long Answer

2)a) Activation of T-cell and TS-cell.

T-cell get activated by the following methods.

1. Identification of antigen :- As and when antige-n entered into the body, T-lymphocytes or macrophages identify the antigen.

⇒ T-cell has surface receptors to identify the ge antigen. The

⇒ These receptors are called as MHC II molecules.

⇒ Antigen has antigenic determinats on its surface Based on the antigenic determinats, the receptors of T-lymphocyte recognises the antigen.

2. processing of antigen by macrophages

⇒ T-lymphocytes unable to identify all the antiges

⇒ To identify the antigens they take help from macrophages or dendritic cells or Langerhan's cell and process the antigens macrophage engulf the antigen and process it.

⇒ During processing the antigen undergo ~~for~~ fragmentation with in the macrophage.

⇒ The non immunogenic substances released out.

⇒ The processed antigen is immunogenic. This reaches the surface of macrophage.

3. presentation of antigen by macrophages :-

⇒ processed antigen is present on the surface of macrophage Ia protein and class II mHC molecules are also present on the surface of macrophage.

⇒ By these molecules the macrophage present the antigen to Tc cells or T_H cells.

⇒ If Ia protein is present on the surface of macrophage the processed antigen get identified by T_H cells. so macrophage present the processed antigen to Thelper cell.

⇒ some of the macrophages contain HLA and class I mHC on their surface. besides the processed antigen.

⇒ If HLA A is present on the surface of macrophage along with processed antigen, that is identified by Tc cells. so macrophage present antigen to Tc cell.

⇒

4. Binding of T cell to antigen :-

⇒ T-cell receptor binds to antigenic determinants determinants of antigen. After binding T-cell get activated. This activated T-cell is called as sensitized T-cell.

5. clonal differentiation :-

⇒ sensitized T cell under go differentiation. Leads to the formation of T-cell (releases lysosomal enzymes in to the antigen through these pores).

- clones

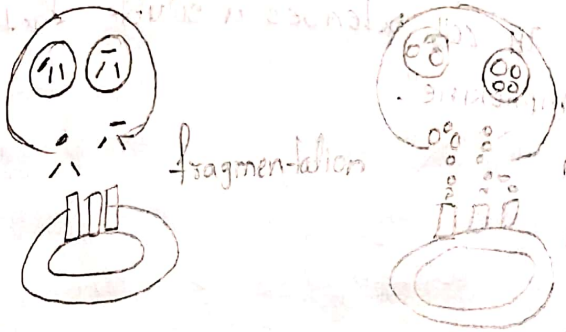
⇒ T-cells are called as T-lymphoblasts. These are activated T-cells.

6. Secretion of Tc cells :-

⇒ Activated T cell secretes "perforin" Protein

⇒ This perforin attaches to antigens and make pores to the membrane in the presence of Ca++ ion

⇒ T-cell releases lysosomal enzymes in to the antigen through these pores.



7. Killing of antigen by Tc cell :-

⇒ Antigen under go fragmentation by the lysosomal enzymes secreted by Tc-cell.

⇒ These pieces are called as "Apoptotic bodies"

⇒ This process is known as "Apoptosis"

8. Secretion of lymphokines by TH cells :-

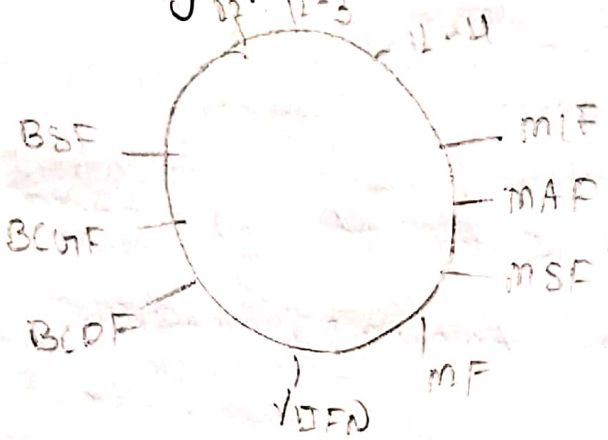
⇒ T-helper cell has Ia receptor. Due to the presence of Ia protein on the surface of macrophage, T-helper cell identifies the antigen.

⇒ By this a relation is established in between macrophage and macrophage cell.

⇒ This relation stimutes the macrophage and make it to secrete a soluble factor called Interlenkin-I"

Ag-Ia molecules complex and interlenkin-I activates T cell.

⇒ Activated TH cell releases a soluble factor called "Lymphokine".



2) Activation of B-cell

⇒ Activation of B-cells takes place in the following stages. They are.

1) selection of B-cells
2) Identification of antigens
3) processing of antigens by the macrophages
4) presentation of antigens
5) Triggering of B-cells
6) clonal differentiation
7) production of plasma cells and memory cells
8) secreation of immunoglobulins

1 selection of B-cells :-

⇒ The immune system has many B-cells

⇒ These B-cell have antigen binding sites

- on the surface.

⇒ These are called as "Receptors". These receptors in the form of Immunoglobulins.

⇒ These antigens also have antigenic determinants or epitopes on their surface.

⇒ Binding of B-cells to antigens occurs in between the receptors of B-cells and antigenic determinants epitopes of antigens.

⇒ this is the first step of B-cell activation

⇒ Although there are many B-cells, every antigen has its special B-cell.

⇒ This specifically depends upon the receptors of B-cells and epitopes of antigens.

2. Identification of Antigen:-

⇒ Antigens when they entered to body, they get identified by B-cells or macrophages.

⇒ B-cells and identify antigens through their "surface immuno globulins"

⇒ B-cells binds to antigen through the help of surface immunoglobulins.

This binding activates B-cells.

3. Processing of antigen by macrophages:-

⇒ macrophage binds to antigen and makes it immunogenic

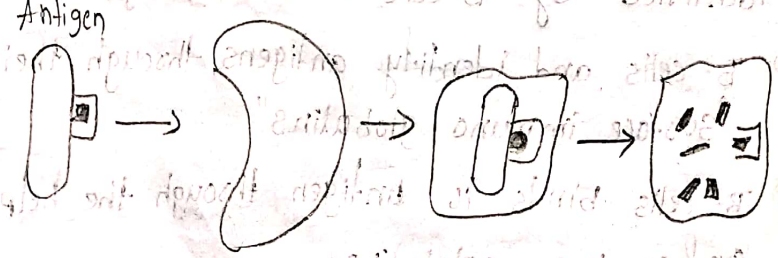
⇒ During the processing of antigen - macrophage swallows the antigen and ingests as phagosome

⇒ In side the macrophage the activity of antigen get degraded by removing necessary regions

⇒ macrophage expose the processed antigen on its surface

⇒ During processing - antigen get ready as more antigenic by removing 90% of external substances.

⇒ Processed antigen kept on the surface of macrophage.



4. Presentation of Antigen :-

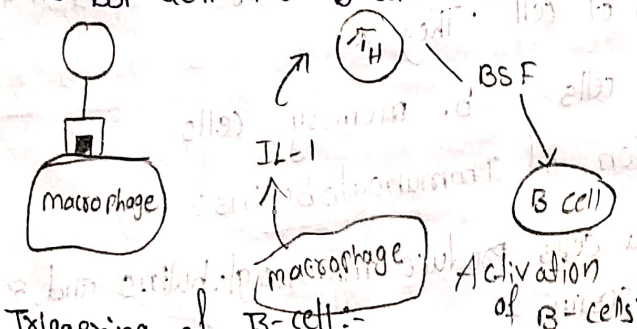
⇒ Presentation of antigen refers to the processed antigen is transferred from amcrophage to B-cell / lymphocyte.

