

Cellular and tissue adaptation

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis

- ▶ Necrosis
 - ▶ Enzymatic digestion of cell
-

- ▶ sequence of morphologic changes that follow cell death in living tissue

Cellular and tissue adaptation

Necrosis

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Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis

- ▶ Necrosis
 - ▶ Enzymatic digestion of cell
-

- ▶ autolysis
- ▶ heterolysis
- ▶ denaturation of proteins

Cellular and tissue adaptation

Necrosis

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Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis

- ▶ **Histology**
 - ▶ Nuclear changes
-
- ▶ cytoplasmic eosinophilia
 - ▶ glassy homogenous cytoplasm

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis

- ▶ Histology
 - ▶ Nuclear changes
-

- ▶ karyolysis
- ▶ pyknosis
- ▶ karyorrhexis

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

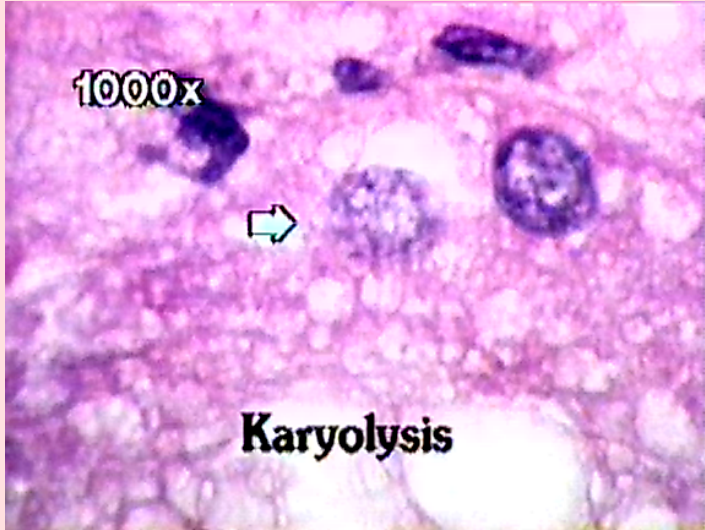
Atrophy

Degradation of material

Other terminology

Dysplasia

Karyolysis



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

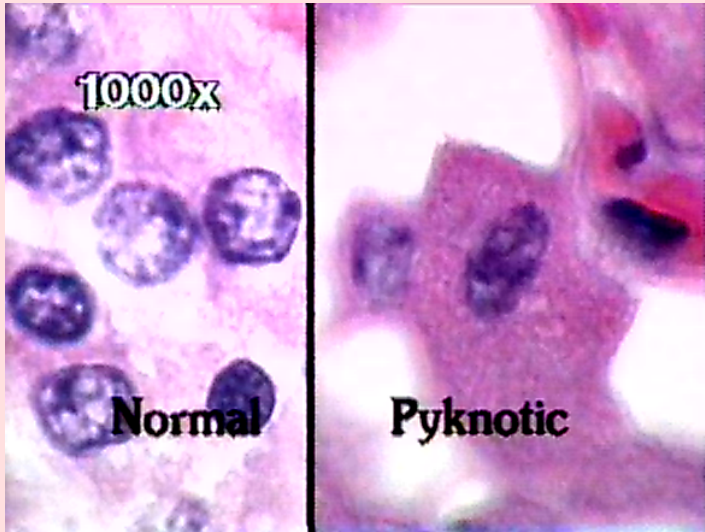
Atrophy

Degradation of material

Other terminology

Dysplasia

Pyknosis



Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, classification

- ▶ **Coagulative**
- ▶ Liquefactive, colliquative
- ▶ Caseous
- ▶ Fat necrosis

-
- ▶ denaturation
 - ▶ preservation of structural outlines for days
 - ▶ characteristic of hypoxic cell death except in the brain

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, classification

- ▶ Coagulative
- ▶ Liquefactive, colliquative
- ▶ Caseous
- ▶ Fat necrosis

-
- ▶ complete digestion of the dead cells
 - ▶ characteristic of bacterial and some fungal infection, and hypoxic cell death in the central nervous system

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, classification

- ▶ Coagulative
 - ▶ Liquefactive, colliquative
 - ▶ **Caseous**
 - ▶ Fat necrosis
-
- ▶ cheesy, white gross appearance
 - ▶ amorphous granular debris in a ring of granulomatous inflammation
 - ▶ characteristic of tuberculous infection

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, classification

- ▶ Coagulative
- ▶ Liquefactive, colliquative
- ▶ Caseous
- ▶ **Fat necrosis**

-
- ▶ white, chalky areas grossly
 - ▶ shadowy outlines of necrotic fat cells with basophilic calcium deposits
 - ▶ due to action of pancreatic lipases

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

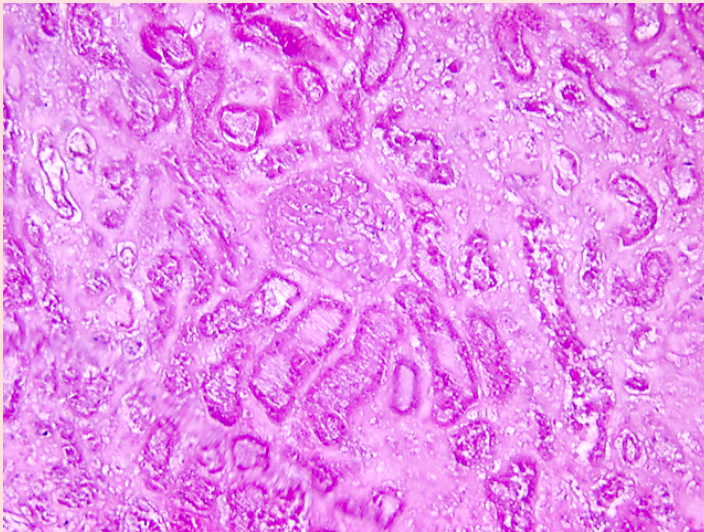
Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, kidney



