



محاضرة رقم 2

Lecture No. 2

المناعة 1

INNATE IMMUNITY

Sawa University

College of health and medical techniques

Department of Medical Laboratories

Third Stage

جامعة ساوة الاهلية

كلية التقنيات الصحية والطبية

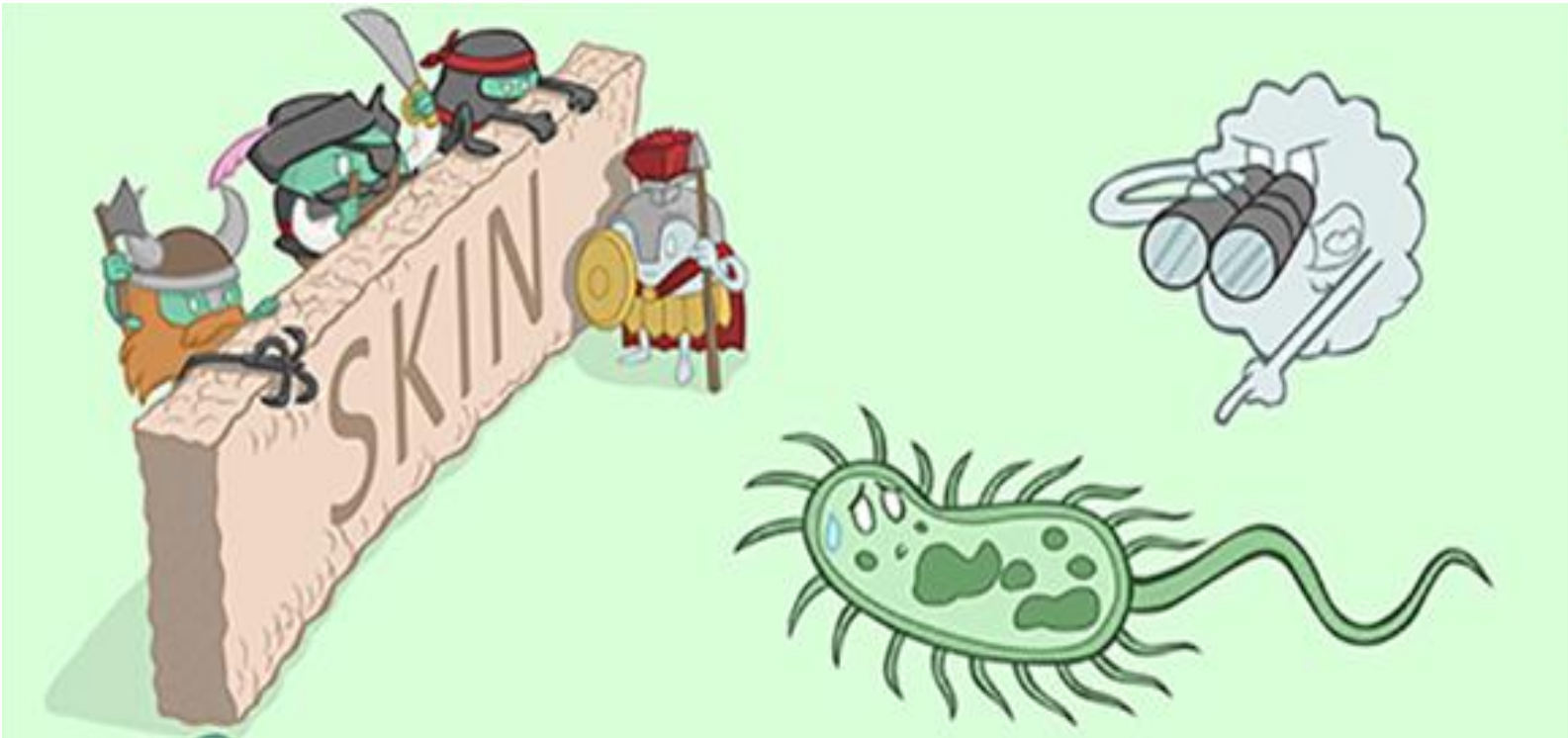
قسم تقنيات المختبرات الطبية

المرحلة الثالثة

تدريسي المادة : د. زيدون حسين مهدي

The components of the innate immune system

Include **epithelial barriers** and **sentinel cells** in tissues (macrophages, dendritic cells, mast cells, and others); innate lymphoid cells, including NK cells; and a number of plasma proteins.



