



Lecture title:
Apoptosis

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Summary:

This form of cell death is a regulated suicide program in which activated enzymes capable of degrading the nuclear DNA and cytoplasmic proteins. Then fragments occur to the apoptotic cells and phagocyte without an inflammatory reaction. Thus apoptosis differs from necrosis which is characterized by loss of membrane integrity, leakage of cellular contents and frequently inflammatory reaction

Mechanism of apoptosis:

1. Signaling.
2. Control and integration.
3. Execution.
4. Removal of the dead cells.



Differences between apoptosis & necrosis

Apoptosis

- **Morphology:**
 - Cell shrinkage
 - Nuclear condensation & fragmentation
 - Formation of apoptotic bodies
 - Apoptotic bodies engulf by macrophages

Necrosis

- **Morphology**
 - Cell swelling
 - Nuclear changes (pyknosis, karyorrhexis & karyolysis)
 - Eosinophilic cytoplasm
 - Necrotic area infiltrate & cleaned by inflammatory cells

AUTOPHAGOCYTOSIS

Autophagocytosis is the uptake and intracellular degradation of damaged organelles.

Cells with sublethal injury often have various amounts of damaged organelles., the cell has a system to clean up after a "storm." In autophagy, portions of the cytoplasmic matrix and its damaged organelles are enveloped by cell membranes to form **autophagosomes**, which subsequently fuse with lysosomes. When phagocytic white cells ingest dead or dying cells, the process is very similar and termed **heterophagy**.

