



**SNS COLLEGE OF ALLIED HEALTH SCIENCES**

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai



**DEPARTMENT OF CARDIAC TECHNOLOGY**

**COURSE NAME: PATHOLOGY**

**I YEAR**

**GENERAL PATHOLOGY:**

**TOPIC III: IRREVERSIBLE CELL INJURY**



# IRREVERSIBLE CELL INJURY



Irreversible cell injury is one of the more severe and long-lasting cell injuries that lead to cell death by necrosis or apoptosis.

The characteristic features of irreversible cell injury are swelling of the mitochondria and lysosomes, damage to lysosomal membranes leading to the leakage of enzymes, damage to cell membrane, and increased acidosis in the cellular environment.



# Types



The two types of cellular responses occurred by irreversible cell injury are necrosis and apoptosis.



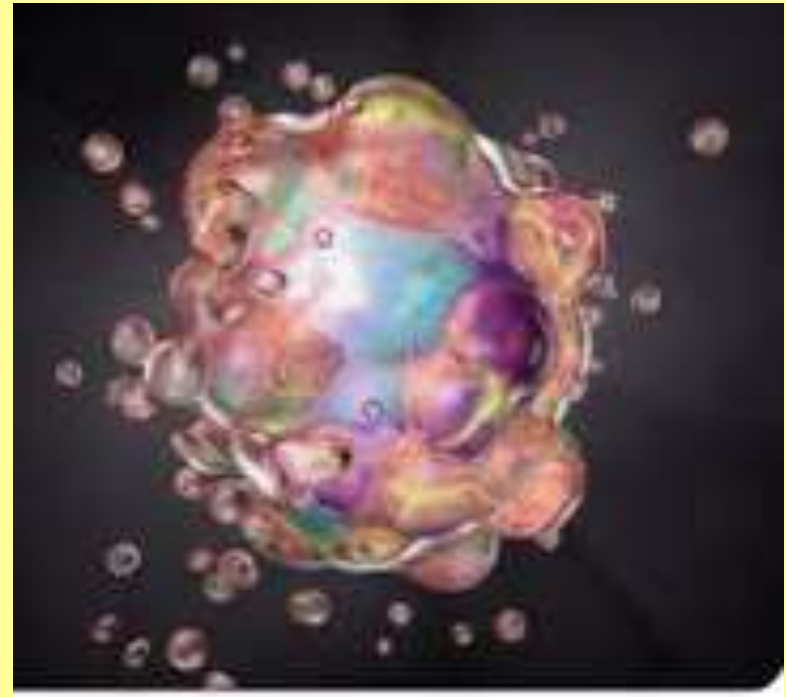
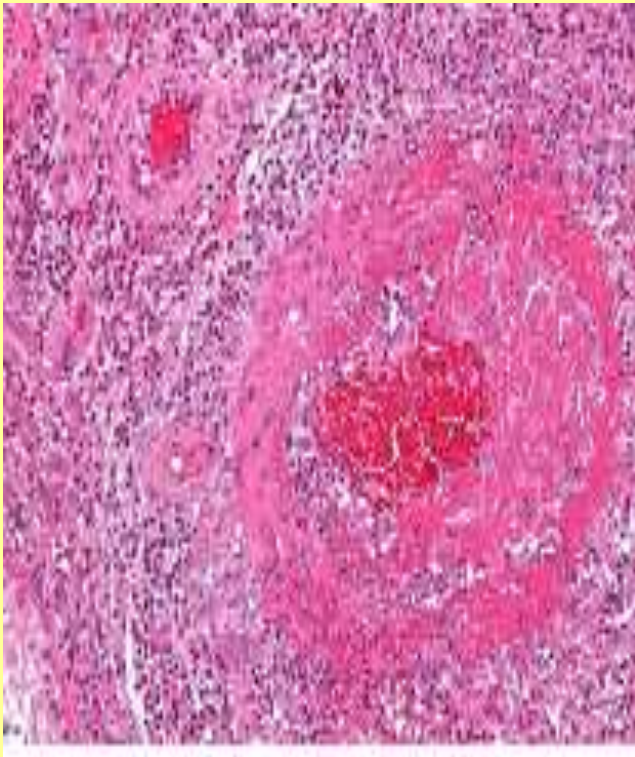
# Necrosis

- Necrosis is a type of cell death characterized by cytoplasmic swelling, damage to cell membrane, and organelle breakdown. The components of the cytosol are leaked into the extracellular space as a result of necrosis. The six types of necrosis are **coagulative necrosis, caseous necrosis, liquefactive necrosis, gangrenous necrosis, fat necrosis, and fibroid necrosis.**



# Necrosis

# Apoptosis





# Apoptosis



- Apoptosis is the programmed cell death of the harmful cells. The process depends on the energy and is mediated by the enzyme caspase that cleaves specific proteins in the cytoplasm and nucleus.



