CHANDIGARH UNIVERSITY

Discover. Learn. Empower.

UNIVERSITY INSTITUTE OF SCIENCES

DIVISION CHEMISTRY

Bachelor of Engineering (Computer Science & Engineering)

Biology For Engineers 20SZT148

Ageing & Apoptosis

By Shruti Sharma

DISCOVER . LEARN . EMPOWER

BIOLOGY FOR ENGINEERS

Course Objective

- This subject is designed to impart fundamental knowledge on emerging fields of sciences like bioinformatics.
- It is designed to impart knowledge that how to apply different soft wares in research.

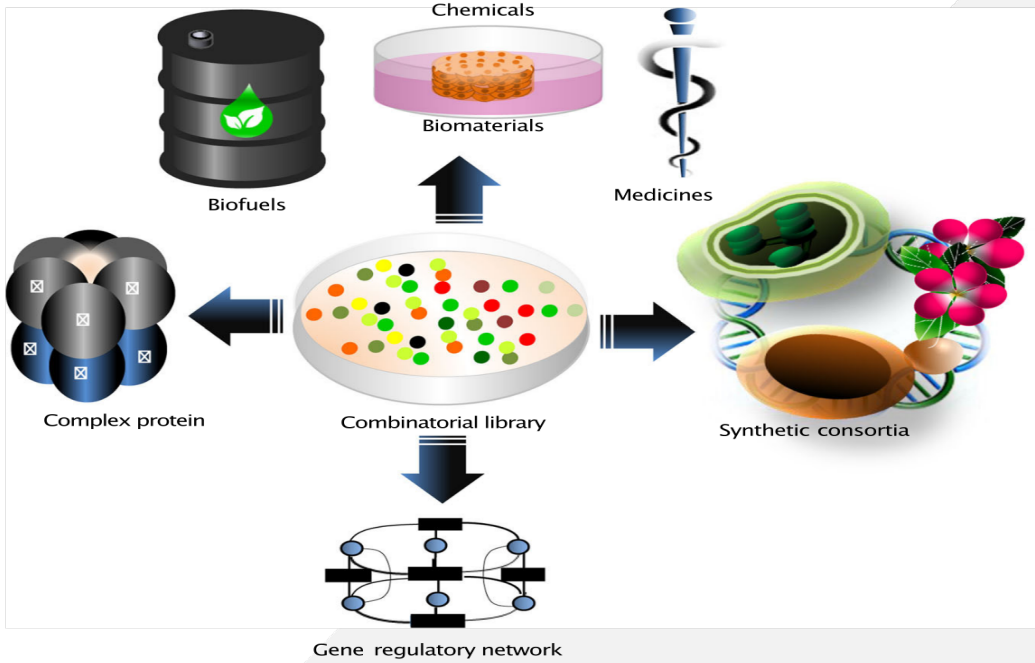
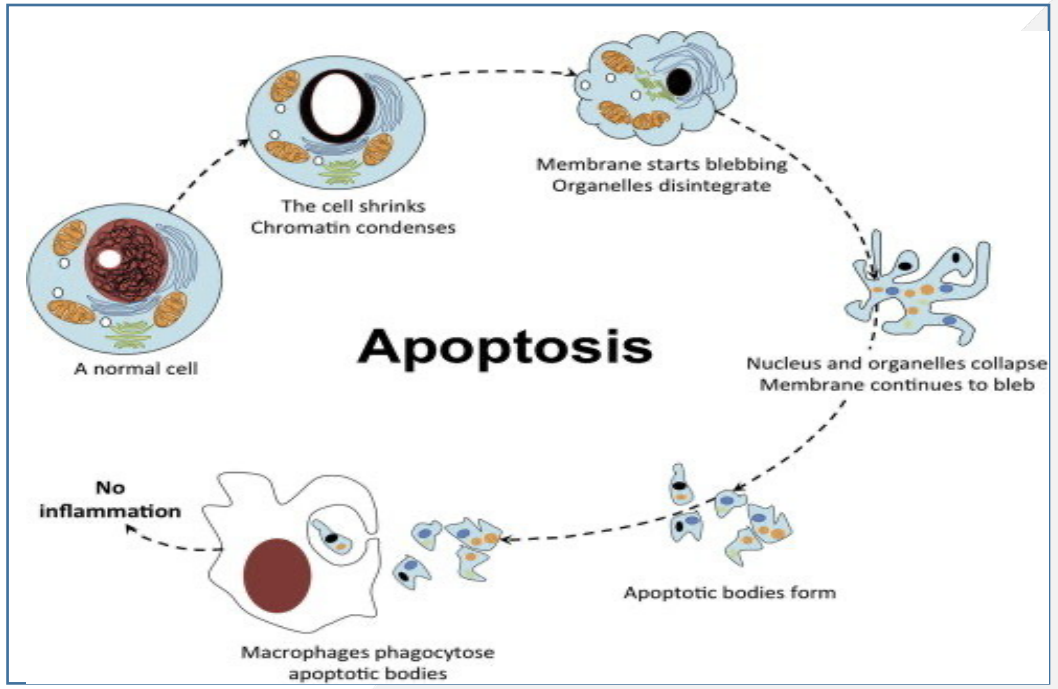


