



Practical Pathophysiology

Stage 3

Collage of Pharmacy / AL Mustansiriyah University

INTRODUCTION TO PATHOPHYSIOLOGY



Pathology: the word pathology comes from the Latin words “patho” & “logy”.

- ‘Patho’ means disease
- ‘logy’ means study or science, therefore **pathology** is the study of disease by scientific methods.

Diseases: defined as an abnormal variation in structure or function of any part of the body.

physiology

Physio: mean function or activity or mechanism

logy’ means study or science,

Pathophysiology is the science that studying the four aspects of the disease:

1. Etiology,

2. Pathogenesis

3. Morphologic changes

4. Functional derangements and clinical significance.

1. **Etiology** means the cause of the disease. The etiology of diseases could be:

- **genetic**
 - **acquired** (infectious, nutritional, chemical, physical, etc).
- ❑ If the cause of the disease is unknown it is called **idiopathic** and the disease usually preceded by 'essential' or 'primary' word e.g **primary** billiary cirrhosis or **essential** HT.
- ❑ If the disease caused by genetic and acquired factors called **multifactorial**.
- ❑ If the disease caused by health care staff (doctors, pharmacists, nurses, lab staff...) it called **Iatrogenic**

2. **Pathogenesis:** Pathogenesis means the mechanism through which the causative agent produce the pathological and clinical manifestations. The pathogenetic mechanisms take place in the incubation period. Pathogenesis leads to morphologic changes and clinical manifestation.

Other special terms can be included here:

Pathogen: any disease-producing agent

Pathogenicity: refers to the ability of an organism to cause disease

pathogenic: causing or capable of causing disease.

Virulent: highly pathogenic pathogen.

3. **Morphologic changes:** The morphologic changes refer to the structural alterations in cells or tissues that occur following the pathogenetic mechanisms. The morphologic changes are:

- gross morphologic changes (macroscopic changes): occur in the involved organ and can be seen with the **naked eye**
- microscopic changes: they are only seen under **microscope**.

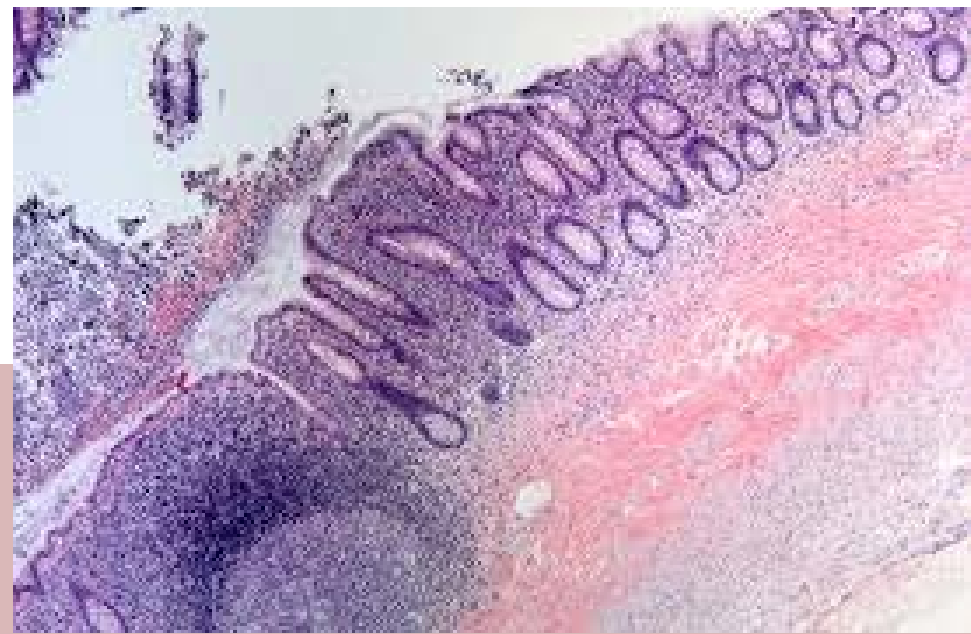
Both the gross & the microscopic morphologic changes are specific to that disease. so morphologic changes are very important to diagnosis



Appendix – Normal



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- 4. Functional derangements and clinical significance including signs and symptoms

Symptoms: what the patient feel

Signs: what the doctor see

- In summary, pathology studies:-
- Etiology → Pathogenesis → Morphologic changes
→ clinical features (due to functional derangement)

BRANCHES OF PATHOLOGY

- a. **Histopathology:** Histopathological examination studies **tissues under the microscope**. During this study, the pathologist looks for abnormal structures in the tissue.
- b. **Cytopathology:** Cytopathology is the study of **cells** from various body sites to determine the cause or nature of disease
- c. **Hematopathology** This is a method by which abnormalities of the cells of the **blood** and their precursors in the **bone marrow** are investigated to diagnose the different kinds of diseases eg: anemia & leukemia.

