

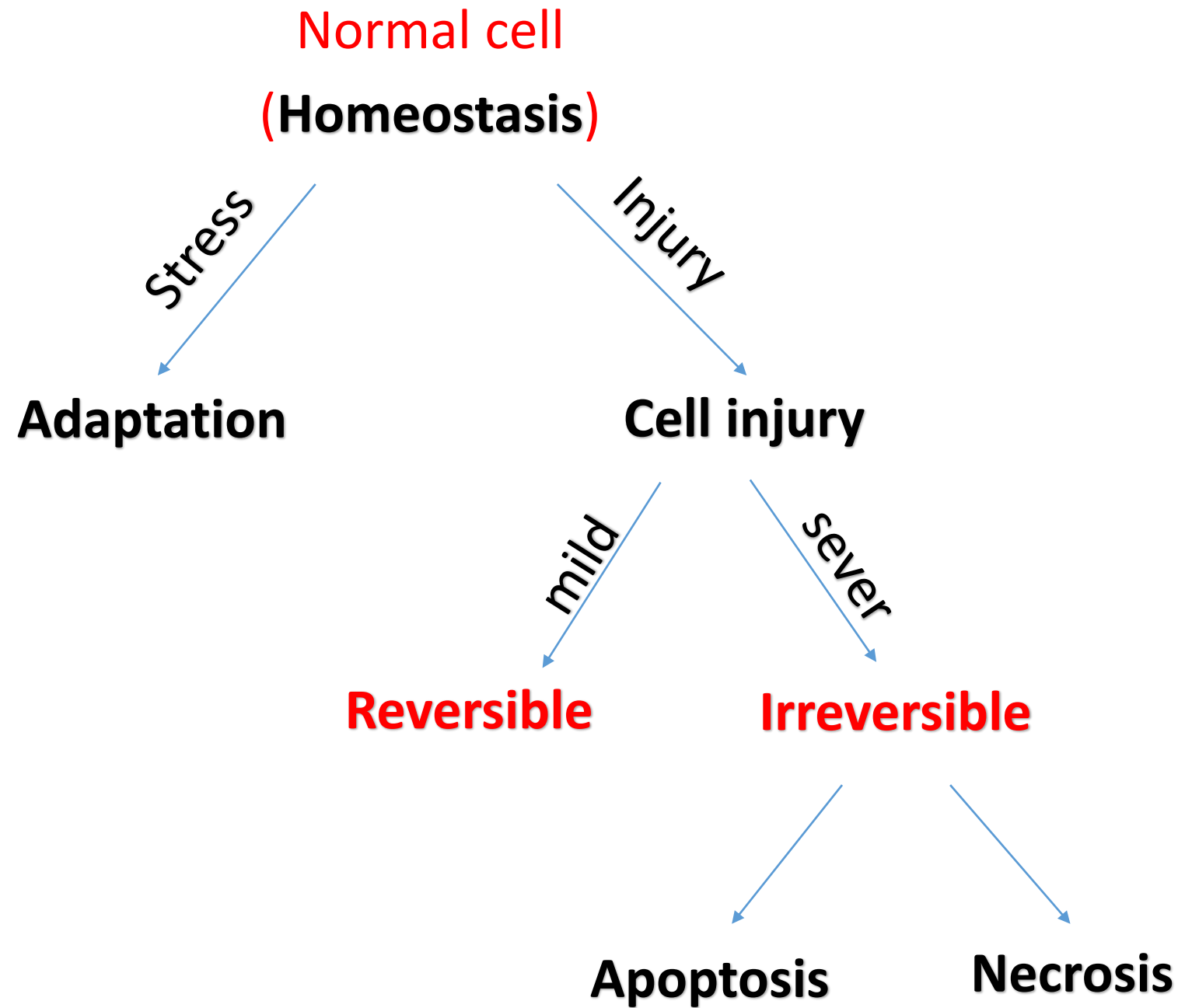
HISTOPATHOLOGY

Third stage
Theory

By

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General Cell Responses to Injury

Reversible cell injury: If injury is of low intensity or of short duration, afflicted cells may be able to recover. Cells can remove and replace injured parts by fabricating new membranes. (The cell return to normal function or structure)

Irreversible cell injury: If the force is of high intensity and long duration, the cell may not adapt but show signs of irreversible damage. (The cell does not return to the normal function or structure such as necrosis)

Degeneration: change of tissue to a less functionally form.

