

## Pathology

### Lecture No.1: Pathology

#### What is pathology?

Pathology is the study of structural and functional abnormalities that are expressed as diseases of organs and systems by scientific methods.

#### How is pathology traditionally divided?

1. **General pathology:** concerned with the basic reactions of cells and tissues to abnormal stimuli that underlie all diseases.
2. **Special (systemic) pathology:** examines the specific responses of specialized organs and tissues to more or less well-defined stimuli.

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#### What is the final goal of pathology?

The identification of the cause or causes of disease (etiology) that can lead to disease prevention and/or successful therapy.

#### What are the four core aspects of the disease process in pathology?

1. Cause of the disease (Etiology)
2. Mechanisms of disease development (Pathogenesis)
3. Structural alterations in cells and organs (Morphologic changes)
4. Functional consequences of morphologic changes observed clinically

#### What is etiology?

Etiology refers to the cause or causes of a disease.

#### What are the major classes of etiologic factors?

- **Genetically determined diseases:** due to abnormalities in DNA inherited from one or both parents.
- **Acquired diseases:** due to environmental factors.

#### What are the main environmental (acquired) etiologic factors?

1. Deficiency diseases (e.g., iron deficiency anemia)
2. Physical agents (trauma, heat, cold, electricity, irradiation)
3. Chemical factors (poisons, toxins)
4. Infective organisms (bacteria, viruses, fungi)
5. Immunological factors (hypersensitivity)
6. Psychogenic factors (depression, psychosomatic disorders such as essential hypertension)
7. Endocrine factors (e.g., diabetes)

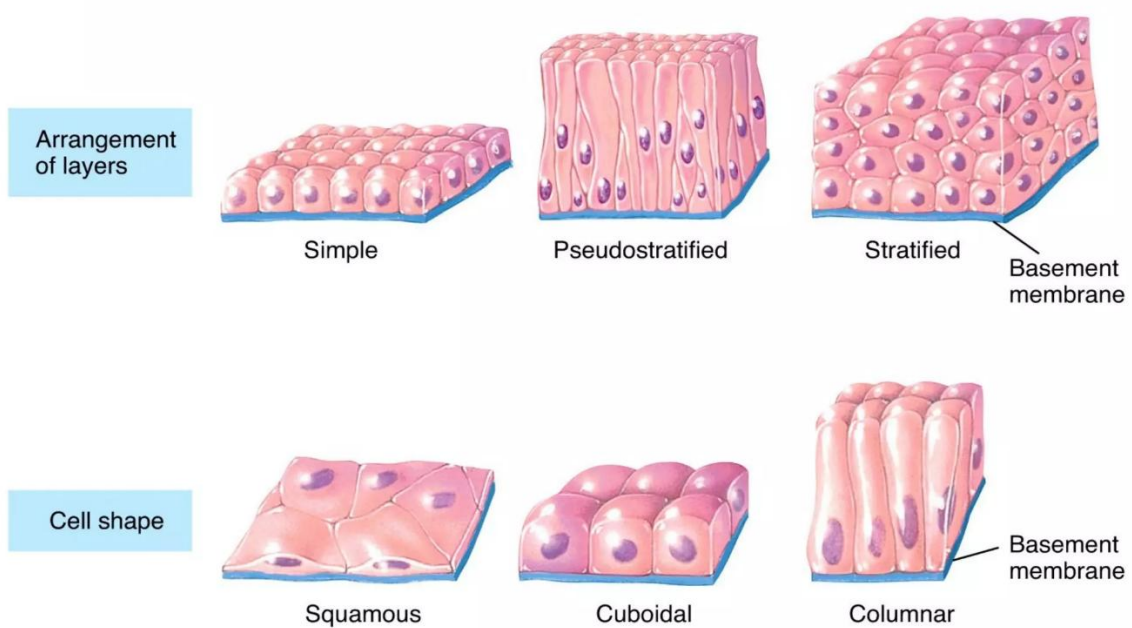
## What is pathogenesis?

