

## PENDAHULUAN

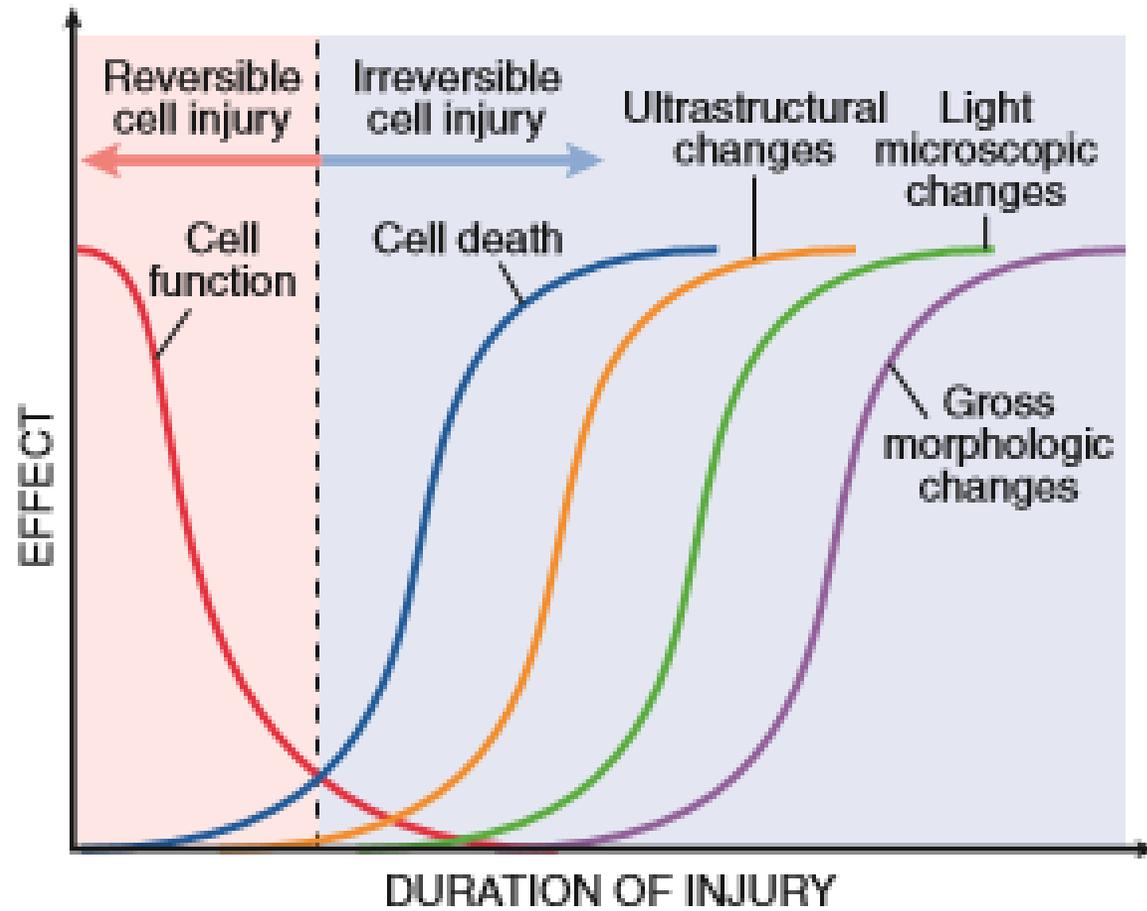
JIKA SUATU SEL MENERIMA STRES FISILOGIS YANG MELEBIHI KEMAMPUAN RESPON ADAPTASINYA ATAU MENERIMA RANGSANGAN PATOLOGIS MAKA SEL AKAN MENGALAMI JEJAS.

