

Course Title: General Pathology (MLT 2nd Sec A and B)
Mid term assignment

Name:

Note:

- Write in your own words, do not copy paste.
- Use only MS word to attempt questions.

1. Define the following terms with 2 physiological and pathological examples each.

- A. Atrophy
- B. Hypertrophy
- C. Hyperplasia
- D. Metaplasia

2. How does the calcium ions influx affects the cell?write it in your own words.

3. What is free radical?What is the effect of Reactive Oxygen Specie(ROS) on the cell?

4. Write down some differences between Apoptosis and Necrosis.

5. Write a note on Air Embolism.

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2nd Semester (Section B)

Program:BS. MLT

Paper: General Pathology

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Q No 1: Atrophy

- ❖ *Ans: Atrophy is a decrease in cell size or shrinkage in the size of the cell by the of cell substances is know as Atrophy.*

Causes of Atrophy

- *Decreased work load e.g(immobilization of a limb to permit healing of a fracture)*
- *Loss of innervation*
- *Diminished blood supply*
- *Inadequate Nutrition etc.*

Physiological example

- *Some stimulat are physiological i.e e.g(loss of hormone stimulation in menopause due to decrease level of estrogen hormone and then shut down the reproactive system) and other pathalosisic are e.g(denervation)*

Pathological Example of Atrophy

- *Nerves disease include charcot.marie.tooth disease, poliomyelitis, amyotrophic lateral sclerosis (ALS) OR Lou Gehrig disease and Guillain Barre syndrome.*

B. Hypertrophy

- *Hypertrophy is an increase in cell size or organ or tissue due to increase in the size of the cell.*
- *In Hypertrophy there is no new cell just bigger cells containing increased amount of structural proteins and organelles.*

Physiological Example

- *An example of pathologic hypertrophy is in cardiac muscles as a result of hypertension or Aortic valve disease.*

Pathological Example

- *Muscular hypertrophy in response to exercise. Skeletal and cardiac muscle fibers to*

increase in diameter and to accumulate more structural contractile proteins.

C. Hyperplasia

- *Hyperplasia is an increase in the number of cell which result increase in the size of the organ it is the result of increased cell mitosis or division.*
- *Hyperplasia can be physiological or pathological .*

Physiological hyperplasia

1. Hormonal hyperplasia

- *The proliferation of the glandular epithelium of the female breast at puberty and during pregnancy.*
- **Compensatory hyperplasia**
- *In which residual tissue grows after removal or loss of part of an organ e.g when part of a liver is related mitotic activity in the remaining*

cells begins as early as 12 hrs later, eventually restoring the liver to it's normal weight.

Pathological hypertrophy

- *Growth of adrenal gland due to production of adrenocorticotrophic hormone by a pituitary adenoma, and proliferation of endometrium due to prolonged estrogen stimulus.*

D . Metaplasia

- *It is the reversible replacement of the differentiated cell type with another mature differentiated cell type. in simplistic terms it is as if the original cell's or not robust enough to with stand the new environment and so they change in to another type more suited to the new environment.*

Physiological example

Prominent example of Metaplasia involves the changes associated with the respiratory tract in response to inhalation of irritants such as smog or

smoke.the bronchial cells convert from muscus secreting ciliated columnar epithelium to non ciliated squamous epithelium.2nd example the most common example of Metaplasia is Barrett's esophagus.

Pathological example

- *1.one example of pathological irritation is cigarette smoke,which causes the muscus secreting ciliated pseudo stratified columnar respiratory epithelial cell that line the air ways to be replaced bye stratified squamous epithelium.*



Q No.2:How does the calcium ions influx affect the cell?

- ❖ *Ans:Influx of calcium ions into human erythrocytes occurs by a facilitated diffusion process ,which can be inhibited by*

phenothiazines and the cinchona alkaloids. Calcium affects many membrane functions including cation permeability, lipid composition and some cytoskeletal interactions which may determine cell shape.

Most often, the calcium ion increase is initiated by the release of calcium ions from intracellular stores followed by the stimulation of influx of extracellular calcium ions. Most regulatory effects of calcium ions are mediated by Ca^{+2} binding proteins (example) calmodulin and achieved by alterations of phosphorylation state of target proteins.



Q No.3: What is a free radical? What are the effects of reactive oxygen species (ROS) on the cell?

❖ Ans: **Free radical**

➤ *A radical is an atom or group of atoms that have one or more unpaired electrons. radical can have positive, negative or neutral charge.*

➤ **Effects of oxygen radical**

➤ *There are many types of radicals but those of most concern in biological systems are derived from oxygen, and known collectively as reactive oxygen specie. oxygen has two unpaired electrons in separate orbitals in it's outer shell this electric structure makes oxygen specially susceptible to radical formation. sequential reduction of molecular oxygen leads to formation of a group of reactive oxygen specie.*

➤ **Super oxide anion**

➤ **Peroxide**

➤ **Hydroxyl radical**

3. **Process:** *membrane blebbing ,shrinkage of cell, nuclear collapse (nuclear fragmentation) chromatin condensation , chromosomal DNA fragmentation , apoptotic body formation .then engulf by white blood cell.*

❖ **Necrosis:** *Necrosis is the premature death of cells and living tissue .though necrosis is being researched as a possible form of programmed cell death , it's considered un programmed cell death process at this time.*

❖ **Neutral:** *caused by factors external to the cell or tissue,such as infection, toxins, or trauma.*

❖ **Effects:** *always detrimental.*



Q No.5:

❖ **Ans: Air embolism:** *An air embolism, also known as gas embolism, is a blood vessels blockage caused by one or more bubbles of air or other gas in the circulatory system. air embolism may also occur in the xylem of vascular plants, especially when suffering from water stress. air can be introduced into the circulation during surgical procedures, lung over-expansion injury, decompression, and a few other causes.*



The End