**A:** Pathogenesis is the sequence of events in cells or tissues in response to etiologic agents, from the initial stimulus to the ultimate expression of the disease.

## What are morphologic changes?

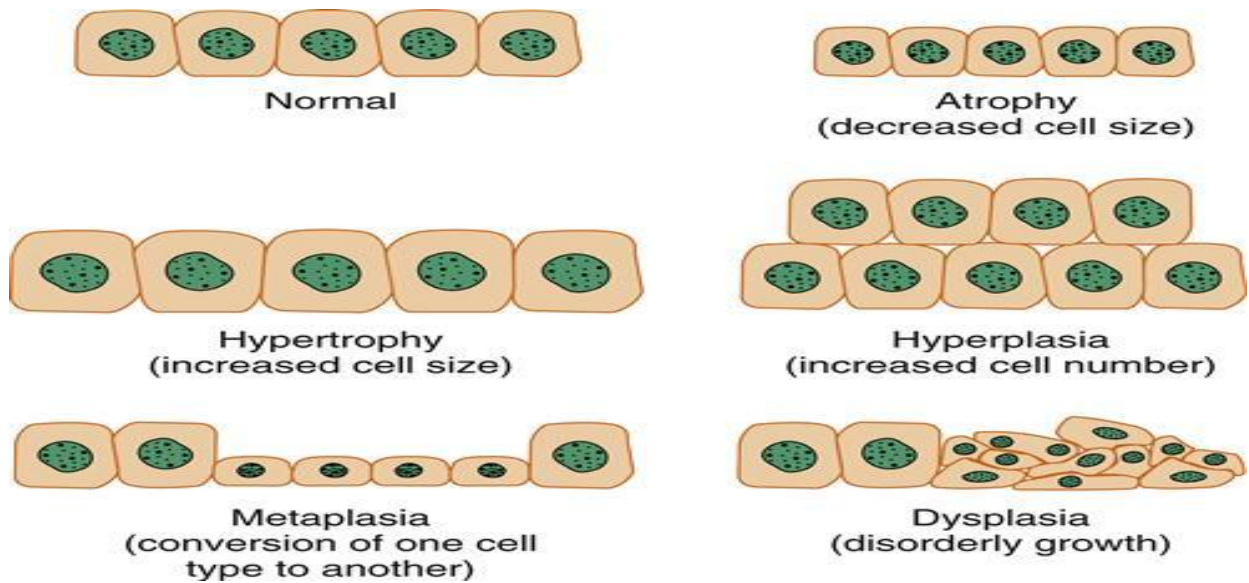
Morphologic changes are structural alterations in cells or tissues that are characteristic of a disease or diagnostic of the etiologic process. They can be studied grossly or microscopically.

# Epithelial Tissue



## What is meant by functional derangement and clinical significance?

It refers to how morphologic changes affect normal function and determine the clinical features (signs and symptoms), course, and prognosis of a disease.



### What is a disease?

A disease is any illness or abnormal state of health of the whole body or specific organs with characteristic symptoms, due to impairment or alteration of structure, function, or both.

