



P A T H O L O G Y

Lecture 1: Introduction to Pathology

1. Definition and Scope

The word **pathology** comes from the Greek *pathos* (suffering or disease) and *logos* (study).

Definition

Pathology is the scientific study of the structural and functional changes in cells, tissues and organs that underlie disease.

Main divisions

- **General pathology:** deals with the basic reactions of cells and tissues to abnormal stimuli that underlie disease.
- **Systemic (special) pathology:** deals with the specific responses of specialized organs and tissues to more or less well-defined stimuli.

2. The Four Core Aspects of a Disease Process

Four aspects of any disease process form the core of pathology. Together they explain what causes a disease, how it develops, what it looks like and what it does to the patient.



The four core aspects of a disease process

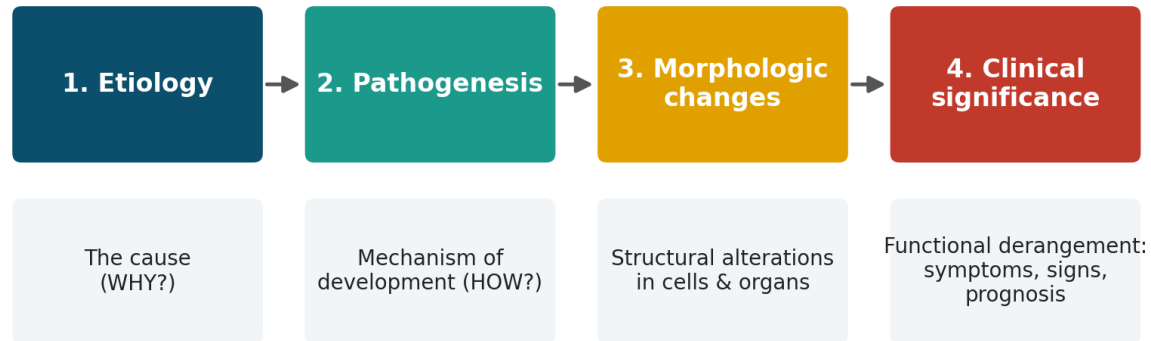


Figure 1. The four core aspects of a disease process

Aspect	Question answered	Description
Etiology	Why?	The origin of a disease, including its underlying causes and modifying factors.
Pathogenesis	How?	The sequence of events in the response of cells or tissues to the etiologic agent, from the initial stimulus to the ultimate expression of the disease.
Morphologic changes	What does it look like?	Structural alterations in cells or tissues that are characteristic of the disease or diagnostic of the etiologic process.
Functional derangements and clinical manifestations	What does it do?	The nature and distribution of morphologic changes influence normal function and determine the symptoms, signs, course and prognosis.



3. Etiology

Etiologic factors fall into two main classes:

- **Intrinsic (genetic):** the disease is genetically determined, caused by abnormalities in the DNA of the fertilized ovum that are inherited from one or both parents (example given in the lecture: cancer).
- **Acquired:** the disease results from environmental factors, listed below.

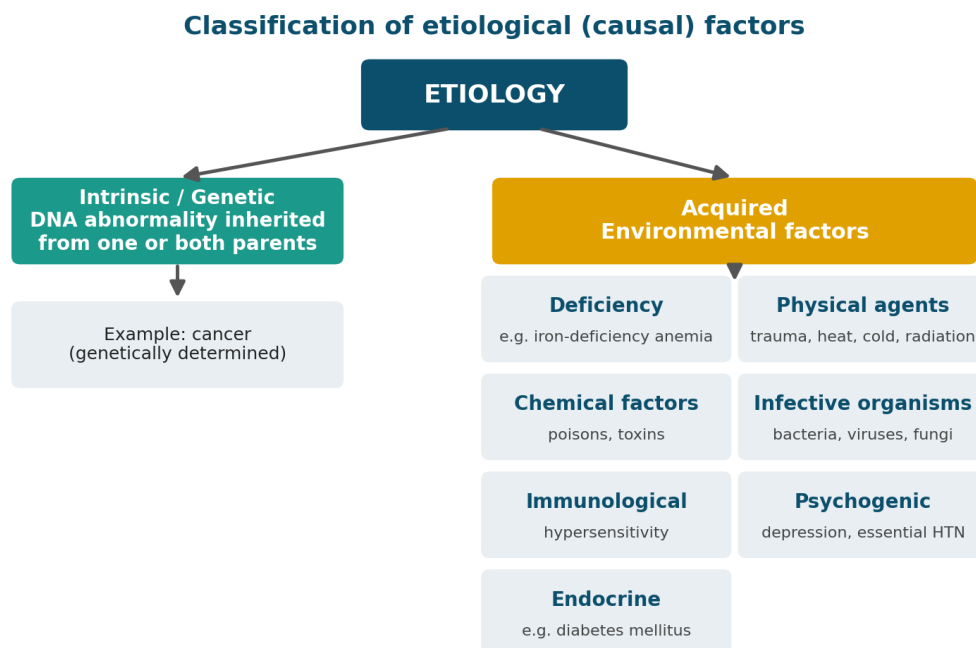


Figure 2. Classification of etiological factors

Acquired causes of disease

Category	Examples	Notes
Deficiency	Iron-deficiency anemia	Lack of an essential nutrient
Physical agents	Trauma, heat, cold, electricity, irradiation	Direct physical damage to tissue
Chemical factors	Poisons, toxins	Injurious chemical exposure
Infective organisms	Bacteria, viruses, fungi	Microbial infection



