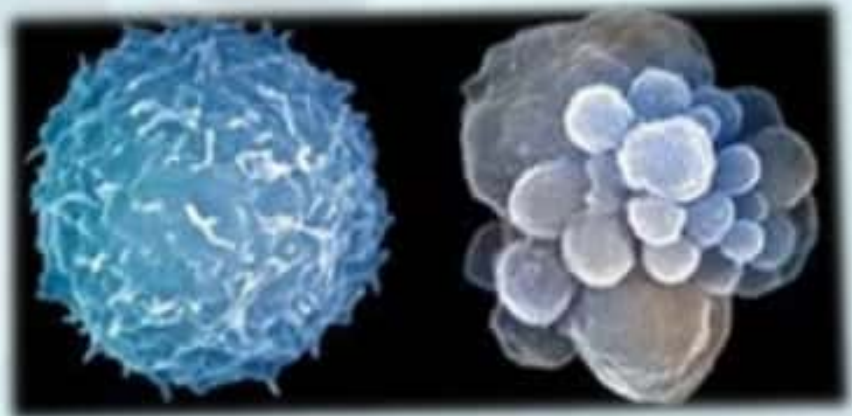


2 apoptosis programmed cell death

- In human body, cells were produced every second by mitosis there is a similar number die by apoptosis.
- Between 50_ 70 billion cells die each day in adult.
- Between 20_ 30 billion cells die each day in child.

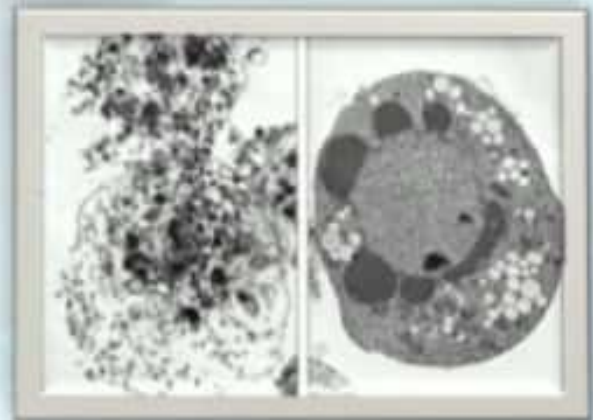
Apoptosis programmed cell death

- Form of cell death, in which a 'suicide' program is activated within the cell, leading to:
- fragmentation of the DNA.
- shrinkage of the cytoplasm.
- membrane changes and cell death without lysis or damage to neighboring cells.



General characteristics of apoptosis

- It is a normal phenomenon, occurring frequently in a **multicellular organism**.
- a cell that undergoes apoptosis dies neatly, without damaging its neighbors. The cell shrinks and condenses.
- There is no inflammation in apoptosis.



Importance of apoptosis

1_ Programmed cell death is needed for proper normal development as mitosis is.

Examples: –

- The moldiness of the tadpole tail in frog .
- The formation of the fingers and toes of the fetus requires the removal, by apoptosis.
- The sloughing off of the endometrium at the start of menstruation.



Importance of apoptosis (cont..)

- **Example:**

Incomplete differentiation in two toes due to lack of apoptosis



Importance of apoptosis

2. Programmed cell death is needed to destroy cells that represent a threat to the integrity of the organism.

• **Examples:**

- Cells infected with viruses.
- Cells with DNA damage.
- Cancer cells (Uncontrolled proliferated cells).