### How are diseases classified?

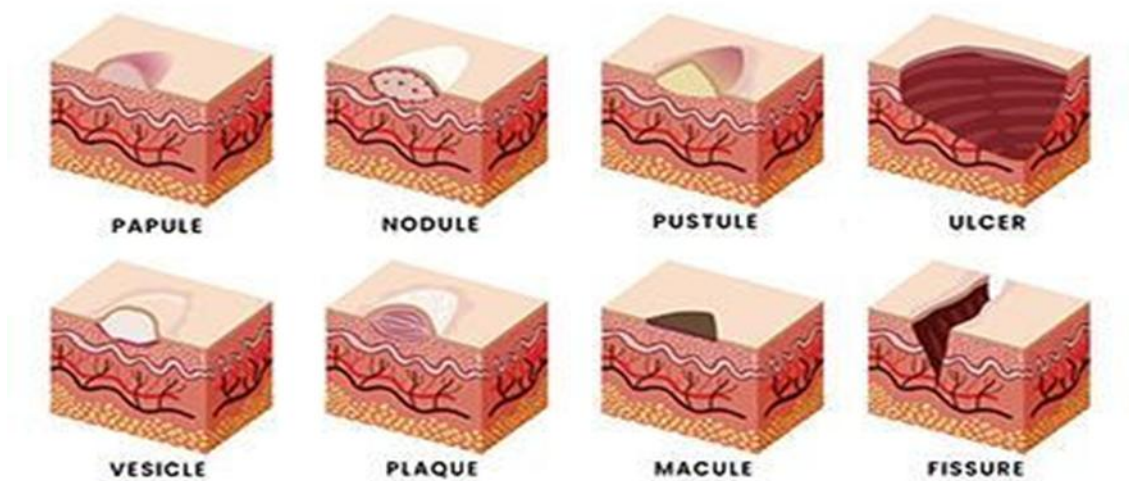
1. **Congenital diseases:** develop during fetal life.
2. **Acquired diseases:** arise during postnatal life.

### What types of acquired diseases are described?

- Contagious diseases
- Deficiency diseases
- Degenerative diseases
- Infectious diseases
- Epidemic diseases
- Endemic diseases

### What is a lesion?

1. Any injury or wound
2. Any single patch or area of abnormal tissue
3. A morbid alteration in tissue function



### **What is a sign?**

A sign is an objective indication of disease discovered during physical examination.

### **What are symptoms?**

Symptoms are indications of the presence or course of a disease described by the patient.

### **What is diagnosis?**

Diagnosis is the recognition of a disease or the location of an injury based on signs and symptoms.

### **What are the types of diagnosis?**

- Clinical diagnosis
- Pathologic diagnosis
- Differential diagnosis

### **What are clinical features?**

**A:** Clinical features are the manifestations of symptoms in a person due to a disease condition.

### **What is prognosis?**

Prognosis is a prediction of the progress, course, and outcome of a disease.

### **What is a syndrome?**

A syndrome is a complex or complete group of symptoms occurring together that characterizes a disease or lesion and forms a basis for accurate diagnosis.

### **What is histopathology?**

Histopathology is the study of pathological changes in tissue structure, examining cellular changes microscopically.

## What is haematology?

Haematology is the study of blood diseases.

## What is experimental pathology?

Experimental pathology involves observing the effects of manipulations on animal models or cell cultures in research on human diseases.

## What is clinical pathology?

Clinical pathology approaches a patient's illness through the sequence: patient history, examination, investigations, diagnosis, and treatment.

## What is chemical pathology?

Chemical pathology is concerned with chemical analysis related to disease.

