

## CHAPTER 15 THE INNATE IMMUNE RESPONSE

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### THE INNATE IMMUNE RESPONSE

- ◆ There are two types of immune response that protect the host: the innate immune response and the adaptive immune response
- ◆ The innate immune response is a nonspecific response that responds immediately to any type of infection

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### FIRST LINE OF DEFENSE

- ◆ The first line of defense in the innate immune response consists of barriers including mechanical, chemical, and microbial barriers
- ◆ Barrier defenses include normal flora, the skin, mucous membranes, the lacrimal apparatus, saliva, the epiglottis, sebum, perspiration, gastric juice, urine, and transferrins

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### SECOND LINE OF DEFENSE

- ◆ The second line of defense in the innate immune response involves specific cells and chemicals that actively defend the body
- ◆ Toll-like receptors (TLRs) that identify molecules associated with antigens and enable immune cells to differentiate between self and non-self
- ◆ Cytokines and chemokines are chemical mediators that are produced at the onset of and throughout the course of the response to an infection

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### SECOND LINE OF DEFENSE

- ◆ The cellular components of the second line of defense are white blood cells (leukocytes)
- ◆ There are 7 types of cells involved in the innate immune response: neutrophils, basophils, eosinophils, monocytes and macrophages, dendritic cells, mast cells, and natural killer cells

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### SECOND LINE OF DEFENSE

- ◆ The process of margination and diapedesis describes the attachment of white blood cells to the endothelial lining of the blood vessel and the movement of these white blood cells out of the blood and into the infected tissues.

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### FIVE MECHANISMS OF INNATE IMMUNITY

- ◆ There are five mechanisms of innate immunity:
  - ◆ phagocytosis
  - ◆ inflammation
  - ◆ fever
  - ◆ complement
  - ◆ interferon

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### PHAGOCYTOSIS

- ◆ Phagocytosis is the cellular response in which microorganisms, damaged host cells, and cellular debris resulting from apoptosis are removed from the body
- ◆ The first step of phagocytosis is chemotaxis which is the release of chemicals by cells involved in infection that attract phagocytic cells to an infected area. Other steps of phagocytosis include adherence, ingestion, digestion, and excretion

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### INFLAMMATION

- ◆ Inflammation is a physiological response to body trauma. It involves vasodilation and increased vascular permeability, resulting in redness, pain, heat, and swelling

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## FEVER

- ◆ Fever is a systemic rise in body temperature that often accompanies and augments the effects of inflammation. Fever can speed up immune responses, inhibit bacterial growth, inactivate toxins, and lower plasma iron concentration

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## COMPLEMENT SYSTEM

- ◆ The complement system is part of the innate immune response that destroys bacteria by punching a hole in the bacterial cell membrane. It also enhances other parts of the innate response such as phagocytosis and inflammation
- ◆ Complement can be activated in three ways: the classical, alternative, or lectin-binding pathways

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## INTERFERON

- ◆ Interferon is a protein produced by virus-infected cells that can protect neighboring cells from infection with that virus
- ◆ The five mechanisms of the innate immune response are highly integrated and act together

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