

Biology Notes FA/FSC

Chapter No 13 Immunity

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Fakhr E Alam

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Immunity

Immunity:

meaning: immu-is—resistance
 ity — condition/occurrence.

Definition:—"The ability of a body which resist^s against the disease or pathogen is known as immunity."

Immunology:—"It is the branch of biology in which we study about immunity".

Q: what is First Line defence, Explain its components:

First Line defence:

Definition:—"These is non-specific and included structures, chemicals, and processes that work to prevent pathogens from entering the body."

Components of first line defence: -(also imp for mca)

The first line defenders include the skin and mucous membranes of the respiratory, digestive, urinary and reproductive systems.

A-Skin as a first line defence:

Introduction:—Skin is regarded as one of the first line of defence because it provides a biological barrier, protecting the internal organ.

Importance: (Role)

1- It protects the body especially the underlying tissues against pathogens.

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2- It protects the body from excessive water loss.

3- It is also involved in providing insulation and temperature regulation.

Components of skin's defence:

①-physical components of the skin's defence:

Physical components of the skin's defence is composed of two main layers i.e.

②-The epidermis:

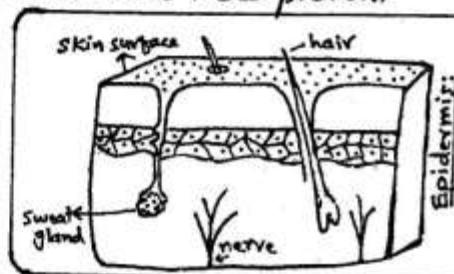
introduction: - "It is the outer most layer of skin which is composed of multiple layers of tightly packed cells that prevent the entrance of microbes."

Role of the epidermis:

1- It is a waxy layer of skin which does not allow the pathogen to enter the body.

2- The natural shedding of dead skin cells remove many attached microorganisms.

3- The epidermal dendritic cells actively patrol the skin to engulf and digest the pathogens.



③-The Dermis:

introduction: - "It is situated beneath the epidermis and contain protein fibres called collagen."

Role of the dermis:

Dermis contains collagen fibers which is tough and gives strength to skin and pliability to resist abrasions because the

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abrasion can introduce microorganisms to body. & (also imp for me)

②- Chemical components of the Skin's defence:

①- perspiration:

Definition: - "The process in which sweat is excreted through skin is known as perspiration."

Sweat: - It is saline fluid which is secreted by skin's sweat glands. It contains salt and enzymes.

Role of perspiration:

- 1- most microbes can not live in a highly saline skin's surface.
- 2- The lysozymes in sweat can destroy the cell walls of bacteria.

②- Sebum:

Definition: - "It is a fatty lubricant matter^(oil) secreted by sebaceous gland of the skin." & (also imp for me)

Role of sebum:

- 1- The sebum (oil) keeps the skin pliable and less likely to break or tear.
- 2- It also lowers the pH of the skin to a more acidic level that inhibits the growth of many types of bacteria.

③- Defence against infection in digestive Tract:

introduction: - "The digestive tract also contains different chemicals or fluids which control the entry of microbes to the body or blood."

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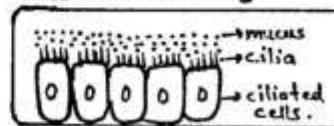
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Role of Digestive Tract:

- 1- HCl in the stomach is the first line of defence against bacterial and viral infections. (also imp for m. o.)
- 2- The microbes which are ingested with food can not survive in acidic environment of stomach.
- 3- Normally good bacteria that live in digestive tract can also move into the stomach, to prevent their over growth because stomach contains HCl and other acid chemical which kills microorganisms



② Defense against infection in Respiratory tract: (cilia and Mucus):

Introduction: - "Respiratory tract also contains special structure and fluid that prevent the pathogens entry to the body."

Role of cilia and mucus:

- 1- The cilia and mucus of respiratory tract filter out the dangerous particles e.g. bacteria, viruses, dust, pollen, that could otherwise enter into lungs and could cause damage.
- 2- The cilia and mucous membrane lie inside the nose to trap particles before they enter the body.
- 3- The cilia movements can direct the flow of mucus, removing it from the nasal cavity.
- 4- Sneezing force air through the nasal cavity is also

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effective at removing particles and mucus.

- 5- Due to cilia movement each breath becomes warm which prevent the cold air from damaging sensitive lung tissues, resulting the lungs tissues , protected from pathogens attack.
- 6- Mucus adds moisture to each breath to prevent the airways and lungs from becoming dry and damaged.
- 7- The mucus[↑] thin moisturized coat on respiratory tract which catches the dust and bacteria.
- 8- This thin mucus which trap dust and microbes is swept up towards the wind-pipe by tiny breathing hairs called cilia where it can be coughed up or swallowed.

Q: What is second line of defence, Explain the roles of its components:

Second line of defence: (Non-specific defence)

introduction: - once pathogens are able to neutralize the responses from the first line of defence and are able to penetrate inside the body , they are encountered by the second line of defence which is non-specific because it handles a variety of microbes.

Components of second line of defence:

Non-specific defence includes the following components.