## What is immunopathology?

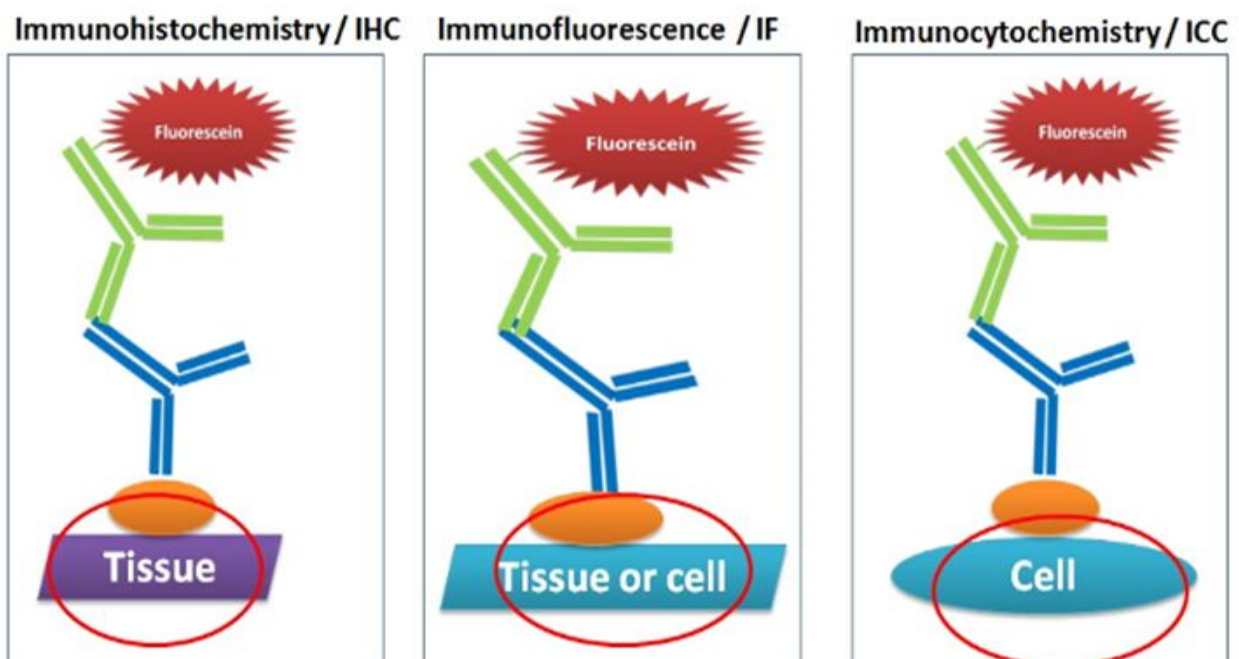
Immunopathology is the study of immunological diseases.

## What is cytopathology?

Cytopathology is the study of diseases and the resulting changes in cells.

## What are immunohistochemistry and immunofluorescence?

They are techniques that use antibodies with antigen specificity to visualize substances (such as cellular proteins or surface receptors) in tissue sections or cytological preparations.



## What is molecular pathology?

Molecular pathology is the study and diagnosis of disease at the molecular level through examination of molecules in organs, tissues, or body fluids.

## What is morbid anatomy (autopsy)?

An autopsy is a thorough post-mortem examination of a dead body to determine the cause and manner of death and to evaluate any disease or injury present.

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### 1. Pathology is the study of:

- a. Normal body functions
- b. Behavioral disorders only
- c. **Structural and functional abnormalities expressed as disease**
- d. Genetic inheritance patterns only
- e. Clinical treatment methods

### 2. General pathology mainly deals with:

- a. Diseases of specific organs
- b. Surgical techniques
- c. **Basic reactions of cells and tissues to abnormal stimuli**
- d. Diagnostic imaging
- e. Epidemiology

### 3. Special (systemic) pathology focuses on:

- a. Molecular mechanisms only
- b. **Specific responses of specialized organs and tissues**
- c. Community diseases
- d. Blood disorders
- e. Environmental health

### 4. The final goal of pathology is to identify:

- a. Symptoms
- b. Signs
- c. Prognosis
- d. **Cause or causes of disease (etiology)**
- e. Treatment protocols

### 5. Which of the following is NOT one of the four core aspects of disease?

- a. Etiology
- b. Pathogenesis
- c. Morphologic changes
- d. Functional consequences
- e. **Epidemiology**

**6. Etiology refers to:**

- a. Structural changes
- b. Disease outcome
- c. Clinical features
- d. **Cause of disease**
- e. Disease spread

**7. Genetically determined diseases are caused by:**

- a. Environmental toxins
- b. Nutritional deficiency
- c. **Abnormalities in DNA**
- d. Infection
- e. Trauma

**8. Acquired diseases are mainly due to:**

- a. Genetic inheritance
- b. Chromosomal mutation only
- c. **Environmental factors**
- d. Ageing only
- e. Autoimmune reaction only

**9. Iron deficiency anemia is an example of:**

- a. Infectious disease
- b. Genetic disease
- c. Endocrine disease
- d. **Deficiency disease**
- e. Degenerative disease

**10. Trauma and irradiation are examples of:**

- a. Chemical factors
- b. Immunologic factors
- c. **Physical agents**
- d. Endocrine factors
- e. Psychogenic factors

