SYLLABUS THEME 2 – CELL INJURY & CELL DEATH

Please READ:

Core Pathology, Stevens and Lowe – Chapters 2 and 3 (Prescribed Textbook)

Cell Injury Cell Death by Fausto, N. 2006 (see Media Library)

Cellular Adaptations, Injury & Death by Kumar, Cotran & Robbins (see Media Library)

Cell Injury & Necrosis - http://www.uvm.edu/~jkessler/PATH301/301celli.htm

Human Pathology - http://www.humpath.com/cell-injury

Slideshare - http://www.slideshare.net/axix/cell-injury-patho

SCRIBD - http://www.scribd.com/doc/512763/Cell-Injury-Death-and-Adaptation

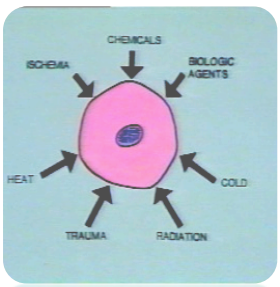
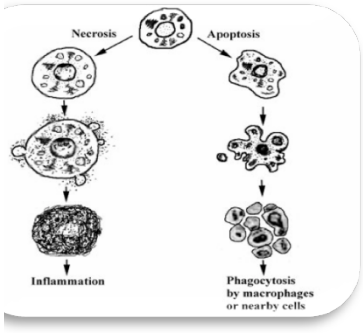


Image ref: https://www.thehistoricalarchive.com/images/products/1251.jpg

Additional resources:



YouTube videos hosted by WashingtonDeceit - Medical School Pathology,

Chapter 1a - http://www.youtube.com/watch?v=m097UUkqU2Q&feature=channel

Chapter 1b –http://www.youtube.com/watch?v=KvAeiboMZV8&feature=channel

Chapter 1c – http://www.youtube.com/watch?v=F_1IYfb7HYM&feature=channel

Chapter 1d - http://www.youtube.com/watch?v=vH6lQXqOgmw&feature=channel

Chapter 1e - http://www.youtube.com/watch?v=UpWB0guoHB4&feature=channel

Image Ref: http://herkules.oulu.fi/isbn9514266676/html/graphic11.jpe

P.S. There are other videos available – keywords: cell injury, cell adaptations, cell death, reversible & irreversible cell injury, mechanisms of injury….

INSTRUCTIONS for CLASS ACTIVITIES: - Work in groups of 4.

1. Each group to answer the allocated sections.
2. PLEASE keep to STIPULATED time (60 minutes).
3. Use WYSIWYG or WORD to type out your answers.
4. CONVERT your file to a PDF file, before uploading into discussion board.

DEFINE THE FOLLOWING TERMS: (some will be revision from previous worksheet)

Necrosis	Apoptosis	Atrophy
Autolysis	Radiation damage	Ageing
Deposition	Calcification	Degenerations
Endogenous pigmentation	Exogenous pigmentation	

CELLULAR ADAPTATIONS OF GROWTH AND DIFFERENTIATION:

As mentioned earlier, cells must constantly adapt to changes in the environment, even in normal conditions. ***Pathologic adaptations*** *share the same mechanism, but they allow the cells to modulate their environment and maybe escape.*

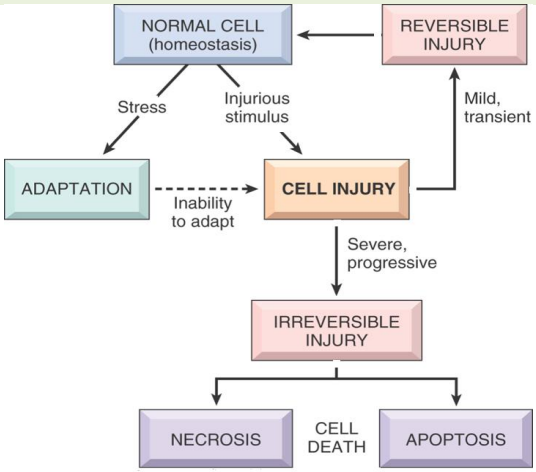
TASK 1: EXPLAIN this statement. (Core Pathology, pg 7-9 + Path Illus.)

Image Ref: http://usmlewiki.org/images/c/c0/Cardiac_hypertrophy.png

The important pathologic adaptations in cell growth and differentiation include ***atrophy, hypertrophy, hyperplasia and metaplasia.***

TASK 1: WRITE short notes on each of the adaptations. (Core Pathology, pg 9-16 + Path Illus.)

Cells are active participants in their environment, constantly adjusting structure and function to accommodate changing demands and extracellular stresses – maintains normal homeostasis. As a cell encounters physiologic stresses or pathologic stimuli, it adapts thereby achieving a new steady state and remaining viable. When its adaptive capabilities are exceeded, cell injury develops. Cell injury is mostly reversible; however it can suffer irreversible injury and eventual death, if the stress is severe or persistent.



There are 2 patterns of cell death. Image Ref: http://1.bp.blogspot.com/-XJFej1jCIfg/TeDxRkrxk-I/AAAAAAAAASs/0ifxWx0yEfY/s1600/showimage.jpeg

TASK 2: DESCRIBE the patterns of apoptosis. (Core Pathology, pg 28-33)

EXPLAIN/DESCRIBE the patterns of necrosis, including the different types. (pg 25-28)

The stresses that can induce cell injury range from gross physical trauma following a MVA to a single gene defect that underlies many metabolic diseases.

