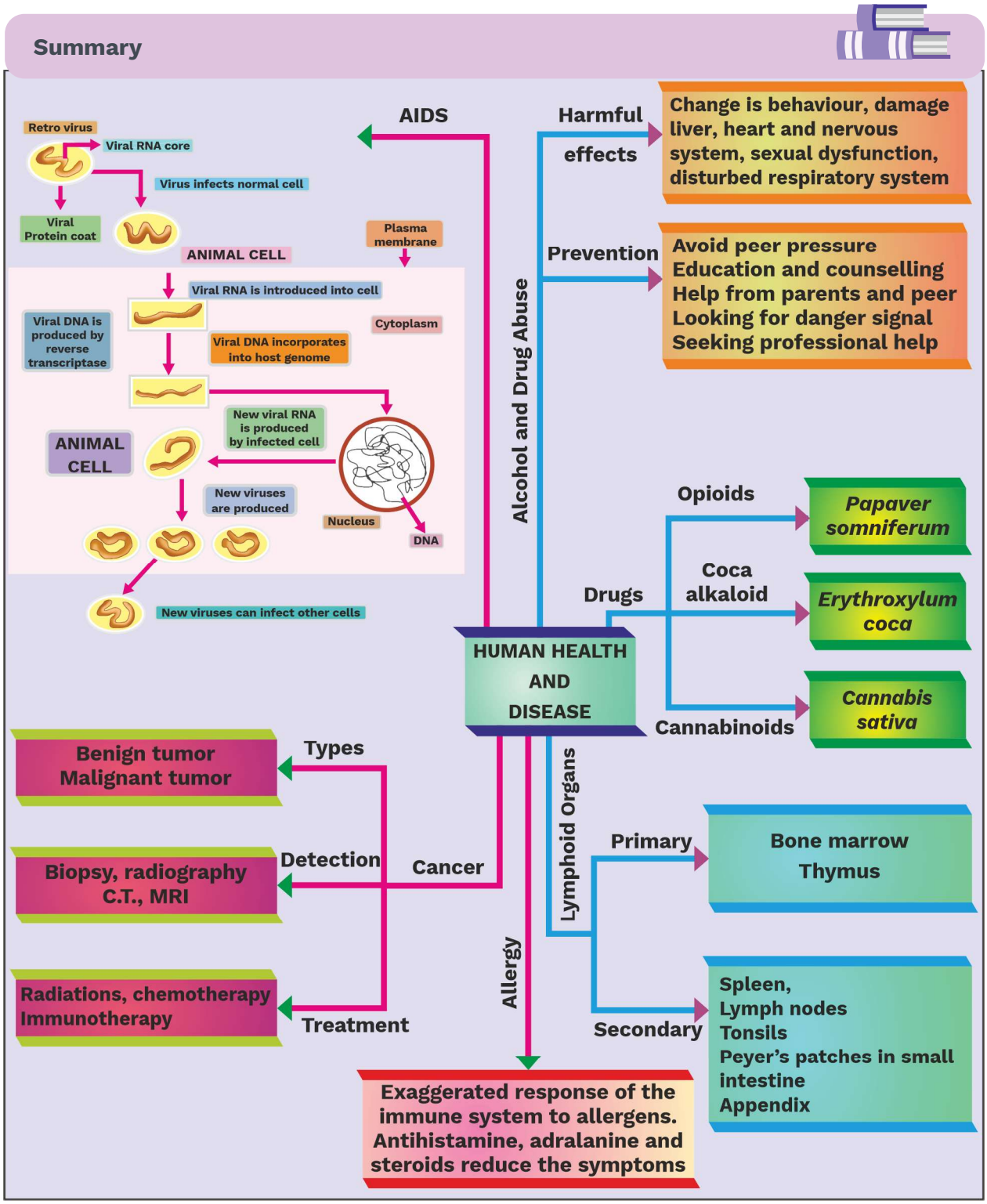
Which one of the following is not a property of cancerous cells whereas the remaining three are?

(1) They compete with normal cells for vital nutrients.
(2) They do not remain confined in the area of formation.
(3) They divide in an uncontrolled manner.
(4) They show contact inhibition.