**11. Poisons and toxins are classified as:**

- a. Infective agents
- b. Physical agents
- c. **Chemical factors**
- d. Endocrine factors
- e. Genetic factors

**12. Bacteria, viruses, and fungi are:**

- a. Chemical agents
- b. Physical agents
- c. **Infective organisms**
- d. Endocrine agents
- e. Psychogenic agents

**13. Hypersensitivity belongs to which etiologic factor?**

- a. Chemical
- b. Physical
- c. Genetic
- d. **Immunological**
- e. Endocrine

**14. Depression and psychosomatic disorders are:**

- a. Endocrine factors
- b. Genetic disorders
- c. **Psychogenic factors**
- d. Degenerative disorders
- e. Infectious disorders

**15. Diabetes is classified under:**

- a. Deficiency disease
- b. Infectious disease
- c. Genetic disease only
- d. **Endocrine factors**
- e. Degenerative disease

**16. Pathogenesis describes:**

- a. Disease symptoms
- b. Structural changes only
- c. **Sequence of events from cause to disease expression**
- d. Prognosis
- e. Diagnosis

**17. Morphologic changes refer to:**

- a. Functional abnormalities only
- b. **Structural alterations in cells or tissues**
- c. Genetic mutations only
- d. Clinical symptoms
- e. Laboratory findings only

**18. Morphologic changes can be studied:**

- a. Only microscopically
- b. Only grossly
- c. Only chemically
- d. Only clinically
- e. **Grossly and microscopically**

**19. Functional derangement explains:**

- a. Etiology
- b. Pathogenesis
- c. **Clinical signs, symptoms, and prognosis**
- d. Genetic inheritance
- e. Disease classification

**20. Disease is defined as:**

- a. Any infection
- b. Only congenital abnormality
- c. **Abnormal state of health with structural or functional impairment**
- d. Mental illness only
- e. Injury only

**21. Diseases developing during fetal life are called:**

- a. Acquired
- b. Degenerative
- c. Endemic
- d. **Congenital**
- e. Epidemic

**22. Diseases arising after birth are termed:**

- a. Congenital
- b. Genetic
- c. **Acquired**
- d. Endemic
- e. Epidemic

**23. A contagious disease is one that:**

- a. Is inherited
- b. Is nutritional
- c. **Is communicable by contact or intermediate agent**
- d. Occurs in old age
- e. Is region-specific

**24. Degenerative disease is commonly found in:**

- a. Childhood
- b. Fetal life
- c. **Old age**
- d. Adolescence
- e. Pregnancy

**25. An epidemic disease affects:**

- a. One individual
- b. Animals only
- c. **A large number of people in a community**
- d. A specific organ
- e. A specific family

**26. Endemic disease is one that:**

- a. Occurs worldwide
- b. Is genetic
- c. **Prevails in a particular region or locality**
- d. Is seasonal only
- e. Is always contagious

**27. A lesion can be defined as:**

- a. Normal tissue
- b. **An area of abnormal tissue**
- c. A symptom
- d. A syndrome
- e. A diagnosis

**28. A sign is:**

- a. Subjective complaint
- b. **Objective evidence of disease**
- c. Described by patient
- d. Psychological response
- e. Laboratory value only

**29. Symptoms are best described as:**

- a. Objective findings
- b. **Patient-reported indications of disease**
- c. Diagnostic tests
- d. Structural changes
- e. Pathologic lesions

**30. Diagnosis means:**

- a. Predicting outcome
- b. Treating disease
- c. **Recognizing a disease based on signs and symptoms**
- d. Studying tissue
- e. Preventing disease

**31. Clinical diagnosis is based on:**

- a. Tissue biopsy only
- b. Molecular analysis
- c. **Objective symptoms**
- d. Differential comparison
- e. Autopsy findings

**32. Pathologic diagnosis involves:**

- a. Patient complaints
- b. **Recognition of structural lesions**
- c. Disease prognosis
- d. Clinical history only
- e. Epidemiologic data

