

## Normal Flora and Non-specific Resistance

### 1. Define:

**Inflammation** – Inflammation (inflammatory response) is normally a protective, localized response characterized by an increase in redness, swelling and temperature within an area of traumatized tissue. It involves the release of histamine, kinins, leukotrienes, etc. from traumatized tissues and WBCs attracted to the area.

**Pyrogen** – A pyrogen is a chemical substance that increases body temperature and so causes fever. White blood cells (WBCs) such as macrophages and lymphocytes release substances, e.g., tumor necrosis factor and interleukin 1, that function as endogenous pyrogens. These can cause an increase in temperature locally in association with inflammation.

**Macrophage** – A macrophage is a large phagocytic cell (makros = large, phagein = eat), produced from a monocyte (WBC) after it has left the bloodstream and entered another tissue. Macrophages ingest pathogens, aging neutrophils and cellular debris. They also present antigenic determinants to lymphocytes, thus helping to stimulate adaptive immune responses. Macrophages are often given alternate names when they are associated with specific tissue types (Kupffer cells in the liver, Langerhans cells in skin and mucosa, osteoclasts in bone, etc.).

**Interferon** – Interferons are proteins that are produced by body cells and were named for their ability to interfere with the life cycles of cytolytic viruses. There are several different types of interferons, and they have a variety of other functions.

**Bacteriocins** – Bacteriocins are chemicals produced by certain bacteria that are toxic to other closely related bacteria. These are sometimes given specific names such as the colicins formed by *E. coli*. Normal microbiota help to defend the body against pathogens by producing bacteriocins.

### 2. Innate

3. The skin is multi-layered, its surface is often highly keratinized, making it tough and inhospitable to microbes. The surface cells of dry skin are dead and are constantly being shed, taking microbes with them. The dermis of the skin (a layer made of dense connective tissue) is tough and leathery, forming an effective barrier.
4. Acidic (having a pH of about 5.5)/ salty (hypertonic).
5. Skin/ it is salty (hypertonic), acidic (pH is about 5.5) and has oils and waxes that inhibit microbial growth.
6. Multiple layers/ dead and shed
7. Mucous/ antibodies
8. Lysozyme/ cilia

9. Phagocytic white blood cells (WBCs)/ monocytes
10. Phagocytic/ reticuloendothelial
11. Neutrophils or polymorphonuclear leukocytes
12. Inflammation/ histamine
13. Inflammation or the inflammatory response/ prostaglandins
14. Inflammatory/ Histamine is a powerful vasodilator substance. It causes the precapillary sphincter muscles of arterioles to relax, thus allowing blood to enter the capillary beds. It also increases the permeability of capillary walls allowing proteins, fluids and certain cells to leave the bloodstream and enter the tissue spaces. The increased blood flow to a traumatized area will bring phagocytic WBCs and circulating antibodies to the area. The antibodies and phagocytic WBCs can more easily leave the bloodstream and enter the traumatized tissue area if the capillary walls are more permeable.
15. Pyrogens
16. Interferons
17. Interferons
18. Complement factors (C1-C9)
19. Holes through the cell membranes of infected cells or pathogens/ opsonization
20. Perforin/ granzymes
21. Normal microbiota or normal flora/ available nutrients and the binding sites on host cell surfaces
22. Bacteriocins/ binding sites on the surfaces of host cells
23. The microorganisms forming our normal microbiota or "normal flora" help to defend the body against pathogens by competing for available nutrients, taking up the binding sites available on host cell surfaces, and by producing bacteriocins that kill other bacteria.