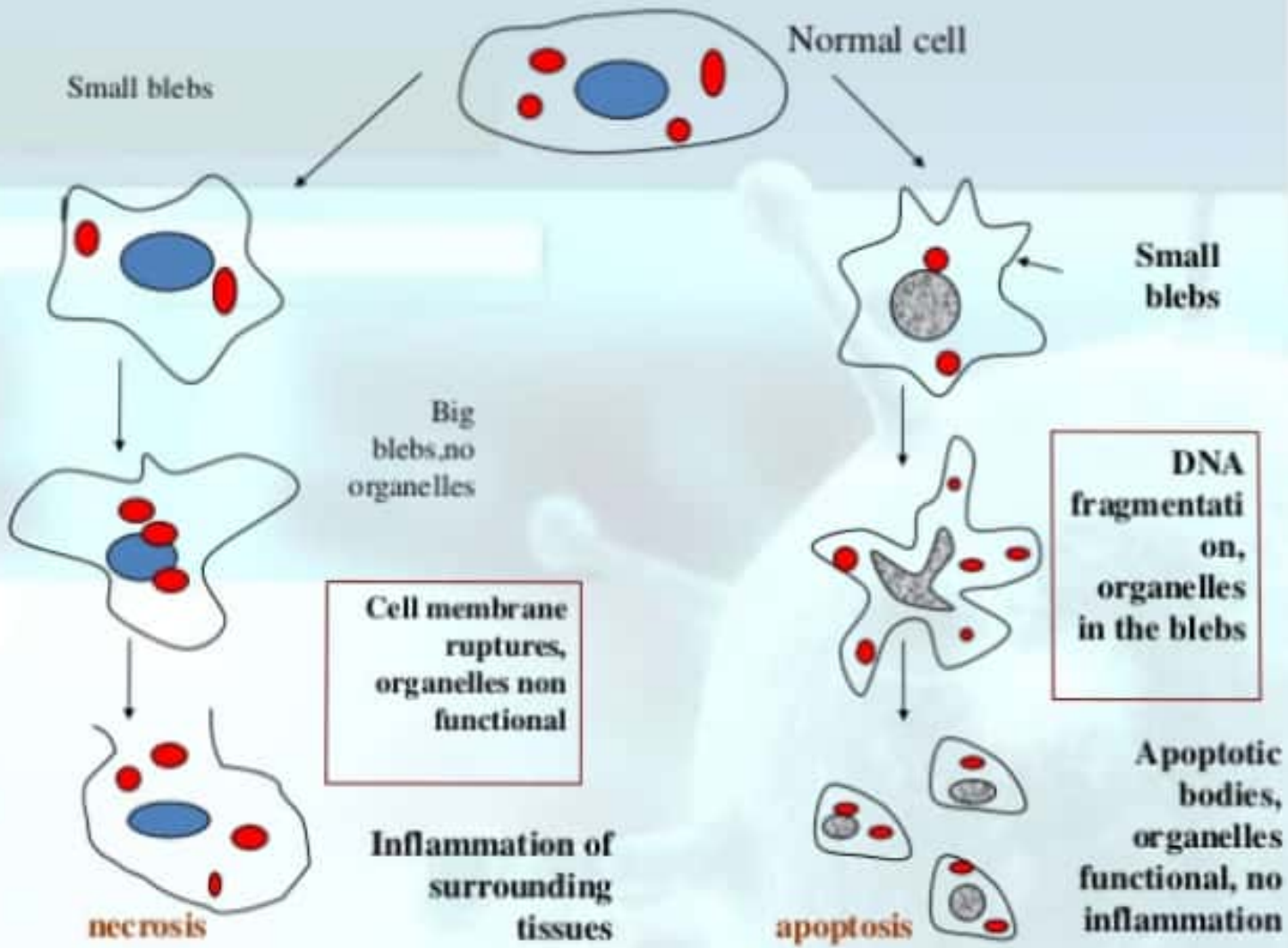


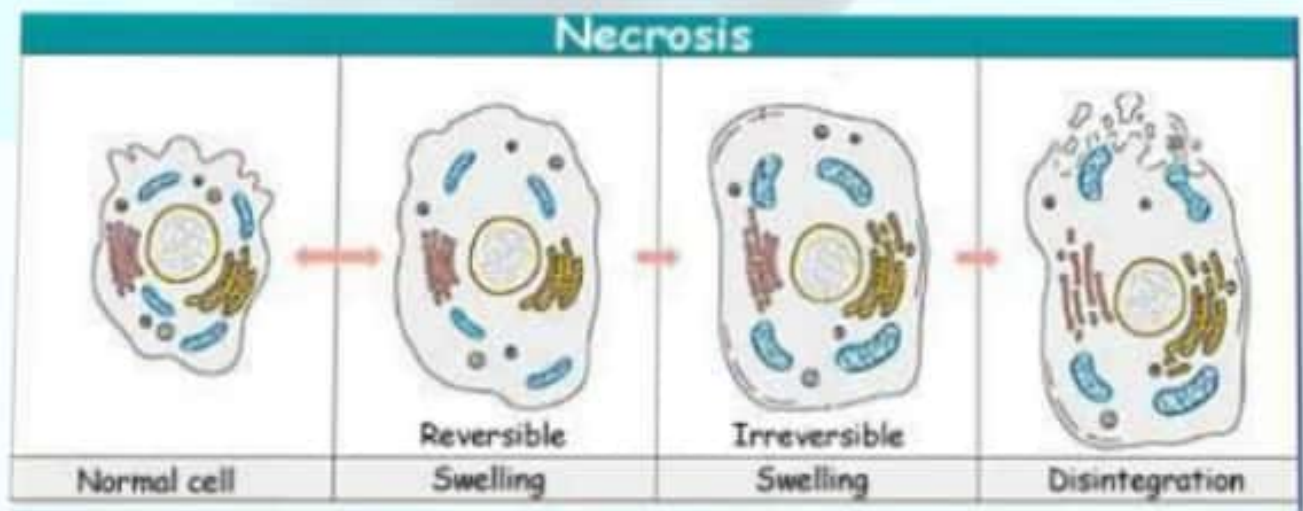
Cell death

- The body is very good at maintaining a constant number of cells. So there has to exist mechanisms for ensuring other cells in the body are removed, when appropriate.
- Two forms
 - **Apoptosis** - suicide - programmed cell death
 - **Necrosis** - killing - decay and destruction