**33. Differential diagnosis is used to:**

- a. Treat disease
- b. Determine prognosis
- c. **Distinguish between similar diseases**
- d. Study tissues
- e. Predict outcome

**34. Clinical features refer to:**

- a. Tissue structure
- b. Laboratory tests
- c. **Manifestation of symptoms due to disease**
- d. Disease cause
- e. Disease outcome

**35. Prognosis is a prediction of:**

- a. Disease cause
- b. Diagnosis method
- c. **Course and outcome of disease**
- d. Structural changes
- e. Laboratory results

**36. A syndrome is:**

- a. A single symptom
- b. A disease cause
- c. **A group of symptoms occurring together**
- d. A lesion
- e. A prognosis

**37. Histopathology studies:**

- a. Blood diseases
- b. Chemical changes
- c. **Microscopic tissue changes**
- d. Immune reactions
- e. Molecular structures only

**38. Haematology is the study of:**

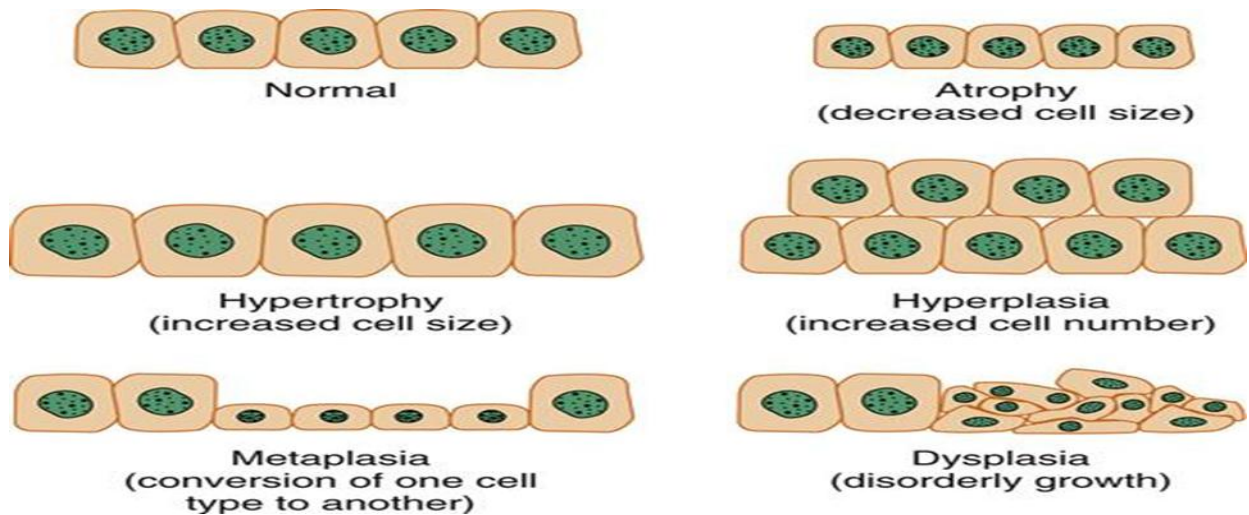
- a. Tissue pathology
- b. **Blood diseases**
- c. Immune disorders
- d. Genetic diseases
- e. Chemical pathology

**39. Molecular pathology focuses on disease at the level of:**

- a. Cells only
- b. Organs only
- c. **Molecules in tissues and body fluids**
- d. Systems only
- e. Whole body only

**40. An autopsy is performed to:**

- a. Treat disease
  - b. Diagnose living patients
  - c. **Determine cause and manner of death**
  - d. Study symptoms
  - e. Prevent infection
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1. Which term describes a decrease in cell size?