⇒ Thymus independent antigen directly presented to B-cells. The antigen present on the surface of macrophage binds to surface immunoglobulin of B-cell and get activated.

⇒ T-helper cells directly bind to the processed antigens present on the surface of macrophage. This binding activate T_H - cells.

⇒ The soluble factor secreted by macrophage is known as Interleukin -I. IL-1 also activates T-cells

⇒ This BSF activates B-cell.



5) Triggering of B-cell :-

⇒ Triggering of B-cell done by bound antigen or by the secretion of lymphokines by Thelper cells

⇒ During this period - enhancement of metabolic rate of B-cell, synthesis of RNA and proteins and

also replication of DNA takes place inside the B-cell.

6. clonal differentiation :-

⇒ The B-cell which is activated by antigen undergo a series of divisions

⇒ 8 generation of cell division takes place with in 5 days.

⇒ B-cell stimulating factor which are secreted by T- helper cells help for the differentiation

⇒ In this differentiation formation of isotype cells takes place.

7 production of plasma cells and memory cells:-

⇒ The differentiated B-cell finally production two types of cell. They are

a. plasma cells b. memory cells

8. secretion of Immunoglobulins :-

⇒ plasma cells produce immunoglobulins and send in to serum.

⇒ memory cells have surface immunoglobulins exist in circulation, they meant for the identification of a specific antigen by which they were produced.

2)
(b) structure and function of antibody

⇒ The substances which enter in to the body of organi-sms and stimulate immunological reaction is called as "antigens"

→ function of antibody

1. Antigen specificity :-

⇒ This is purely depend upon the specific functional sites of the antigenic determinats on the antigen.

⇒ Remaining portion of the antigen rigid in the sense of antigenicity. The following factors influence the antigenicity

* Acid, base functional groups play an important role in the regulation of antigenic determinant specificity.
* spatial configuration of haptens is important.
* The axial group of antigens play key role in the determination of specificity.

2. Species specificity: The organisms belongs to a particular species, species have specific antigens in their tissues.

3. Iso specificity :- Iso antigens or allo antigens which are present in few individuals, but not in all. In the individuals those who lack allo-an-

antigens, they produce allo antibodies.

4. Organ specificity :- These are confined to spec organs only. The organs like brain, kidn thyroglobulin, lens proteins of a particular speci have species, the same specificity will exhib ted wit on other species too.

"This is called as "organ specific antigens"

5. Auto specificity :- Auto antigens are not immu unogenic in general. but in certain situation lens protein thyroglobulin act like auto antig ns.

⇒ Structure of antibody :-

⇒ The structure of immunoglobin proposed by Rod - ney in 1962. Immunoglobulin is a "glycoprotein"

⇒ This has 'Y' (or) 'T' shape.

⇒ It is a made up of poly peptide chains.

⇒ out of 4 polypeptides 2 are small chains called as light chains remaining 2 are large chains called heavy chains.

⇒ These two pairs of chains are isotypic

Heavy chains are 5 type They are.

1. Gamma (γ) chain - Present IgG immunoglobulin
2. Alpha (α) chain - Present IgA immunoglobulin
3. mue (μ) chain - Present Igm immunoglobulin
4. Delta (Δ/δ) chain - Present IgD immunoglobulin
5. Epsilon (ε) chain - Present Igε immunoglobulin

⇒ Each chain ends with one amino (NH_2) terminal end, another carboxyllic (COO^-) terminal end.

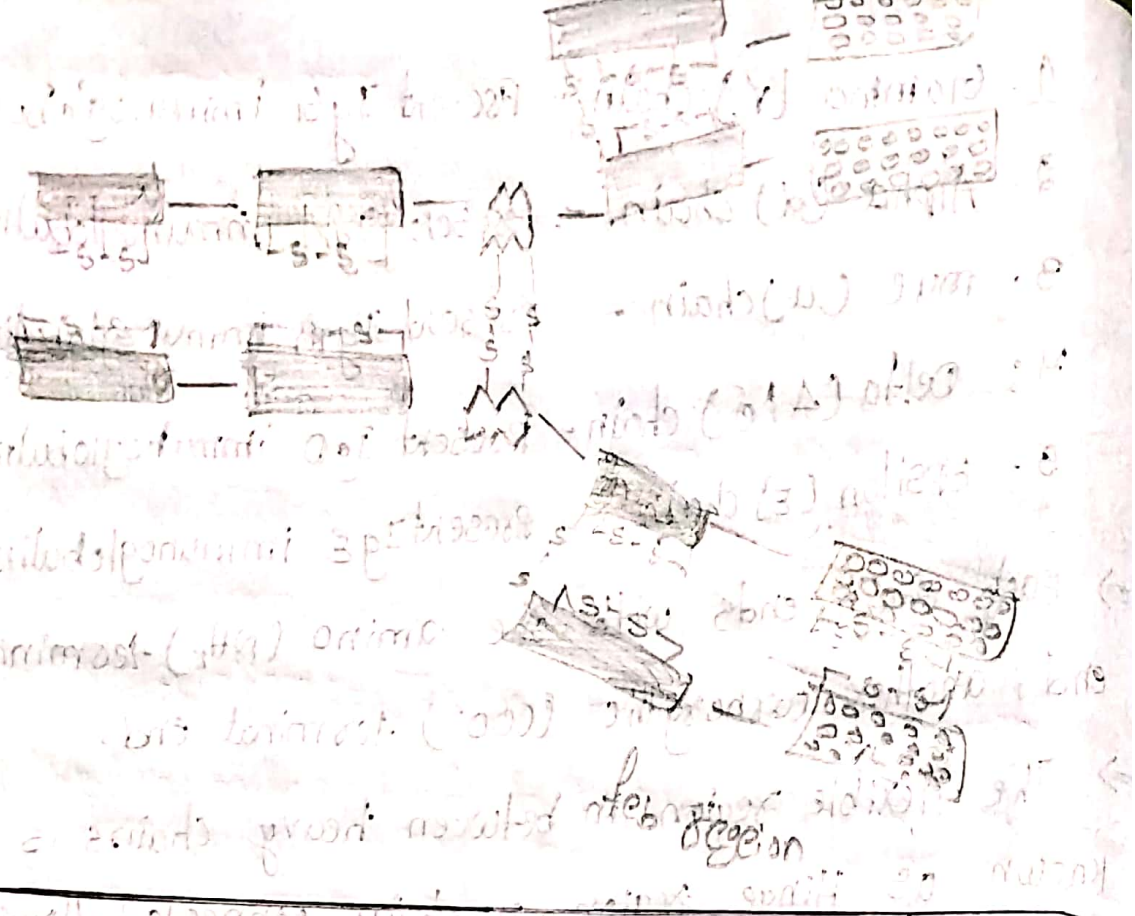
⇒ The flexible region in between heavy chains is known as Hinge region, H chain connected through disulphide bonds.