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

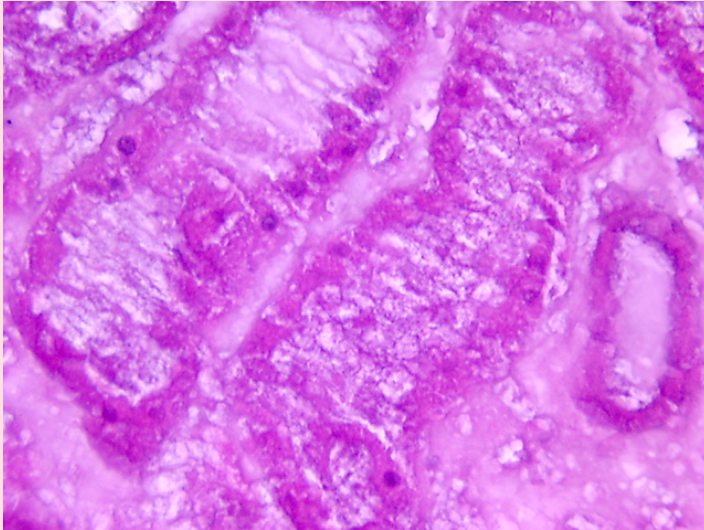
Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, kidney



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

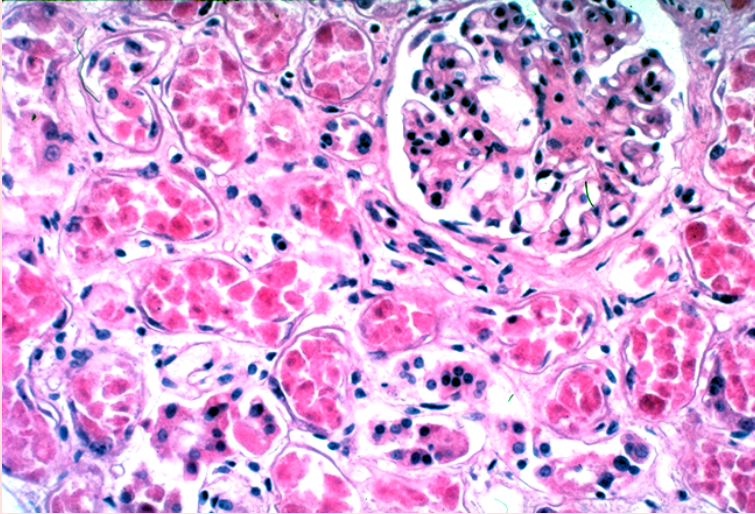
Atrophy

Degradation of material

Other terminology

Dysplasia

Acute tubular necrosis



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

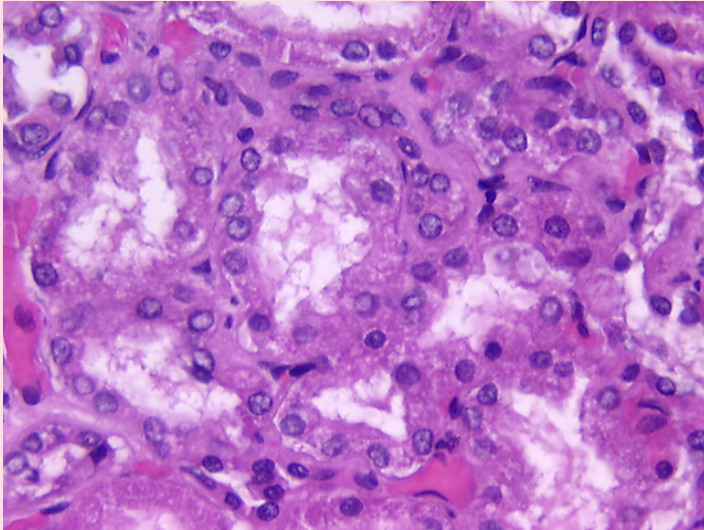
Atrophy

Degradation of material

Other terminology

Dysplasia

Normal kidney



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

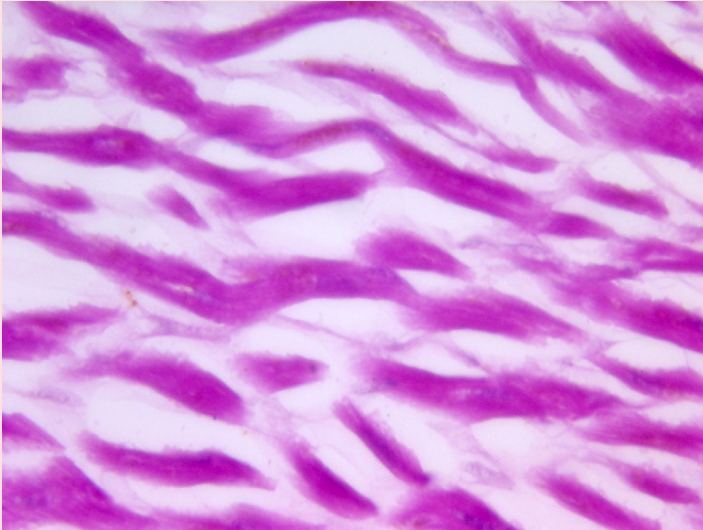
Atrophy

Degradation of material

Other terminology

Dysplasia

Necrosis, myocardium



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

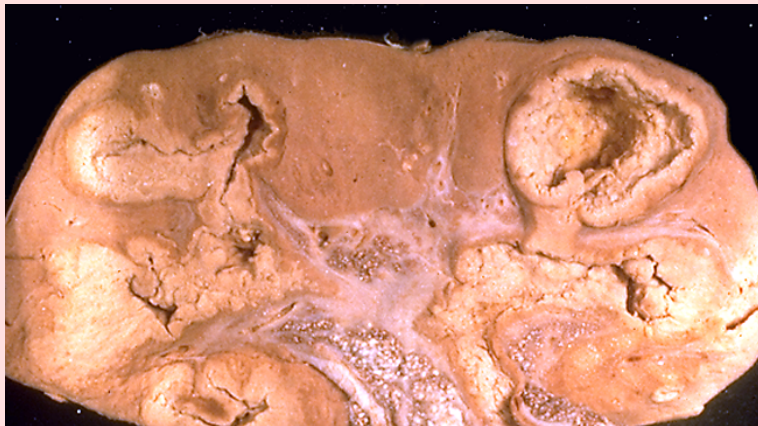
Atrophy

Degradation of material

Other terminology

Dysplasia

Caseous necrosis, kidney



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

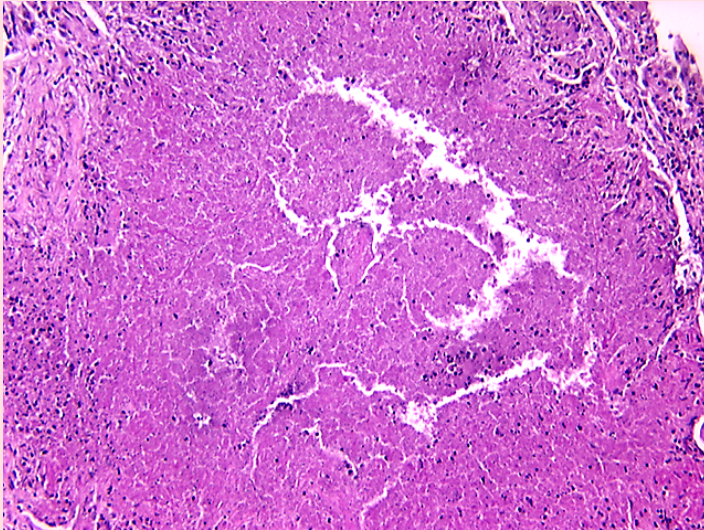
Atrophy

Degradation of material

Other terminology

Dysplasia

Caseous necrosis



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

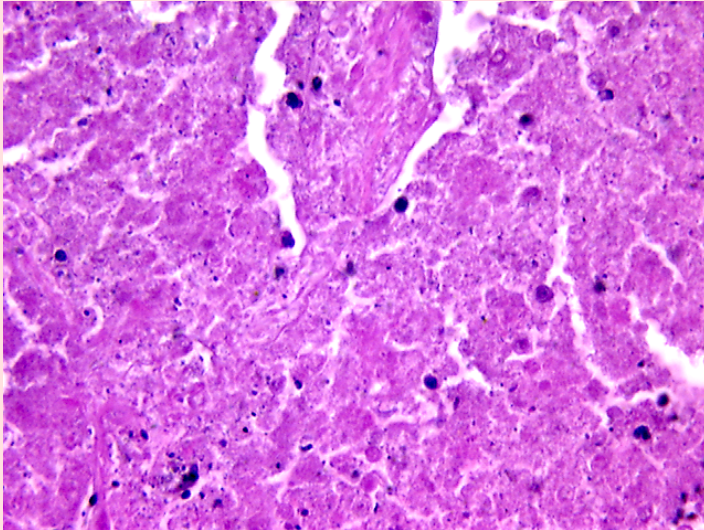
Atrophy

Degradation of material

Other terminology

Dysplasia

Caseous necrosis



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

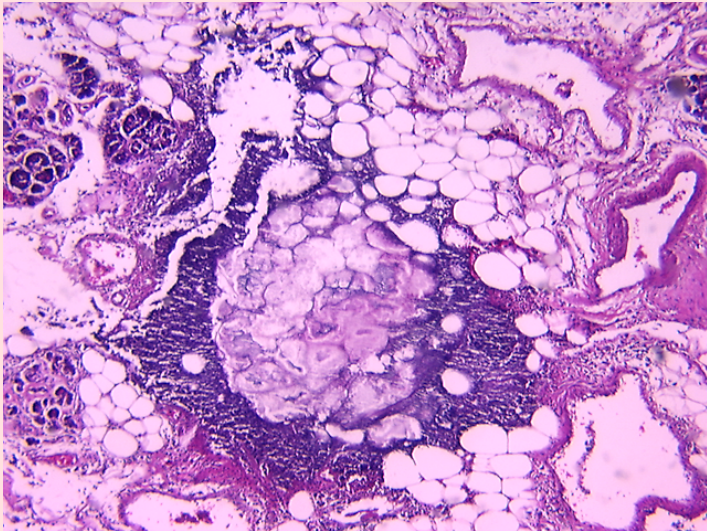
Atrophy

Degradation of material

Other terminology

Dysplasia

Fat necrosis



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Apoptosis

- ▶ **Programmed cell death**

- ▶ Histology

- ▶ Progress

- ▶ Regulation

- ▶ during embryogenesis

- ▶ in hormone — dependent involution

- ▶ physiologic — endometrium/breast

- ▶ pathologic atrophy — prostate after castration

- ▶ cell deletion in proliferating populations — intestinal epithelium; tumors