Fig 1. Biological System Engineering Engineeringhttps://upload.wikimedia.org/wikipedia/commons/thumb/7/7b/Applications_of_combinatorial_gene_circuit_optimization_strategies.svg/1200px-Applications_of_combinatorial_gene_circuit_optimization_strategies.svg.png

APOPTOSIS

Course Outcome

CO Number	Title	Level
CO1	To develop the firm foundation in science principles and higher level of understanding in each of the biology sub-discipline.	**Remember**
CO2	To excel in career as researcher in both traditional and emerging fields of science .	**Understand**
CO3	Understand ethical principles and responsibilities for science practices in society.	Understand
CO4	To learn the new areas of biology for contemporary research with interdisciplinary approach	Understand



Will be covered in this lecture

Fig 2. Apoptosis https://www.researchgate.net/profile/Johnny_Stiban/publication/274013152/figure/fig3/AS:267537132814350@1440797231149/Cytology-of-apoptosis-The-different-stages-of-apoptotic-cell-death-start-by-cellular.png

APOPTOSIS

Apoptosis is a form of programmed cell death that occurs in multicellular organisms

Apoptosis is a highly regulated and controlled process.

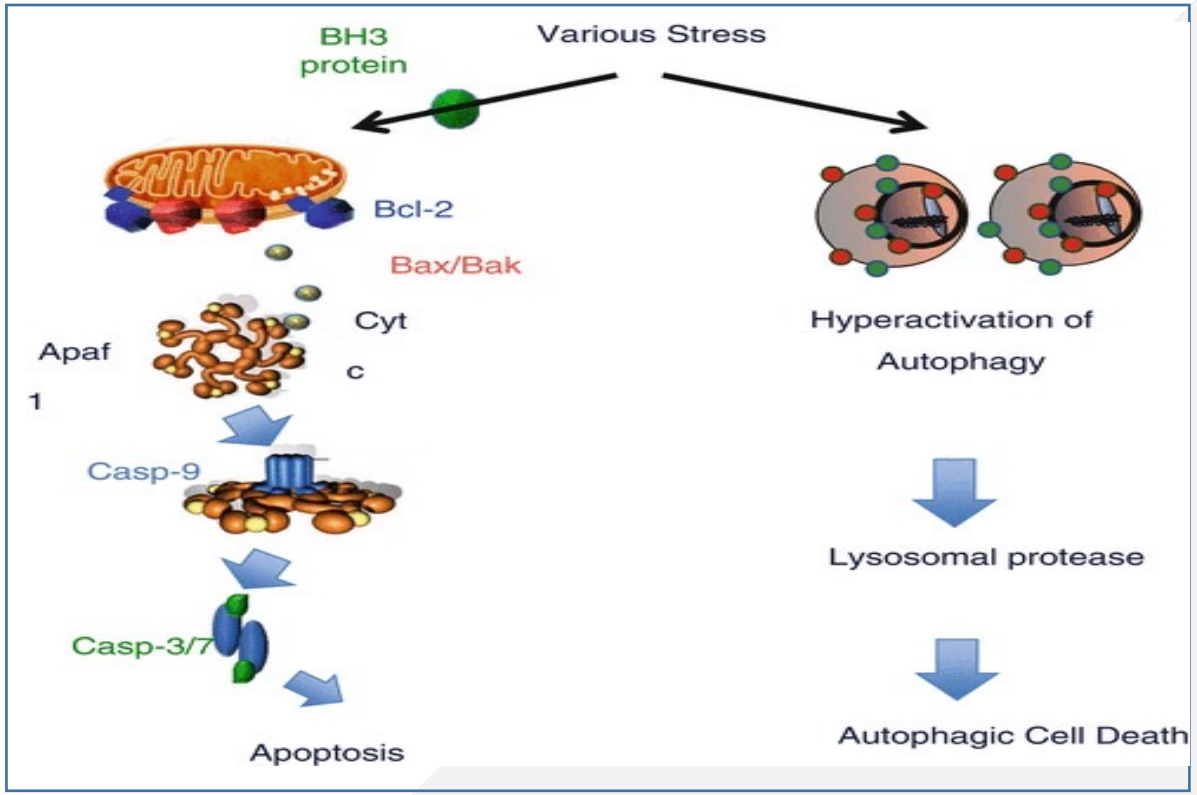


Fig 3. Apoptosis
https://www.ncbi.nlm.nih.gov/books/NBK500342/bin/323691_1_En_18_Fig2_HTML.jpg

AGEING

- Ageing is the process during which structural and functional changes accumulate in an organism as a result of the passage of time.
- The changes manifest as a decline from the organism's peak fertility and physiological functions until death.

APOPTOSIS

- Apoptosis is a highly regulated and controlled process.
- There are some changes take place in cell during apoptosis
- Blebbing
- cell shrinkage
- nuclear fragmentation
- chromatin condensation
- chromosomal DNA fragmentation
- mRNA decay.