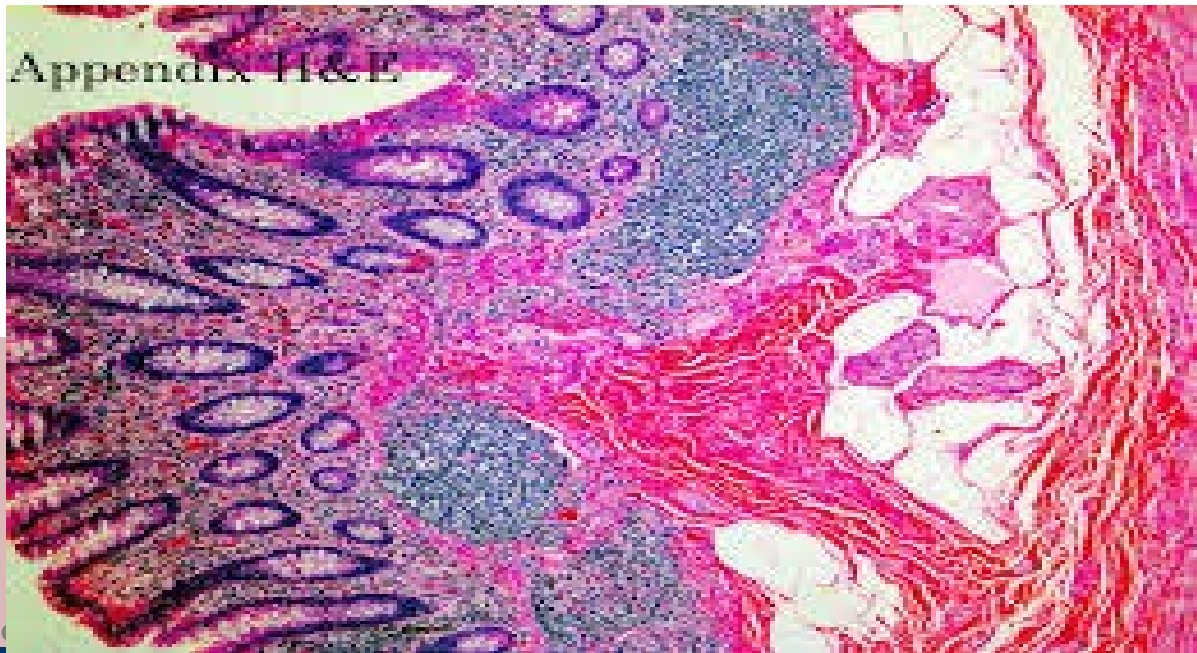
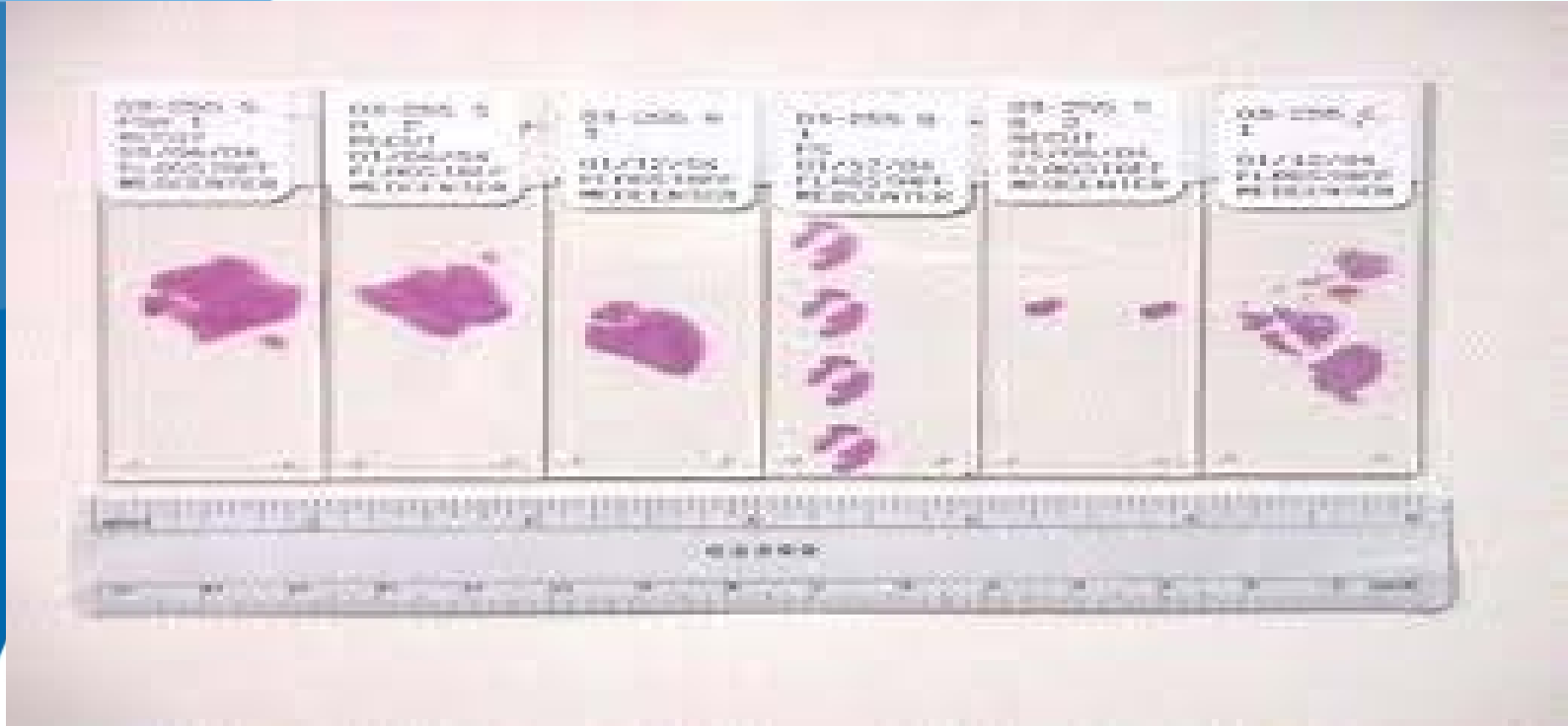
d. **Microbiology**: to identify **micro-organisms** responsible for many diseases.