⇒ Keeping in mind the functional status, we can identify two regions in an immunoglobulin. They are Fab fragment and F_c fragment.

⇒ Fab fragment interacts with antigenic determinants, where as F_c fragment involves in complement fixation and attachment of phagocytic cells.

⇒ Every light chain contains two domains. They are variable light chain region (VL) fragment. Involves. constant light chain region (CL).

VL region located at NH_2 - terminal end and CL region exist at COO^- terminal end.



3) a) Humoral-cell mediated Immunity

Based on immune response immunity is of 2 type

1) Humoral immunity 2) cell mediated immunity.

1) Humoral immunity

B-Lymphocytes after the stimulation by an antigen Produced antibodies and release them in to the bod fluids like plasma, lymph and interstitial fluid.

⇒ The immunity caused by antibodies is know as humoral immunity

⇒ This is also known as antibody mediated immunity. It gives protection from Bacteria, virus and micro organisms. B-cell involve in this Process.

mechanism of Humoral immunity:-

⇒ Humoral immunity depend upon antigen- Antibody reaction. This mechanism takes place in 4 phases.

⇒ B-lymphocyte identifies the antigen In second phase B-cell becomes effector cell.

⇒ In third phase enhance their number through proliferation and produce antibodies.

⇒ In fourth phase antigen-antibody reaction occurs.

⇒ During the maturation of B-lymphocyte, they synthesize antibody proteins, and exhibit on their cell surface.

⇒ These are called as receptors of antigens. In-fact, they resemble with the antibodies would be produced by B-lymphocyte.

⇒ With the help of these receptors B-lymphocytes identify specific antigen and initiate immune responses.

⇒ Then B-lymphocytes left bone marrow and migrate into spleen and lymphonodes through blood. identifies the antigens and infectant micro organisms.

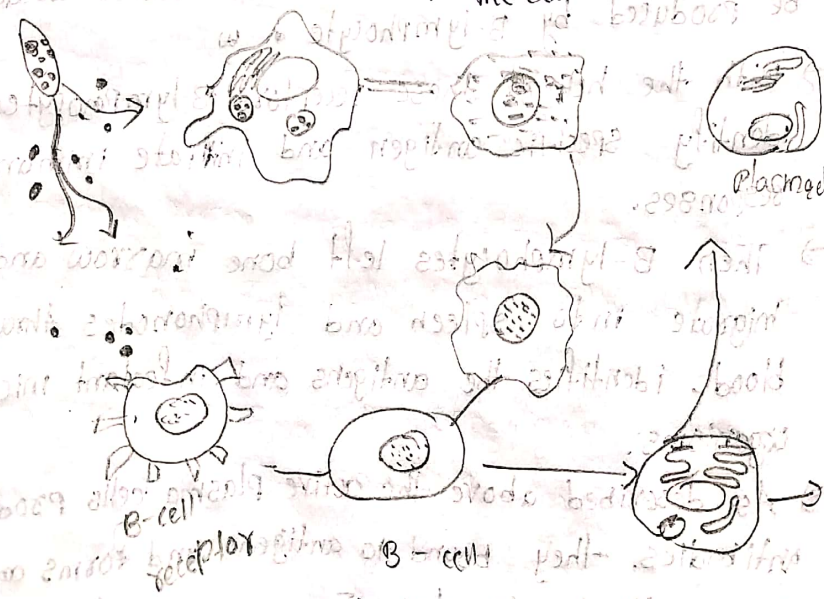
⇒ As described above the active plasma cells produce antibodies, they bound to antigens and forms antigen-antibody complex. These are 4 stages.

1. Neutralization :- Antibody binds with Antigen, Phy-
- sically inhibits and inactivates. Infectant virus
- inhibited in this method.

2 Agglutination :- Antibody has minimum two binding sites. These antibodies bind antigens like a clump.

3. Precipitation :- This is similar to agglutination. but the antibodies bind to soluble antigens and form Precipitation.

4. Activation of complement Proteins :- The antigen an tibody complex activates complement proteins Activated complement proteins attach to the sur face of micro organisms, ferforates the plasma membrane and destruct the cell.



3)b) hyper sensitivity

⇒ Immune system of the body highly complex. It always works to protect the body from the pathogenic organisms.

⇒ In special conditions, the reaction to the antigenic stimulus is severe and cause harm to the host tissue. This condition is called as "Hyper sensitivity"

⇒ Harmful reactions of immune system shows severe symptoms is called as hyper sensitivity.

⇒ This is seen in secondary response. i.e; if the antigen enters into the body for the second time

⇒ It leads to acute or severe symptoms or leads to death of the individual. so this is called destruction process.

Allergens :-

⇒ Penicillin, sulfamide, Aspirin like drugs.

⇒ Pollens, spores, dust particles etc---

⇒ Straw berry, Brinjal, shell fishes like food material.

⇒ Bacteria, virus, fungi, parasites like infectants

⇒ Blood transfusion in between dissimilar blood group individuals.

classification :-

A. classification based on the time required for hyper sensitivity.

two types based on time taken for reaction to occ they are

1) Immediate hyper sensitivity
2) Delayed hyper sensitivity

1. Immediate hyper sensitivity. Immune responses takes place with in fraction of minutes, such kind hyper sensitivity is known as immediate hyper sensitivity.

⇒ In this immune responses occur and disappear in a sequence.

⇒ Rashes form with in few minutes.

⇒ Accumulation of granular white blood cells and antibody reactions occurs in few minutes

2. Delayed hyper sensitivity:- Immune responses takes place. some what slow, with in 24 to 72 hours.

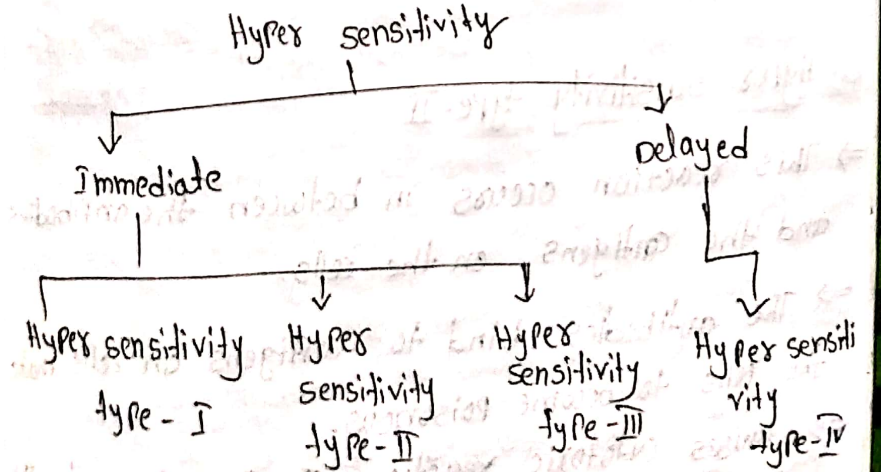
⇒ such kind of hyper sensitivity is known as delayed hyper sensitivity.

⇒ In this the immune responses lasts for long time and slow.
⇒ Allergic responses appear after 8H to 48 hours.
⇒ As a result of this red rashes formed on the body
⇒ It involves in the reactions in between antigens and T- cells.