- ▶ deletion of autoreactive T cells in thymus (failure might result in autoimmunity)

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Apoptosis

- ▶ Programmed cell death
 - ▶ **Histology**
 - ▶ Progress
 - ▶ Regulation
-

- ▶ involves single cells or small clusters
- ▶ eosinophilia, condensed chromatin with peripheral aggregation
- ▶ fragmentation of DNA by endonucleases
- ▶ ultimately karyorrhexis
- ▶ cells shrink rapidly

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Apoptosis

- ▶ Programmed cell death
 - ▶ Histology
 - ▶ **Progress**
 - ▶ Regulation
-

- ▶ formation of cytoplasmic buds
- ▶ fragmentation into apoptotic bodies
- ▶ apoptotic bodies phagocytosed or rapidly degraded
- ▶ no inflammatory response
- ▶ entire process from 5 to 30 minutes

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Apoptosis

- ▶ Programmed cell death
- ▶ Histology
- ▶ Progress
- ▶ Regulation

-
- ▶ oncogenes and tumor suppressor genes
 - ▶ cell proliferation and apoptosis coupled

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

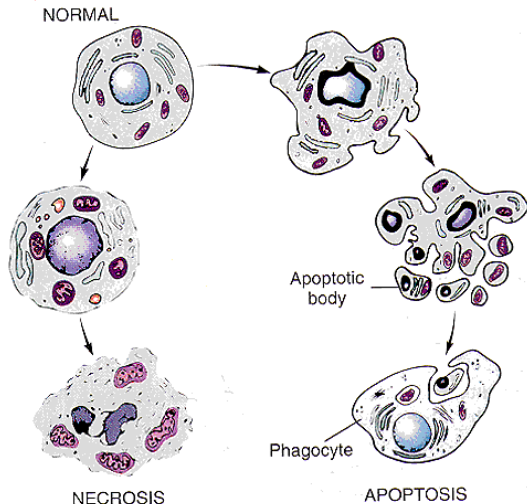
Atrophy

Degradation of material

Other terminology

Dysplasia

Apoptosis, necrosis



Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Adaptation

- ▶ Adaptation
- ▶ Cellular stress
- ▶ Morphological changes

-
- ▶ changes in homeostasis
 - ▶ changed cellular proliferation and differentiation
 - ▶ quantitative and structural alteration of cells and their parts

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Adaptation

- ▶ Adaptation
 - ▶ Cellular stress
 - ▶ Morphological changes
-

- ▶ heat shock response (HSR)
- ▶ temperature, ischemia, inflammation

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Adaptation