JEJAS SEL (*CELL INJURY*) TERDIRI ATAS *REVERSIBLE CELL INJURY* DAN *IRREVERSIBLE CELL INJURY*

Sumber:

1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28

# HUBUNGAN ANTARA EFEK DAN DURASI JEJAS PADA SEL



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# ETIOLOGI JEJAS SEL

Hipoksia

Agen Kimia

Agen  
Penyebab  
Infeksi

Reaksi  
Imunologis

Faktor  
Genetik

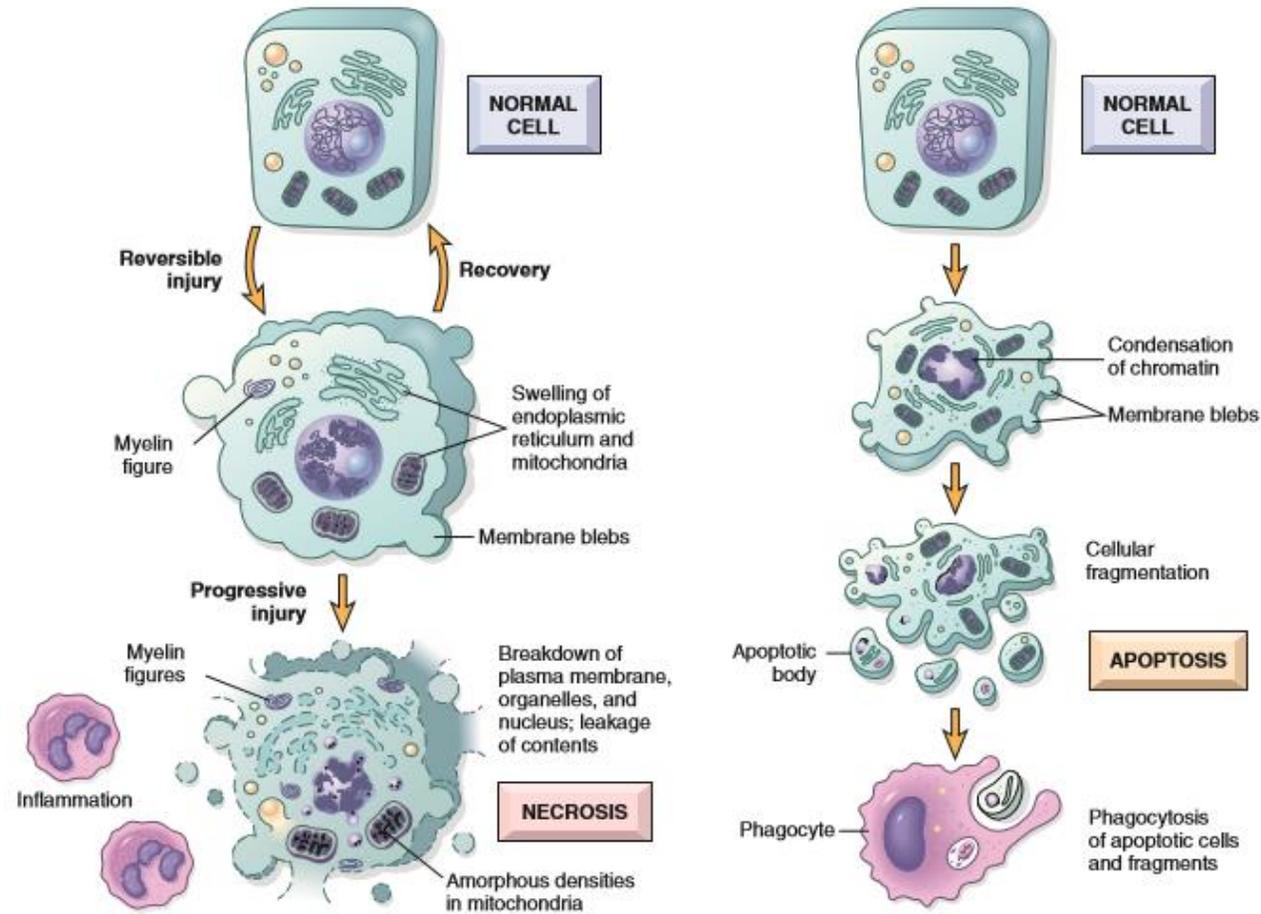
Imbalans  
Nutrisi

Agen Fisis

Penuaan

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Feature	Necrosis	Apoptosis
Cell size	Enlarged (swelling)	Reduced (shrinkage)
Nucleus	Pyknosis → karyorrhexis → karyolysis	Fragmentation into nucleosome size fragments