B: classification based on the immune mechanism:-

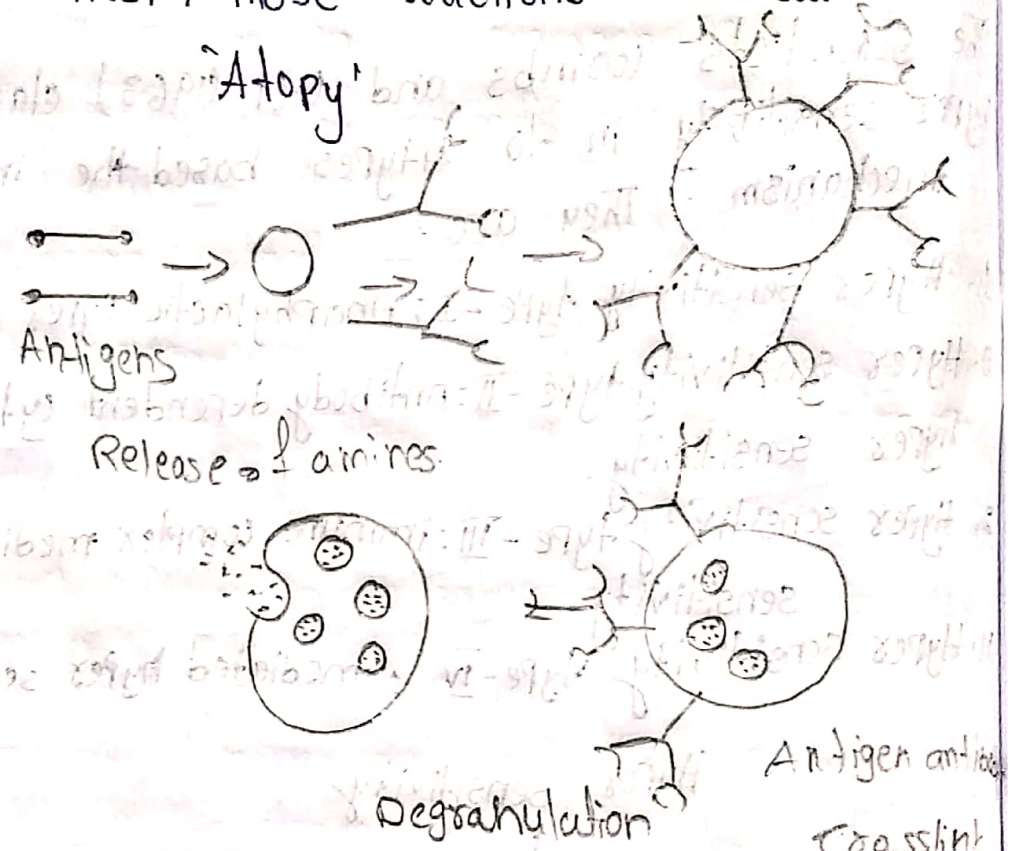
The scientists coombs and Gel (1963) classified hyper sensitivity in to 4types based the immune mechanism. They are.

1. Hyper sensitivity type -I: Anaphylactic Hyper sensitivity
2. Hyper sensitivity type -II: Antibody dependent cytotoxic hyper sensitivity.
3. Hyper sensitivity type -III: immune complex mediated hyper sensitivity.
4. Hyper sensitivity type-IV : mediated hyper sensitivity



1. Hyper sensitivity type-I Anaphylaxis described by Richet in 1902. Anaphylaxis means ana = without, phylaxis = protection.

Symptoms :- Death, vomiting and motions, red rashes. The allergy reactions due to the genetic effect, those reactions are called as 'Atopy'



2. Hyper sensitivity type-II

⇒ This reaction occurs in between the antibodies and the antigens on the cells.

⇒ The antibodies bind to antigens on cells make the cells to become poisonous.

⇒ causes cytotoxic reaction. In this type of allergy the host tissue get damaged.

⇒ The best example for this is the Erythroblastosis fetalis, which occur due to the interaction of Rh+ve and Rh-ve antigen, antibodies.

3. Hyper sensitivity type - III

Antigen - antibody complex leads to this type of allergy. some of the times many antigens entered into body, against to them antibodies released and forms antigen - antibody complexes.

1. Arthus reaction 2. serum sickness.

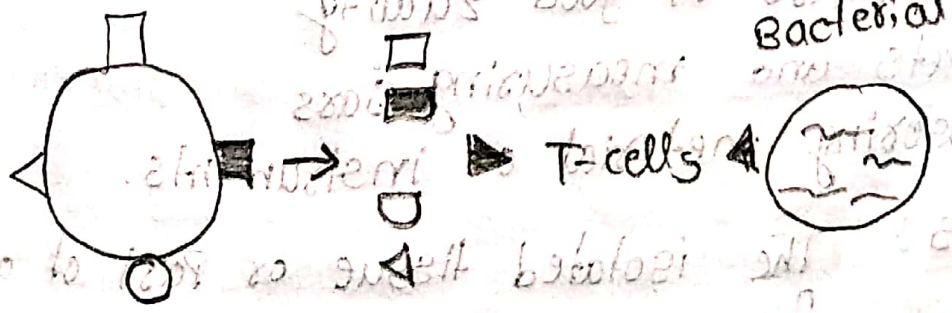
4. Hyper sensitivity type - IV

The interaction in between antigens and activated T- cells leads to type IV hyper sensitivity.

⇒ The T- cells stimulated by antigen. the same antigen entered into the body for the second time the T- cells bound to antigen releases some proteins.

Exam :- Tuberculin reaction

⇒



4a) Animal cell culture

A:- culturing the animal cells or tissues chemical media under appropriate environmental conditions is known as "Animal cell culture".

(i) cell structures (ii) cell nutrition cell cycles
(iii) cellular metabolism (iv) Oncogenesis
(v) In the production of animal viruses and antiviral substance
(vi) Embeyonic development.

material requried for animal cell culture:

⇒ The following material is requried for animal cell culture in the laboratory.
⇒ Air conditioned room.
⇒ constant temperature should be ~~maid~~ maintained in the room.
⇒ Autoclave for sterilizing culture media
⇒ pH meter to check pH of media.
⇒ filter papers of good quality
⇒ Pippets and measuring jars
⇒ scissoring meterial or instruments.

Explants :- The isolated tissue or part of animal body to go for cell culture is known as explant.

(i) Provide nutritions food animals growing in laboratories

(ii) The room of animals should be kept clean and free from microbes

(iii) use sterile surgical instruments to dissect the animal body

(iv) Isolation of the organ to be cultured

(v) small pieces of the isolated organ are used as explants.

Balanced salt solution :-

⇒ Balanced salt solution is the nutritive solution containing essential inorganic substance and glucose.

⇒ But organic substance are absent. cell will grow well in this solution.

Culture media :- culture media is the nutritive solution meant for growth of animal cell consists of inorganic and organic substance.

⇒ sodium, potassium, calcium, magnesium, phosphorus and bicarbonates are the inorganic substance.

⇒ organic glucose is present to provide energy

⇒ Besides these, 8type of vitamins and 14amino acids are also present.

The media used for animal cell culture are classified in to 3types.

1. natural media 2) complex natural media
3. chemical media

1) Natural media

Natural media do not contain any kind of chemi-cals contain only animal related natural substa-nce. This is called as natural media

Exam Blood plasma, Blood serum.

