

Lecture 4 Department of Smart Medical Systems / Human Digestive Syst

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; Healing and Repair :

It is body attempt after injury restoring normal structure and function .

It consist two processes :

- Tissue regeneration 2 – Fibrous organization (scar formation) .

Wound Healing :

Wound healing 4- 6 weeks . There are many factors affecting wound healing , bacterial infection , age , stress

, diabetes , obesity , smoking , nutrition .

Phases of healing processes : Four phases of wound healing

A – Hemostasis :

1 – Vascular constriction 2 - Platelets aggregation with fibrin , formation of thrombus .

B – Inflammation :

1 - Neutrophils infiltration 2 – Monocytes infiltration and changed to macrophages 3 – Lymphocytes infiltration . 4 – Macrophage 5 – Mast cell

C – Proliferation :

1 – Re – epithelialization 2 – Angiogenesis (blood vessels) 3 – Collagene fibers synthesis 4 – Extra cellular matrix 5 – Granulation tissue

D - Remodeling :

1 - Collagen remodeling 2 – Vascular maturation and regression 3 – Scar formation



FACTORS delay wound healing :

A - Local factors :

- Environmental factors / Moist environment allow wound to heal faster and less painful than dry environment in which cells dehydrate and die , these cells become crusts and scab .
- Infection ; bacterial infection causes (pus) Purulent exudates .
- Necrosis ; Necrotic tissue delay healing .
- Trauma ; Wound will heal slowly if repeatedly Traumatized

B – Systemic factors : delay wound healing These include :

- Age : Wound in older patients heal slowly .
- Nutritional status : Deficiency of some vitamins and minerals delay wound healing .
- Obesity : due to poor blood supply to adipose tissue
- Diabetes :
- Stress ;

Adaptation :

After cell injury or after inflammation so the cell or organs changed to some adaptation in response many factors :

Types of Adaptation : Hypertrophy , Atrophy , Hyperplasia , Metaplasia

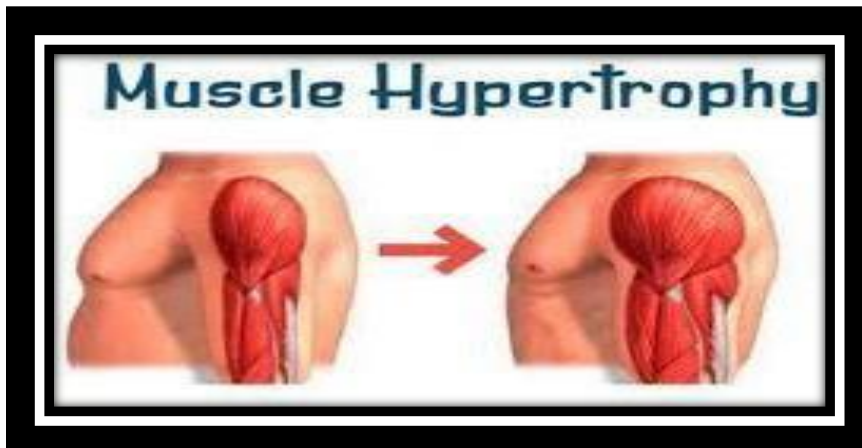
Hypertrophy :

It is increased in size of cells and organs (Not number) . There are two types :

A - Physiologic Hypertrophy : 1- Muscles building Happen with training (sport exercises) , such as weight lifting .

- Breast hypertrophy during pregnancy and Lactation .

– Compensatory hypertrophy , this occur in kidney when one kidney is removed , so other kidney become larger than normal .



B - Pathologic Hypertrophy

- Hypertrophy of cardiac muscles , due to hypertension , Valve diseases , Infarction or thrombus in coronary artery , Chronic Pneumonia with fibrosis // Lung of smokers
- So increase in size of cardiac muscles and reduce in size of heart chambers , reduce in capacity of the heart to pump blood to the tissues and organs .

Atrophy :

It decrease in size of cells , It occur partial or whole body .

Causes : 1 – Old age (ageing) loss of teeth , loss of hair , thinning of skin (that creates wrinkles) , weakness of muscles , loss of weight .