Causes are grouped into the following broad categories: hypoxia, physical agents, chemicals & drugs, microbiologic agents, toxins, immunologic reactions, genetic defects, nutritional imbalances and age.

(Kumar, Cotran and Robbins, Basic Pathology)

TASK 3: EXPLAIN these broad categories of CAUSES of cell injury. (Path Illustrated + Core Path, pg 7)

EXAMPLES OF CELL INJURY & CELL DEATH:

*"some common forms of cell injury, namely ischemic and hypoxic injury, and some types of toxic injury. Although apoptosis contributes to cell death in some of these conditions, it has many unique features. (****Kumar, Cotran and Robbins, Basic Pathology****)*

TASK 4: DESCRIBE the examples of cell injury & necrosis. (Path Illust.)

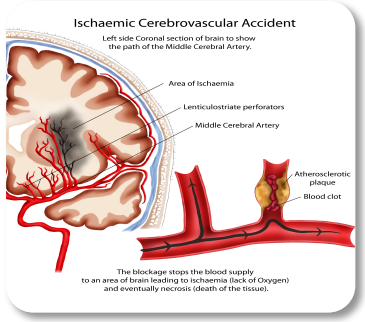
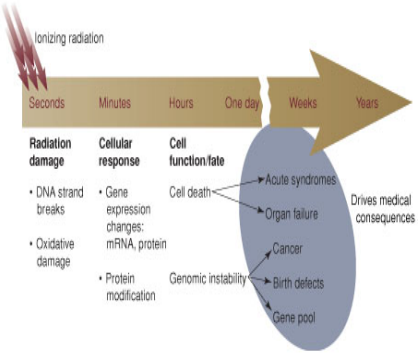


Image Ref: http://neuro4students.files.wordpress.com/2010/03/annotated-ischaemia-copy.jpg



CELL DAMAGE – RADIATION:

Ionising radiation (both gamma- and x- rays), as you learnt from 1st year, can cause serious cellular and tissue damage.

<u>TASK 5:</u> EXPLAIN this statement. (Core Pahology, pg 141-143

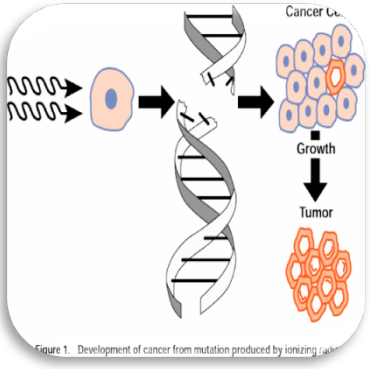
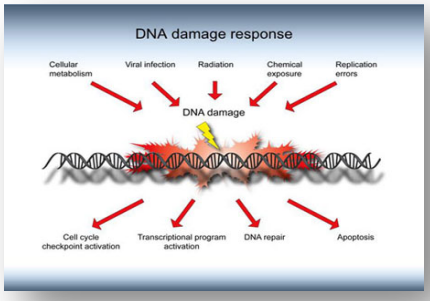


Image Ref: http://www.bilkent.edu.tr/~bilheal/aykonu/ay2011/cancer.gif + https://www.llnl.gov/str/JulAug03/gifs/Wyrobek1.jpg

CELLULAR AGEING:

True ageing and ageing complicated by disease processes may be difficult to differentiate, but true ageing is normally seen in an "ideal" environment with minimal stress. However, the latter is more identifiable and therapy can be directed more easily.

<u>TASK 6:</u> EXPLAIN how the progressive accumulation of alterations in structure and functions may lead to cell death or diminished capacity of the cell to respond to injury. (Core Path, pg 34 + Path Illust.)



HEREDITY, GENES AND DISEASE:

"Knowledge of the genetic influence on disease is increasing rapidly." (Reid & Robert, Pathology Illustrated)

<u>TASK 7:</u> EXPLAIN the genetic abnormalities and associated disorders related to cells. (+ Core Pathology, Chapter 5)

Image Ref: http://www.paterson.man.ac.uk/images/dnadamage/DDR.jpg

DEGENERATION:

Damage insufficient to cause necrosis, but may lead to necrosis or return to normal. Various types include fatty change, cloudy swelling and hyaline, fibrinoid, mucoid, and amyloid degeneration.

<u>TASK 8:</u> Briefly EXPLAIN each type. (Patholgy Illustrated)

CALCIFICATIONS and ENDOGENOUS PIGMENTATION:

"Abnormal deposits of calcium salts occur in 2 circumstances: dystrophic and metastatic" **<u>TASK 9:</u> WRITE short notes on pathologic calcifications.**

<u>TASK 10:</u> Briefly DISCUSS the abnormal pigmentation related to certain diseases. (Pathology Illustrated)

TAKE the Test – Assessment 2 - Cell Adaptations, Injury and Death.

Homework: Review resources and ANSWER questions on:

Syllabi 3 & 4 – **Tissue Responses to Injury**