A) Blood plasma :- Blood plasma collected from frog and fowl

b) Blood serum :- The blood plasma which lacks fibrinogen is called as blood serum.

2) complex natural media. one or more natural media and balanced salt solution mixed toge-to form. complex natural media.

⇒ This media is used for the cultivation of human cells and other animal tissues.

A) supplemented Hanks - simins media

(~~In this~~ media ~~salt~~ solution mixed ~~together~~ to form)

In this media 80% Hanks- Simns solution 10% Bovine Embeyo Extract 5% Hourse serum Penicillin and streptomycin are Present.

B) supplemented Bovine amniotic fluid media:

In this media 37.5% Bovine amniotic fluid 20% Horse serum 5% Bovine Embryo extract 37.5% of Hanks balanced salt solution, streptomycin penicilin and micostatin are present.

3. chemical media :-

These are artificial media containing chemicals. It contains the following substances. They are

i) Glucose (Produce energy)
ii) Phenol red (P^H indicator)
iii) $NaHCO_3$ (Buffering agent)
iv) Inorganic substance
v) 8 types of vitamins
vi) 12-14 amino acids
vii) Hormones.

Example for chemical media : Eagle medium fischermedium, medium no-199, medium no-612 medium no-635 medium no-858, medium no CMRI-1066.

A) fischer's medium:- This is the suitable medi for culturing mammalian cells and fowl cells.

⇒ In this medium 14 amino acids, 9 vitamins and Hanks balanced salt solution are present.

B) medium no.199:- This is prepared by morgan ⇒ 1950. In this 8 vitamins, 14 amino acids Tween-80, Glucose, ferric nitrate, nucleic acids.

C) medium no 612:- This prepared by Helen and etal.. It contains all the substances of medium no. 199 But cestain, Glutathione, Ascarbic acid are more.

D) medium no 635:- It consists all the substanc of medium no. 612 but nucleic acids are absent.

E) medium no 858:- It consists all the substa - nce of medium no. 612 Along with them co-enzymes and sodium gluconates are pres

F) medium CMRL 1066:- In this medium excep A, B, E & K vitamins, ferric nitrate and sodium bicarbonate, all other substances of medium no. 858 are present.

4)b) cloning method

cloning refers to the production of genes or cells organisms with identical genetic constitition. The scientists of Genetics invented for 3 types of cloning methods .. They are.

1) Embryo cloning 2) Reproduction cloning
3) Gene cloning.

I. Embryo cloning :-

The therapeutic cloning is also known as embryo cloning. By this as Embryo cloning .. By this human Embryos are cloned for scientific research Purpose -s. The aim of this cloning is not the Pooduction of humen by cloning.

⇒ This is meant for the collection of stem cells inorder to study the humen Embryonic develop -ment. and therapeutic method for some diseases

II Reproductive cloning :-

⇒ Dolly the female sheep is the best example for the reproductive cloning..

⇒ Ian wilmut etal cloned Dolly in 1996, who were working in Roslin institute scotland.

⇒ The generated lamb is phenotypically and genotypically identical to the sheep from which the udder cells were collected for cloning.

⇒ It has taken birth on 5th July 1996. This is named as - Dolly.

III Gene cloning :-

⇒ formation of one gene or DNA sequence copies by using genetic engeneering techiniques is called as gene cloning.

⇒ The following are the steps involving in gene cloning.

1) Collection of DNA fragments with desirable characters
2) Insertion of collected DNA fragments in to the vector.
3) Transfer of recombinant vector in to the host
4) selection of transgenic host cells.

1. Collection of DNA fragments with desirable characters.

⇒ cell wall of the destructed by using enzymes
⇒ Dissolve the cell membrane by using detergents.
⇒ Pure DNA isolated by centrifugation.

⇒ Restriction enzymes cleave the DNA molecules in two ways, they are.

a) Blunt ends (flush ends)

b) sticky ends (cohesive ends)

a) Blunt ends :- some enzymes identify exact opposite points on two strands of DNA, and cut at that region.

5'------ AGCTAC ---- 3'

3'------ TCGATG ------ 5'

5'---- AGC TAC ------ 3'
       ||| |||
3'---- TCG ATG ---- 5'

b) sticky ends :- Some enzymes identify exact opposite ⇒ many restriction enzymes cut the DNA at various regions.

⇒ As a result one strand is longer than other with more nitrogen bases, There by forms two sticky ends with complementary nitrogen bases.

5'---- ACAGAATTCAC ---- 3'
       |||||||||
3'---- TGTCTTAAGTG ---- 5'

5'---- ACAG
       |||
3'---- TGTCTTAA

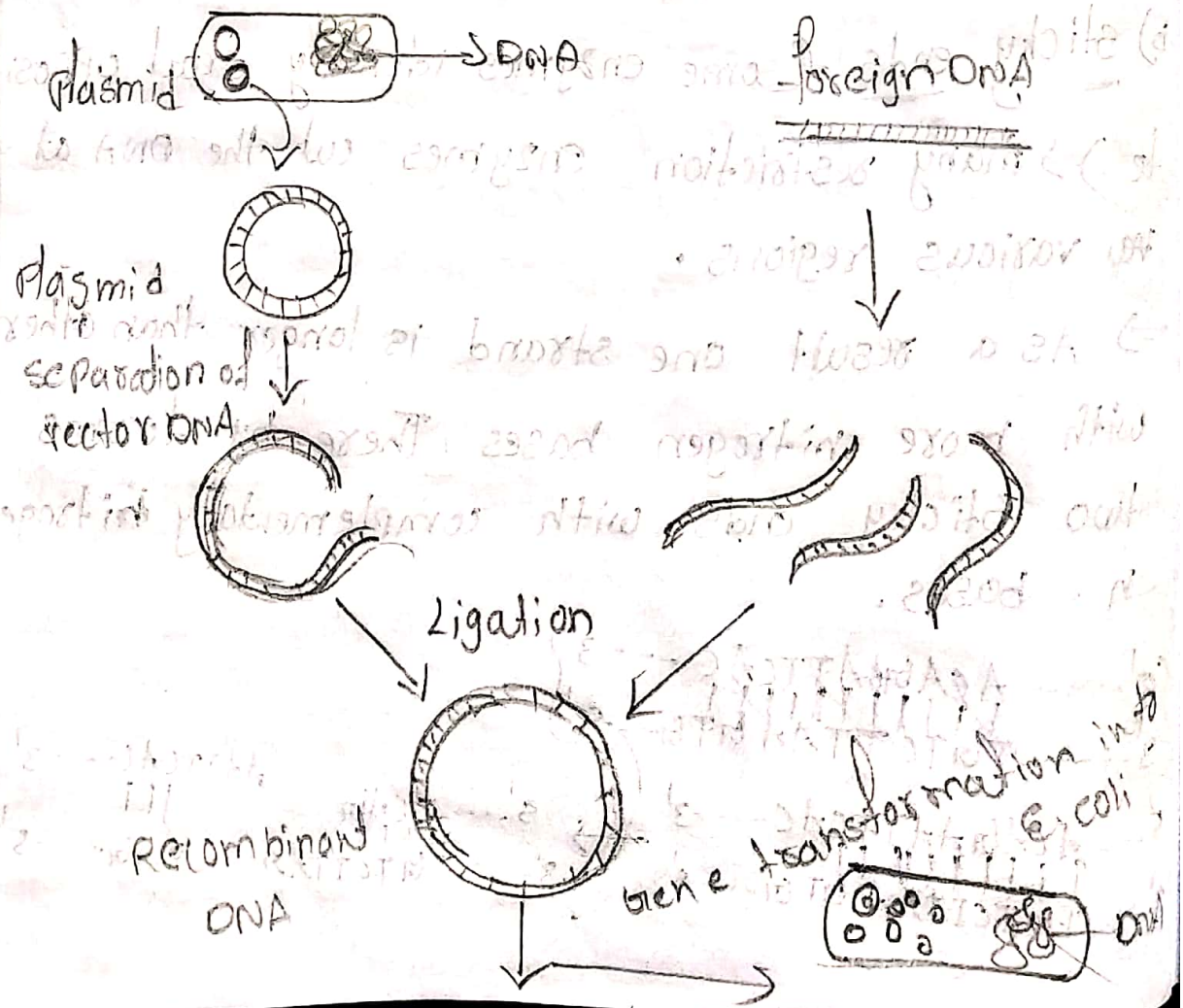
AATTCAC ---- 3'
|||
GTG ---- 5'