APOPTOSIS

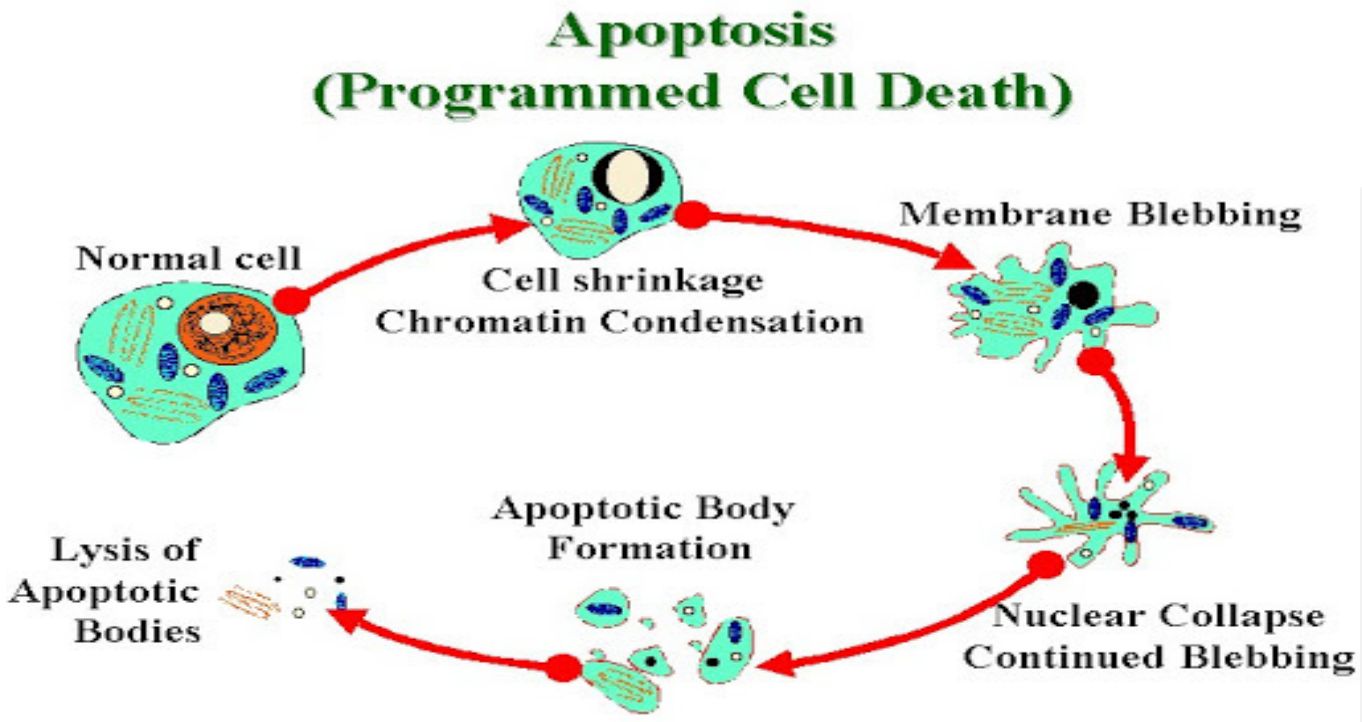


Fig4 Apoptosis
https://ibimapublishing.com/uploads/372284-fig-1.png

DIFFERENCE BETWEEN APOPTOSIS AND NECROSIS

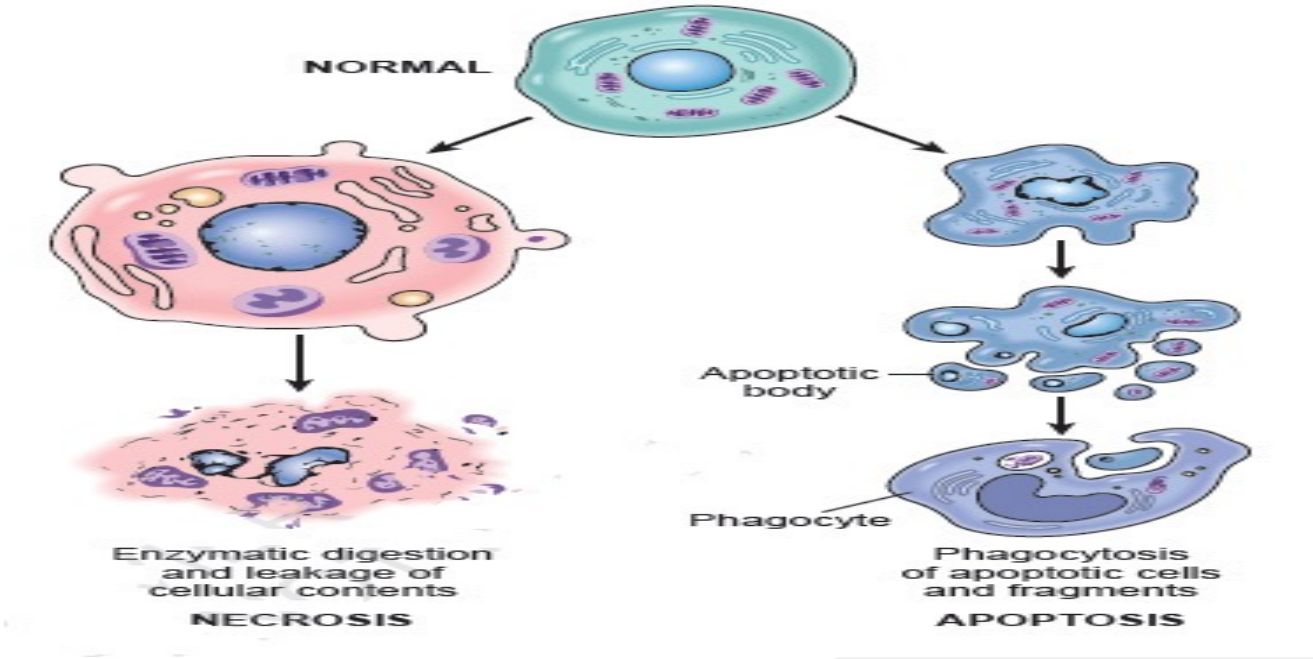


Fig 5 Necrosis and apoptosis https://upload.wikimedia.org/wikipedia/commons/6/69/Structural_changes_of_cells_undergoing_necrosis_or_apoptosis.png

PATHWAYS OF APOPTOSIS

- Apoptosis can be initiated through one of two pathways.
- In the intrinsic pathway the cell kills itself because it senses cell stress.
- In the extrinsic pathway the cell kills itself because of signals from other cells.