A- Macrophages and Neutrophils:

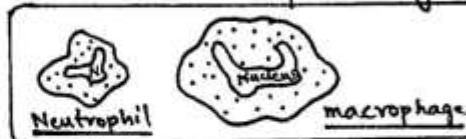
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Introduction: - "The monocytes (macrophages) and neutrophils are types of white blood cells which are involved in providing immunity to the body."



① Macrophages: (all is imp for me@)

introduction: - "Monocytes are released by the bone marrow these float in the blood stream, from where they enter the tissues and turn into macrophages."

Largest blood cell: - of all blood cells macrophages are the largest or biggest.

Types of macrophages: - most boundary tissues have their own macrophages. For example Alveolar macrophages live in the lungs and keep the lungs clean and disease free by ingesting foreign things like smoke, dust etc.

Role of macrophages:

1- macrophages clean up dead neutrophils.

2- macrophages clean up pus as a part of the healing process.

② Neutrophils: (all is imp for me@)

introduction: - "They are common phagocytic white blood cells in the body of human."

production: - Bone marrow produces Trillions of neutrophil white blood cells daily and release them into blood stream.

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Life span: - The life span of neutrophils is short, generally less than a day.

Role of Neutrophils:

- 1- Neutrophils are attracted to foreign material, inflammation and Bacteria, which are then eaten by macrophages.
- 2- Neutrophils also concerned with cut or splinter region of the body to prevent the microbes (pathogens) entry.
by a process called chemotaxis
- 3- Once a neutrophils find a foreign particle or bacteria it engulfs it and releases enzymes called hydrogen peroxide from its granules to kill the bacteria.
- 4- In a site of serious infection pus is formed due to reaction of neutrophils, bacteria and other cells.

②-Natural Killers cells:(NK-cells) (all is imp for mcq)

Introduction: "Natural killer cells are a type of lymphocyte (WBC) which play a major role in the host-rejection of both tumors and virally infected cells."

Role of NK-cells:

- 1- Natural killers cells are cytotoxic in nature and small granules in their cytoplasm contain special proteins such as perforin and proteases known as granzymes.
- 2- perforin chemical of NK-cells forms pores in the cell membrane of the target cell through which the granzymes

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can enter the cell, Leads to ^{the} destruction of the virus inside.

3- NK-cells are also activated for destructive action, in response to interferons or macrophage-derived cytokines.

②-Complement system: ←(all is imp for me)

introduction: - "If pathogenic bacteria get through all the immune system's initial defence, the activation of the complement system is initiated to control the Bacteria or pathogen."

Components of complement system:

The complement system includes proteins and white blood cells which carry antibodies.

or structures

③-Antibodies:- The antibodies are microscopic killing proteins that search for anything they don't recognize as being part of the body.

④-proteins:- The protein circulates in an inactive form but in response to the recognition of microorganism they become activated. WBCs and protein work together to coat invading bacteria and makes the bacteria incapable for reproduction.

Role of complement system: 1- Complement system first binds with bacteria/pathogens and then damages the bacterial cell wall, as a result destroys the microbes.

2- It also binds to bacterial cell walls and stimulate the phagocytosis process by neutrophils and macrophages.

3- It also attracts the phagocytic cells such as neutrophils into an area of infection.

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D-interferon: ← (all is important)

Introduction: - "interferons are a group of proteins that are produced by human cells in response to viral infection and other stimuli. They have the ability to interfere with viruses that are replicating."

Types of interferon: - There are three main types of interferon.

1-interferon-alpha and Beta:

These interferon is mainly produced by white blood cells and certain connective tissue cells, called fibroblasts.

2-interferon-gamma:

gamma interferon is produced by activated T-cells.

Mechanism of interferon against Viruses: (Role of interferons)

- when viral nucleic acid enters the host cell.
- The interferon genes of the host cell is turned on.
- as a result the host cell produces interferon molecules which are then, released.
- when the first affected host cell is killed by virus, the interferons molecules enters another cell.
^{asa}
- result such second cell makes Antiviral protein (against the virus) which block viral replication.

E-Inflammatory response: ← (all is important)

introduction: - "The inflammatory response (i.e.-inflammation)

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occurs when tissues are injured by bacteria, toxins, heat or any other reason."

Role of inflammatory response:

- 1- During inflammatory response first the damaged tissues release chemicals, including histamine, bradykinin and serotonin.
- 2- Then these chemicals cause blood vessels to leak fluid into the damaged tissue, causing swelling.
- 3- These chemicals also attract white blood cells (phagocytes) that engulf microorganisms and dead or damaged cells. This process is called phagocytosis.
- 4- Once the inflammatory process has begun, it continues until the infection that caused it has been eradicated (completed).

Symptoms of inflammatory response:

The main symptoms of the inflammatory response are as follows.

- 1- The tissue in the ^{area gets} red and warm, as a result of the large amount of blood reaching the site.
- 2- The tissues in the area are swollen, again due to the increase amount of blood and proteins that are present.
- 3- The area gets painful, due to the expansion of tissue, causing mechanical pressure on nerve cells, and also due to presence of the pain mediators.

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E- pyrexia and pyrogens:

Introduction: - "when microbes enter the body and produce a major infection, in response the body produces fever, which slows down microbial production and enhances the body's own fighting abilities."

①- pyrexia: (Fever)

Definition: - " pyrexia means the elevation (high) of body temperature above the normal range".