⇒ The DNA fragments that are formed due to the reaction of restriction enzyme get separated through "Gel electrophoresis" method

2. Insertion of collected DNA fragment in to the vector

⇒ Inserting the desirable DNA fragments (DNA) in to a suitable vector like plasmid, bacterio phage or cosmid etc---

⇒ Isolate plasmid DNA as said above made in to fragments by restriction endo nuclease enzyme. The DNA fragment with desirable genes combined with the end of the plasmid by using DNA ligase enzyme.



3. Transfer of recombinant vector into the host:-

⇒ Recombinant DNA Bacterial cells kept in cold calcium chloride solution the r-DNA enter into bacterial cell through geno transformation.

⇒ The recombinant DNAs undergo replication in host cells clones are formed in every cell.

4. Seeletion of Transgenic host cells:-

⇒ The selection is based on the type of gene that was cloned for example.

⇒ In order to select a cell that contain a antibiotic ~~resis~~ resistance gene, first the cells kept in the medium that contain antibiotic and inculate them into antibiatic medium.

5)a) Transgenic Animals:-

⇒ The organisms that have foregn genes with in their own genome are called Transgenic animals.

⇒ The transgenic animals became very famous after 1982 the world came to know about the productio-n of transgenic animals for the first time

⇒ Transgenesis is more complex in higher animals when compared to mice.

⇒ The reason is the lack of efficient gene segregation.

⇒ Due to the modern reserch on Biotechology large transgenic animals with desirable genes can be produced.

1. Transgenic fish :- In fish, external fertilization and development takes place. many types of transgenic fishes have been produced which exhibit high efficiency in the growth and size.

⇒ fresh fish eggs are collected from water

⇒ Introduce the growth hormone transgene into these eggs throuth micro injection or electrophoration later, these eggs are allowed to develop by incubating them thermoregulatory tanks.

⇒ The capacity of transgenesis in fishes is of about 70%.

2. Transgenic Goat

⇒ Transgenic goats were Experimentally developed by simson (1988) for the first time.

⇒ The transgenesis on goats are mainly related to the development of mammary glands.

⇒ These mammary glands are denoted as Bioreactors of many Proteins which are

extensively used in field of Pharmacy.

⇒ The silk protein is separated from these milk. dried converted into white powder.

⇒ In the same way the transgenic sheep are produced for more growth and more production of wool

⇒ The amino acid cysteine is needed for the production of high quality wool

Application of Transgenic animals :-

⇒ Transgenic animals are genetically modified organisms. new hereditary characters are embedded in these organisms.

⇒ These animals are very useful to understand. The different diseases of human beings and their prevention.

⇒ we can enhance the size and quality of production like eggs, meat, milk and wool by transgenesis.

⇒ wecan produce duro drug resistant organisms by Transgenesis.

⇒ we can enhance growth speed.

5b) Stem cells

The blastocyst cells which can be modified into varied other types of tissues through cell division are called as 'stem cells'

⇒ These are also called as 'Base cells'

⇒ 'Thomson' separated stem cells from human embryo for the first time.

⇒ stem cells are present in embeyo aswell as adults.

⇒ Adult stem cells replace the cells which lost by wear and tear mechanism.

→ stem cells are undifferentiated cells.

Totipotent stem cells
pleuripotent stem cells.
multi potent stem cells.
unipotent stem cells

1. Totipotent stem cells :-

⇒ Totipotent cells produced from zygote.

⇒ Hence the zygote is totipotent.

⇒ Entire organism develops from the zygote

2) pleuripotent stem cells :-

⇒ pleuripotent stem cells differentiated from

totipotent stem cells.

⇒ The cells that can be modified into all other types of cells, except placenta are known as pleuri-potent. Stem cells.

3) multipotent stem cells :-

⇒ multipotent stem cells differentiated from pleuripote-nt stem cells. multipotent stem cells can give rise to only a limited number of cells type.

Exam :- Haemopoietic stem cells.

4) unipotent stem cells :-

⇒ unipotent stem cells are differentiated into RBC, WBC and blood platelets only from multipotent stem cells. Each unipotent stem cell give rise to single modified cell type.

Example :- The cells of mast tissue :- These can be differentiated in to cell only.

stem cell - Types :- stem cells are two types : They are

1) Embryonic stem cells

2) Adult stem cells.

1. Embryonic stem cells :- embryonic stem cells are presented in the embryo.

2. Adult stem cells :- Adult stem cells are present in Adult animals only. These are also known as somatic stem cells.

Stem cells uses :-

1. Diabetes mellitus
2. Parkinson's diasease predominant in old age People
3. Alzheimer's disease ; memory loss
4. Diseases related to spinal cord
5. Cancer.

The charcters of cells that are used in cell based treatment in the parkinsons disease.

⇒ should produce Dopamine

⇒ have to undergo division and have to survive in the brain

⇒ have to connect with host brain tissue

⇒ Due to the above characters the stem cells are veary co-operative in the cell based treatment.

⇒ In the above said 2 diseases, the Embryo stem cells are used for certain extent

Short Answers Eight qua

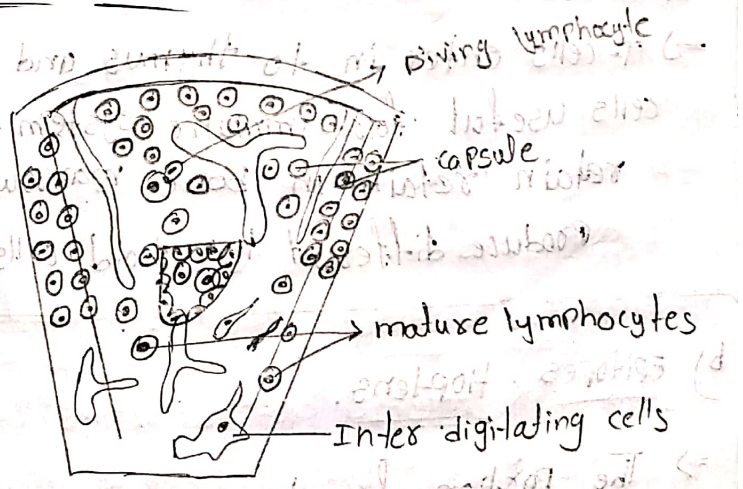
1a) primary lymphoid organs of Immune system

⇒ These are also called as "central lymphoid organs" These are lympho epithelic structures

⇒ lymphocytes population growth and attaining immuno competency takes place in lymphoid organs.