Plasma membrane	Disrupted	Intact; altered structure, especially orientation of lipids
Cellular contents	Enzymatic digestion; may leak out of cell	Intact; may be released in apoptotic bodies
Adjacent inflammation	Frequent	No
Physiologic or pathologic role	Invariably pathologic (culmination of irreversible cell injury)	Often physiologic; means of eliminating unwanted cells; may be pathologic after some forms of cell injury, especially DNA and protein damage

DNA, deoxyribonucleic acid.

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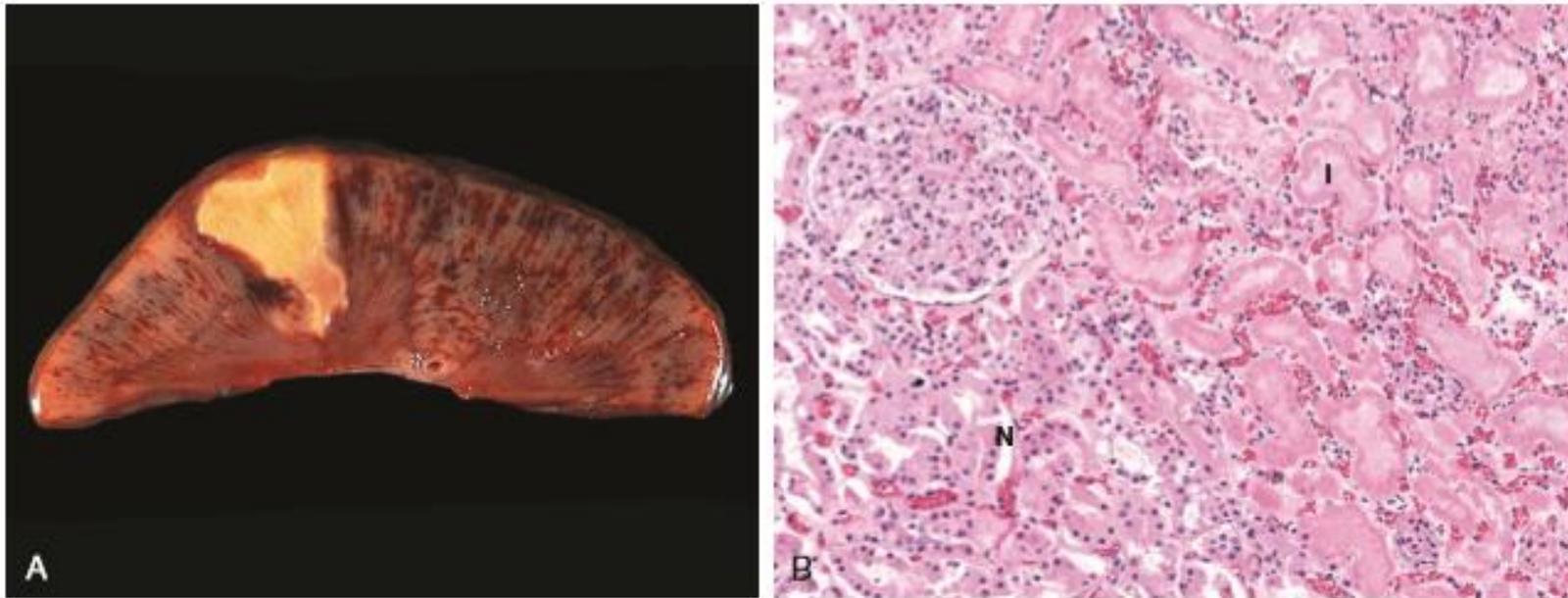
# NEKROSIS