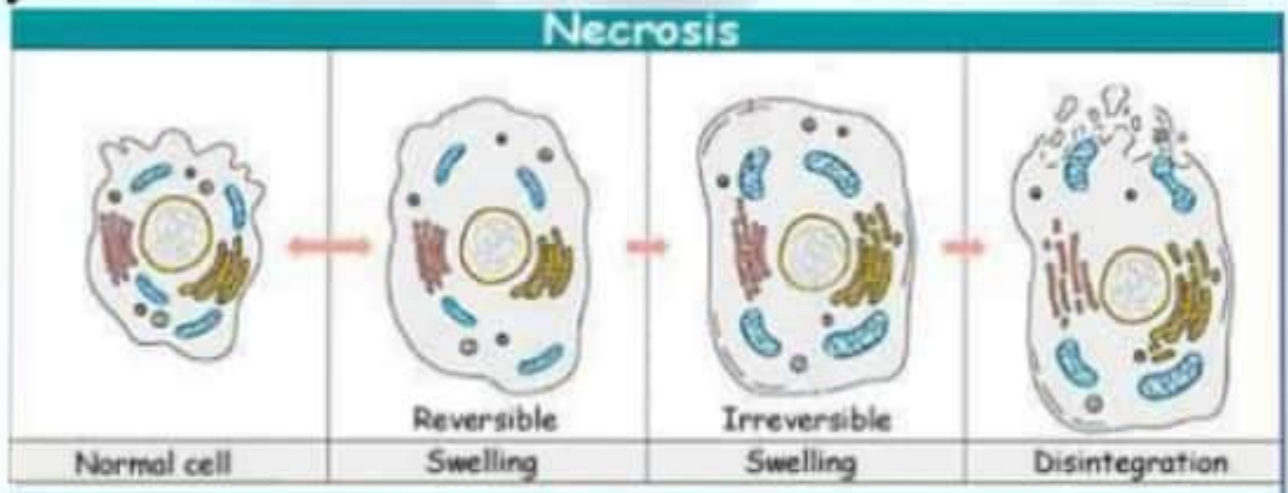
1- Necrosis

- Necrosis is the sum total of morphologic changes that follow cell death in a living tissue or organ
- Dead cells usually show changes in both the cytoplasm and in the nucleus.

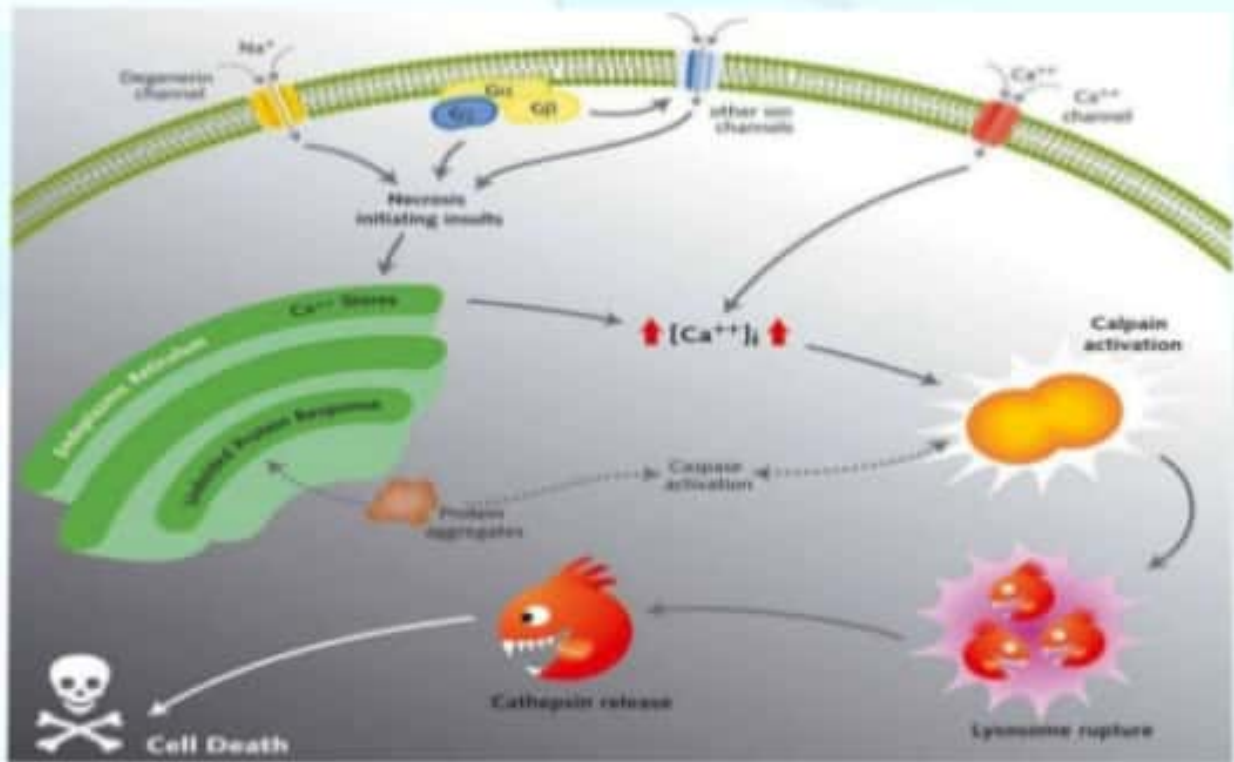


1- Necrosis

- Cytoplasmic changes are: increases eosinophilia, glassy appearance, granular or vacuolated cytoplasm, swollen mitochondria, may also show calcification
- Nuclear changes: Karyolysis, Pyknosis and Karyorrhexis.