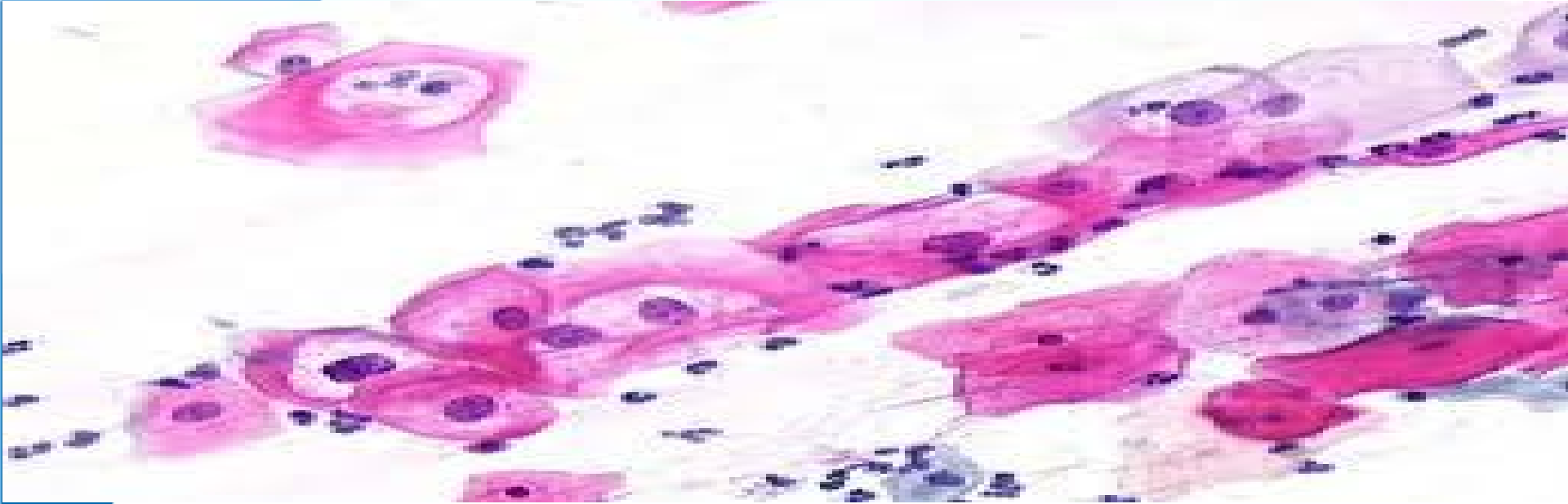
e. **Chemical pathology**: This is a method by which the **metabolic disturbances** of disease are investigated e.g biochemical tests including blood, urine, etc.