⇒ After attaining immuno competency in primary lymphoid organs, lymphocytes migrate into secondary lymphoid organs through blood and lymph and stored there.

1. Thymus gland



⇒ Thymus gland produces "Thymosin" hormo

⇒ Thymosin is helpful for activation and m
-uoation of T-lymphocytes emerged from
bone marrow.

2. Bone marrow :-

⇒ This a primary lymphoid organ: The soft
tissue present in bone cavity is caued as
Bone marrow:

1) Circulating and edipose region

2) Haemopoitic region.

⇒ Haemopoietic region contain haemopoiti
stem cells.

⇒ T-cells enter in to thymus and produce
cells useful for immune system. B cell
retain retain in bone marrow and
Produce different lymphoid cells.

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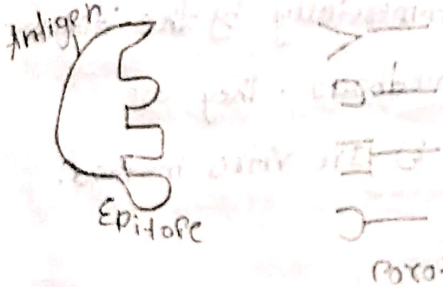
b) Epitopes, Hoptens.

⇒ The portion of antigen which stimulate the
production of antibodies and interacts with
those antibodies known as "Epitope"

⇒ One antigen has more than one Epitope

The size of an Epitope is approximately 25-3HA° and molecular weight is 400-1000 daltons.

→ The Epitopes which are present in side the antigen are called as "Hiding antigenic dete rminants"



HAPTENS

⇒ The antigens which generate immune respon ses at their own are called as "Complete antigens"

⇒ The haptens they themselves unable to stimula -te immune responses ie unable to form antibo dies but specifically interacts with antibodies.

⇒ for example:- Dinitro phenol (DNP) combines with Bovine serum albumin forms complete antigen and stimulate immune responses.

9) monoclonal antibody

⇒ Antibodies produced a clone of specific lymphocytes are called monoclonal antibody

Production of monoclonal antibody

Production of monoclonal antibody from hybridoma clones commercially by the following two methods. They are

1) In vivo method 2) In vitro method.

1) In vivo method :-

⇒ In vivo method refers to production of monoclonal antibody in the body of a individual.

⇒ select an appropriate rat and inject hybridoma cells in to a muscle.

⇒ In vitro method:

⇒ In vitro method refers to the production of monoclonal antibody out side the body of the individual

⇒ After two weeks a few grams of antibody are produced.

d) Cytokines

⇒ cytoknes are low molecules weight soluble proteins of glycoproteins mediate interactions among the cell of immune system.

⇒ These are secreated from the cell of immun: -e system. viral infected cells.

⇒ The cytokines secreated from lymphocytes are "lymphokines" the cytokines secreated from monocytes are called as "monokines"

⇒ The main cytokines are two types.

1) Interlenkins 2) Inter ferons.

1) Interlenkins Interkins are the cytokines produced by white blood cells. They influence the growth and differentiation of various cells of immune system.

2. Interferons:- These are the anti viral proteins produced viral infected cells

functions of Cytokines:-

⇒ Cytokines bound to the receptors on the surfa, -ce on the immune cells.

2. some of the tyfokines work like growth factors. they encourage cell division and cell growth

3) They play role in cell mediated immunity.

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(6) vaccines

⇒ preparation of biological factor inorder to enhance the resistance power against aspecific disease is known as vaccine.

⇒ The term vaccines derived from latin word "vacca"

⇒ The meaning of vacca is 'cow'

⇒ The father of vaccination was "Edwardsen" a British scientist.

⇒ types of vaccines :-

Although vaccines are available against many diseases, vaccines to be developed to the diseases like AIDS and malaria.

⇒ vaccines are of the following types:

1) Attenuated whole agent vaccines
2) Inactivated whole agent vaccines

3) Toxoid vaccines
4) component vaccines
5) conjugante vaccines
6) Recombinant vactor vaccines
7) DNA vaccines

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f) major Histo compatibility complex

⇒ The group of genes responsible for immune responses. antigens of transplatation and Proteir - s of complement system are called as major histo compatibility complex.

Histo compatibility molecules The molecules Pro duced mHC genes are called Histo compatibi - lity molecules or antigens. mHC malecules are 4 types.

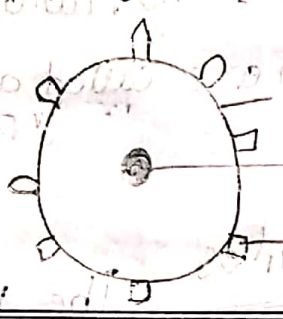
1. class - I mHC molecules
2. class - II mHC molecules
3. class - III mHC molecules
4. class - IV mHC molecules.

class - I - mHC molecules are Presend in the surface of nucleated cells. and blood platelets.

class - II mHc these antigens involve in graft rejection

class - III mHc these are present on the surface of T-helper cell, macrophages, B-cell and antigen

class - IV mHc these antigens are present on leukemia T-cells (TLa) and immatured they mocytes.