Causes: — pyrexia may be caused by toxic substances, bacterial or viral infections that affect the temperature regulating center in the hypothalamus of Brain.

②Pyrogen: (Definition)

"The substances that may cause the ^{increase} in temperature are called pyrogen." ← (also imp for mcq)

Role of pyrogen and its production:

- 1 → Pyrogens affect the heat regulating center in hypothalamus by increasing the threshold (tolerance) of heat.
- 2- Progens are Secreted by toxic bacteria or released from degenerating tissues of the body that cause fever during conditions of sickness.
- 3- Progens are also produced by many microorganisms including - Bacteria, yeasts and moulds.

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Ways the fever kills microbes:

Explanation: → Fever is actually the body's natural way of defending itself from pathogens because many of them can't survive in the body due to high temperature caused by fever.

- High body temperature also gives signals to infection-fighting cells of the immune system such as phagocytes, neutrophils, and lymphocytes to defend and help in fighting of infection.
- Due to stimulation of immune system and high temperature the pathogenic microbes cannot survive.

The Benefits of fever:

The following are the benefits of fever to human body.

- 1- Immune system starts to produce more Antibodies during fever which are more effective than any medicine.
- 2- More white blood cells are produced during fever to provide immunity against infection.
- 3- more interferons is made which blocks the spread of viruses to healthy body cells.
- 4- During fever blockage of iron takes place on which the bacteria feed.
- 5- Increased temperature in fever directly kills microbes.

Q: Describe the Third Line of Defence: (specific defence)

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Third Line of defence:

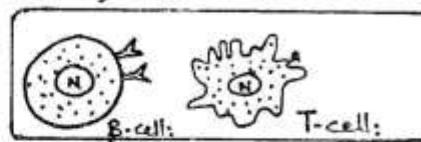
Introduction:—“If a pathogen crosses the first and second line of defence and gets into blood-stream, the body tries to control and fights against pathogens which is accomplished by specific defence mechanism i.e. the two defence mechanism — The cell mediated immunity (cellular part) and humoral immunity (Antibodies in plasma).”

Example:-

- T-lymphocytes (T-cells) along with macrophages give the cell mediated response or immunity.
- while the B-lymphocytes (B-cells) give the humoral response or immunity.

Lymphocytes: (also imp for mca)

Definition:—“It is one of the five kinds of white blood cells or leukocytes, circulating in the blood, which are different in their functions.”



Types of lymphocytes:

The most abundant lymphocytes are B-lymphocytes and T-lymphocytes.

Role of lymphocytes: (also imp for mca)

- 1- B-lymphocytes produce antibodies when pathogen is recognized in the blood stream.
- 2- the T-lymphocytes sensitize when they come across pathogens and give signals to immune system

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to fight against infection.

3-T-lymphocytes co-operate with B-lymphocytes to produce antibodies.

4- Although B-lymphocytes are responsible for antibody production but they require to be stimulated by helper T-lymphocytes first.

5- Each B-cell and T-cell is specific for a particular antigen.

Q: what is immunity, write its basic types:

Immunity:

Definition: "The ability of a body which resists against diseases or pathogens is called immunity."

Basic types of immunity:

There are two main types of immunity. i.e—

① Innate immunity: (inborn or Natural immunity)

Definition:—"It is the type of immunity which is inborn and inherited from parents or antibodies obtained from mother's milk during Lactation." (all is imp for me)

Explanation:

→ The innate immunity system is naturally ^{developed} in body by birth and it is non-specifics, which can response against all kinds of infections, generally.

→ It is present from the birth and is inherited from mother

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to offspring.

- It is genetically present in the body and can be transferred to next generation.

② Acquired immunity: (Adaptive immunity)

Definition: - "It is the type of immunity which is developed during life time of an individual." (all is imp for meas)

Explanation:

- It is not present from the birth but it ^{is} acquired during life.
- It is developed by the organism in response to a disease caused by the infection of microbes or vaccine.
- In acquired immunity the protective lymphocytes of body produce antibodies which not only fight against the antigens and relieve → infectious disease but also provide immunity against further attack.

- The acquired immunity which has been developed may be-

1-Temporary immunity: - "The immunity which works for short time or developed only during disease".

Example: - in influenza infection.

2-permanent immunity: - "The immunity which works for long time against pathogens."

Example: - in measles, mumps, polio and small pox infection.

Types of Acquired immunity:

Acquired immunity is of two types. i.e.-

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(a) Active or natural immunity: (also immunization)

Definition: - "It is a long Lasting immunity developed by antibodies produced by an individual's own cells."

Explanation:

- In this case the body immunity system is stimulated to produce antibodies which produce resistance.
- Active immunity Lasts for months or years and the body is protected for a long time.

Development of active immunity:

Active immunity is developed in three ways.

- 1- During the disease. e.g. - in chicken pox, mumps, measles etc.
- 2- During a sub clinical infection. e.g. 'Sabin' - vaccine against polio
- 3- having killed micro-organisms or detoxified toxins. e.g. Killed 'Salk' - vaccine against polio, tetanus toxoids against tetanus, it is developed.

(b) Passive or Artificial immunity: (also immunization)

Definition: - "It is a short Lasting immunity in which organism itself does not produce antibodies but the antibody against specific antigen (pathogen) is directly injected from other source".