f. **immunopathology**: diagnose the **autoimmune diseases** also deals with the **diagnosis of other diseases by immunological methods**

g. **Cytogenetics and Molecular techniques**: in which **inherited chromosomal abnormalities** in the germ cells or **acquired chromosomal abnormalities** in somatic cells are investigated using the techniques of molecular biology.

h. **Autopsy**: Autopsy is examination of the dead body to identify the cause of death. This can be for forensic or clinical purposes.





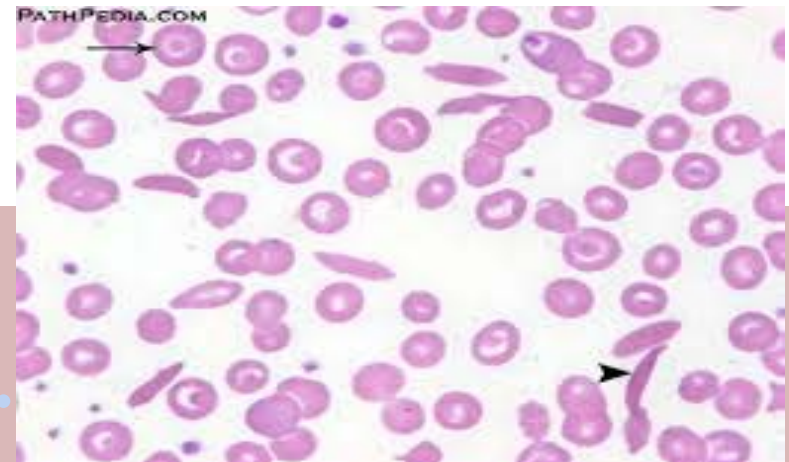
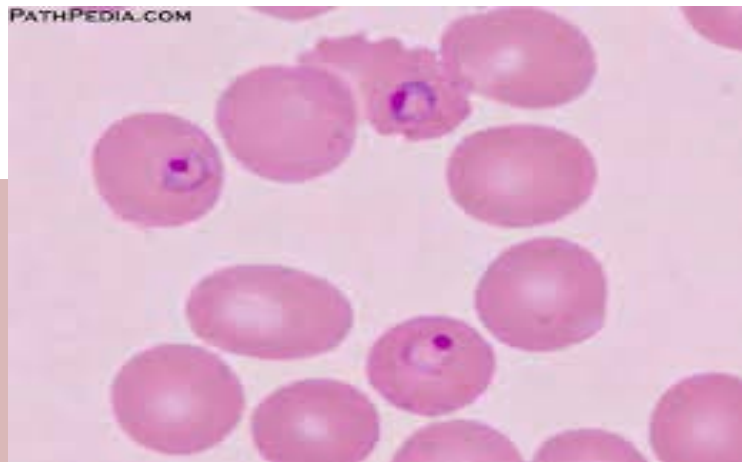
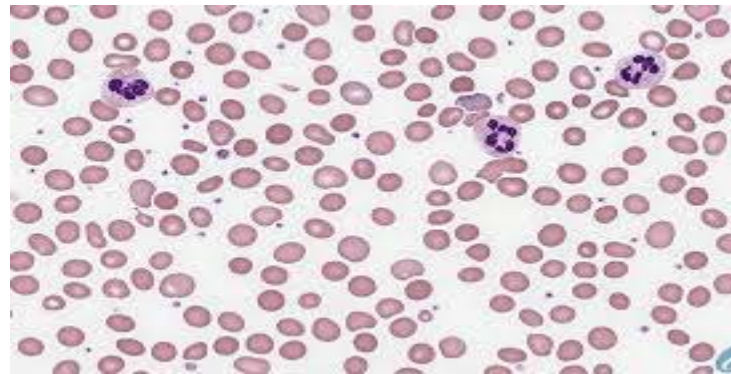
cancer