- Merupakan tipe kematian sel yang berhubungan dengan kehilangan integritas membran dan kebocoran konten seluler.
- Pola nekrosis jaringan
  - *Coagulative necrosis*
  - *Liquefactive necrosis*
  - *Gangrenous necrosis*
  - *Caseous necrosis*
  - *Fat necrosis*
  - *Fibrinoid necrosis*

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1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28

# NEKROSIS KOAGULATIF

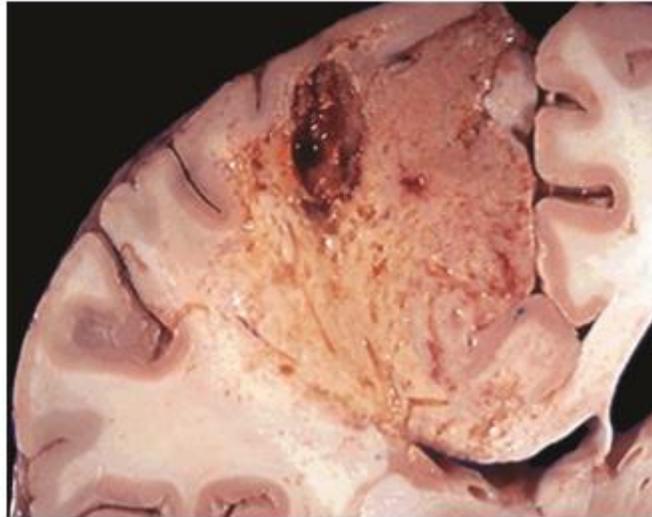


- **Coagulative necrosis** is a form of necrosis in which the underlying tissue architecture is preserved for at least several days
- Contoh: **Infark**

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1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28

# NEKROSIS LIKUEFEKTIF

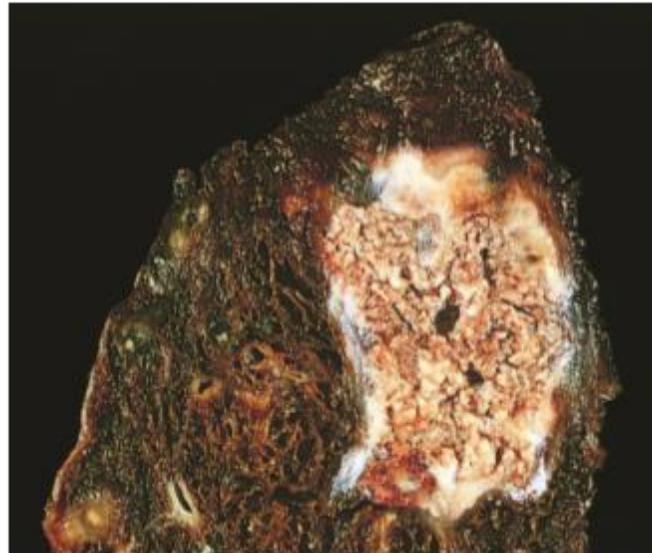


- *Liquefactive necrosis* is seen in focal bacterial or, occasionally, fungal infections, because microbes stimulate the accumulation of inflammatory cells and the enzymes of leukocytes digest (“liquefy”) the tissue.
- Contoh: **Infeksi Bakteri**

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1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28