- ▶ Adaptation
 - ▶ Cellular stress
 - ▶ **Morphological changes**
-

- ▶ cell size and shape
- ▶ changes in size and distribution of organelles
- ▶ nuclear changes

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Forms of adaptation

- ▶ Hyperplasia, hypertrophy, atrophy, metaplasia
- ▶ Metabolic disorders

-
- ▶ cellular and tissue changes
 - ▶ sometimes reversible, sometimes not
 - ▶ regulated × unregulated

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Forms of adaptation

- ▶ Hyperplasia, hypertrophy, atrophy, metaplasia
 - ▶ **Metabolic disorders**
-

- ▶ proteins
- ▶ lipids
- ▶ saccharides
- ▶ water
- ▶ minerals
- ▶ pigments

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplasia, Hypertrophy

- ▶ **Hyperplasia**
- ▶ Hypertrophy
- ▶ (Combination)

-
- ▶ increased *number* of cells
 - ▶ increased volume of tissue
 - ▶ increased proliferation (mitoses)
 - ▶ often: increased activity, biosynthesis. . .
 - ▶ usually: capability to increased workload of the tissue

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplasia, Hypertrophy

- ▶ Hyperplasia
- ▶ **Hypertrophy**
- ▶ (Combination)

-
- ▶ increased *size* of cells
 - ▶ increased volume of tissue
 - ▶ in some tissues the only possibility of adaptation to increased workload
 - ▶ blood supply?
 - ▶ no changes in mitotic activity

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplasia, Hypertrophy

- ▶ Hyperplasia
 - ▶ Hypertrophy
 - ▶ (Combination)
-

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Classification of hyperplasia/hypertrophy

- ▶ Physiologic
 - ▶ Pathologic
-

- ▶ after hormonal stimulation (pregnancy)
- ▶ hyperplastic changed during regeneration (liver)

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Classification of hyperplasia/hypertrophy