Explanation:

- Antibodies used in passive immunity are produced in another organism.
- It works immediately and temporary.
- The antibodies lasts for 2-3-weeks in the body of the individual.

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For Example: - Antibodies in mother's breast milk provide baby with temporary immunity against diseases. This can protect the baby against infection during the early year of childhood.

Q: What is vaccination, write the types of vaccines.

or - How a vaccine develop active immunity explain:

Immunization:

Definition: - "The process used to develop immunity is known as immunization."

Vaccine:

meaning: - The word vaccine has been evolved from vacca which means cowpus, which contains virus for cowpox. the cowpox virus is just like smallpox virus in structure & (also imp forms)

Definition: - "It is the harmless substance which is prepared from microbes that stimulates the immune system to develop defence against the actual pathogens." & (also imp forms)

Vaccination:

Definition: - "Immunization with vaccines is called vaccination."

→ Edward Jenner, first developed the technique of vaccination in 1795. & (also imp forms)

Types of Vaccines:

① Live vaccines: Definition: - "These vaccines are

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obtained from living modified microbes."

- Explanation: → Live vaccines stimulate the immunity system of organisms which develops antibodies against the actual pathogen.
- They usually require a single dose and are more effective than the killed vaccines. Examples:- BCG, polio, measles.
t (also imp for meo)

②-Killed vaccines:

Definition: - "These vaccines are prepared from microbes that have been killed by heat or chemicals".

- Explanation: → These vaccines contain chemical substance which stimulate the immunity system of organisms.

→ They are usually more safe but less effective and require many doses.

Examples: - Typhoid, cholera, tetanus (also imp for meo)

Q: What is specific defence, Explain the type of specific defence mechanisms:

Introduction: - "The specific defence mechanisms are effective against specific pathogens."

Types of specific defence mechanisms:

There are two main types of specific defence mechanisms i.e-

①-The cell mediated immune response: (also imp for meo)

Introduction: - The cell mediated immune system consists of T-cells which originates in the bone marrow, but moves to the thymus (gland) where their development is completed.

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T-cells are highly specialized cells in the blood and lymph.

Role of T-cells:

They fight against bacteria, viruses, fungi, protozoan and cancer cells etc, with in the host cells and react against external matter such as organ transplant.

Types of T-cells: - There are four kinds of T-cells {all is imp
of 4 types}

①- Memory T-cells: - These long-lived cells survive after the infection has been neutralized and provide cell-mediated immunity by responding rapidly to another encounter with the same antigen.

②- Cytotoxic T-cells: - These directly inactive any cells carrying antigens. They attach themselves to the target cell and release powerful toxins called perforin which make holes in the target cells and kills them. The main role cytotoxic T-cells is in destruction of abnormal body cells e.g.- infected cells and cancer cells.

③- helper T-cells: - These are essential for correct function of not only the cell-mediated immunity, but also of antibody mediated immunity. The production of special chemical called cytokines and co-operation with B-lymphocytes to produce antibodies are the functions of helper T-lymphocytes.

④- Suppressor T-cells:

These cells act as 'brakes', turning off activated T- and B-lymphocytes after

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This limits the powerful and potentially damaging effects of the immune system.

Work of cellular immune response:

The cellular immune response occurs in two phases i.e-

① Activation phase:

The cytotoxic T-cells that have the appropriate T-cell receptors are activated and repeatedly divided.

② Effectors phase:- after the activation cytotoxic T-cells the cytotoxic T-cells encounter target cells and kill them.

② The antibody mediated immune response:

Introduction:- The antibody mediated immune response or humoral immune system consists of B-lymphocytes (B-cells) which originates in the bone marrow and stays there to develop. B-cells can produce antibodies but need exposure to foreign antigens to do so. (also imp for mca)

Antibodies:

Definition:- "Antibodies are chemically proteins present in blood plasma and lymph, which fight against foreign particles."

Role of antibodies:

- 1- They help in fighting bacteria and viruses in body fluids.
- 2- Antibodies bind to certain parts of an antigen to mark it for destruction by the T-cells.

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Work of antibody mediated immune response:

- The pathogens activate only those B-cells having matching receptors. these cells stand and ready to enter the battle.
- The macrophage which is attached with B-cells, activate the helper-T-cells with matching receptors.
- These T-cells (helperT-cells) in turn lead the battle ahead with activated B-cells and release chemicals which make the selected B-cells to go through rapid division.
- All daughter B-cells are able to produce the same antibodies as the mother cell.
- these antibodies then bind to certain parts of an antigen to mark it for destruction by the T-cells.

Q: Describe the Structure Model of Antibodies:

Antibodies:

Definition:- "Antibodies are immune system-related proteins called immunoglobulin which fight against foreign antigens."

Structure of antibody: (also imp. for mcq)

- Each antibody consists of four polypeptides chains i.e - Two heavy chains and two light chains. These four chains joined to form a 'Y'-shaped molecule.
- The amino-acid sequence in the tips of the 'Y' varies greatly among different antibodies called variable region or Antigen

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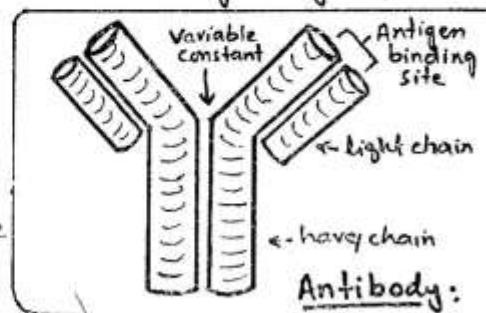
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binding region. This variable region composed of 110-130 amino-acids, give the antibody its specificity for binding antigen.

