

BATU-EXAM

Made by batuexams.com
at MET Bhujbal Knowledge City
Engg Mechanics Department

The PDF notes on this website are the copyrighted property of batuexams.com.

All rights reserved.

Tutorial No. 2.

Page No.

Date

Q) Introduction to basic term of Pathophysiology.

- i) Disease = The term disease broadly refers to any condition that impairs normal function i.e. functional abnormality. It may be caused by external factors such as infectious disease or it may be caused by internal dysfunctions like autoimmune diseases.
- ii) Pathophysiology = Pathophysiology is described as the study of the biological and physical manifestations of disease as they correlate with the underlying abnormalities and physiological disturbances.
- iii) Etiology = Etiology is the cause or origin of disease.
- iv) Injury = Physical harm or damage to someone's body caused by an accident or an attack, is termed as injury.
- v) Pathogenesis = ~~Ischemia~~ = Pathogenesis is defined as the origination and development of a disease.
- vi) Ischemia = Ischemia is lack of blood supply to a part of the body. Ischemia may cause tissue damage due to the lack of oxygen and nutrients.
- vii) Hypoxia = Hypoxia is the condition in which there is a decrease in the oxygen supply to a tissue.
- viii) Necrosis = Necrosis is defined as the death of most

Page No.

Date

or all of the cells in an organ or tissue due to disease, injury, or failure of the blood supply.

ix) Homeostasis = Homeostasis is a state of balance among all the body systems needed for the body to survive and function correctly.

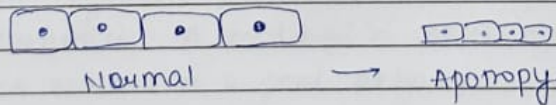
Tutorial no. 3

DATE / /

23 3 Give detail about Atrophy, Hypertrophy, hyperplasia, metaplasia, dysplasia

→ Atrophy

- 1 Atrophy is decrease in cell size due to loss of cell substance
- 2 Atrophic cells are living although they function at sub-normal level. Cellular atrophy causes decrease in organ size
- 3 The stimuli causing organ atrophy are same as that cause apoptosis.
- 4 If atrophy takes place in enough number of organ's cell the complete organ becomes smaller.
- 5 The stimuli may lead to decreased work load, loss of innervation, ischemia, inadequate nutrition, deficiency or lack of endocrine secretion and aging.
- 6 Atrophy may result from imbalance of protein synthesis and breakdown
- 7 Deficiency of hormones, which promote protein anabolism and/or excess of catabolic hormones, which promote protein breakdown anabolism & / or excess of catabolic hormones may both lead to atrophy.
- 8 These hormones include insulin, glucocorticoids & thyroid stimulating hormone.
- 9 Atrophy is mainly found in heart, skeletal muscle, brain etc
- 10 It may be pathological or physiological



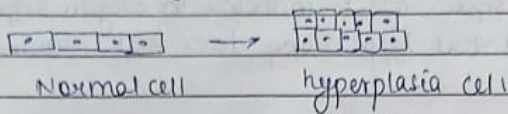
(d) **Oxidative Damage:** Reperfused ischemic tissues have been found to contain concentrations of activated oxygen species. They are produced during the reoxygenation of hypoxic tissue. These species damage membranes by lipid peroxidation and fragmentation of polypeptides.

(e) **Altered Permeability due to Detergency:** Breakdown of phospholipids of cell membranes into fatty acids, which form calcium. The soaps decrease surface tension and membrane permeability by their surfactant action.

1.4.3 Free Radical Mediated Cell Injury

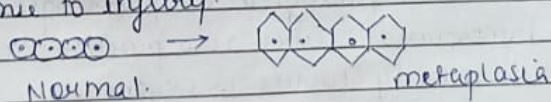
Free radicals are chemical entities with an unpaired electron in an outer orbital. They are extremely unstable or reactive, so they readily react with bio-molecules, when they enter cells. They can oxidatively degrade nucleic acids and many membrane molecules. Free radicals also trigger autocatalytic reactions, which generate more free radicals. Free radicals are generated by many reactions like absorption of ultra-violet light by water, the reduction of oxygen to water, activity of many oxidases like xanthine oxidase and other reactions catalyzed by transition metal ions e.g. Fenton reaction. Metabolism of chemicals also generates free radicals e.g. carbon tetrachloride. Free radicals

Pathologic hyperplasia is mostly due to excessive tissue stimulation by hormone or growth factors. Pathologic hyperplasia may also be involved in carcinogenesis. Proliferation of fibroblasts & angiogenesis is process of wound healing, is another example of pathologic hyperplasia.



→ Metaplasia

1. Metaplasia is defined as the replacement of one differentiated somatic cell type with another differentiated somatic cell type in same tissue.
2. Direct change in type of cell.
3. The function of one cell is completely different to that of other.
4. Metaplasia can also occur as a normal physiological response. For ex: the squamous metaplasia that occurs in the uterus cervix during the menstrual cycle as the squamocolumnar junction migrates across the transformation zone.
5. Metaplasia arises from differentiated cell type in response to injury.



