

Introduction to pathology

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So what is pathology ?

Pathology comes from an **Ancient Greek** roots; literally to the study of *suffering*; *pathos*: "suffering" (disease) & *logia* "study of"

So it is.. The scientific study of disease!

The study of the structural & functional changes in cells, tissues, & organs that underlies diseases

- + *Cellular pathology* → to emphasize that all diseases originate at the cellular level. “**R. Virchow**” who is “the father of modern pathology”
- + NOW, cellular disturbances arise from alterations in molecules (genes, proteins, and others) that influence the survival and behavior of cells.
- + SO the foundation of modern pathology is understanding the cellular & molecular abnormalities that give rise to diseases.

+ **General pathology:**

basic concepts that are shared among various disease in multiple organs/systems (Ex: Inflammation, cell injury and neoplasia)

+ **Systematic Pathology:**

discuss pathology of diseases of a specific organs/systems

Anatomical pathology

- +Cytopathology
- +Dermatopathology
- +Forensic pathology
- +Histopathology
- +Neuropathology
- +Pulmonary pathology
- +Renal pathology
- +Surgical pathology

Clinical pathology

- +Hematopathology
- +Immunopathology
- +Radiation pathology

Molecular pathology

the study of disease Includes:

The four aspects of a disease process that form the core of pathology are:

1-Causation (**etiology**).

2-Biochemical and molecular mechanisms (**pathogenesis**)

3- The associated structural (**Morphologic changes**) and functional alterations in cells and organs.

4- The resulting clinical consequences (**clinical manifestations**).

1-Etiology ..The “why”

*+ underlying **causes** and modifying factors that are responsible for the initiation and progression of disease.*

+ genetic and environmental factors

2-Pathogenesis ..The “HOW”

+the mechanism through which **Etiology** causes the **development & progression** of disease,

+the cellular & molecular changes that give rise to the specific **functional & structural** abnormalities that characterize the disease.

*Etiology and pathogenesis of disease are essential for understanding disease ++ also is the basis for developing **rational** treatments and effective preventive measures.*

*Thus, **pathology provides the scientific foundation for the practice of medicine.***

3-Morphology is structural alteration of cell and tissue as a result of the pathogenesis:

+ **gross** : naked eye

+ **microscopic**

+Pathologists also use a variety of molecular, and other techniques to define the biochemical, structural, and functional changes that occur in cells, tissues, and organs in response to injury.

Morphology, Gross (Naked eye)

Normal



Cirrhosis

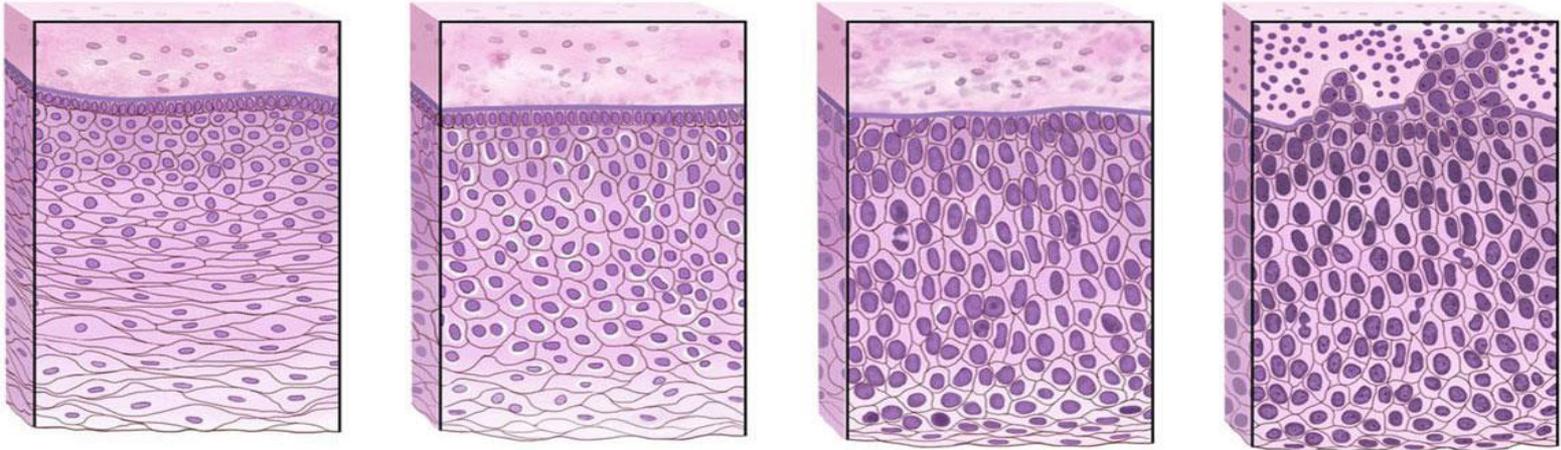


Irregular surface

Nodules

Morphology, microscopic

Normal → **Hyperplasia** → **Dysplasia** → **Cancer**



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4-Clinical manifestations.

