

School of Nursing

Course Code : BSCN2002

Course Name: PPG

Importance of the study of pathology, Definition of terms, Methods and techniques

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Era of pathology

- **Van leeuwenhoek** – introduced the first microscope, introduced histological staining, first described spermatozoa, red blood cells and giardia.
- **John hunter** – introduced pathology museum in study of diseases a unique collection of pathological specimens.
- **Edward Jenner** – introduced inoculation for small pox.
- **Xavier Bichat** – divided the study of pathology into general and systemic

Definition of pathology

1. Literal translation: "the study of suffering (pathos)"
2. The study of the essential nature of disease, disease processes, and the structural and functional changes in organs and tissues that cause or are caused by disease
3. The study of the gross and microscopic patterns of disease

- **Etiology** is the study of cause/ causative agent of disease
- **Morphology** is the study of structural changes in disease (gross and microscopic)
- **Clinical significance** – study of how clinical features are related to changes.

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Medical pathology

- Is divided into two
 1. **general pathology** e.g. common inflammation, cancer, ageing.
 2. **systemic pathology**
 - specific changes in organs e.g. goiter, pneumonia, breast cancer.

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Clinical pathology

- Is a medical specialty that is concerned with diagnosis of disease based on laboratory analysis of bodily fluids such as blood and urine, using tools of chemistry, microbiology, hematology and molecular pathology.
- **Histopathology** – investigation and diagnosis of disease from examination of tissues.
- **Cytopathology** – investigation and diagnosis of disease from the examination of isolated cells

Importance of study of pathology

- General knowledge of how disease are caused.
- General patterns and classification of diseases
- Evolution of disease from its causes to clinical presentation
- The signs and symptoms of disease
- Nature, spread and precautions to prevent common diseases
- Know the different disciplines that make up pathology
- Better understand the patient and his disease.

Etiology of pathology

- a. Genetic
- b. Acquired (environmental factors)

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Enviromental agents

- Physical
- Chemical
- Nutrition
- Infections
- Immunological
- psychological

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Genetic factors

- Age
- Genes



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Morphologic changes

- a. Gross changes
- b. Microscopic changes

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Clinical significance

- a. Signs and symptoms
- b. Disease course
- c. Prognosis

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Methods Used in Pathology

- 1. Gross examination of organs
 - a. Gross examination of organs on the exam has two major components
 - i. Determining what organ are you looking at!
 - ii. Determining what's wrong (the pathology)!
 - b. Useful gross features
 - i. Size
 - ii. Shape
 - iii. Consistency
 - iv. Color

- Microscopic examination of tissue
 - a. Light microscopy
 - i. Hematoxylin and Eosin (H&E) - Gold Standard Stain*

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Hematoxylin dye

- Stains the following blue to purple
- Nuclei .
- Nucleoli .
- Bacteria
- Calcium
- Many others

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eosin

- Stains the following pink to red
- Cytoplasm
- Collagen
- Fibrin .
- RBCs
- Thyroid colloid
- Many others

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Other histochemical stains (chemical reactions)

- Prussian blue
- Congo red.
- Acid fast (Ziel-Neelson, Fite)
- Periodic acid-Schiff (PAS)
- Gram stain
- Trichrome
- Reticulin

Ancillary techniques

- a. Immunofluorescence microscopy (IFM)
 - i. Renal diseases
 - ii. Autoimmune diseases
- b. Transmission electron microscopy (TEM)
 - i. Renal disease
 - ii. Neoplasms
 - iii. Infections
 - iv. Genetic disorders

Molecular techniques

- A. Protein electrophoresis
- b. Southern and Western blots
- c. Polymerase chain reaction (PCR)

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REFERENCES

- Harsh Mohan – Textbook of Pathology, 2015, Jaypee Brothers Medical Publishers
- Sharma Suresh K– Textbook of Pharmacology, Pathology and Genetics for Nurses (2 Volumes), 2016, Jaypee Brothers Medical Publishers.

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