

Lecture 3 Cells and tissues damage and death. Necrosis and apoptosis.

Necrosis classification by etiology

- trophoneurotic,
- toxic,
- traumatic,
- vascular,
- allergic

Trophoneurotic necrosis

- occurs under central nervous system and peripheral nerves injury

Traumatic necrosis

- occurs in the result of physical,
- electrical,
- chemical,
- thermal trauma direct action.

Toxic necrosis

- occurs in the result of toxins,
- mostly of bacterial origin influence on tissues.

Allergic necrosis

- develops on condition of tissues hypersensitivity (sensibilization).

Vascular (ischemic) necrosis

- occurs in the result of tissues blood supply significant decrease or termination.

Clinicopathologic classification of the necrosis

- coagulation,
- colliquative,
- infarction,
- gangrene,
- decubitus,
- sequester.

Coagulation (dry) necrosis

- is characterized with sphacelus portion deaquation and induration.
- It includes cheesy (caseation) necrosis under tuberculosis,
- lues,
- lymphogranulomatosis as well as cereous myonecrosis under abdominal and flea-borne typhus, cholera, fibrinoid necrosis under allergic and lymphocytic diseases, malignant hypertension as well as adiponecrosis which is distributed into ferment, which occurs under pancreatitis and non-ferment caused by trauma.

Colliquative (wet) necrosis

- is characterized with necrotic tissue rarefication and fusion in the result of hydrolytic processes activation.
- It is developed in tissues rich with moisture,
- for example in cerebrum.

Infarction

- It is necrosis caused by blood supply deficiency.
- Occurs in the result of
- thrombosis,

embolism,

long term arteriostenosis and long term, functional overexertion of organ in hypoxia conditions.

Infarction of the lung

Infarction of the splen

Gangrene

It is death of tissues contacting with air (bowel, extremities).

Under the influence of air ferric sulphide is formed from hemoglobin, and this ferric sulphide colors necrotic portion in black.

Dry and wet gangrenes are differentiated.

Gangrene

Gangrene

Decubitus

is a kind of gangrene.

It is caused by blood supply and nervous trophism disturbance of subiculum in the place of squeezing (sacral bone, bladebones, calx) under seriously ill patient long term decubitus, for example, cerebrovascular accident.

Sequestrum

is sphacelus which is not subject for autolysis for a long time.

As a rule sequestra are observed in bones under osteomyelitis.

Apoptosis

It is genetically programmed death of unnecessary or defective cells in living body and the following causing these cells destruction in the process of embryogenesis and physiologic involution: cutaneous epithelium, white and red corpuscles extinction.

Apoptosis

Apoptosis differs from necrosis in:

- inflammation absence,

- only several cells or their groups are involved in the process,

- cell membrane is saved,

- cellular breakdown is done not by activated hydrolytic ferments, but in participation of special calcium-magnesium dependent endonucleases which cut nucleus into numerous fragments,

- formed cells fragments (apoptosis corpuscles) phagocytized by parenchymatous or stromal cells which are situated nearby.

Apoptosis

Apoptosis morphogenesis develops in several stages:

- chromatin condensation and margination, nucleus becomes fragmented,

- intracellular organelles condensation and cells shrinkage,

- apoptosis corpuscles formation,

- apoptosis corpuscles phagocytosis with parenchymatous cells or macrophages .