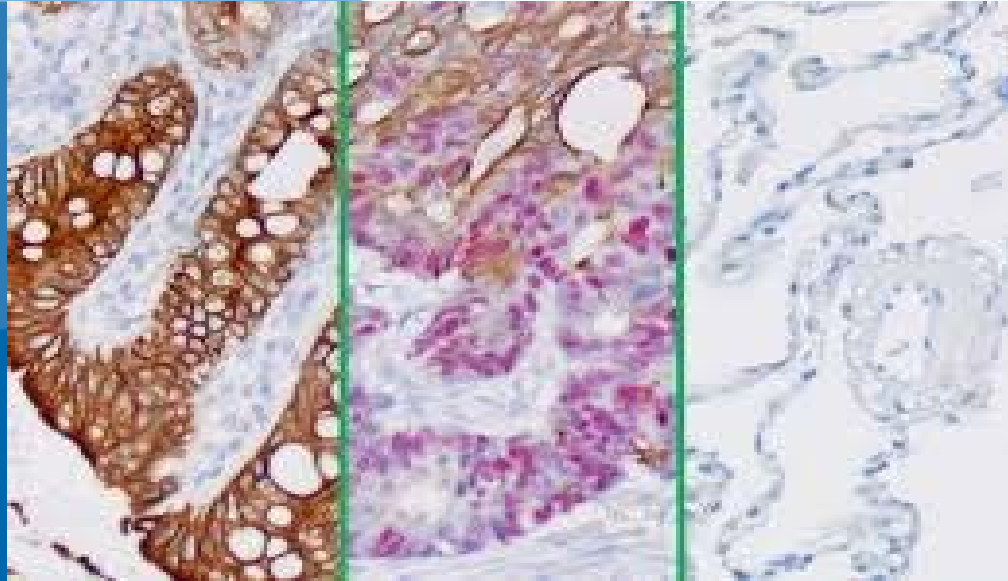
cytopathology

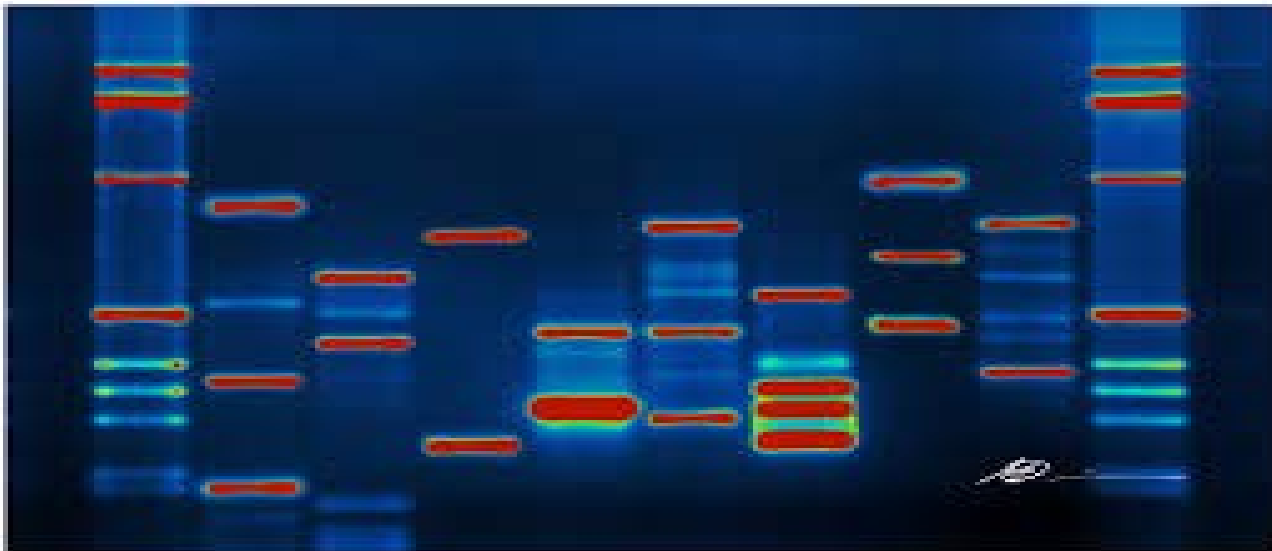
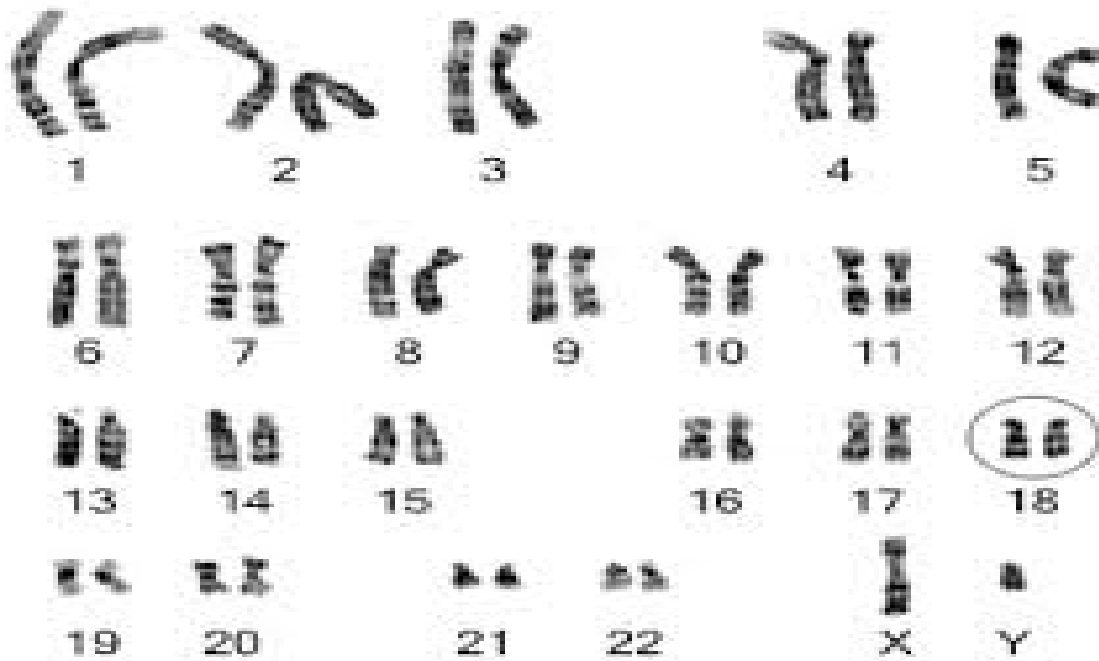
a Journal of the American Cancer Society