- a. Hypertrophy
- b. Hyperplasia
- c. Dysplasia
- d. **Atrophy**
- e. Metaplasia

2. Hypertrophy is best defined as:

- a. Increase in cell number
- b. Decrease in cell number
- c. **Increase in cell size**
- d. Conversion of one cell type to another
- e. Disordered cellular growth

3. An increase in the number of cells in a tissue is known as:

- a. Atrophy
- b. Hypertrophy
- c. **Hyperplasia**
- d. Dysplasia
- e. Metaplasia

4. Which cellular adaptation involves replacement of one mature cell type by another?

- a. Hyperplasia
- b. Dysplasia
- c. Atrophy
- d. Hypertrophy
- e. **Metaplasia**

**5. Disorganized growth of cells with loss of uniformity is called:**

- a. Hyperplasia
- b. Metaplasia
- c. Hypertrophy
- d. **Dysplasia**
- e. Atrophy

**6. Which of the following represents a normal tissue appearance?**

- a. Cells with increased number
- b. Cells with decreased size
- c. Cells with irregular arrangement
- d. Cells converted to another type
- e. **Uniform cells with normal size and arrangement**

**7. Which adaptation may predispose to malignancy?**

- a. Atrophy
- b. Hypertrophy
- c. Hyperplasia
- d. Metaplasia
- e. **Dysplasia**

**8. Hyperplasia differs from hypertrophy because hyperplasia involves:**

- a. Larger cells
- b. Smaller cells
- c. Cell type conversion
- d. **Increase in cell number**
- e. Disordered growth

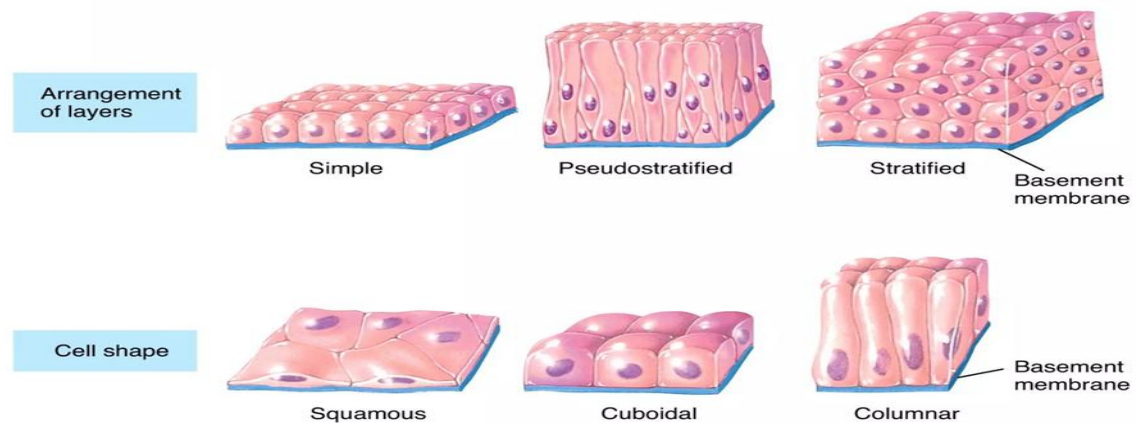
**9. Which process is usually a reversible adaptive response to chronic irritation?**

- a. Dysplasia
- b. Atrophy
- c. **Metaplasia**
- d. Neoplasia
- e. Necrosis

**10. Which cellular change is characterized by decreased functional demand?**

- a. Hyperplasia
  - b. Hypertrophy
  - c. Dysplasia
  - d. Metaplasia
  - e. **Atrophy**
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# Epithelial Tissue



**1. Epithelial tissue is classified based on all of the following EXCEPT:**

- Arrangement of layers
- Cell shape
- Presence of basement membrane
- Blood supply**
- Number of cell layers

**2. Epithelium composed of a single layer of cells is called:**

- Stratified epithelium
- Pseudostratified epithelium
- Transitional epithelium
- Simple epithelium**
- Glandular epithelium

**3. Which epithelial type appears multilayered but all cells rest on the basement membrane?**

- Stratified epithelium
- Simple epithelium
- Pseudostratified epithelium**
- Cuboidal epithelium
- Squamous epithelium

**4. Epithelium composed of multiple layers of cells is known as:**

- Simple epithelium
- Pseudostratified epithelium
- Columnar epithelium
- Cuboidal epithelium
- Stratified epithelium**