1-Epithelial Barriers

The major interfaces between the body and the external environment—the **skin, Mucous Membranes in gastrointestinal tract, respiratory tract, and genitourinary tract**—are protected by continuous epithelia that provide physical and chemical barriers against infection.

The Skin

Sweat and sebaceous secretions—by virtue of their acid pH and certain chemical substances (especially fatty acids)—have antimicrobial properties that tend to eliminate pathogenic organisms.

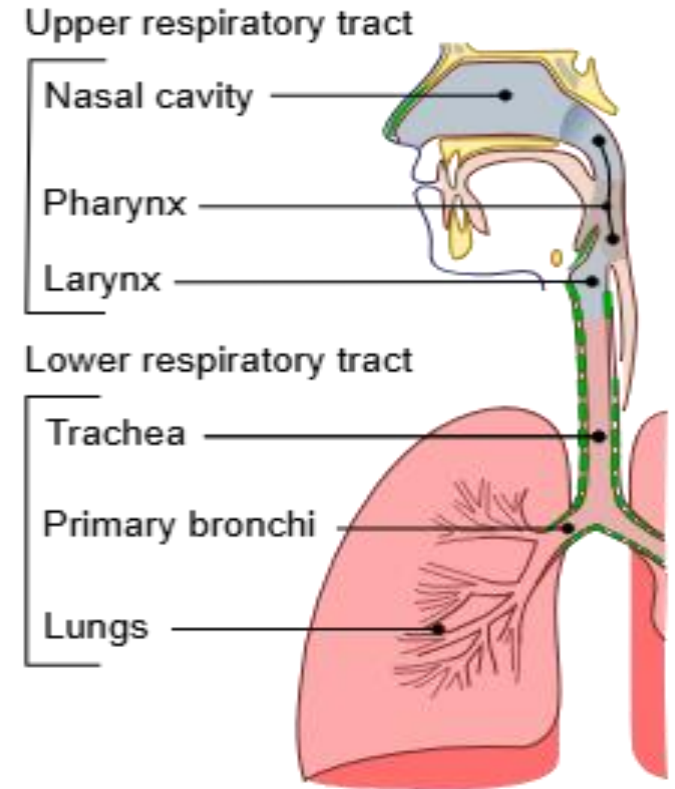
Mucous Membranes

In the respiratory tract, a film of mucus covers the surface and is constantly being driven upward by ciliated cells toward the natural orifices. **Bacteria tend to stick to this film.**

The respiratory tract

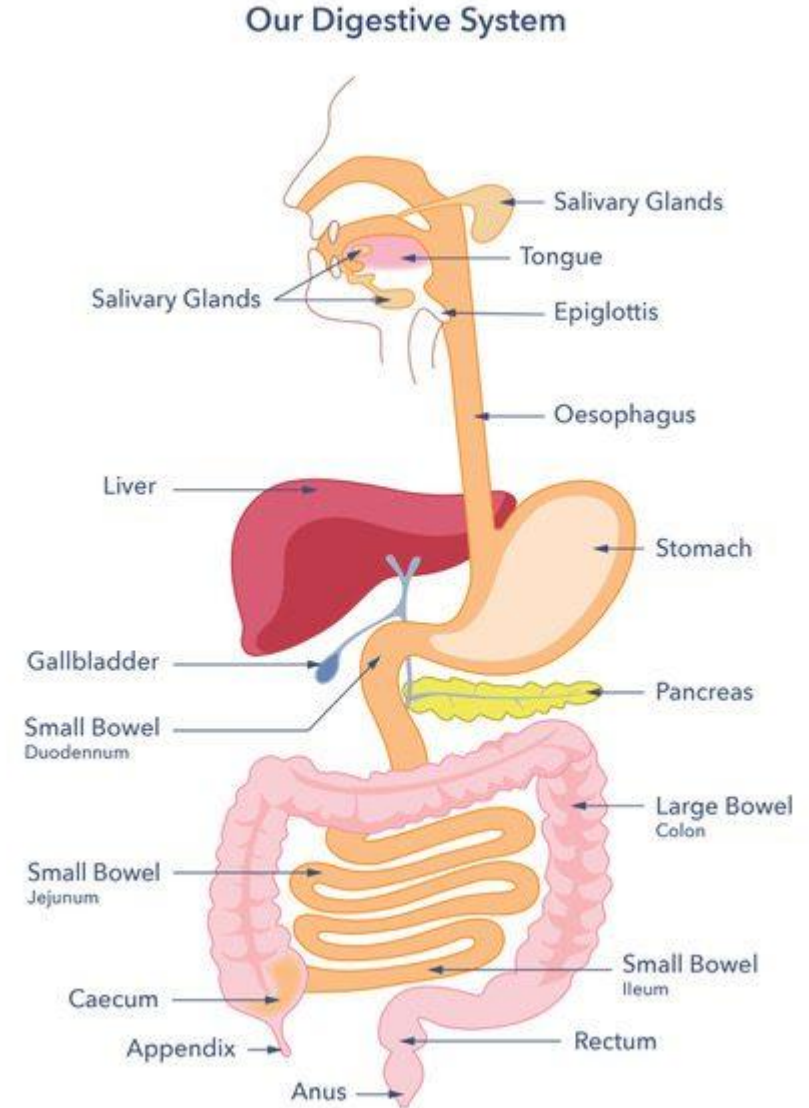
The walls of the respiratory tract are mucous covered when the suspended particles ($\sim 5\text{ }\mu\text{m}$) present in the air enter the respiratory tract, they get stuck to these mucous covered walls.