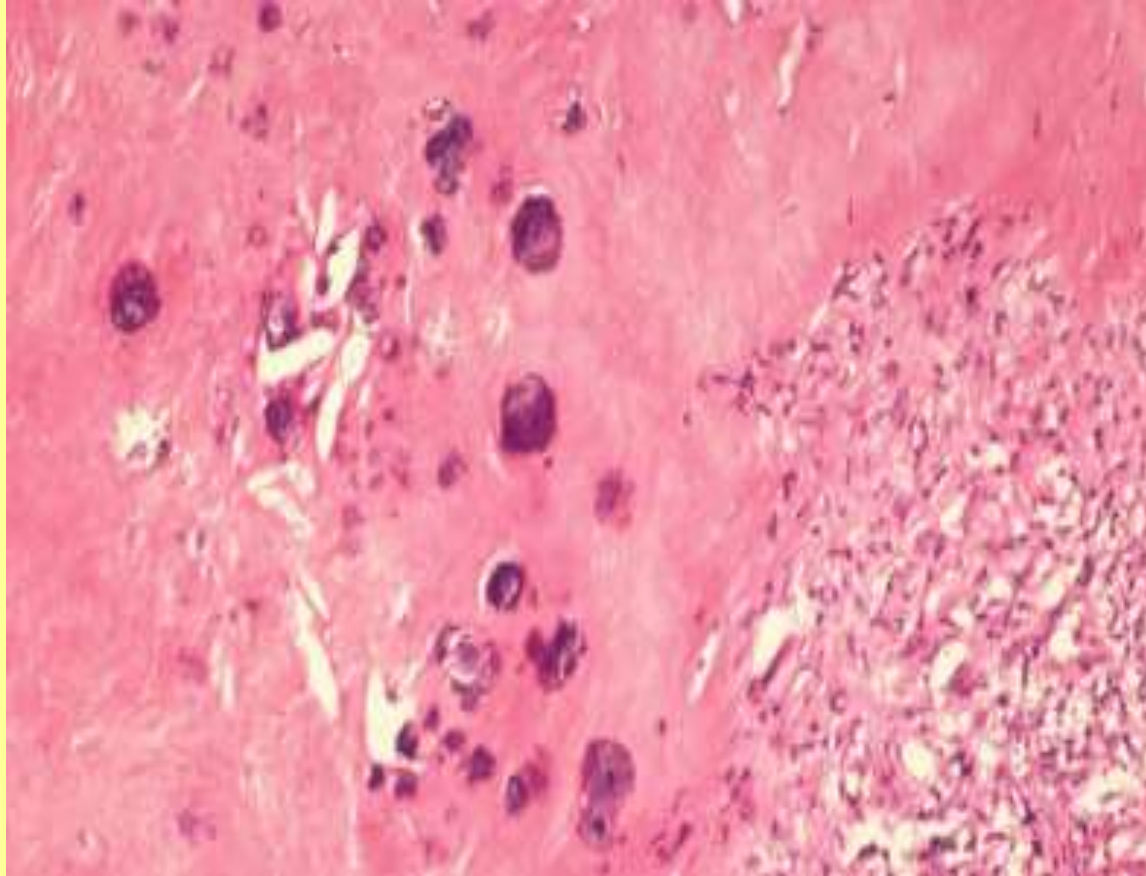
# Dystrophic & Metastatic



- Dystrophic calcification is deposition of calcium salt in degenerated tissues with the absence of a systemic mineral imbalance. It is often associated with trauma, infection, or inflammation and rarely appears in the head and neck area
- Metastatic calcification with hypercalcemia occurs when calcium deposits in previously normal tissue whereas dystrophic calcification occurs in previously damaged tissue.



# Dystrophic & Metastatic







# Similarities

## Similarities Between Reversible and Irreversible Cell Injury

- Reversible and irreversible cell injury are two types of conditions in which the regular homeostasis of the cell is disturbed.
- They induce stress in the cells.
- Both types of injuries can lead to cell death.



# Difference



## **Difference Between Reversible and Irreversible Cell Injury**

### Definition

- Reversible cell injury refers to a type of cell injury that can return to the steady state by altering cellular conditions while irreversible cell injury refers to one of the severe types of cell injury that leads to the cell death.



## **Significance**

- Reversible cell injury can return to the normal position while irreversible cell injury has passed the point of no return.

## **Characteristics**

- Reversible cell injury is sub-lethal and short-acting while irreversible cell injury is lethal and long-lasting.

## **Causes**

- The lack of oxygen (hypoxia or ischemia) or blood flow to the cells cause reversible cell injury while immunological responses or viral infections cause irreversible cell injury.



## **Response**

- Reversible cell injury results in cellular swelling and fat accumulation while irreversible cell injury results in necrosis and apoptosis.

## **Recovery**

- Reversible cell injury can be treated with drugs while irreversible cell injury leads to permanent cell loss.



# Conclusion



**Reversible cell injury** is a condition that can return to the steady state. Its cellular response is characterized by cell swelling and fatty accumulation.

**Irreversible cell injury** cannot return to the viable state of the cell. It leads to cell death by necrosis or apoptosis. The main difference between reversible and irreversible cell injury is the ability to return to the normal position and cellular response.

