

# Introduction of pathology

pathology is devoted to understanding the causes of disease and the changes in cells, tissues, and organs that are associated with disease and give rise to the presenting signs and symptoms in patients.

**Pathology** literally derived from two Latin words “pathos” & “logos”. ‘Pathos’ means disease or suffering and ‘logos’ means study.

**Pathology** is a study of structural , biochemical , and functional changes in cells, tissues ,and organs that underlie disease .

pathology is scientific study of disease .

**Disease** is defined as an abnormal variation in structure or function of any part of the body.

**Health** is a complete physical ,mental and social well bening ,not merely an absence of disease.

**Patient** is a person affected by the disease .

**Pathology is divided into general & Special or Systemic pathology**

**A- General pathology** :- deals with general changes in all tissues of the body e.g.. Inflammation, cancer, edema , hemorrhage ....etc .

**B- Special or Systemic pathology** :- study of diseases pertaining to specific organs and body systems e.g. Cardio Vascular System CVS, Central Nervous System CNS, Gastro Intestinal Tract GIT.....etc.

## Subspecialties of pathology

**1- Histopathology:** Examination of the tissues in tissue section under light or electron microscope .

**2- Cytopathology:** Examination of isolated cells for diagnosis of the disease .

**3- Biochemistry:** Examination of the metabolic disturbances of diseases by evaluation of various compounds in body fluids .

**4- Microbiology:** Identification of the causative microorganism of the disease by examination of (body fluids, mucosal surfaces and excised tissues ) by using microscopical ,cultural and serological techniques .

**5- Haematology :** Microscopical examination of blood and blood related components.

**6- Molecular pathology :** detection and diagnosis of abnormalities at the level of DNA.

**7- Histochemistry:** Detection of cells and tissues constituents using special immunohistochemical techniques.

**8- Forensic pathology:** Examination of tissues taken from autopsy (dead body) .

**9-Toxicology;** concerned with the study of the effects of known or suspected poisons on the body.

**10- immunepathology** examination of abnormalities in immune system

**Pathology gives explanations of a disease by studying the following four aspects of the disease.**

1. Etiology
2. Pathogenesis
3. Morphologic changes
4. Functional derangements and clinical significance.

**1- Etiology** :- means study the causes of disease. It refers to the underlying causes and modifying factors that are responsible for the initiation and progression of disease .

- If the causes of disease is known called **primary etiology** .

- If the causes of disease is un known called **idiopathic** .

There are two major classes of etiologic factors :-

**A- Genetic**

**B- Acquired** ( infectious , nutritional , physical , and chemical ).

## 2- Pathogenesis ( mechanisms of development and progression of disease):-

The sequence events which result from the response of the cells or tissues to the etiologic agent , from the initial stimulus to the ultimate expression of the disease (signs and symptoms ) ,”from the time it is initiated to its final conclusion in recovery or death

## 3. Morphologic changes

The morphologic changes refer to the structural alterations in cells or tissues that occur following the pathogenetic mechanisms . The structural changes can be seen with **the naked eye** or they may only be seen **under the microscope**. Those changes that can be seen with the naked eye are called **gross morphologic changes** or **macroscopic changes** & those that are seen under the microscope are called **microscopic changes**. Both the gross & the microscopic morphologic changes may only be seen in diseased tissue .

### Gross or macroscopic changes

- size
- shape
- weight
- color
- consistency
- surface
- edge
- section

## 4. Functional derangements and clinical significance

Means the morphologic changes in the cells of organ influence the normal function of the organ . these morphologic changes determine the clinical features ( **signs and symptoms** ) , course , and prognosis of disease.

## **-Signs**

the word 'sign' is used by health care professionals to get actual information's about the

particular disease by asking symptoms from the patients and also using other measurable tests like the blood test , X-ray, observing temperature .

The Signs are observable by feeling, hearing or on seeing and so is said to be the **objective** evidence of disease. For example swelling , fractures, bleeding are the signs. Hence signs are the physical demonstration of a disease, can be detected by doctors.

## **- Symptoms**

Symptoms are felt by the patient only; it is provided by the patient to the doctor, on the basis of which further diagnosis are done.

Symptoms are said to be **subjective** as they can only be felt by the patient . Example: shivering, headache, body ache, nausea, muscles fatigue. Symptoms can be considered as an indication of a particular disease; these are not visible to others . Symptoms should be taken seriously, and if noticed, should consult a physician as soon as possible.

## **-Prognosis** (sequelae or complications of a disease)

Expected outcome of the disease, It is the clinician's estimate to the severity and possible result of a disease.

## **Clinical pathology**

Clinical pathology is a branch of pathology use the laboratory methods (clinical chemistry , clinical microbiology , and hematology) for diagnosis and treatment of disease.

Clinical chemistry :- concerned with analysis of body fluids .

Hematology :-study of blood and blood forming tissues to evaluate the presence of disease .

## **Specimens used in clinical pathology**

**1- blood**

**2-urin**

**3-sputum**

**4-feces**

**5- body fluids**

A- Cerebrospinal fluid CSF

B-Pleural fluids

C- abdominal fluids

D-joint fluids

E-bone marrow

### **Techniques Used In Clinical Pathology**

1- light microscope

2- electron microscope

3-histo chemistry technique

4- immune histochemistry technique

5-biochemical technique

6- hematological technique

7- cell culture

8-microbial culture

9- molecular technique

### **Molecular pathology**

is a branch of pathology that study the diseases which result from defect in the chemical structure of genomic DNA , and precisely, in the sequence of the DNA bases that directs amino acid synthesis.

**Molecular pathology applications include:- the study, for example, of abnormal hemoglobin molecules, such as in sickle cell disease and the alterations in the genome that control cell growth, which is important part in the development of neoplasms**