- ▶ Physiologic
- ▶ Pathologic

-
- ▶ hormonal (thyroid, endometrium)
 - ▶ hyperplastic changes after repeated damage (may turn malignant)
 - ▶ compensatory
 - ▶ caused by increased workload
 - ▶ from neural stimulation (achalasia)
 - ▶ vascular
 - ▶ other (eg drug therapy)

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Hypertrophy of the left ventricle



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

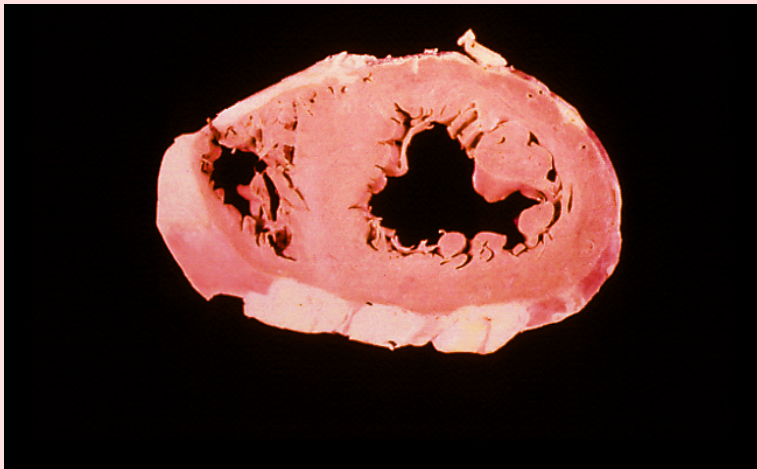
Atrophy

Degradation of material

Other terminology

Dysplasia

Hypertrophy of the right ventricle



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

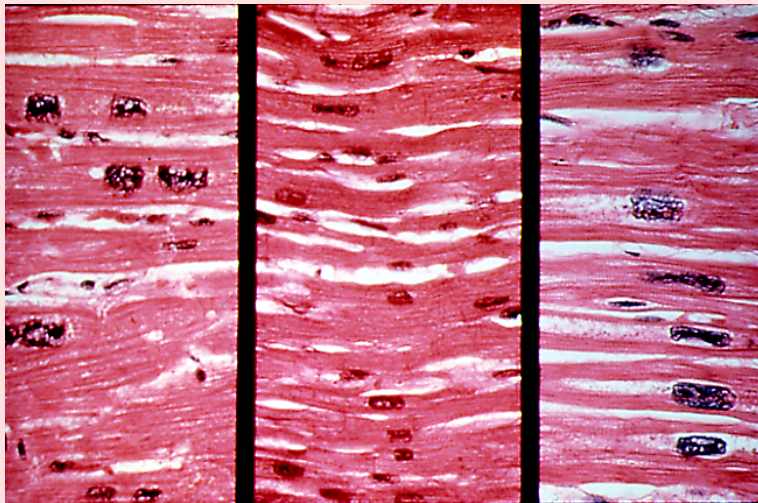
Atrophy

Degradation of material

Other terminology

Dysplasia

Hypertrophy, myocardium



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

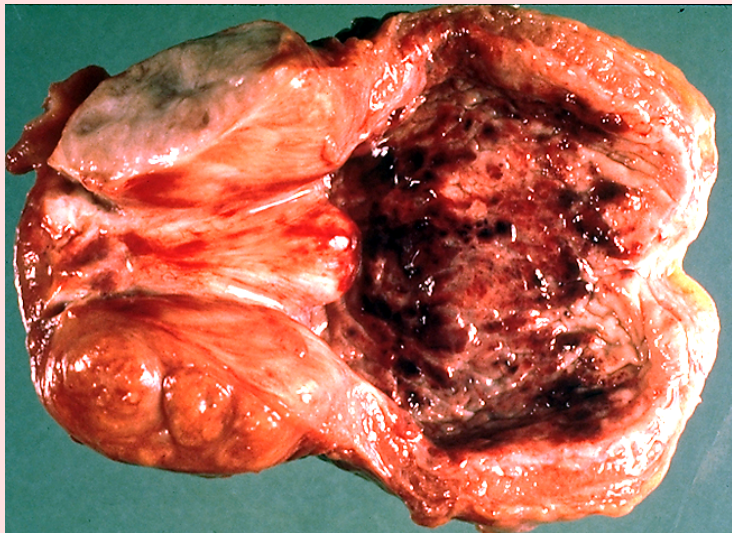
Atrophy

Degradation of material

Other terminology

Dysplasia

Hypertrophy, uterus



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplastic gums (Dilantin)



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

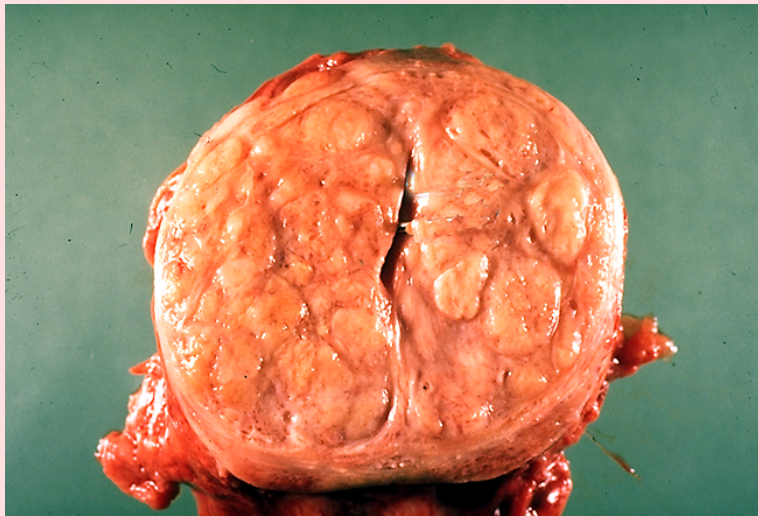
Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplastic prostate