# NEKROSIS KASEOSA (PERKIJUAN)

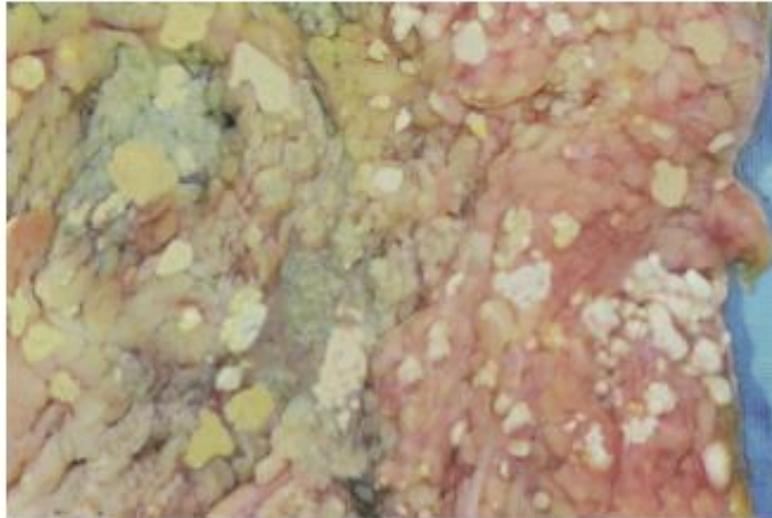


- **Caseous means** “cheese-like,” referring to the friable yellow-white appearance of the area of necrosis.
- Khas pada **infeksi tuberkulosis**

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1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28

# NEKROSIS LEMAK

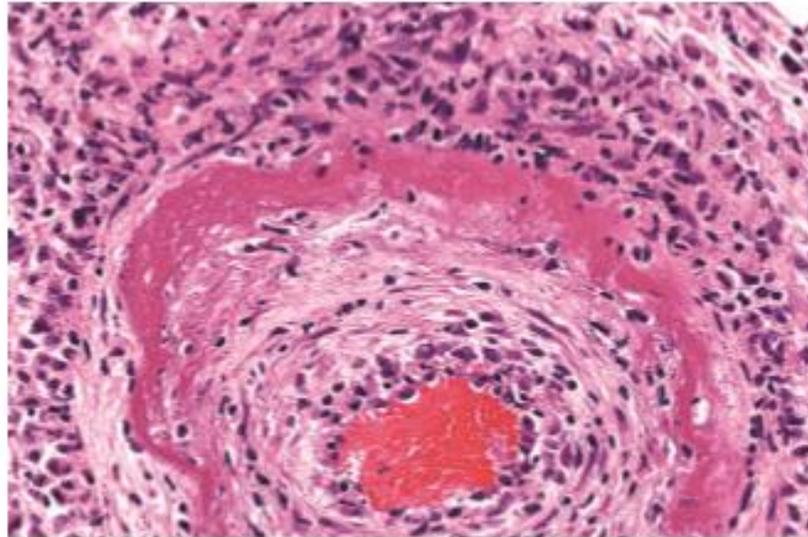


- **Fat necrosis** refers to focal areas of fat destruction, typically resulting from release of activated pancreatic lipases into the substance of the pancreas and the peritoneal cavity.
- **Pankreatitis** → Kegawatan darurat abdomen

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1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28

# NEKROSIS FIBRINOID



- **Fibrinoid necrosis** is a special form of necrosis, visible by light microscopy, usually in immune reactions in which complexes of antigens and antibodies are deposited in the walls of arteries.
- The deposited immune complexes, together with fibrin that has leaked out of vessels, produce a bright pink and amorphous appearance on H&E preparations called **fibrinoid (fibrin-like)** by pathologists