Necrosis



Causes

Necrosis may occur due to external or internal factors:

External factors may involve

1. **Mechanical trauma** (physical damage to the body that causes cellular breakdown)
2. **Damage to blood vessels** (which may disrupt blood supply to associated tissue),
3. **Thermal effects** (extremely high or low temperature) can result in necrosis due to the disruption of cells.

Causes

Internal factors causing necrosis include

1. **Trophoneurotic disorders**; injury and paralysis of nerve cells.
2. **Pancreatic enzymes** (lipases) are the major cause of fat necrosis.
3. necrosis programs in cells with **immunological barriers** (intestinal mucosa) may alleviate invasion of pathogens through surfaces affected by inflammation
4. **Bacterial toxins**; activated natural killer cells; and peritoneal macrophages.
5. necrosis programs in cells with **immunological barriers** (intestinal mucosa) may alleviate invasion of pathogens through surfaces affected by inflammation
6. **Toxins and pathogens** may cause necrosis; toxins such as snake venoms may inhibit enzymes and cause cell death

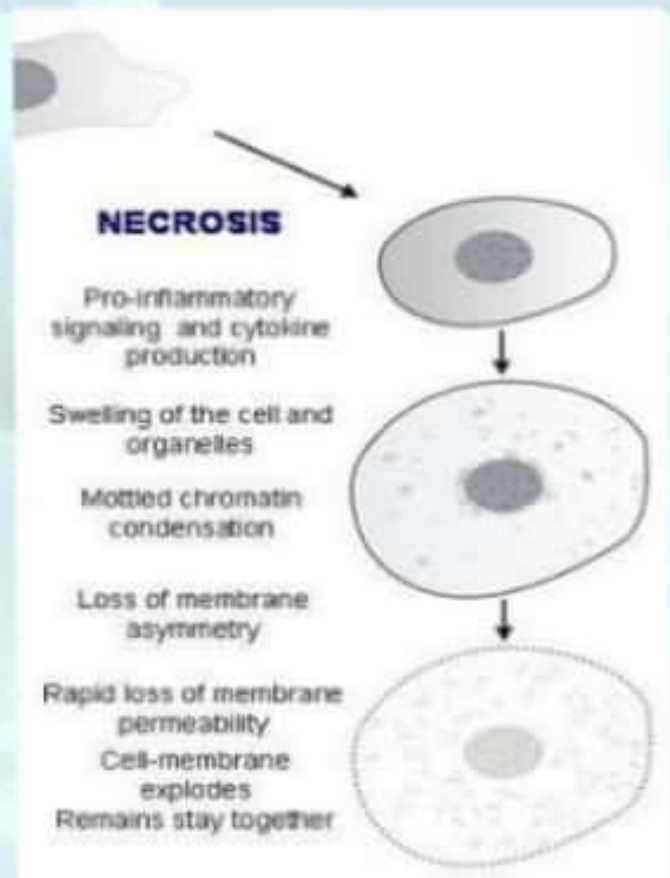
Causes



Mechanisms of Necrosis

Necrotic Cell Death

- Loss of metabolic functions
- Loss of the integrity of the cell membranes
- Cessation of the production of proteins and ATP.
- Cells organelles swell and become nonfunctional.



Mechanisms of Necrosis

1. **Depletion of ATP-leads** to breakdown of the cell's ion balance
2. **Reduce oxygen level** (hypoxia)
3. **Oxidative stress** - the presence of excess oxygen radicals