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

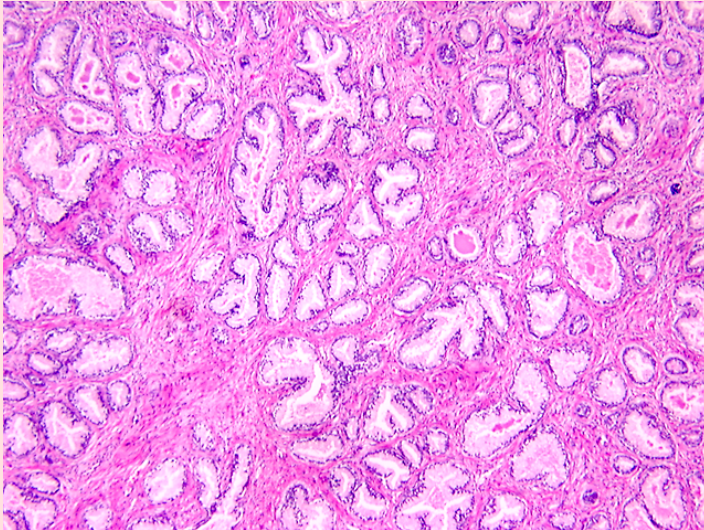
Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplastic prostate



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

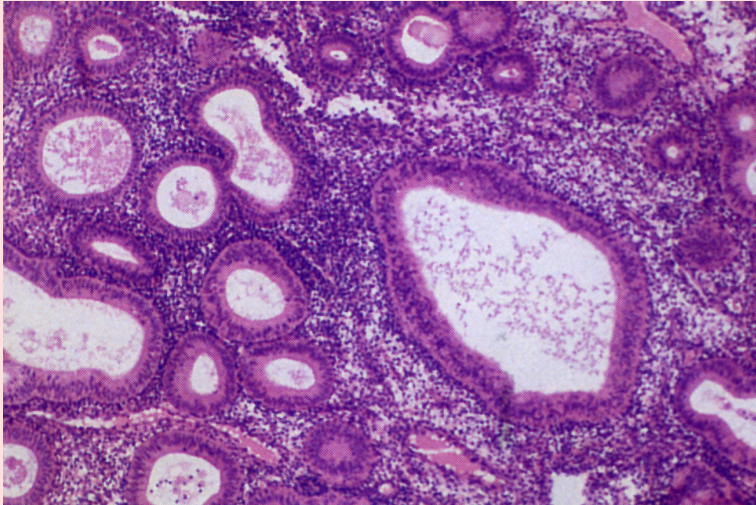
Atrophy

Degradation of material

Other terminology

Dysplasia

Hyperplastic endometrium



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Metaplasia, prosoplasia

- ▶ **Metaplasia**
- ▶ Prosoplasia
- ▶ Metalaxia

-
- ▶ differentiated cell or tissue changes into a different one
 - ▶ caused eg. by different conditions within the tissue
 - ▶ direct: connective tissue into bone
 - ▶ indirect: cylindrical epithelium into squamous epithelium

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Metaplasia, prosoplasia

- ▶ Metaplasia
- ▶ **Prosoplasia**
- ▶ Metalaxia

-
- ▶ differentiation of the tissue beyond physiological type
 - ▶ keratinisation leads to leukoplakia

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Metaplasia, prosoplasia

- ▶ Metaplasia
- ▶ Prosoplasia
- ▶ **Metalaxia**

-
- ▶ rebuilding of the tissue according to function
 - ▶ trabecular bone

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

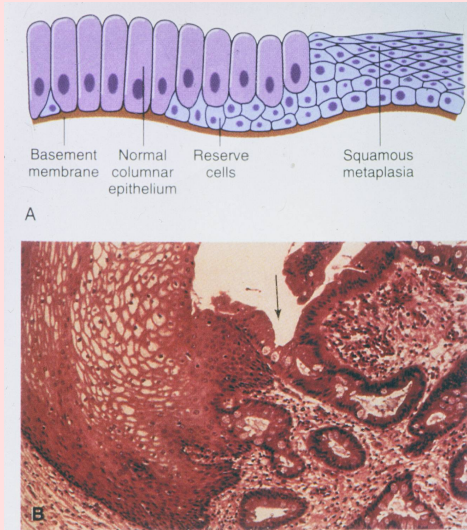
Atrophy

Degradation of material

Other terminology

Dysplasia

Squamous metaplasia



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy

- ▶ **Atrophy**
- ▶ Simple atrophy
- ▶ Numeric atrophy
- ▶ Etiology, classification

-
- ▶ decreased size of cells, tissues and organs
 - ▶ the tissue was formerly of normal size

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy

- ▶ Atrophy
 - ▶ Simple atrophy
 - ▶ Numeric atrophy
 - ▶ Etiology, classification
-

