Let’s all JOIN the class

- Turn on your clicker
- Clickers will autojoin when turned on
- Attendance will be taken daily by clicker
- Keep your clicker handy, we will answer some quiz questions as we go through the material today.
- To answer a question, press your choice; the clicker will automatically send your response
- You can change your answer: Just enter new choice.

Health and Disease

- Disease may be defined as a deviation from the normal state of health or from a state of wellness.
- Disease develops when significant changes occur in the body leading to a state in which homeostasis cannot be maintained.
- When defining normal values for health indicators, the figures usually represent an average or range of values expected.

Terms used in Pathophysiology

- **Pathophysiology** is the study of the functional or physiologic changes in the body that result from disease processes.
- **Pathology** is the study of cell and tissue changes associated with disease. These studies are often valuable in establishing the cause of a disease.
Pathology makes use of specimens obtained from biopsy either from living bodies or from examination after death (autopsy).

Terms used to discuss disease processes

- Diagnosis
- Etiology
- Idiopathic
- Iatrogenic
- Predisposing factors
- Prevention

Terms to describe characteristics of a disease

- Pathogenesis
- Onset
  - Acute, sudden, obvious
  - Insidious, gradual, vague, mild
- Acute disease
- Chronic disease
- Subclinical
- Latent
- Prodromal
- Manifestations
- Signs
- Symptoms
- Lesion
- Syndrome

- Diagnostic tests
- Remissions and exacerbations
- Precipitating factor
- Complications
- Therapy
- Sequelae
- Convalescence

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Figure 9-10 The natural course of infection.
Prognosis
Morbidity
Mortality
Epidemiology
Epidemics and pandemics
Incidence
Communicable disease

Notifiable or reportable disease
Autopsy

**Cellular Adaptations in disease**

- Sometimes adaptations are normal changes such as increased breast development during pregnancy and lactation.
- Abnormal changes may be precursors to pathological changes such as the development of tumors or cancer.
Terms used for changes in cells

Hypertrophy of Heart Muscle

Dysplasia in Cervix
Cell Damage and Necrosis

- Cells may be damaged or destroyed by changes in:
  - Metabolic processes
  - ATP production
  - pH in the cells
  - Or by damage to the cell membrane

Mechanisms Causing Cell Injury

- Ischemia
- Physical agents
- Mechanical damage
- Chemical toxins
- Microorganisms
- Abnormal metabolites in cells
- Nutritional deficiencies
- Imbalance of fluids and electrolytes

Cell damage occurs in stages

- Initial cell damage causes alteration in a metabolic reaction
- This leads to a loss of function
- If the factor causing the initial damage is removed quickly, the cell may be able to recover and return to its normal state
- Otherwise, the cell damage becomes irreversible and the cell dies
Events after cell death

- After the cell dies, the nucleus disintegrates
- Lysosomal enzymes are released and cause lysis of the cell
- Lysosomal enzymes cause inflammation and damage to nearby cells
- If large numbers of cells die, released substances enter the blood and may be used to diagnose the type of cells involved or the cause of the damage

More Terms

- **Necrosis** is the term used when a group of cells die.
- The process of cell death varies with the cause of damage and type of cells:
  - **Liquefaction necrosis** is where dead cells liquefy in presence of certain enzymes
  - **Coagulative necrosis** occurs when cell proteins are denatured and maintain some shape, as in cooking egg whites.

- **Infarction** is the term applied to an area of dead cells resulting from a lack of oxygen; this can result in a loss of function within the organ affected, e.g. myocardial infarction.
Gangrene refers to an area of necrotic tissue that has become invaded by bacteria. Surgical removal is often necessary to prevent spread of the infection.

Time for cell death

- Specific cell types die at different rates:
  - Brain cells die quickly (4-5 minutes)
  - Heart muscle can survive for about 30 minutes
- Death used to be associated with cessation of heart action and respiration
- But, we can keep heart and breathing functions going artificially.
- Brain death is current criterion for death