Summary


HUMAN HEALTH AND DISEASE
Diseases
Diseases
Salmonella typhi
Typhoid
Streptococcus pneumonia
Pneumonia
Wuchereria bancrofti
Filariasis
Entamoeba histolytica
Amoebiasis
Rhino virus
Common cold
Trichophyton Epidermophyton
Ringworm
Ascaris
Ascariasis
Plasmodium
Malaria
Flavivirus
Dengue
Alphavirus
Chikungunya
Immunity
Innate Not specific
Barriers
Physical Physiological Cellular Cytokine
Acquired specific
2 types
Active
• Natural Infected by the diseases Artificial Immunisation
Passive
• Natural Colostrum
• Artificial Tetanus
Produces primary and secondary responses
T lymphocytes
B lymphocytes
Helps B cells to produced antibodies
Produces antibodies
Auto Immunity
Due to genetic reasons the body attacks self cells E.g. Rheumatoid arthritis

Summary


HUMAN HEALTH AND DISEASE
AIDS
Retro virus
Viral RNA core
Virus infects normal cell
Viral Protein coat
ANIMAL CELL
Plasma membrane
Viral RNA is introduced into cell
Cytoplasm
Viral DNA is produced by reverse transcriptase
Viral DNA incorporates into host genome
New viral RNA is produced by infected cell
ANIMAL CELL
New viruses are produced
Nucleus
DNA
New viruses can infect other cells
Alcohol and Drug Abuse
Harmful effects
Change is behaviour, damage liver, heart and nervous system, sexual dysfunction, disturbed respiratory system
Prevention
Avoid peer pressure
Education and counselling
Help from parents and peer
Looking for danger signal
Seeking professional help
Drugs
Opioids
Papaver somniferum
Coca alkaloid
Erythroxylum coca
Cannabinoids
Cannabis sativa
Cancer
Types
Benign tumor
Malignant tumor
Detection
Biopsy, radiography
C.T., MRI
Treatment
Radiations, chemotherapy
Immunotherapy
Lymphoid Organs
Primary
Bone marrow
Thymus
Secondary
Spleen,
Lymph nodes
Tonsils
Peyer's patches in small intestine
Appendix
Allergy
Exaggerated response of the immune system to allergens. Antihistamine, adralanine and steroids reduce the symptoms

Solved Exercise

Q1 **Opiate narcotic is**
(1) bhang
(2) charas
(3) heroin
(4) nicotine

A1 **(3)**
The drugs derived from opium are called opioids .They have narcotic, analgesic, astringent and sedative effect.

Q2 **Virus is the causative agent of which of the following diseases?**
(1) Rabies, mumps
(2) Cholera, tuberculosis
(3) Typhoid, tetanus
(4) AIDS, syphilis

A2 **(1)**
They are caused by Virus. Rabies is caused by Rabies Virus and mumps are caused by *Paramyxovirus*.

Q3 **Which is the safest technique for the detection of cancer?**
(1) Radiography (X¬ray)
(2) Magnetic resonance imaging (MRI)
(3) Histopathological studies
(4) Computed tomography (CT)

A3 **(1)**
MRI ,as it uses non -ionising radiations and magnetic fields to detect any physiological changes in the concerned tissue.

Q4 **Which one is highly infectious disease?**
(1) Hepatitis B
(2) AIDS
(3) Cough and cold

(4) Malaria

A4 **(3)**

Man acquires infection by ingesting *Ascaris* eggs from contaminated food and water.

Q5 **The causative agent of Malignant malaria is**

(1) *Plasmodium*

(2) *P. vivax*

(3) *P. malaria*

(4) *P. falciparum*

A5 **(4)**

Malignant malaria caused by Plasmodium falciparum can even be fatal too.

Q6 **Which one is caused due to an allergic reaction?**

(1) Typhoid

(2) AIDS

(3) Goitre

(4) Hay fever

A6 **(4)**

Hay fever is caused due to pollens from plants.

Q7 **Nicotine is a stimulant because it imitates the effect of**

(1) testosterone

(2) dopamine

(3) thyroxine

(4) acetylcholine

A7 **(4)**

Nicotine is a component of a tobacco product that shows effects on the human body similar to acetylcholine.

Q8 **The nature of antibodies are**
(1) proteins
(2) carbohydrates
(3) lipids
(4) phosphol

A8 **(1)**
Antibodies are proteinaceous in nature..

Q9 **'Active immunity' indicates**
(1) decreased rate of heartbeat
(2) increasing quantity of blood
(3) resistance developed after suffering from a disease
(4) resistance present at the time of

A9 **(3)**
Active immunity is generated after contact with the pathogens.

Q10 **The component of (HIV) is**
(1) double stranded RNA and DNA
(2) double stranded DNA and proteins
(3) single stranded DNA and RNA
(4) single stranded RNA and proteins

A10 **(4)**
HIV is a retrovirus and has single stranded RNA.