- ▶ the cells are smaller
- ▶ the number of the cells is smaller (bone marrow)
- ▶ combinations
- ▶ pseudohypertrophy

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy

- ▶ Atrophy
 - ▶ Simple atrophy
 - ▶ **Numeric atrophy**
 - ▶ Etiology, classification
-

- ▶ malnutrition
- ▶ decreased blood supply, ischemia
- ▶ senile (+ cachexia)
- ▶ pressure
- ▶ radiation
- ▶ endocrine, neurogenic, idiopathic
- ▶ inactivity
- ▶ physiologic (involution)

Cellular and tissue adaptation

Necrosis

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Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy

- ▶ Atrophy
 - ▶ Simple atrophy
 - ▶ Numeric atrophy
 - ▶ Etiology, classification
-

Cellular and tissue adaptation

Necrosis

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Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

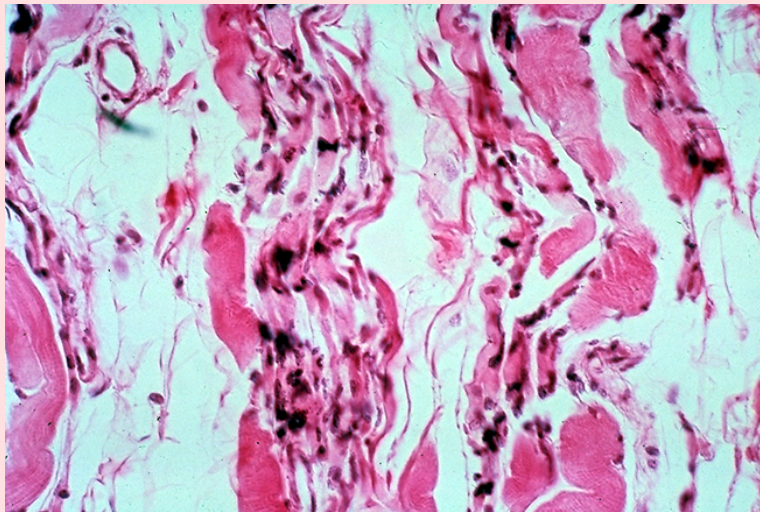
Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy, striated muscle



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

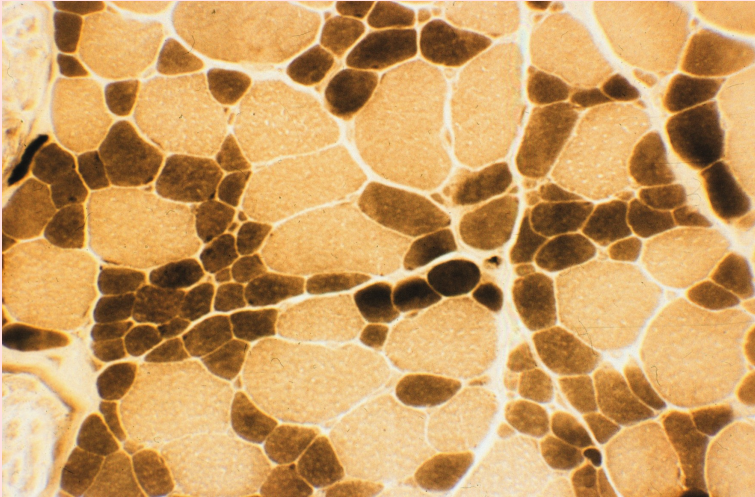
Atrophy

Degradation of material

Other terminology

Dysplasia

Neurogenic atrophy of striated muscle



Cellular and tissue adaptation

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Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

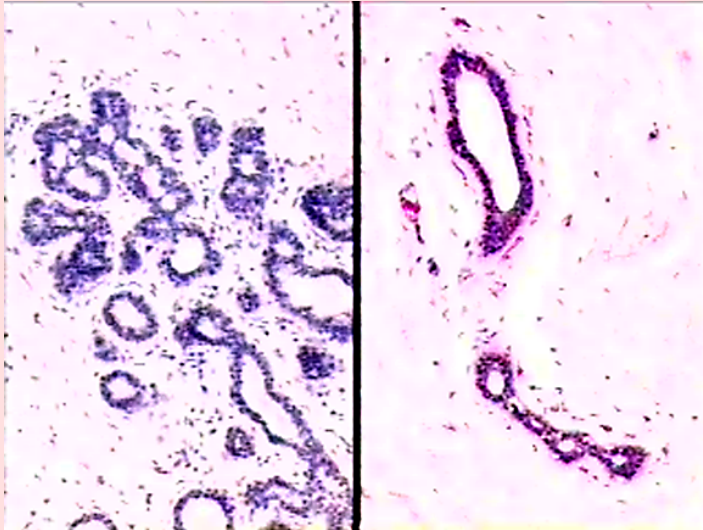
Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy, breast



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy, brain



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Atrophy, kidney



Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia,
Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Degradation of intracellular or extracellular material

- ▶ **Lysosomes**
 - ▶ Ubiquitin-proteasome complex
-

- ▶ lysosomes contain acid hydrolases
- ▶ can destroy extracellular material (after endocytosis)
- ▶ can destroy intracellular material (proteins)
- ▶ autophagic vacuols with cellular structures to be destroyed get fused with primary lysosomes

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Degradation of intracellular or extracellular material