Category	Examples	Notes
Immunological factors	Hypersensitivity	Abnormal immune reactions
Psychogenic factors	Depression; psychosomatic disorders such as essential hypertension	Mind–body interaction
Endocrine factors	Diabetes	Hormonal disturbance

4. Pathogenesis, Morphology and Clinical Features

- **Pathogenesis:** the sequence of events from the initial stimulus to the final expression of the disease.
- **Morphologic changes:** structural alterations that are characteristic of the disease or diagnostic of its cause.
- **Functional derangements and clinical manifestations:** the type of morphologic change and its distribution in different organs determine the clinical features (symptoms and signs), the course and the prognosis.

5. Common Terminology

Term	Meaning
Disease	Any illness or abnormal state of health, of the whole body or of specific organs, with characteristic symptoms. It is due to disturbance, alteration or impairment of function, structure or both.
Patient	The person affected by the disease.
Lesion	A characteristic change in tissues and cells produced by disease in an individual or an experimental animal.



Term	Meaning
Gross (macroscopic) changes	Pathologic changes that can be recognized by the naked eye.
Etiology	The causal factors of disease (the “why”).
Pathogenesis	The mechanism by which lesions develop (the “how”).
Symptoms	Functional implications of the disease felt by the patient.
Signs	Objective indications of disease, especially evidence discovered during physical examination.
Clinical features	The manifestation of certain symptoms in a person due to a disease condition.
Diagnosis	The clinical significance of the morphologic and functional changes, together with the results of other investigations, used to determine what is wrong.
Syndrome	A complex of symptoms occurring together, characteristic of a disease or lesion, that provides a definite basis for accurate diagnosis.
Prognosis	A prediction of the progress, course and outcome of a disease (what is going to happen).
Treatment	What can be done about the disease.
Prevention	What should be done to avoid complications and spread of disease.

Key distinction

Symptoms are subjective (felt and reported by the patient), whereas signs are objective (found by the examiner).

6. Subdivisions of Pathology

A. Based on the species studied



- Human pathology (the largest branch)
- Animal pathology
- Plant pathology
- Veterinary pathology
- Poultry pathology

B. Based on the method of diagnosis

Subdivisions of pathology by method of diagnosis

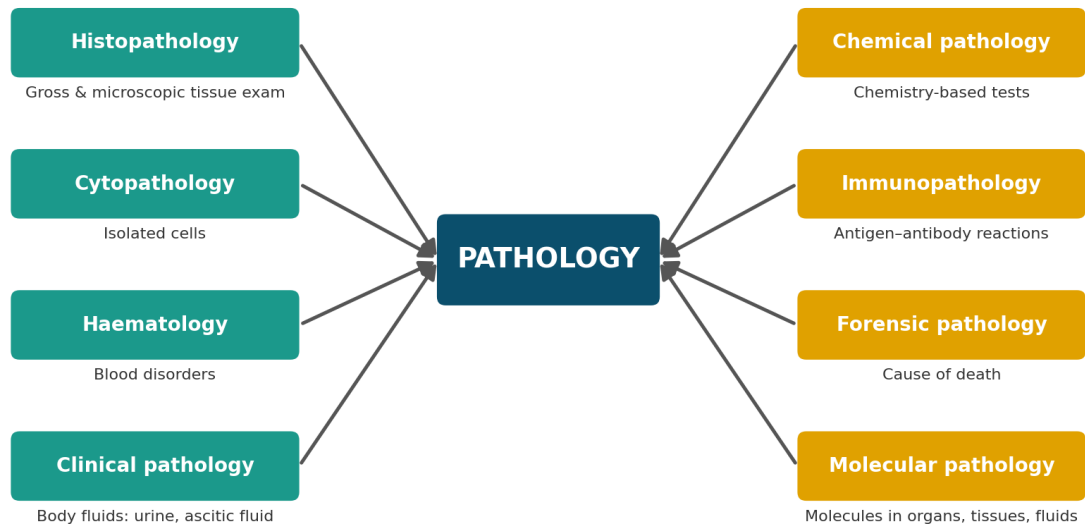


Figure 3. Subdivisions of pathology

Branch	Focus
Histopathology	Diagnosis of disease by gross and microscopic examination of tissue.
Cytopathology	Diagnosis of disease at the cellular level, by examination of isolated cells.
Haematology	Blood-related disorders.



Branch	Focus
Clinical pathology	Diagnosis based on laboratory analysis of body fluids such as urine and ascitic fluid.
Chemical pathology	Diagnosis of disease using the tools of chemistry.
Immunopathology	Diagnosis of disease by detecting specific antigen–antibody reactions.
Forensic pathology	Determining the cause of death.
Molecular pathology	Diagnosis through examination of molecules within organs, tissues or body fluids.

Reference:

Kumar, V., Abbas, A. K., Aster, J. C., Debnath, J., & Das, A. (2025). Robbins, Cotran & Kumar pathologic basis of disease (11th ed.). Elsevier.