The mucous layer of the upper respiratory tract is provided with antiseptic properties by virtue of the presence of lysosomes and IgA in it.



The gastrointestinal tract

In the gastrointestinal tract, several systems function to inactivate bacteria: **Saliva contains numerous hydrolytic enzymes; the acidity of the stomach kills many ingested bacteria** (eg, *V cholerae*); and the small intestine contains many proteolytic enzymes .

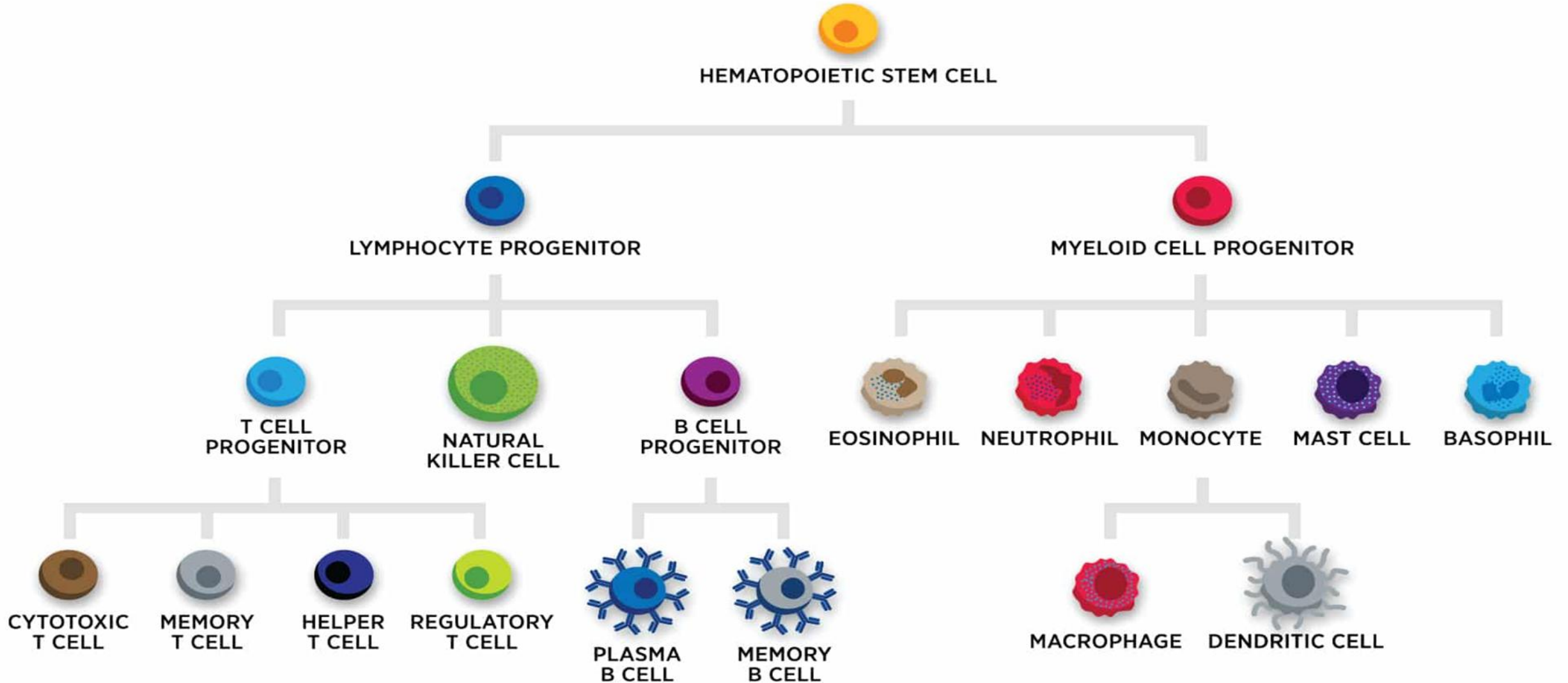


Note :- It must be remembered that most mucous membranes of the body carry a constant normal microbial flora that itself opposes establishment of pathogenic microorganisms ("bacterial interference") and has important physiologic functions. **For example, in the adult vagina, an acid pH is maintained by normal lactobacilli, inhibiting establishment of yeasts, anaerobes, and gram-negative bacteria.**

NORMAL FLORA