2 – Poor nourishment 3 – poor nerve supply(poliomyelitis)

4 – poor blood supply 5 – Lack of Exercise

Hyperplasia

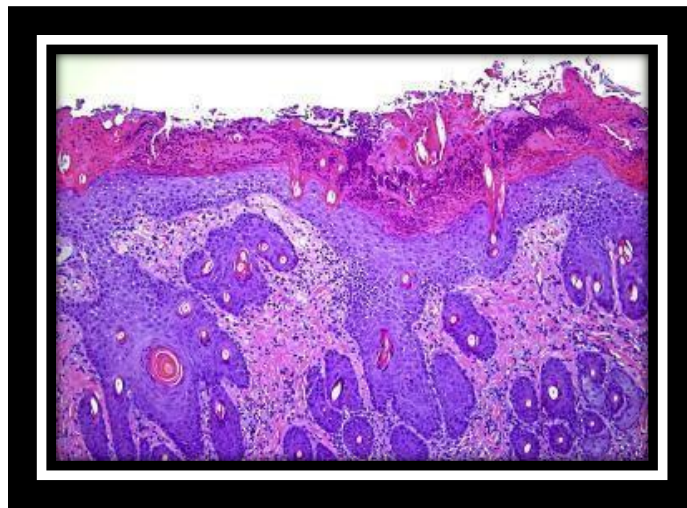
It increase in number of cells , It happen with chronic diseases such as tuberculosis (T.B.) , fungal diseases and some parasitic diseases . Proliferation of lining cells and project to the lumen . There are two types :

1 – Physiological hyperplasia / during breast feeding

2 – Pathologic hyperplasia /

A – Cushing's disease / hyperplasia of adrenal cortex Disturbances of hormone production .

B – Benign Prostatic hyperplasia (enlargement of Prostate .



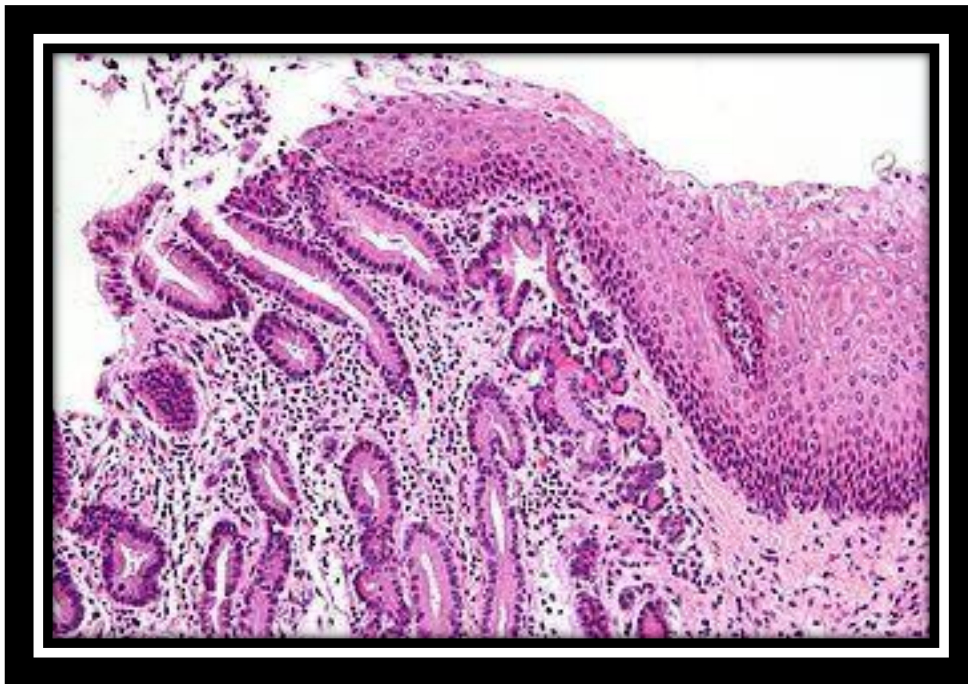
Hyperplasia in skin (epidermis)

Metaplasia :

It is changes or transform cell type to another cell type such as change gastric mucous membrane from simple columnar epithelium to stratified squamous epithelium .

Metaplastic ossification in the cartilage of bronchi of patient with multidrug resistant tuberculosis .

Hyperplasia and Metaplasia occur due to continuous irritation (



physical or chemical irritation) and may be turn to cancer .

Metaplasia in Mucous membrane of Intestine