- *The end results of genetic, biochemical, and structural changes in cells and tissues are functional abnormalities that lead to the clinical manifestations (symptoms and signs) of disease, as well as its progression (clinical course and outcome).*
- *Hence, clinicopathologic correlations are very important in the study of disease.*

Etiology

Pathogenesis

Morphology

Clinical
manifestations

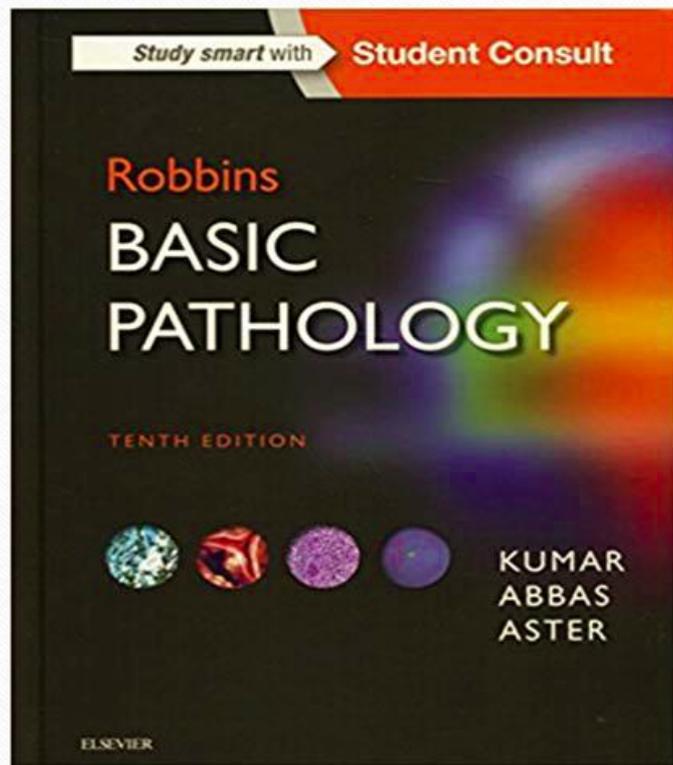
anatomy,
physiology,
biochemistry,
pharmacology,
microbiology,
community, ..etc

Pathology

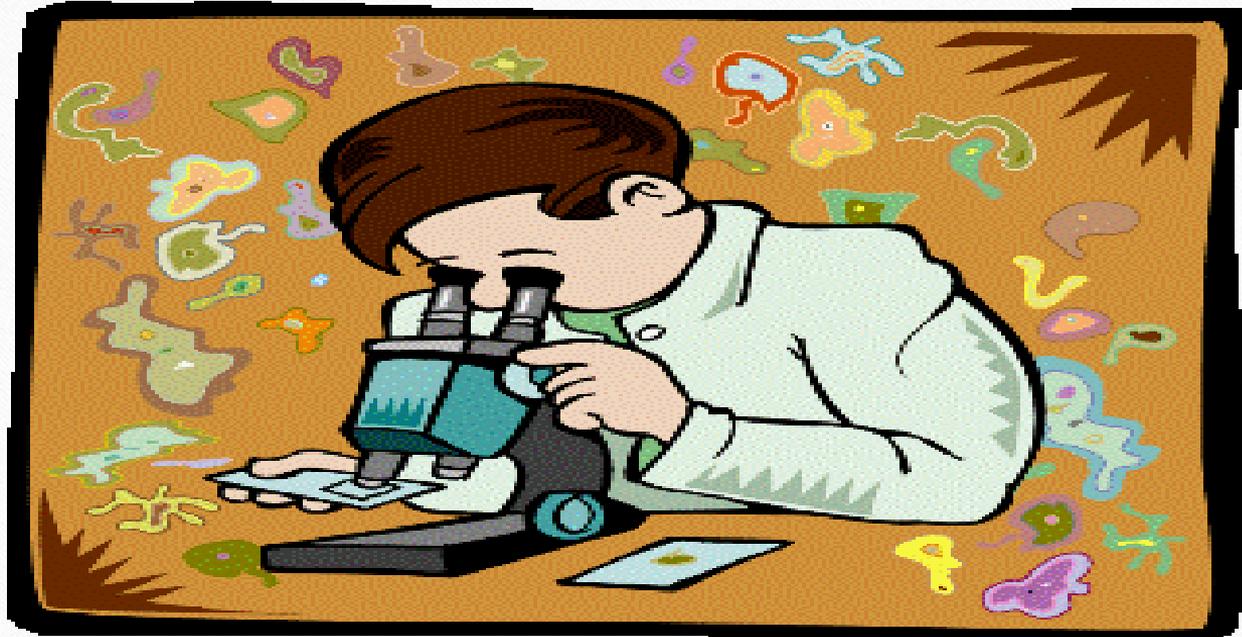


medicine ,
surgery,
orthopedic,
gyne-obs,
pediatrics,
ENT,
Psychiatry,
Radiology

The book .. 😊



So what do pathologist do?



1st: The Sample .. What do we get?

Resections

Biopsy, like :

- Bone marrow aspiration and biopsy
- Cardiac biopsy
- Core biopsy
- Endometrial biopsy, D&C
- Endoscopic biopsy
- Bronchoscopic biopsy
- Excisional and incisional biopsy
- Fine-needle aspiration biopsy
- Lymph node biopsy
- CT guided Needle biopsy
- Punch biopsy
- Shave biopsy

Processing into
a paraffin block



Microtome

Staining H&E ☺



Figure 1



Paraffin block tissue samples



Diagnosis

Thank you