- ▶ Lysosomes
- ▶ Ubiquitin-proteasome complex

-
- ▶ proteins to be destroyed get bound to the ubiquitin and destroyed in plasmatic proteolytic complex — proteasome

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Other terminology

- ▶ **Involution**
- ▶ Hypoplasia
- ▶ Aplasia
- ▶ Pseudohypertrophy

-
- ▶ physiological process
 - ▶ organ of normal size diminishes or hyperplastic organ returns back to normal
 - ▶ examples: thymus, breast or uterus after pregnancy

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Other terminology

- ▶ Involution
- ▶ **Hypoplasia**
- ▶ Aplasia
- ▶ Pseudohypertrophy

-
- ▶ insufficient development of an organ
 - ▶ the size is usually smaller
 - ▶ the function usually suffers or the organ is incompetent

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Other terminology

- ▶ Involution
- ▶ Hypoplasia
- ▶ **Aplasia**
- ▶ Pseudohypertrophy

-
- ▶ the organ did not develop at all or is rudimentary

Cellular and tissue adaptation

Necrosis

Apoptosis

Adaptation

Forms of adaptation

Hyperplasia, Hypertrophy

Classification of hyperplasia

Metaplasia

Atrophy

Degradation of material

Other terminology

Dysplasia

Other terminology

- ▶ Involution
- ▶ Hypoplasia
- ▶ Aplasia
- ▶ Pseudohypertrophy

-
- ▶ atrophy of functional tissue
 - ▶ replacement of functional tissue with fat
 - ▶ the volume of the fat makes the organ to seem larger than normal
 - ▶ example: some kinds of muscle dystrophies

Cellular and tissue adaptation

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Other terminology

Dysplasia

Dysplasia

- ▶ **Dysplasia**
 - ▶ Reactive dysplasia
 - ▶ True (malignant) dysplasia
-
- ▶ cellular (especially nuclear) atypia
 - ▶ cytoplasm of the cells is more basophilic
 - ▶ nuclei are larger and irregular

Cellular and tissue adaptation

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Other terminology

Dysplasia

Dysplasia

- ▶ Dysplasia
- ▶ **Reactive dysplasia**
- ▶ True (malignant) dysplasia

-
- ▶ changes are caused by some processes from *outside* of the cells
 - ▶ changes disappear if the irritation stops (are reversible)

Cellular and tissue adaptation

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Dysplasia

Dysplasia

- ▶ Dysplasia
- ▶ Reactive dysplasia
- ▶ True (malignant) dysplasia

-
- ▶ the changes in the cell is irreversible
 - ▶ the changes are actually malignant
 - ▶ without treatment the dysplasia progresses into evident neoplastic process

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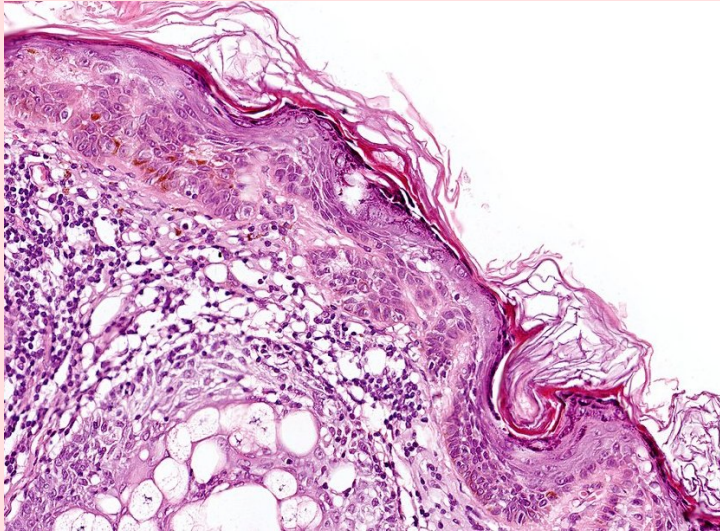
Atrophy

Degradation of material

Other terminology

Dysplasia

Solar keratosis



Cellular and tissue adaptation

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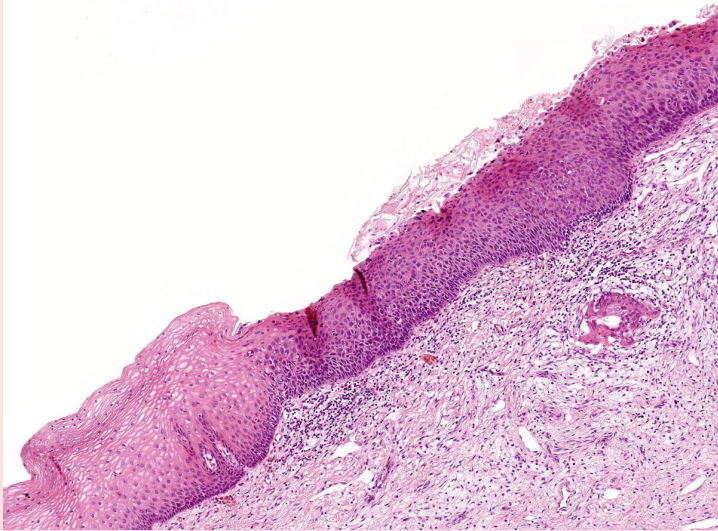
Atrophy

Degradation of material

Other terminology

Dysplasia

Severe dysplasia of the cervix uteri



Cellular and tissue adaptation

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