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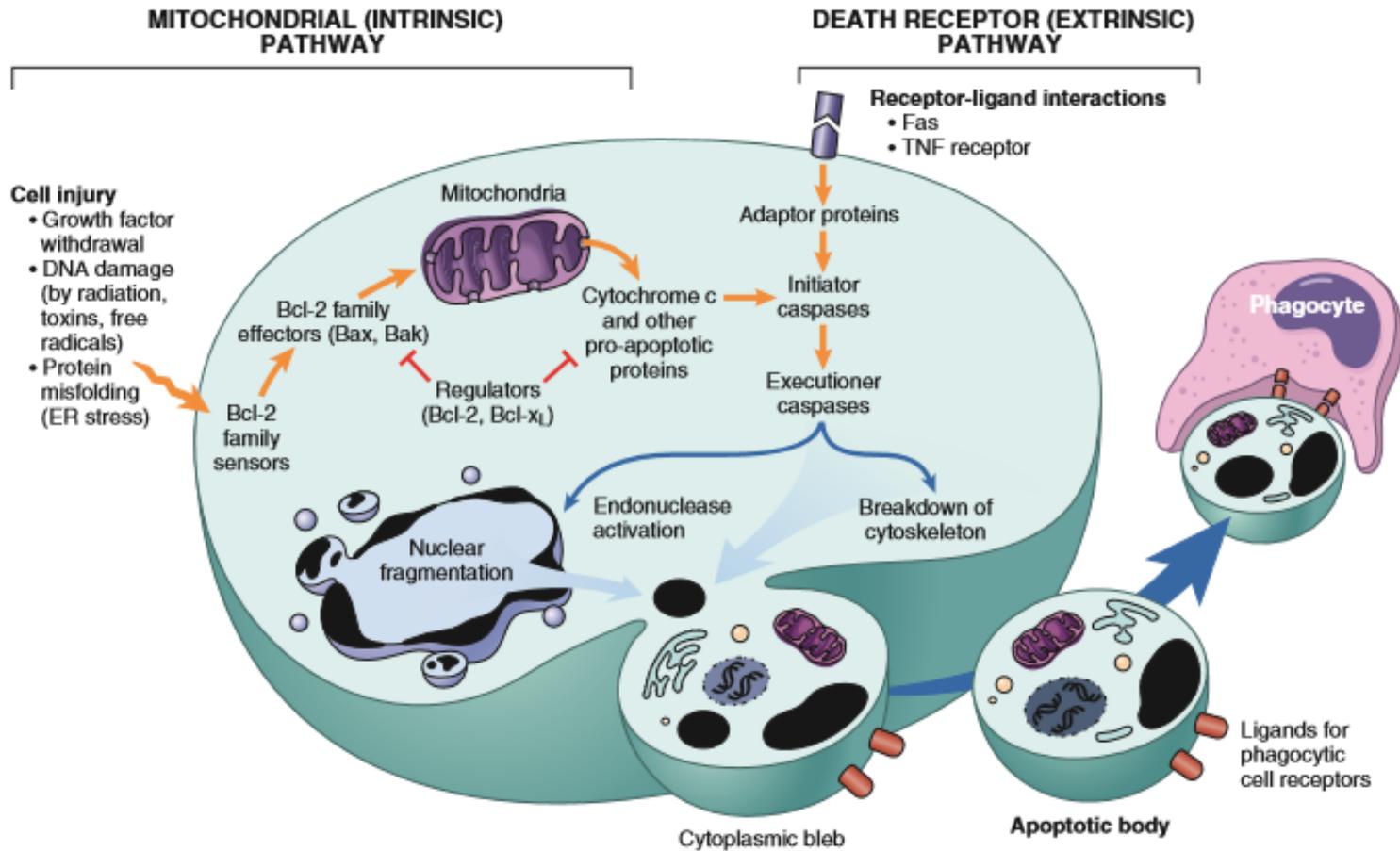
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# APOPTOSIS

- **Apoptosis** is a pathway of cell death in which cells activate enzymes that degrade the cells' own nuclear DNA and nuclear and cytoplasmic proteins.
- Dikenal juga dengan kematian sel terprogram (*programmed cell death*).
- Apoptosis dapat disebabkan oleh sebab-sebab **fisiologis** maupun **patologis**.

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1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28



# MEKANISME APOPTOSIS

Sumber:

1. Kumar V, Abbas AK, Aster JC. Cell injury, cell death, and adaptations. In: Robbins basic pathology. 9th ed. Philadelphia: Elsevier; 2013. p. 1-28



**TERIMA KASIH**