**Pathology**

**Mid-Term Assignment (Spring-2020)**

**(BS-MLT 2nd Sec-A)**



**Submitted by**

**Abdul Hameed Khalid**

**Class No:**

**16021**

**Submitted to**

**Mr. Waqas Ihsan**

**Atrophy:**

Atrophy is the first type of adaptation. In this type of adaptation, cell is decrease in size or shrinkage in the cell size. Because of the loss of cell substances. And also atrophy is a word used to the wasting away and degradation in the size of the cell or any part of the body. Finally they decrease the affected area work.

Physiological example of atrophy is

1. The maturity of child, or in other word the structure of body changes from childhood towards maturity.
2. A normal process of aging in some tissues like atrophy in brain with aging.

Pathological examples of atrophy are

1. Erosion of spine by tumor in nerve root.
2. Testicular atrophy

**Hypertrophy:**

Hypertrophy basically describe to “increase in the size of the cell”. Physiological hypertrophy occurs due to a normal stress and pathological hypertrophy occurs due to abnormal stress.

Physiological examples

1. During pregnancy the growth of or enlargement of uterus.
2. Hypertrophy caused by prolactin and estrogen hormone during breast lactation.

Pathological examples

1. Heart chronic hemodynamic- the common stimulus due to overload.
2. Skeletal muscles in response to exercise.

**Hyperplasia:**

Hyper basically describe to “increase in the number of the cell and also increase the cell division”.

Physiological examples

1. Prostatic hyperplasia in old age.
2. After hepatectomy the regeneration of liver is due to hyperplasia.

Pathological examples

1. Pseudo carcinomatous hyperplasia of the skin.
2. Due to human papilloma virus which is causes skin warts- hyperplasia of epidermi**s.**

**Metaplasia:**

It is the reversible change in which an adult cell type such as epithelial or mesenchymal cells is replaced by another mature cell type of the same tissue. It is thought that metaplasia is arise due to genetic deprogramming of epithelial cells.

Pathological examples

1. Cigarette smoking causes chronic irritation in respiratory track.
2. Chronic gastric ulcer and Barrett’s esophagus.

Physiological examples

1. The most common metaplasia is columnar to squamous as occur in the respiratory tract in response to the chronic irritation as seen in a habitual cigarette.

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**Q2. How does the calcium ions influx affects the cell? Write down in your own words.**

**Calcium ions:**

Calcium ions are that main thing which are play great role in the contribution of the physiological and biochemical process of an organisms cells. Like signaling transportation and also they are second messenger, in neurotransmitter which is release from neurons.

**Effect of calcium ions influx on cell:**

Calcium ions could severe and great role in cell death, mostly in the nervous system and also in other tissue. Calcium ions comes to the cytosol (intracellular fluid) from extracellular fluid. After the influx they are placed in mitochondria and also in endoplasmic reticulum. In mitochondria they will rapids and troubled the normal metabolism. They can be causes many types of damages, like damage of plasma membrane, damage of cytoskeleton, damage of DNA. The caused the main situation to cell death. Whether by triggering apoptosis or the leakage of lysosomal enzymes due to the damage of membrane of the lysosomes. That mechanism oftenly occupies in hypoxia, ischaemia and with some toxins. Cell death mechanism can start, when the rise amount of calcium ions inters in the cytoplasm.

**Q3. What is free radical? What is the effect of reactive oxygen specie on the cell?**

**Free Radical:**

An atom which have one or more unpaired electron in their outer shell. It is highly reactive and short lived due to its independence electron. Free radical are organic molecule which is responsible for aging and damage of tissue, so it is possible for disease.

**Reactive oxygen specie:**

They are also known as oxygen radicals due to the free radicals. reactive oxygen specie is the type electron which is unstable. Their most common component is oxygen. That are easily reactive in a cell.

**Effect of reactive oxygen specie on the cell:**

The increase of reactive oxygen specie in cell is may cause cell death due to the damage of RNA, DNA and may proteins.

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**Q4. Write down some differences between apoptosis and necrosis.**

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| ⁕. Programmed cell death. | ⁕. Premature cell death. |
| ⁕. Through shrinkage of cytoplasm due to condensation of the nucleus. | ⁕. Through swelling of cytoplasm due to break down of cell (cell Lysis) |
| ⁕. A natural physiological process. | ⁕. A unnatural pathological process. |
| ⁕ Not involve any external agents. Like toxins etc. | ⁕. Involve external agents. Like toxins, trauma |
| ⁕. Internuleosomal DNA fragmentation. | ⁕. Random DNA breaks. |
| ⁕. Imbalance phospholipids in cell membrane bilayer. | ⁕ . Loss of plasmal membrane integrity. |
| ⁕. Detachment and engulfment by phagocytes. | ⁕. Inflammatory cell recruitment. |

**Q5. Write a note on Air Embolism?**

**Embolism:**

It is the condition when artery is blocked, this blockage is due to external particle which is not the part of blood stream this foreign body may be blood clot, air bubble, fat globule and some other reasons which causes embolism or blockage. As we know that blood carry oxygen to different part of the body if this blockage occurs then supply of oxygen may be stop or nearly to be stop due which the organ cannot work properly this may sometime cause failure of an organ or death.

**Conditions:**

There are several condition which is chronic, but two are the most serious conditions which is caused by embolism.

1. Pulmonary embolism
2. Stroke

**Causes of an Embolism:**

There are different agent which causes embolism such as

1. Blood clot
2. Air bubble
3. Cholesterol
4. Amniotic fluid

There are different reasons due to which embolism occurs. Every cause have its own process and reason.

**Air embolism:**

The embolism which is causes due to entrance of air bubble or gasoes particle in to the blood stream which can block the proper flow of blood in to the organ, this type is known as air embolism. There are different reasons which causes air embolism. Mostly the driver such as scuba driver faces air embolism. Because we know that they swim to the surface too quickly the change in pressure causes nitrogen bubble in to their blood stream which is trapped into their blood vessel, resulting the embolism cause mean the blockage of vessel. When it reaches to the brain it is known as cerebral embolism which is cause of stroke.

**Causes of an air embolism:**

There are several causes of an air embolism. Some are

1. Injection or surgical procedure accidentally inject air into the blood stream
2. Severe injury of lung also causes air embolism
3. Scuba driving
4. Explosion

**Symptoms of an air embolism:**

Following are the main reasons of an air embolism

1. Respiratory failure
2. Chest pain
3. Heart failure
4. Difficulty in breathing
5. Muscular pain
6. Mental status occasionally change. Imbalance of mental heath
7. Stroke
8. Disturb Blood pressure\_ mostly low blood pressure in air embolism

Embolus is the intravascular mass, which is solid, liquid and gaseous, in other words embolus is a blockage inside the vessels, embolism is may be caused by blood clot (thrombus) , fat globule (fat embolism) and air bobble ( Gas embolism) and many other things which is cause the embolism.

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