Types of degeneration

Cloudy swelling or _ Albuminous degeneration

_ Granular degeneration

1_ Entrance of few amount of water to the cell organelles (mitochondria and endoplasmic reticulum).

2-microscopically: Water appear granular like.

3_ Grossly: The organ appear swelled.

4_ Caused by irritant agents such as virus, bacteria and radiation.

5_ Occur in kidney and liver.

Hydropic degeneration

- 1_ Entrance of too amount of water to the cytoplasm.
- 2_ Microscopically: clear spaces with irregular borders.
- 3_ Grossly: the organ appear swelled.
- 4_ Caused by viral diseases ,tumor and friction with solid material.
- 5_ Occur in kidney, liver, heart and skin.

Fatty change degeneration

- 1_ Entrance of fat droplets to the cell cytoplasm.
- 2_ Microscopically: clear spaces with regular borders.
- 3_ Grossly: the organ appear swelled and fatty in nature.
- 4_ Caused by starvation, lipoprotein deficiency and bacterial toxin.
- 5_ Occur in kidney, liver and heart muscles.

Amyloid degeneration

- 1_ White protein homogenous materials
- 2_ Its occur after immunological stimulation or chronic infectious disease.
- 3_ Grossly: white firm substance around the blood vessel.
- 4_ Microscopically: pink protein homogenous material around blood vessel replacing apart or whole organ.
- 5_ Occur in liver, spleen and kidney.

Fibrinoid degeneration

- 1_ White protein thread like thin slimy and slippery.
- 2_ Occur after inflammation of wound or degeneration in collagen in case of Ag_Ab reaction.
- 3_ Grossly: white thin layer or stringy on the wounded site.
- 4_ Microscopically: pink net fibrils, solid and condense.
- 5_ Occur in small arteries, arterioles and .

Necrosis and Apoptosis

Necrosis: local death of tissue in living body.

Causes:

- 1- Poisoning (chemical, plant toxin, biological agents and animal toxin).
- 2-Cut blood supply.
- 3-Cut nerve supply.
- 4-Mechanical injury.
- 5-Thermal injury.
- 6-Starvation.

Types of necrosis

A-coagulative necrosis:

1_Grossly: dense and pale tissue.

2_Microscopically:* loss of cellular details.

*persistent tissue structure

* nucleus : pyknotic

karyolysis

3_Causes: toxin and alcohol.

***Zinkers necrosis:** special type of coagulative necrosis cause by vit E and selenium deficiency occur in skeletal and cardiac muscles called (white muscle disease).

B-Caseous necrosis:

1-grossly:cheesy like and pale tissue.

2_microscopically:* loss of cellular details.

- *loss of tissue structure

- *nucleus :lysis nucleic become blue and cytoplasm still pink.

3_caused by T.B

C-Liquefactive necrosis:

1_grossly: liquid material and pale tissue.

2_microscopically:* loss of cellular details.

- *loss of tissue structure.

- *pus or water instead of nuclei.

Pus(neutrophils dead or alive + necrosis tissue debris)

3_caused by abscess (streptococcus, staphylococcus)

Fat necrosis:

1_Grossly: dense and pale

2_Microscopically:* loss of cellular details.

*loss of tissue structure.

*nucleus (fat cell replaced by soap

3_caused by *pressure on fat tissue

*rupture in pancreas duct

***Fate (effect) (prognosis) of necrosis**

1_liquification and lysis of blood.

2_replaced by cyst.

3_+ bacteria → abscess.

4_encapsulation tissue.

5_scar tissue.

6_sloughing.

7_calcification.

8_gangrene.

Apoptosis

Apoptosis: Program cell death occur in multicellular organisms lead to characteristic changes morphology and death, these changes include cell shrinkage, nuclear fragmentation and chromatin condensation.

Mechanism: There are two main apoptotic pathways:

- *The extrinsic or death receptor pathway
- *The intrinsic or mitochondrial pathway.

Necrosis	Autolysis (post mortem necrosis)	Apoptosis
1_During the life.	1_After death.	1_During the life.
2_Living and dead tissue.	2_All tissue dead.	2_Living and dead tissue.
3_Congestion or hyperemia.	3_No congestion no hyperemia.	3_No congestion no hyperemia.
4_Inflammatory cell.	4_Absent.	4_Few inflammatory cell.
5_RBCs alive.	5_RBCs autolysed.	5_RBCs alive.