→ The Lower region of 'Y' is called constant region, which determines the mechanism, used to destroy antigen.

Diagram: →



Types of antibodies: (also imp for meas)

The immunoglobine antibodies are divided into five major classes i.e..

IgG, IgA, IgM, IgE and IgD (Ig GAMED)

based on their immune function.

1- immunoglobulin-G: (IgG) (all is imp for meas)

This is the Largest and most common antibody type. It attacks many different pathogens.

2- immunoglobulin-A: (IgA) - It prevent antigens crossing epithelial membranes and invades deeper tissues.

3- immunoglobulin-M: (IgM) it is produced in large quantities in the primary response and is a potent activator of complement system.

4- immunoglobulin-E: (IgE)

It is found in cell membranes of basophiles (WBCs) and if it binds its antigen, activates the inflammatory response. This antibody is often found during excess in allergy.

5- immunoglobulin-D: (IgD) - This is made up of B-cells and

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display on their surface. Antigens bind here to activate B-cells.

Q :- Describe the role of Memory cells in immunity:

Memory cells:

Introduction: - After killing the pathogens the T-cells and B-cells leave behind memory cells. The memory killer T-cells make killer T-cells and memory B-cells make B-cell during multiplication for pathogen killing. (also imp for mea)

Role of memory cells:

- 1- These memory cells are cells that stay behind the killing of pathogen and keep watch for the further pathogens attack.
- 2- If these cells find the pathogen they start multiplying to kill it.
- 3- The memory controlling process is so immediate and so explosive that the pathogen is killed before it has a chance to infect again.
- 4- Memory cells thus, develop immunity against pathogens.

Q :- Define allergy and allergens. List down some common allergic conditions:

Allergies:

Definition: "Allergies are abnormal reactions to ordinary harmless substances."

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Allergens: (also imp for mca)

Definition: - "The reactionary sensitizing substances in allergy are called allergens." OR "Those substances which causes allergies are called allergens."

Causes of allergies: - (Examples of Allergens)

→ Allergens that most frequently cause allergies are - pollens, mold spores, house dust mites, animal danders, foods, insect bites or stings, plants, insect spores, latex, viruses, bacteria, medications and environmental conditions such as cold temperature.

Allergies may be genetical:

Allergies can be developed at any age and the risk of developing allergies is genetic. It is related to ones family history of allergy.

How allergy occurs: (Allergy response)

- During an attack of allergy, IgE-Antibody is overproduced which react (coat) with certain cells containing chemicals including histamine.
- These chemicals is true cause inflammation in the typical allergic systems.
- This is how the immune system is misguided and cause an allergic reaction when stimulated by an allergen.

Examples of allergies: (list of allergic condition)

- The most common allergic conditions are - hay fever, asthma, allergic eyes, allergic-eczema, hives (urticaria) and allergic shock.

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Q: What do you mean by Autoimmune diseases, Give Examples of autoimmune diseases:

Auto-immune diseases:

introduction:- "Autoimmune disorders are diseases that occur when the body produces an inappropriate immune response against its own tissues.

How autoimmune diseases develop:

Sometimes the immune system fails to recognize one or more of the body's normal constituents as 'self' and produce autoantibody which attacks its own cells, tissues or organs. This causes inflammation and damage and leads to autoimmune diseases.

Symptoms of autoimmune diseases:

- The symptoms of autoimmune disorders vary due to particular disorder but many include - Fatigue, dizziness, and low grade fever.
- The symptoms can also vary in severity over time.

Examples of autoimmune disorders:

Some of the autoimmune diseases are as follows (all is important)

1. Lupus:

It is a chronic disease, marked by muscle and joint pain with inflammation in which the abnormal immune response may also involve, attacks on kidneys and other

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organs of the body.

2- Juvenile Rheumatoid arthritis: - It is a autoimmune disease in which the body's immune system considers certain body parts such as joints of the knees, hands and feet as foreign tissue and attacks on them.

3- Scleroderma: - It is a chronic autoimmune disease that can lead to the inflammation and damage of the skin, joints and internal organs.

4- Ankylosing Spondylitis: - It is a autoimmune disease that can lead to the inflammation and damage of spinal column and joints, causing stiffness and pain.

5- Juvenile Dermatomyositis: - It is a autoimmune disease marked by inflammation and damage of skin and muscles.

Role

Q:- describe the role T-cells and B-cells in Transplant rejections:

Transplantation:

Definition: - "The process in which cells, tissues, or organs are transferred from one site of the body to the another."

importance of transplantation:

→ the malfunction of an organ system can be corrected by transplantation of an organ from a donor. e.g- Kidney, Liver, heart, Lung or pancreas.

