First line of defense – physical & chemical barriers

- Genitourinary tract
  - Urinary tract is sterile in a healthy person except the distal urethra
  - How?
    - Urination
    - Secretion (vaginal and seminal fluid)
    - Low pH of vagina (presence of several Lactobacillus sp., Candida albicans)

First line of defense – physical & chemical barriers

- Respiratory tract
  - Nose - nasal hair, mucus secretions (phagocytes and antibacterial enzymes), irregular chambers
  - ciliated epithelium (nasal cavity, sinuses, bronchi and trachea)
  - Cough reflexes
  - Alveolar macrophages

Microbial antagonism

- Normal flora vs. invaders
  - Compete for colonization sites
  - Compete for nutrients
  - Produce bacteriocins

Second line of defense

- Once beyond the protective outer barrier of the body, the invading microbes will encounter a series of nonspecific cellular and chemical defense mechanisms

- Mechanisms:
  - Inflammation – a series of events that removes or contain the offending agent and repair the damage
  - Chemotaxis – movement of cells toward a chemical influence (chemokines or chemotactic agents)
  - Phagocytosis – process in which cell ingest foreign particulate matter e.g. microbes

- Many are carried out by the white blood cells in blood