**5. Squamous epithelial cells are best described as:**

- a. Tall and rectangular
- b. Cube-shaped
- c. **Flat and thin**
- d. Round with large nuclei
- e. Irregularly shaped

**6. Cuboidal epithelial cells are characterized by:**

- a. Flat shape
- b. Tall column-like shape
- c. **Height equal to width**
- d. Spindle shape
- e. Irregular arrangement

**7. Columnar epithelial cells are typically:**

- a. Flat and wide
- b. Cube-shaped
- c. **Tall with elongated nuclei**
- d. Multilayered
- e. Without a basement membrane

**8. The basement membrane is found:**

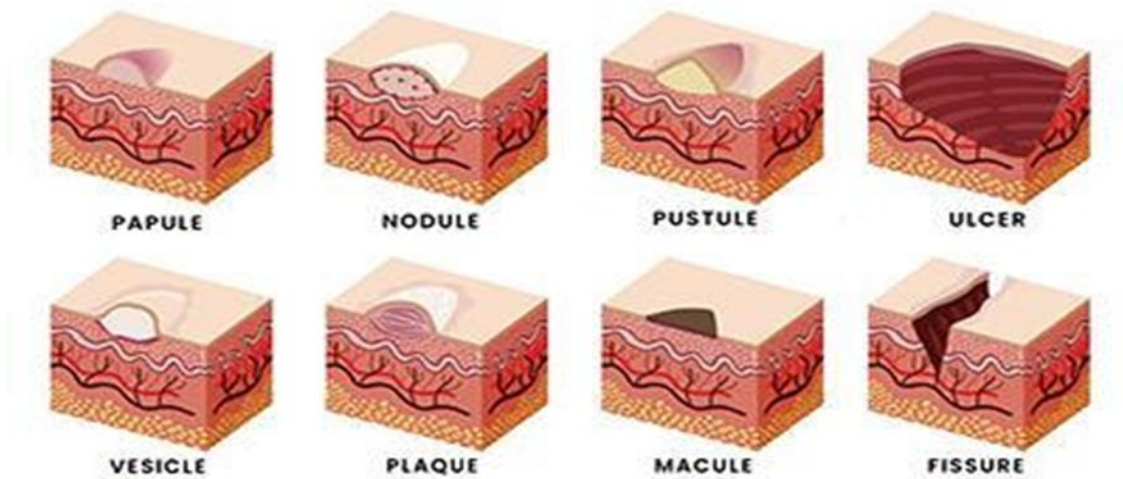
- a. Above epithelial cells
- b. Between epithelial layers
- c. **Between epithelium and underlying connective tissue**
- d. Inside epithelial cells
- e. Only in stratified epithelium

**9. Which classification is based on cell shape?**

- a. Simple and stratified
- b. Pseudostratified and stratified
- c. **Squamous, cuboidal, and columnar**
- d. Simple and pseudostratified
- e. Stratified and columnar

**10. Which epithelial type combines classification by both layers and shape?**

- a. Squamous only
- b. Cuboidal only
- c. Columnar only
- d. **Stratified squamous epithelium**
- e. Pseudostratified only



**1. Which primary skin lesion is defined as a flat, non-palpable change in skin color?**

- a) Papule
- b) Vesicle
- c) Plaque
- d) **Macule**
- e) Nodule

**2. A small, solid, raised skin lesion less than 1 cm in diameter is known as:**

- a) Nodule
- b) **Papule**
- c) Ulcer
- d) Fissure
- e) Pustule

**3. Which skin lesion contains purulent (pus-filled) material?**

- a) Vesicle
- b) Macule
- c) Plaque
- d) Nodule
- e) **Pustule**

**4. A large, flat-topped, raised lesion formed by the confluence of papules is called:**

- a) Papule
- b) Vesicle
- c) **Plaque**

- d) Ulcer
- e) Fissure

**5. A deep loss of skin tissue that may extend into the dermis is termed:**

- a) Fissure
- b) Vesicle
- c) Nodule
- d) **Ulcer**
- e) Macule