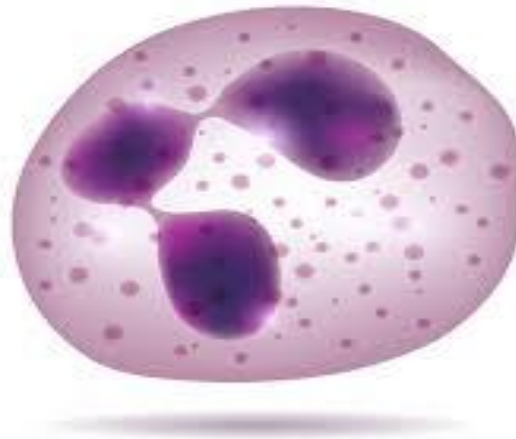
TYPES OF IMMUNE CELLS



2- Cells

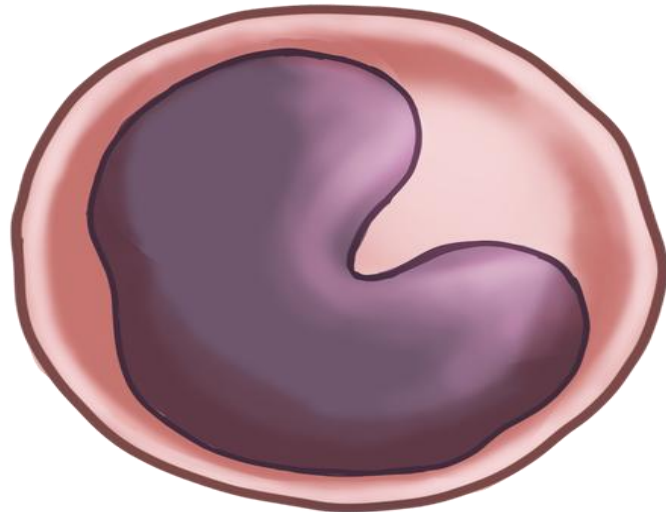
Neutrophile : polymorphonuclear leukocytes (PMNs), are the most abundant leukocytes in the blood, In response to infections, the production of neutrophils from the bone marrow increases rapidly, and their number may rise to as **high** **Neutrophils** are the first cell type to respond to most infections, particularly bacterial and fungal infections, and thus are the dominant cells of acute inflammation.

NEUTROPHILE



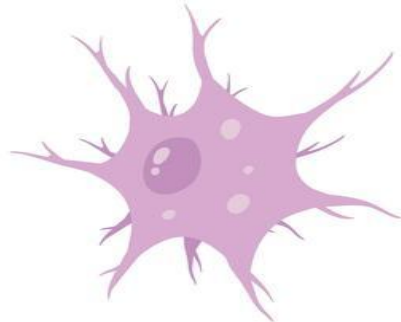
Monocytes are less abundant in the blood than neutrophils, they also ingest microbes in the blood and in tissues.

During inflammatory reactions, monocytes enter extravascular tissues and differentiate into cells called **macrophages**, which, unlike neutrophils, survive in these sites for long periods.