Blood Films

Properly Prepared Smears
(for microscopic analysis)



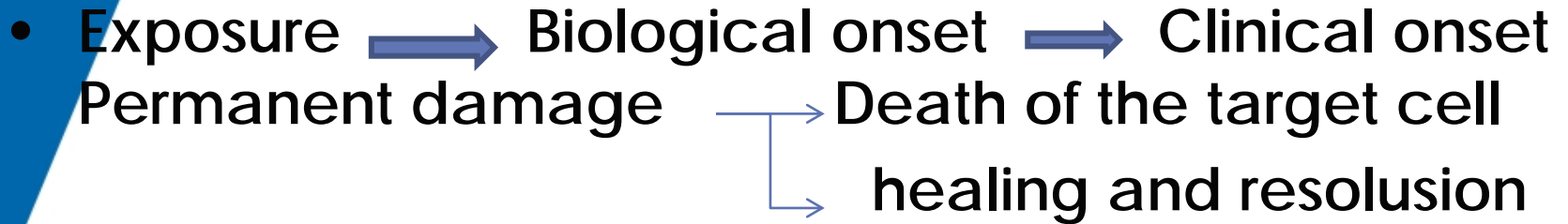






- **Course of disease:**

The course of disease include



The pathological stages (pathological course) in the natural history of disease include:

- I. **Exposure** to various risk factors (causative agents)
- II. **Latency period** between exposure and biological onset of disease. Not always present
- III. **Biological onset of disease**; this marks the initiation of the cellular morphological changes without any sign or symptom.

Following biological onset of disease, it may remain **asymptomatic or subclinical** (i.e. without any clinical manifestations), or may lead to overt **clinical** disease.

Incubation period refers to variable period of time (including stages from I-III) without any obvious signs or symptoms (the patient looks well).

IV. The clinical onset of the disease: including signs and symptoms

Outcome and consequences of disease

Following clinical onset, disease may follow any of the following trends:

- **a) Resolution** : cure leaving no sequelae,
- **b) healing**: the disease can settle down, but sequelae are left, or
- **c) changed from acute to chronic**: the disease taking prolonged course with periods of exacerbation (**acute on chronic**)
- **d) death.**



Thank you!