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Role of immune system in transplant: (T-cells, B-cells role) (mcq)

- The body's immune system remains barrier to transplantation as a routine medical treatment.
- This immune system has effective mechanisms to combat foreign agents.
- These mechanisms are also involved in the rejection of transplanted organ, which is recognized as foreign body by the recipient's immune system. i.e-

For Example:

- major Histocompatibility complex protein are involved in the presentation of foreign antigens to T-cells and receptors on the surface of the T-cell are uniquely suited to the recognition of protein of this type.
- Histocompatibility complex protein are highly variable between individuals and therefore the T-cells from the host recognizes the foreign Histocompatibility complex protein with a very high frequency, leading to powerful immune responses that cause rejection of transplanted tissue/organ.

— END —

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Exercise :

(Q-A) Select the best answers for the following question.

1- Which of these is not true of both T-cells and B-cells.

- A- They are both lymphocytes B- They both are responsible for immunity.
 C- They both pass through the thymus D- They both have receptor sites.

2- Memory cells of the immune system are derived from-

- A- T-lymphocytes B- B-lymphocytes
 C- plasma cells D- microglia cells.

3- Which of these is specifically responsible for antibody mediated immunity

- A- T-cells B- B-cells
 C- platelets D- All of them

4- T-cells.

- A- are responsible for cell mediated immunity
 B- have passed through the thymus C- stimulate and suppress B-cells.
 D- All of them.

5- Compound formed in an organism for inhibiting growth of another organism's

- is- A- Antigen B- Antibody
 C- Antibiotic D- Antiallergic

6- Antigen binding site in an antibody is found between.

- A- Two light chains B- two heavy chains
 C- one heavy and one light chain D- (B) and (C).

7- Humoral immunity is due to

- A- T-lymphocytes B- L-lymphocytes
 C- P-lymphocytes D- B-lymphocytes

8- Hypersensitivity to an allergen is due to.

- A- increase in temperature B- food habits
 C- Age D- Aberrant functioning of immune system.

9- Surgical removal of thymus of a new born shall result in failure to produce

- A- monocytes B- B-lymphocytes
 C- T-lymphocytes D- Basophils

Chapter No 13 Immunity

Ch-pter-13

582

Exercis-13

⑤- what are the agent of non-specific defense and specific defense?

Answer :- See page No— 557, 565.

⑥- Define allergy and allergens. List down some common allergic conditions.

Answer :- See page No— 575-76.

⑦- Differentiate between the two types of acquired immunity.

Answer :- See page No— 568 .

(Q-C) Write answers of the following questions in detail.

①- what are the main events of inflammatory response. Ans:- see page-561

②- Describe the structural features of human skin which provide effective control against microbes. Answer :- See page No— 553.

③- How macrophages and neutrophils help in killing bacteria.?

Answer :- See page No— 558.

④- How cell mediated immunity is attained. Ans :- see page - 570.

⑤- what do you mean by autoimmune diseases.? Give some examples of autoimmune diseases. Answer :- see page No— 577.

⑥- Describe the role of T-cells and B-cells in transplant rejections.

Answer :- See page No— 578.

— End —

Thanks God.

Chapter No 13 Immunity

chapter-13

581

Exercise-13

Answer-A:

1.-c	2.-g	3.-b	4.-d	5.-b	6.-c	7.-d	8.-d	9.-c
------	------	------	------	------	------	------	------	------

(Q-B) Write shorte answers to the following questions.

①-What are pyrogens? How they affect the hypothalamus.

Ans: Pyrogens:

"Pyrogens are toxic substances produced by bacteria, fungi and virus causing fever."

Explanation: → The Thermostat of the body lies in the hypothalamus and controls the body temperature at 37°C (98.6°F). This temperature is kept constant by the feed back mechanism through nerve receptors in the skin and internally by the nerve endings below the blood vessels.

→ Pyrogens cause the set point of temperature to rise. When ever the pyrogens are produced in the blood or skin, heat receptor cells in the skin and blood vessels detect and nerves carry the message to the Hypothalamus, where the thermostat lies and the temperature setpoint is raised.

②-List three benefits of fever. Answer :- See page No - 564.

③-How interferons inhibit the ability of viruses of infect cell? Ans : See P-561.

④-What would happen if mucus of Bronchi fail to do its job?

Ans: → If the mucus fails to perform its function. The pathogen and dust enter the cells of the trachea or Bronchi and would cause infection in the respiratory tract. → Moreover the air would be cold to which the lungs tissues are sensitive. → In the absence of mucus both the air and respiratory surface would be dry and lungs tissues will not absorb oxygen.

Chapter No 13 Immunity



Previous Entry Test MCQ's of Biology Chapter No -13: (Immunity);

Which of the following statements is correct? ... (ETEA 2016)

- a) Antipyretic drugs lower the temperature set point
- b) Antipyretic drugs rise the temperature set point
- c) Antipyretic drugs do not effect on temperature set point
- d) Antipyretic drugs first lower the temperature set point and then rise

The most abundant lymphocytes are.....(ETEA 2016)

- a) A-Cells b) A and B Cells
- c) B and C Cells d) B and T Cells

In case of immunity, the first line of body defense is .(ETEA 2016)

- a) Macrophages b) Lymphocytes
- c) Blood cells d) Skin

Polio immunization vaccine is effective --- (ETEA 2015).

