باثولوجي - تمريض

الشابتر الأول

Cell Injury and Adaptation

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المصطلح	التفاصيل	
Pathology	Study of Disease	
	"Pathos": suffering, disease	
Disease	An abnormal variation of structure and function of any organ or tissue of body.	
Development of Disease	Susceptible host	
	Conductive Environment	
	Pathogen	
Core of pathology	4 aspects of a disease process that form core of pathology: (1) **Etiology:** causes of disease (2) **Pathogenesis:** mechanisms of its development (3) **Morphologic changes:** structural alteration induced in cells and organs of body. (4) **Clinical significance:** functional consequences of the morphologic changes.	
Classification	(1) Human pathology (Autopsy, Biopsy, Cytology) (2) Experimental pathology	
Position	It's a bridging discipline involving both basic science and clinical practice	
Divisions of Pathology	(1) **General pathology:** Concerned with basic reaction of cells and tissues to abnormal stimuli that underlie all diseases. (2) **Systemic pathology:** Describes specific responses of specialized organs and tissues to defined stimuli.	
Cell Injury	The basis of all diseases is injury to the smallest unit of the body (the cell). A normal cell is in a steady state, if able to handle physiologic demand according to its adaptive capacity.	
Causes of Cell Injury	**Hypoxia:**	oxygen deprivation
	Biological agents:	bacteria, viruses, fungi, and parasites.
	Chemical agents:	strong alkalis and acids, insecticides, alcohol, narcotics and air pollutants.
	Physical agents:	excessive heat and cold, radiation, mechanical trauma and electric injury.
	Endogenous toxins:	uremia, jaundice, & diabetic ketosis.
	Immunologic reactions and autoimmune diseases.	-
	Nutritional imbalances:	protein calorie malnutrition, starvation, obesity, diabetes mellitus, and vitamin deficiencies.
	Genetic abnormalities	-
Types of Cell Injury	**1- Irreversible:** • **Necrosis:** cell death • **Apoptosis:** programmed single cell death	
	2- Reversible: • **Hydropic swelling:** excess water in cell • **Fatty change:** accumulation of fat in cells of some organs. • **Reduce oxidative phosphorylation:** decrease energy stores (ATP)	

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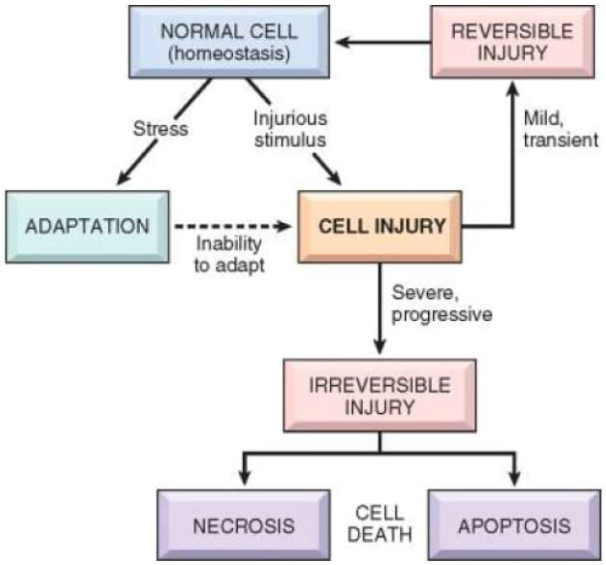
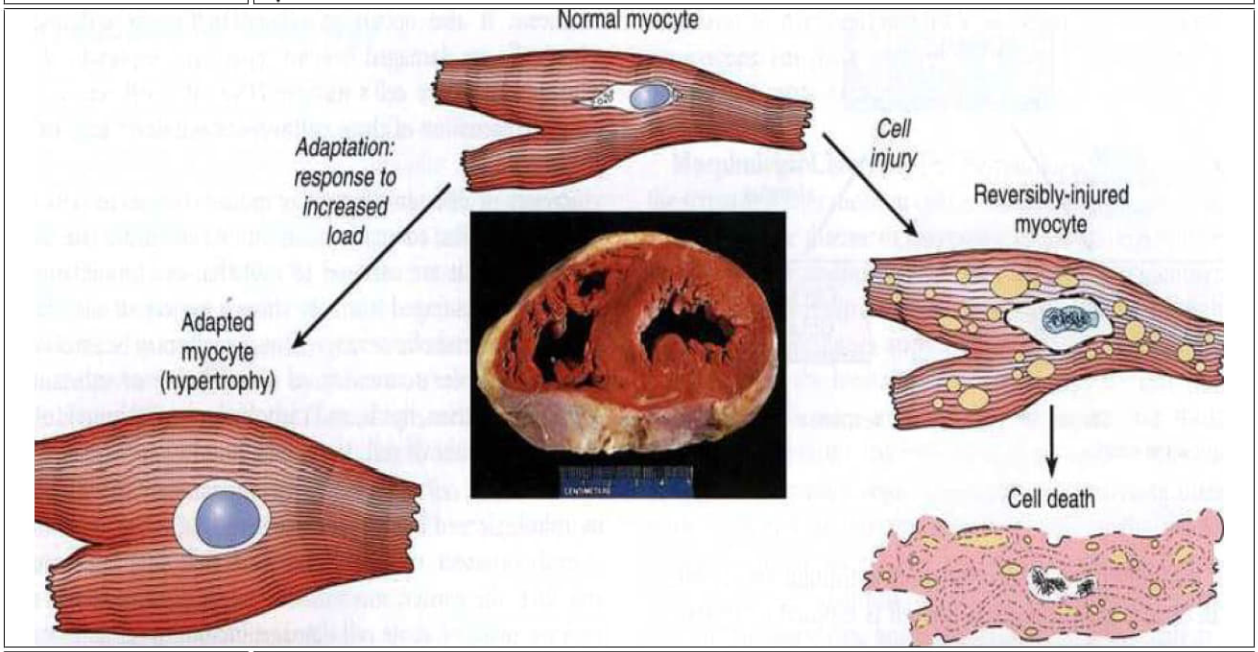
Cellular response to stressor or noxious stimuli	
Cellular adaptation	Cellular adaptations are those in which new physiologic & morphologic changes occur in response to excessive physiologic or pathologic stimuli, but preserving the cell viability and modulating its functions.
Etiology of Cellular Adaptations	• ↑ physiologic demands • Minor stresses • ↓ demand • ↓ nutrition
	