Dendritic Cells

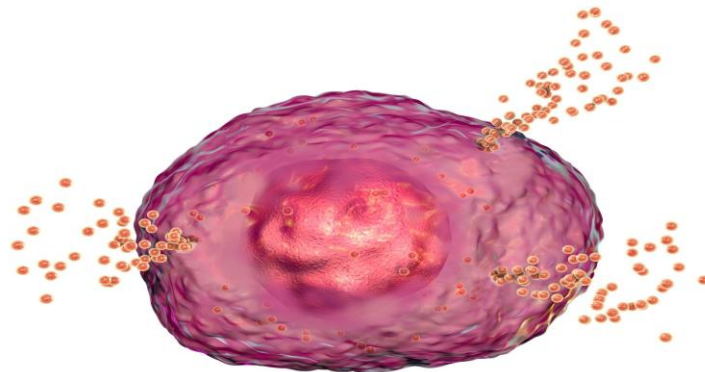
Dendritic cells respond to microbes by producing numerous cytokines that serve two main functions: **they initiate inflammation and they stimulate adaptive immune responses.** By sensing microbes and interacting with lymphocytes, especially T cells, dendritic cells constitute an important bridge between innate and adaptive immunity.



Mast Cells

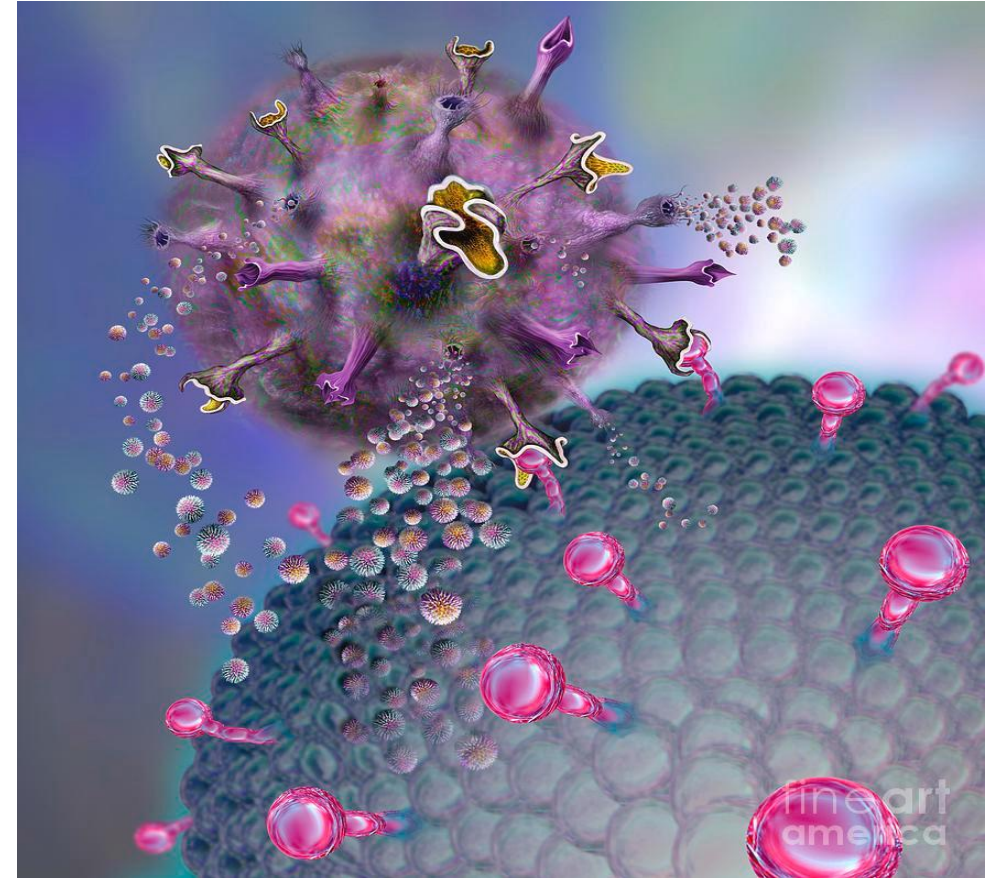
Mast cells are bone marrow–derived cells with abundant cytoplasmic granules that are present in the skin and mucosal epithelium.