- a). 50% b). 60%
- c). 80% d). 90%

The inherit form of immunity through mother milk is the (ETEA 2011)

- a) Active immunity
- b) Innate immunity
- c) Passive immunity
- d) Acquired immunity

A nonspecific defense to tissue damaged

b) Inflammatory response

c) Cell mediate immunity

d) Passive immunity

7. The protein that helps other cells resist viral infection is called (ETEA 2011).

- a) Penicillin b) Histamine
- c) Interferon d) Antigens

8. Antibodies are produced by.... (ETEA 2011)

- a) Red blood cells b) Platelets
- c) B-lymphocytes d) Hormones

9. Immunity acquired after an infection is

- a). active immunity
- b). innate immunity
- c). passive immunity
- d). both B and C

10. Typically an antibody molecule is shaped like the letter.

- a). A b). P
- c). O d). Y

11. Memory cells are formed from

- a). monocytes b). eosinophils
- c). neutrophil d). lymphocytes

Key:-

1. A	2. d	3. d
4. d	5. c	6. b
7. c	8. c	9. j
10. d	11. d	

Unique Professor Notes

With ETEA MCQs:

For

9th, 10th, 11th, 12th

Chapter No 13 Immunity

Chapter No 13 Immunity

Model paper - 2016

584

1 Number	
2 Name:	
3 Address:	
4 Date:	

PR XI (01) 16

BIOLOGY (New)
Inter Part-I
(Fresh/Reappear)

Superintendent

Signature / Stamp:

Fig. No _____
(For Board's Office use only)

BIOLOGY (New)
Inter Part-I
(Fresh/Reappear)

Fig. No _____
(For Board's Office use only)

Allowed: 3 Hours

- There are THREE sections in this paper i.e. Section A, B and C.
Attempt Section-A on the same paper and return it to the Superintendent within the given time.
No marks will be awarded for Cutting, Erasing or Overwriting. Marks of Identification will lead to UFM case. Mobile Phone etc are not allowed in the examination hall.

Marks: 16

Allowed: 3 hours

Section - A

Marks: 16

Write the correct option i.e. A, B, C or D in the empty box provided opposite to each part.

1. What is the example of	A. Saturated	B. Unsaturated	C. Super Saturated	D. Both A and B	
2. The cause of peptic ulcer is	A. Physiological stress	B. Excessive HCl	C. Cigarette smoking	D. All of these	
3. Living cell get direct energy for its activities from	A. Chloroplast	B. Mitochondria	C. ATP	D. Sun	
4. Magnification power of light microscope is	A. 500 nm	B. 750 nm	C. 250 nm	D. 1000 nm	
5. The optimum temperature for thermophilic bacteria is	A. 73 °C	B. 30 °C	C. -10 °C	D. None of these	
6. Peach is an example of	A. Hydrophytes	B. Xerophytes	C. Halophytes	D. Mesophytes	
7. Epithelium ... is also called serum epithelium	A. G	B. A	C. D	D. C	
8. Inclination angle is developed in which A. Annelida	B. Arthropoda	C. Mollusca	D. None of these		
9. Which one of the following element is found in the nucleus of plant cell wall?	A. Fe	B. Vg	C. Zn	D. Cl	
10. The full form of DNA is made up of	A. Peptidoglycan	B. Murein	C. Chitin	D. Cellulose	
11. The group of Connivata is	A. Clubmoss	B. Water moss	C. Some mosses	D. None of these	
12. The only living member of Monopoda is	A. Rayosca	B. Calymene	C. Equisetum	D. Cooksonia	
13. All porous type form of fluorescence is known as	A. Spongiosa	B. Cassidiflora	C. Ibris	D. Ectothelia	
14. The contraction of heart is termed as	A. Systole	B. Diastole	C. Cardiac cycle	D. Both A and C	
15. Natural immunity is due to	A. B-lymphocytes	B. T-lymphocytes	C. Macrophages	D. Both A and B	
16. Sclera is an example of	A. Hydrophytes	B. Mesophytes	C. Xerophytes	D. Halophytes	
17. Itutism is	A. Air borne disease	B. Flood borne disease	C. Water borne disease	D. None of these	
18. Bacterial gas disease is caused by	A. <i>Erwinia</i>	B. <i>Bacillus solanacearum</i>	C. <i>Agrobacterium tumefaciens</i>	D. <i>Pseudomonas</i> species	

Chapter No 13 Immunity

Model paper - 2016 (PR)

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PR XI (01) 16
BIOLOGY (New)
Inter Part-I
(Fresh/Reappear)

Note: Time allowed for Section – B and Section – C is 2 Hours and 40 minutes

Section - B

Marks = 40

Q-II Answer any TEN parts. Each part carries FOUR marks.

1. What do you know about C₄ Photosynthesis?
2. What is ATP? Explain briefly.
3. Write a short note on co enzymes and Activators? Give examples.
4. What is Amoeba? Explain.
5. Write a note on Heterotrophic Bacteria.
6. Explain briefly the process of Centrifugation.
7. Differentiate between Short Day and Long Day Plants.
8. Differentiate between Lipoproteins and Nucleoproteins.
9. Write a note on complexity in Animals.
10. Differentiate between Biparous and Multiparous Cynce.
11. Write a short note on Prions.
12. What is Cyanosis? Explain.
13. Write four functions of Liver in Human.