Types of Cellular Adaptations	• Hypertrophy • Hyperplasia • Atrophy • Metaplasia

المصطلح	التفاصيل
	
Hyperplasia	↑ in number of cells of an organ/ tissue Capability to divide: Physiologic Pathologic
Physiologic Hyperplasia	• Hormonal • Compensatory • Functional demand
Pathologic Hyperplasia	• Excessive hormonal stimulation: Excess of androgen → BPH • Viral infection • Chronic injury → Corn / callus.
	Fertile ground for cancer
Hypertrophy	• ↑ in the size of cells resulting in ↑ size of tissue/ organ. • Non-dividing cells.
Physiologic Hypertrophy	1. Skeletal muscles of bodybuilders 2. Lactating breast. 3. Pregnant Uterus
Pathologic Hypertrophy	1. Hypertension 2. Valvular stenosis
Atrophy	• Shrinkage in the size of the cell. • Decrease function of cell. • VIABLE يعني الخلايا لا تزال حية • Loss of cell substance
Physiologic Atrophy	1. Aging (senile atrophy). 2. Uterus in menopause. 3. Thyroglossal duct. 4. Uterus after delivery.
Pathologic Atrophy	1. Atrophy of disuse 2. Denervation atrophy 3. ↓ blood supply 4. Inadequate nutrition

المصطلح	التفاصيل
	5. ↓ endocrine stimulation 6. Pressure atrophy
Atrophy Categories	**Generalized**: ➢ Starvation atrophy (↓ Nutrition) ➢ Senile atrophy ➢ Endocrine atrophy ➢ Osteoporosis (osteopenia)
	Local: ➢ Ischemic atrophy (Senility – local) ➢ Pressure atrophy ➢ Disuse atrophy (in muscles) ➢ Neuropathic atrophy (poliomyelitis)
Metaplasia	Conversion of one adult cell type to another adult cell type in response to adverse environmental conditions. • Metaplasia is a "Two-edged sword".
Pros and Cons of Metaplasia	**Pro:** • Cytoprotective. **Con:** • Fertile ground for malignancy.
Etiology of Metaplasia	• Irritants • Stones • Deficiency of vitamin A
Epithelial Metaplasia	**Columnar to squamous:** • Lungs: Cigarette, fumes. • Cervix • Ducts: Stones
	Squamous to columnar: • Barrett esophagus: gastric reflux.