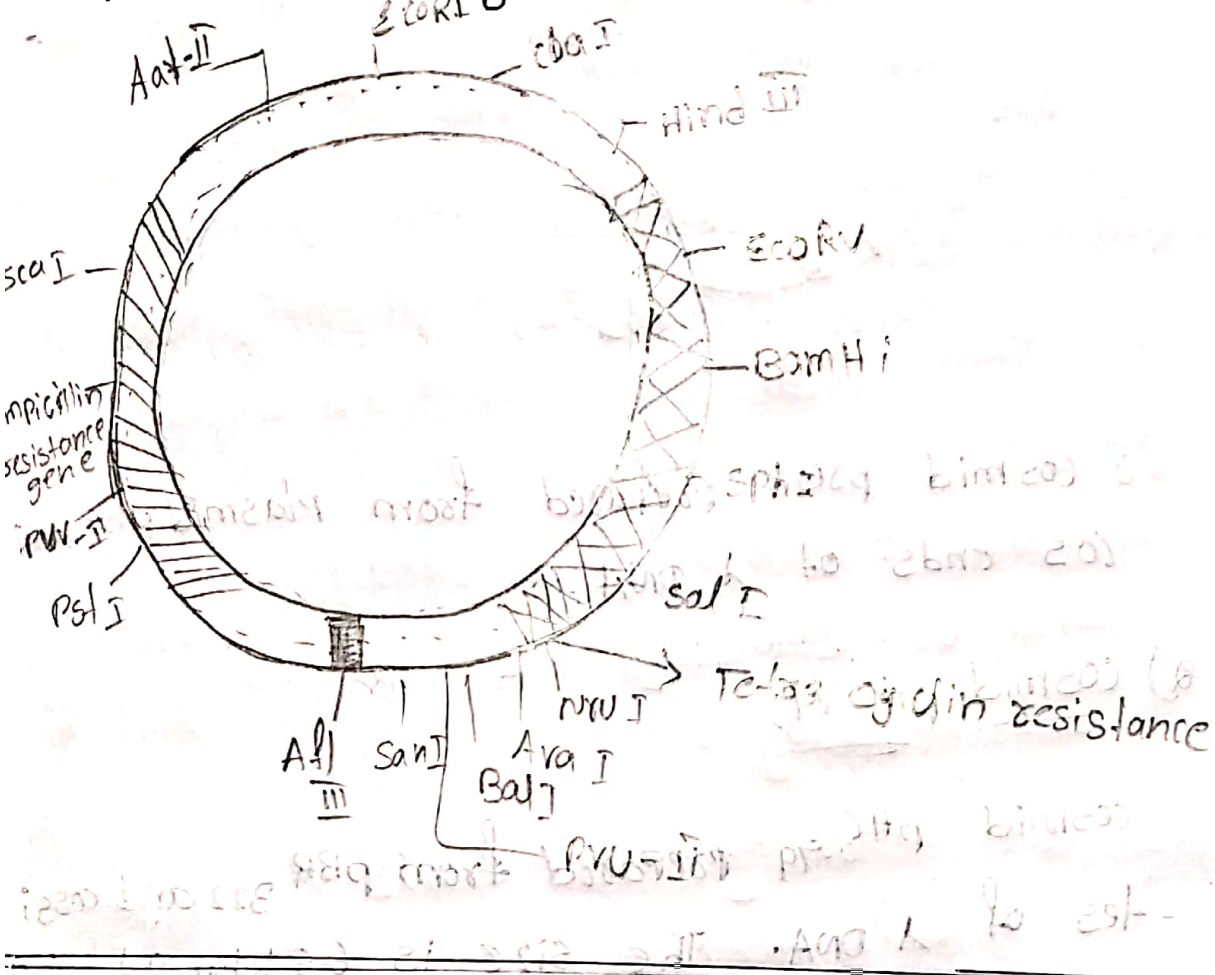
g) plasmid pBR 322:-

pBR 322 is an artificial plasmid this gene cloning vector. This is constructed from 2 plasmids. They are, Psc 101 and col E,

(i) P- Denotes plasmid

(ii) BR - stands for the scientists who constructed this plasmid 'B' for Bolivar and 'R' for Rodriguez.

(iii) 322 is the numerical code given by the scientists. This act like either the parent or grand parent for many vectors.



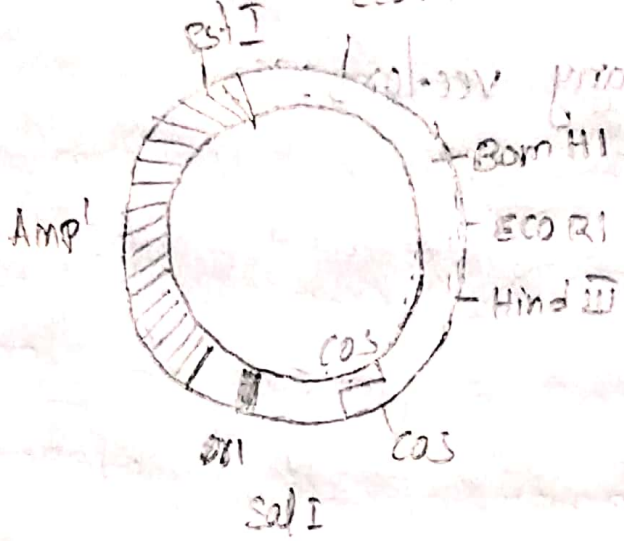
4) COSMIDS

⇒ The hybrid cloning vectors originated from the plasmids are called as cosmids.

⇒ They have characteristic features of both plasmids and bacteriophages.

⇒ They are prepared by combining the ends of the plasmid DNA with the cos terminal end of the λ DNA.

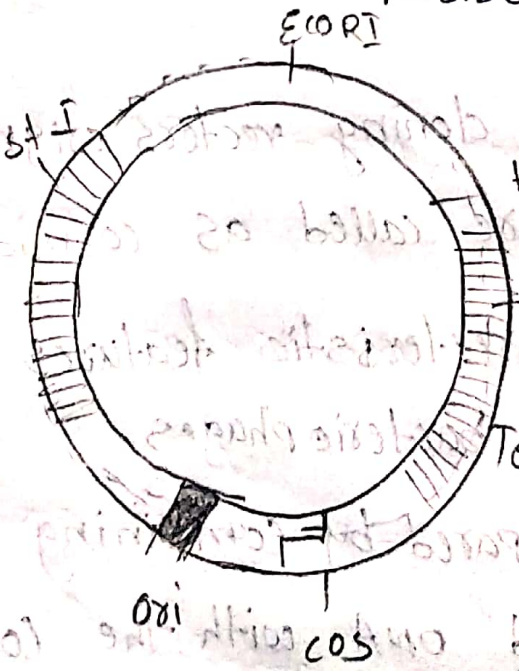
1 Cosmid pJB8 :-



⇒ Cosmid pJB8 prepared from plasmid pBR and cos ends of λ DNA.

2) Cosmid pHC 79 :-

Cosmid pHC 79 prepared from pBR 322 and cos-ites of λ DNA. The size is 6.5 kbp. It carries about 40 kbp size DNA fragments.



i) Application of cell culture.

⇒ Animal cell culture is very important in modern biology. This is used for the welfare of human beings. some of the uses of animal cell culture are as follows.

1) organ culture :-

1) Artificial skin is the example for organ culture. Collect skin pieces from a person and keep them in a flask with appropriate medium and the artificial skin is culture.

2) Bone marrow is also cultured artificially. If there is a deficiency of cytokines in the bonemarrow, such bone people who met fire accidents.

2) vaccines Production

⇒ viruses growth in live cells and increase their population. Based on this By using animal cell culture vaccines are production from viruses.

1) Recombinant DNA Technology

⇒ This is the important modern techniq that are used in Biotechnology.

⇒ The hybrid DNA that has obtained by -bining one organisms DNA with another organisms DNA is known as Recombin DNA..

⇒ In this method we create new combi tions of DNA segments that not found naturally.

⇒ The following the events in recombina DNA technology

1. Isolation of donor DNA for cloning

⇒ Restriction endonucleases cut double st -nd DNA at aspecific places.

⇒ Thus restriction fragments of DNA are produced.

2) Isolation of vector:-

⇒ find a suitable cloning vector which a self replicating genetic material and can

the donor DNA.

k) Transgenic Animals

⇒ The organisms that have foreign genes with in their own genome are called - Transgenic animals.

⇒ The transgenic animals become very famo - us after 1982, the world came to know abo - ut the production of transgenic animal for the first time.

1. Transgenic fish

⇒ In fish, external fertilization and deve - lopment takes place, many types of transge - nic fishes have been produced which exhibit high efficiency in the growth and size.

⇒ Transgenic Goat :-

⇒ Transgenic goats were experimentally develop by simson for the first time.

⇒ The transgenesis on goats are mainly to the development of mammary glands.

⇒ In the same way the transgenic sheep are produced for more growth and more production of wool

⇒ But the microbes present in the intes- -e of sheep utilize the cystine and - ase. to sulfide hence the required amount of cystine is not availble for sheep.

⇒ due to plentyful systhesis of cysteine they produce the wool with high quality