PATHWAYS OF APOPTOSIS

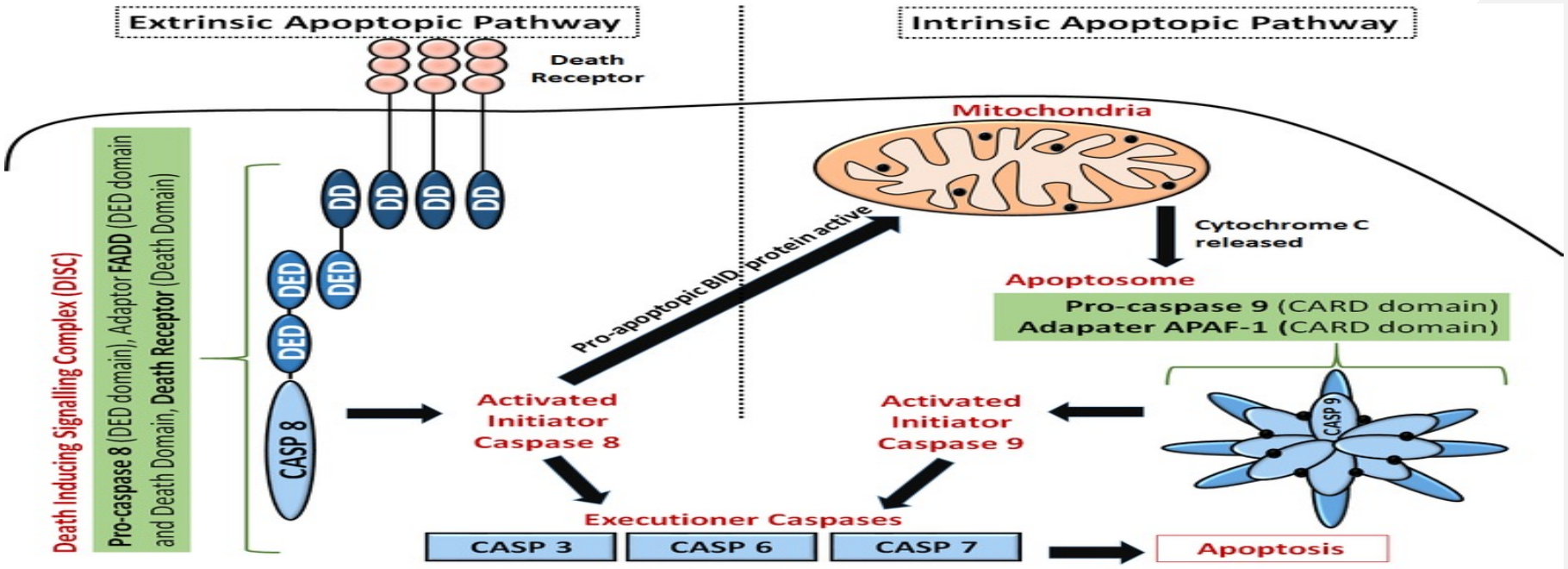


Fig 6
https://teachmephysiology.com/wp-content/uploads/2016/08/apoptosis-pathway.png

CONCLUSION

- Apoptosis is a highly regulated and controlled process.
- There are some changes take place in cell during apoptosis
- Difference between apoptosis & Necrosis
- Pathways of apoptosis
- Ageing

HOME WORK

- Explain the pathways of apoptosis.
- Differentiate between apoptosis and Necrosis

.

APPLICATIONS

- It is a necessary mechanism complementary to proliferation to ensure homeostasis in all tissues.
- Removal of a number of vestigial structures (developmental structure, e.g., tail) is caused by programmed cell death.
- Apoptosis is considered a necessary anticancer mechanism, as defect in this process leads to neoplastic and tumorigenic cell development.

REFERENCES

1. C.B.Powar.2010.Cell Biology VOL I. Himalaya Publishing House.
2. Robert Weaver. 2012 "*Molecular Biology*," 5th Edition, MCGraw-Hill.

- https://en.wikipedia.org/wiki/Ageing#:~:text=Ageing%20or%20aging%20(see%20spelling,animals%20are%20potentially%20biologically%20immortal.
- https://www.khanacademy.org/science/biology/developmental-biology/apoptosis-in-development/a/apoptosis
- https://en.wikipedia.org/wiki/Apoptosis

THANK YOU

For queries
Email: shruti.e8736@cumail.in