Mast cell granules contain vasoactive amines such as **histamine that cause vasodilation increased capillary permeability, as well as proteolytic enzymes that can kill bacteria or inactivate microbial toxins**



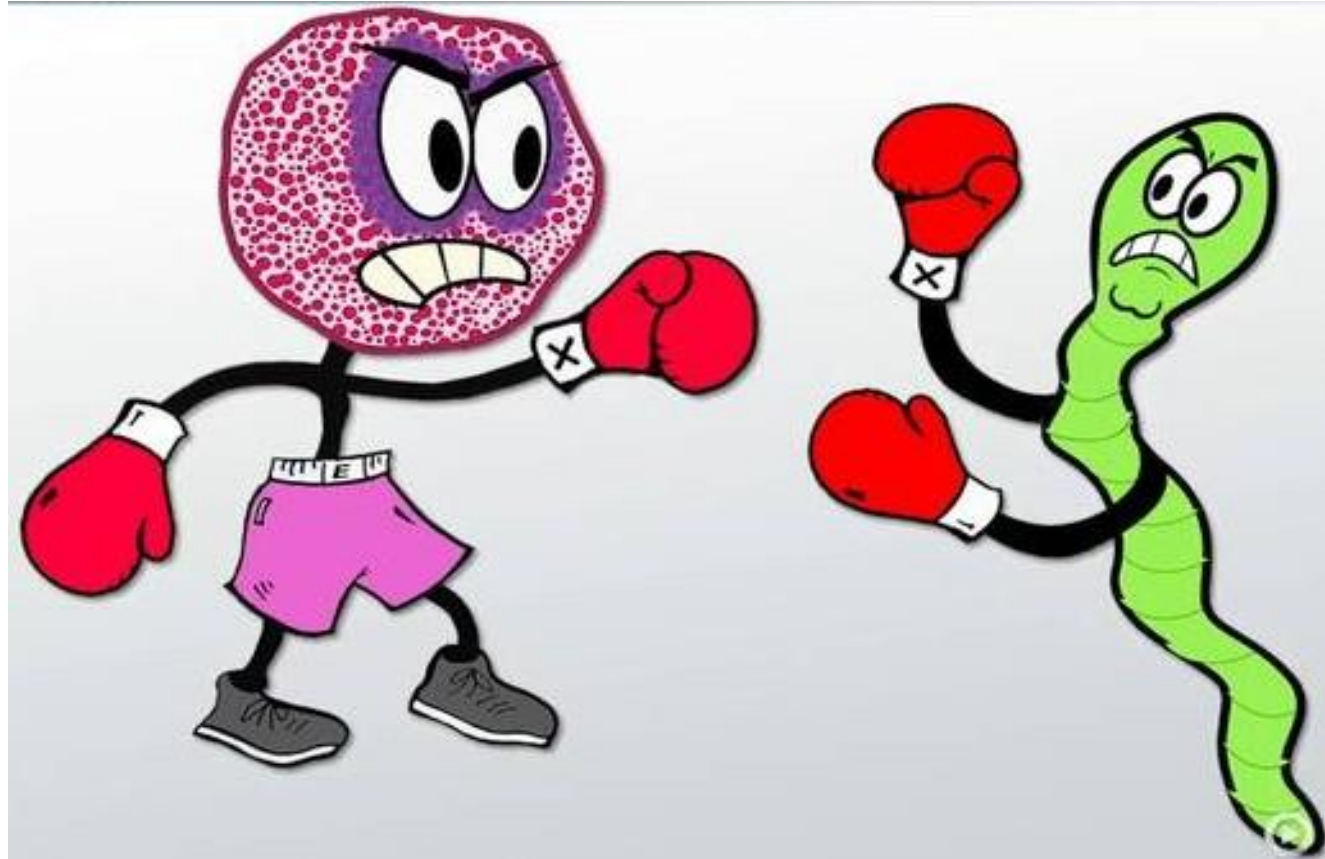
Natural Killer Cells

Natural killer (NK) cells recognize **infected** and **stressed** cells and respond by killing these cells and **intracellular microbes**, such as viruses.



Basophils and Eosinophils

Basophils and Eosinophils are mainly involved in the defense against parasites or allergic reactions.



3- Plasma proteins

A-The Complement system .

B- Cytokines : In response to microbes, dendritic cells, macrophages, mast cells, and other cells secrete cytokines that mediate many of the cellular reactions of innate immunity

C- Other Plasma Proteins of Innate Immunity

Acute-phase proteins (APPs) are an evolutionarily conserved family of proteins produced mainly in the liver in response to infection and inflammation as Plasma **Mannan-binding lectin and C-reactive protein** .

Thank
you!