→ Dysplasia

1. The abnormal or stoppage of growth.
2. When growth of cell is stopped & its shape & size remain constant. as per germ cell then it's called dysplasia.
3. It's disordered cell development.
4. It occurs more often in epithelial cells.
5. Epithelial dysplasia is characterized by cellular proliferation & cyto-logic changes.

detach the cell membrane from cytoskeleton...
 and rupture...
 concentrations of activated oxygen species...
 burst of activated neutrophils, which infiltrate reperfusion tissue in large numbers...
 Reactive oxygen species damage membranes by lipid per-oxidation...
 fragmentation of polypeptides...
 (d) Altered Permeability due to Detergency: Breakdown of phospholipids...
 fatty acids, which form calcium. The soap decrease surface tension and increase...
 membrane permeability by their surfactant action.

1.4.3 Free Radical Mediated Cell Injury

Free radicals are chemical entities with an unpaired electron in an outer orbital. They are extremely unstable or reactive, so they readily react with bio molecules, when generated inside cells. They can oxidatively degrade nucleic acids and many membrane molecules. Free radicals also trigger autocatalytic reactions, which generate more free radicals. Free radicals are generated by many reactions like absorption of ultra-violet light by water, the sequential...
 of many enzymes like xanthine oxidase and oxidase...
 reaction. Metabolism of some...
 damage can...

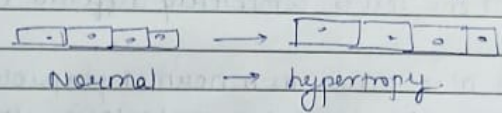
1.5 MORPHOLOGY OF CELL INJURY

Cell injury is characterized by its...
 reaction, irreversible...



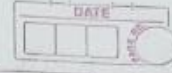
→ Hypertrophy

1. Hypertrophy is Increase in cell size due to increased synthesis of cell substance
 2. Thus, proteins & cytoskeletal elements are synthesized in greater amount by a hypertrophied cell
 3. Increase in cell size reflects increase in organ size
 4. Most Imp fact that hypertrophy does not involve increase in cell numbers.
 5. The stimuli that trigger hypertrophy are increased functional demand and excessive stimulation by trophic hormones
 6. Trophic hormones act by ↑ rate of transcription of genes thereby increasing protein synthesis
 7. It's generally caused by increased functional demand
- Hypertrophy can be either physiological or pathological



→ Hyperplasia

1. The increase in the number of cells in a tissue or an organ is called hyperplasia. It also increase organ size, but unlike hypertrophy there is no increase in cell size.
2. It can be either physiological or pathological
3. Physiologic hyperplasia occurs as a part of normal growth & development of body tissues & organs
 It can be of 2 types based on the trigger
4. Hormonal hyperplasia - It's proliferation of cells under the influence of a hormone
 Proliferation of female breast at puberty and during pregnancy is an example of physiological hormonal hyperplasia.
5. Removal of a portion of a tissue also acts as a powerful trigger for hyperplasia. This type of hyperplasia is called compensatory hyperplasia.



Respiratory - Increase / decrease rate of CO_2 elimination
Metabolic - other than respiratory

Electrolytic Imbalance:

- 1) Blood stream contains many chemicals that are very essential for normal body function. Electrolyte are one of them.
- 2) Ca^{2+} , Mg , Na , K^+ are some example
- 3) The disturbance in these electrolyte level in human body can cause a variety of disturbances. as is termed as Electrolytic Imbalance
- 4) It can result in vomiting, Diarrhoea, sweating, High Uric acid

Tutorial no. 4

10/06/23 4 Define Calcification, Enzyme leakage & cell death, Acidosis & Alkalosis, Electrolyte imbalance.

Ans Calcification: 1) Deposition of calcium salt in tissues other than osteoid or enamel.

OR

Accumulation of calcium in body tissues

2) It normally occurs in formation of bone but abnormal deposition/buildup of calcium can disrupt body's natural process.

3) Two distinct types of pathologic calcification are recognized as:

- A) Dystrophic Calcification
- B) Metastatic Calcification

4) It can occur due to hypercalcemia, calcium metabolic disorders, calcium rich diet etc.

Enzyme leakage & cell death:

- 1) The lysosomes inside cell is fulfilled with hydrolytic enzyme.
- 2) These enzymes are so much destructive that it can instantly destroy the whole cell hence, they are safely packed inside lysosomal membrane.
- 3) Disbalance in normal body function & acid base balance can lead to breakage of lysosomal membranes & leakage of these enzymes that eventually leads to cell death.

Acidosis & Alkalosis:

- 1) Most of body organs function at certain pH range.
- 2) Imbalance of pH range can cause disturbance in functioning. Ideally, pH of blood = 7.4
- 3) If pH goes above 7.4, alkalosis & if pH goes below 7.4 then acidosis.
- 4) Acidosis & alkalosis are 2 types.