Section - C

Marks = 27

Note : Attempt any THREE questions. All questions carry equal marks. Draw neat and labelled diagram where necessary.

Q-III Describe the structure and function of Human Stomach.

Q-IV What are Carbohydrates? Explain Oligosaccharides and Polysaccharides in detail.

Q-V Define Inflorescence. Discuss its major types.

Q-VI Write note on any two of the following.

- (a) Heterospory.
- (b) Coral reef.
- (c) Rhizopus.

Model-Paper
2016
Peshawar
Board

Chapter No 13 Immunity

Model paper (Peshawar)

586

2017

Time Allowed: 20 Minutes	SECTION - A				Marks : 18
The resolving power of light microscope is	<input type="radio"/> 150 nm	<input type="radio"/> 250 nm	<input type="radio"/> 350 nm	<input type="radio"/> 450 nm	
Ribosomes are composed of RNA and	<input type="radio"/> Proteins	<input type="radio"/> Amino Acid	<input type="radio"/> Glucose	<input type="radio"/> Fatty acid	
Which one of the given generates more energy in aerobic respiration?	<input type="radio"/> Sucrose	<input type="radio"/> Fructose	<input type="radio"/> Triglyceride	<input type="radio"/> Glucose	
Which one of the given is rod shaped bacteria?	<input type="radio"/> Spirilla	<input type="radio"/> Bacilli	<input type="radio"/> Cocci	<input type="radio"/> None of them	
Chlamydias is bacteria.	<input type="radio"/> Gram positive	<input type="radio"/> Gram negative	<input type="radio"/> Both	<input type="radio"/> None of them	
Trachoids are elongated cell upto.....	<input type="radio"/> 40 µm	<input type="radio"/> 50 µm	<input type="radio"/> 60 µm	<input type="radio"/> 60 µm	
Example of Co enzyme are	<input type="radio"/> NAD ⁺	<input type="radio"/> FAD ⁺	<input type="radio"/> NADP	<input type="radio"/> None of them	
An African sleeping disorder is caused by	<input type="radio"/> Babesia	<input type="radio"/> Trypanosoma	<input type="radio"/> Toxoplasma	<input type="radio"/> Plasmodium	
Prions are infectious particles.	<input type="radio"/> RNA	<input type="radio"/> DNA	<input type="radio"/> Proteins	<input type="radio"/> Lipids	
Hemoglobins consist of polypeptide chains	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	
The pathway in which RuBP is converted into scine is called.....	<input type="radio"/> Photosynthesis	<input type="radio"/> Photorespiration	<input type="radio"/> Respiration	<input type="radio"/> Fermentation	
Bacterial leaf spot disease is caused by.....	<input type="radio"/> Agrobacterium	<input type="radio"/> Pseudomonas	<input type="radio"/> Rhizobium	<input type="radio"/> Bacteriophages	
The thick walled dead cells like tracheid and vessels are included in	<input type="radio"/> Sclerenchyma	<input type="radio"/> Parenchyma	<input type="radio"/> Collenchyma	<input type="radio"/> Epidermal	
Sessile flowers grouped together on a very short axis is	<input type="radio"/> Capitulum	<input type="radio"/> Cattkin	<input type="radio"/> Panicle	<input type="radio"/> Umbels	
Lingual lipase are secreted by	<input type="radio"/> Tongue	<input type="radio"/> Liver	<input type="radio"/> Pancreas	<input type="radio"/> None of them	
Memory cells of the immune system are derived from	<input type="radio"/> Microglia cells	<input type="radio"/> B Lymphocytes	<input type="radio"/> Plasma cells	<input type="radio"/> T lymphocytes	
Which one of the given is short day plant?	<input type="radio"/> Sunflower	<input type="radio"/> Tobacco	<input type="radio"/> Spinach	<input type="radio"/> Potato	
Starfish belongs to which phylum?	<input type="radio"/> Echinodermata	<input type="radio"/> Annelida	<input type="radio"/> Arthropoda	<input type="radio"/> Mollusca	

Chapter No 13 Immunity

model paper

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2017-Bio-II

PR XI (01) 17

BIOLOGY (New)

Inter Part-I

(Fresh/Reappear)

Note: Time allowed for Section – B and Section – C is 2 Hours and 40 minutes.

Section – B

Marks: 40

Q-II Answer any TEN parts. Each part carries FOUR marks.

1. What do you know about Tissue Culture?
2. Write the functions of Proteins.
3. What is the role of pH in Enzymatic Action?
4. What is Photorespiration?
5. Write a short note on Polio.
6. Write a note on Endospores.
7. Differentiate between Bryophytes and Thallophytes.
8. Write a note on Diatoms.
9. Differentiate between Prototheria and Metatheria.
10. Write a short note on Apical Meristems?
11. What is Ulcer? Discuss briefly.
12. What is Cyanosis?
13. Write the role of Natural Killer Cells.

Section – C

Marks: 27

Note : Attempt any THREE questions. All questions carry equal marks. Draw neat and labelled diagram where necessary.

Q-III Describe the life cycle of Phytophthora infestans.

Q-IV Discuss supporting tissues in plants.

Q-V Explain Cytoskeleton in detail.

Q-VI Write note on any two of the following.

- (a) Metamorphosis in Arthropodes.
- (b) Function of blood cells.
- (c) Osmoregulation in plants.