1.4.3 Free Radical Mediated Cell Damage
Chemical entities with an unpaired electron are highly reactive, so they readily react with bio-molecules. When they react with DNA, they can oxidatively degrade nucleic acids and many membrane molecules. Free radicals also trigger autocatalytic reactions, which generate more free radicals. Free radicals are generated by many reactions like absorption of ultra-violet light by water, the reduction of oxygen to water, activity of many oxidases like xanthine oxidase. Metabolic reactions catalyzed by transition metal ions e.g. Fenton reaction. Metabolic chemicals also generate free radicals e.g. carbon tetrachloride. Free radicals are generated by following three main mechanisms:

1. **Peroxisation of Membrane Phospholipids:** Reactive oxygen species attack double bonds in polyunsaturated lipids. The reaction generates peroxyl radicals which further propagate the damage by generating more free radicals. For example, free radicals oxidize the Thymine bases in DNA strands.

DATE		



- d) Altered permeability due to Detergency:
- 1) Breakdown of phospholipids generates fatty acids, which forms calcium.
 - 2) The soaps decrease surface tension & increase membrane permeability by their surfactant action.

Tutorial no. 5

Q123 5. Write a note on cell membrane damage

Ans: 1. Membrane of cell can be easily damaged by any type of destructive physical agent like heat, radiation.

2. Membrane damage seems to be the key factor in irreversible cell injury.

3. Loss of oxygen supply caused by hypoxia, decrease ATP formation & due to this supply of essential material that cell needs to survive gets reduced.

4. This damage is accompanied by loss of selective permeability & osmotic regulation.

5. Cell membrane may be damaged in some ways.

The following are some of mechanisms of this damage.

a) Loss of membrane phospholipids

1. Massive Ca^{2+} influx due to loss of selective permeability increase cytosolic calcium concentration.

2. Calcium activates endogenous phospholipases, which degrade membrane phospholipids.

3. Synthesis & re-acylation of phospholipids are ATP-dependent & hence, diminished hypoxia.

4. Thus, membrane phospholipids are progressively lost.

5. The irreversible ischemic liver injury is characterized by loss of cell membrane phospholipids.

b) Stretching & Rupture:

1. Calcium also activates intra-cellular proteases, which damage the cytoskeleton.

2. Cytoskeleton damage together with cellular swelling may detach cell membrane from cytoskeleton.

c) Oxidative Damage:

1. High conc. of oxygen species are activated.

2. They are produced during oxidative burst of activated neutrophils, which infiltrate reperfused tissue in large no.

Reactive oxygen species damage membranes & lipids, peroxidation & fragmentation of polypeptides.



Tutorial No. 7 -

Write

1. Right about clinical signs of inflammation. Different types of Inflammation.
- ⇒
- The clinical signs of inflammation include loss of function, heat, pain, redness and swelling.
 - Inflammation is part of the body's complex biological response to harmful stimuli, such as irritants, pathogens, and damaged cells.
 - It is clinically useful to differentiate inflammation and infection as there are many pathological situations where distinguishing them is highly essential to evaluation and treatment.

• These are two types of inflammation:-

1) Acute inflammation

- The response to sudden body damage, such as cutting your finger.
- To heal the cut, your body sends inflammatory cells to the injury. These cells start healing process.

2) Chronic inflammation

- Your body continues sending inflammatory cells even when there is no outside danger!
- For example, in rheumatoid arthritis inflammatory cells and substances attack joint tissue leading to an inflammation that comes and goes and can cause severe damage to joints with pain and deformities.

- Extrinsic asthma: Major factor involved.
 - allergens like pollens, moulds, house dust mite, animals.
 - Occupational chemicals.
- It's most common in children & is precipitated by known allergens.
- The mast cells are found around blood vessels in connective tissue.

- In lining of gut & in upper & lower lining of resp. tract.
 - The allergen enters in human body through respiratory tract or GIT tract.

- Intrinsic asthma.
 - Viral respiratory tract infection.
 - Psychological stimulant.
 - Emotional upsets.

Tutorial No. 10.

1. Write a note on Asthma.

- ⇒ - Asthma is a chronic lung disease that burning & narrow the airways. Asthma cause chronic period of puffed, chest rigidity, tightness of breathe & coughing.
- The airways are tubes that hold air into & out of your lungs. The coughing often occurs at night or early in morning.
 - The sequence results in asthma symptoms. Symptoms can occur each time the airways are swollen.
 - Asthma is a chronic respiratory disease involving inflammation & narrowing of airways that is one of major non-communicable disease worldwide.

• Types of Asthma

- | | | |
|------------------------|-------------------------|-------------------------------------|
| 1) Allergic Asthma | 2) Non Allergic Asthma | 3) Exercise induced asthma |
| 4) Occupational Asthma | 5) Cough variant asthma | 6) Medication induced asthma |
| 7) Nocturnal asthma | 8) Drug induced asthma | 9) Glucocorticoids deficient asthma |

• Etiology

- Allergens from dirt, mammal fur, mold, cockroaches, pollen.
- Irritants such as cigarette smoke, air toxic waste, chemicals.
- Medicines such as aspirin/other non steroidal, anti-inflammatory sulphite in food & drinks.
- Physical activity, with exercise.

BATU-EXAM

Made by batuexams.com

at MET Bhujbal Knowledge City

The PDF notes on this website are the copyrighted property of batuexams.com.

All rights reserved.