IMMUNE SYSTEM

Your Body's Self Defence

What is the Immune System?

The immune system is the **body's defence against infectious organisms** and other invaders.

Through a **series of steps** called the **immune response**, the immune system attacks organisms and substances that invade our body and cause disease.

The immune system is made up of a network of cells, tissues, and organs that work together to **protect the body.**

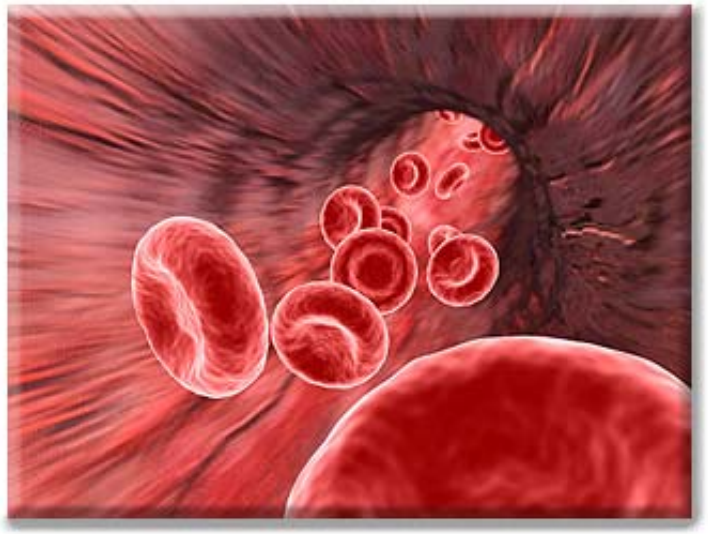
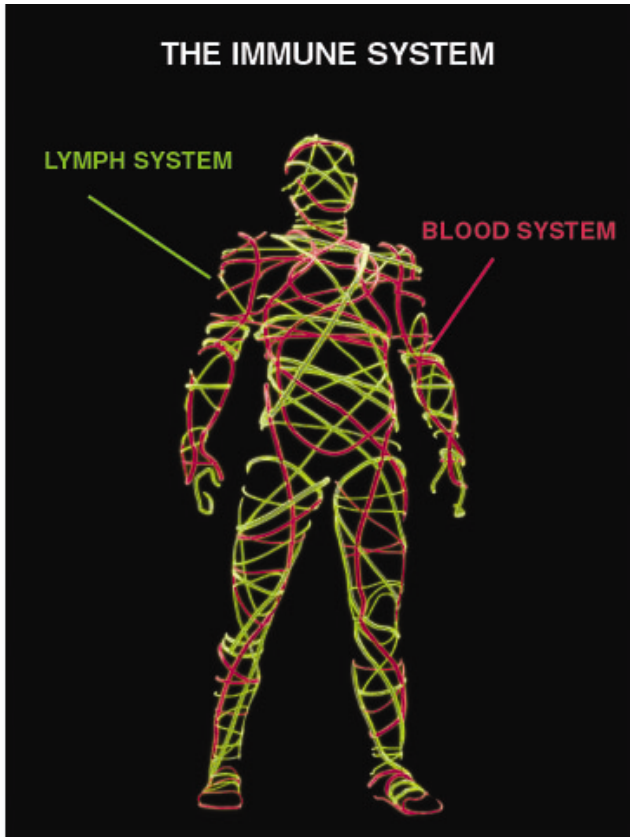


Image of normal circulating human blood.

THE IMMUNE SYSTEM'S FIREPOWER DEPENDS ON THE CIRCULATORY SYSTEM TO TRANSPORT IMMUNE CELLS TO ANY POINT OF THE BODY TO DEFEND AGAINST AN INVADING MICROBE



- **The blood** has three major functions - transportation, regulation and also protection for the body. It holds specialized cells and chemicals that defend the body against diseases.

- The **lymphatic system** operates in **close association with blood circulation**. Both immune cells and foreign molecules enter the lymph nodes via blood vessels or lymphatic vessels. All immune cells exit the lymphatic system and eventually return to the bloodstream. Once in the bloodstream, immune cells (mostly lymphocytes) are transported to tissues throughout the body, where they act as sentries on the lookout for foreign antigens.

- *An antigen is any substance that causes your immune system to produce anitbodies against it.*

HOW DOES THE IMMUNE SYSTEM WORK TO DEFEND THE BODY AGAINST AN INVADING MICROBE?

FIRST LINE OF DEFENCE

SURFACE BARRIERS

- **Skin**
- Mucus membrane (eyes, ears, airways, mouth, digestive tract)
- Complements (blood proteins)

SECOND LINE OF DEFENCE

INNATE IMMUNITY
(inbuilt – always ready immune protection)

Phagocytes (neutrophils, macrophages, natural killer cells, dendritic cells)

- **Find and destroy pathogens**
- Blood proteins mark the pathogens for more destruction
- Fight viral infection
- **Raise and relay alarm signals to activate adaptive immunity**

THIRD LINE OF DEFENCE

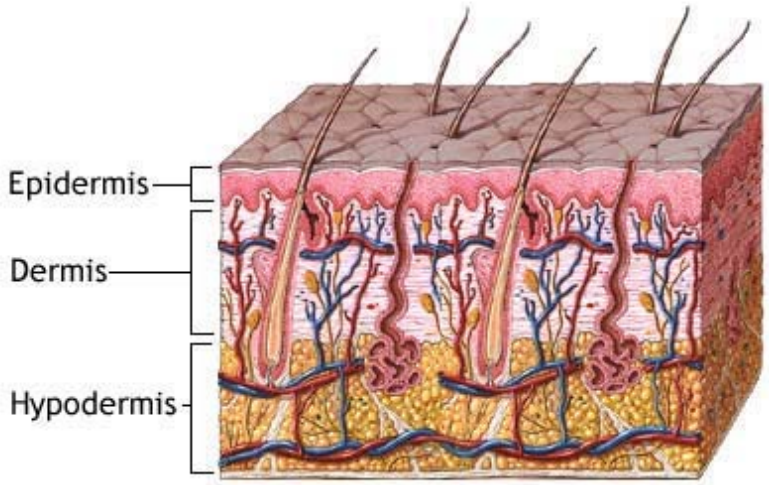
ADAPTIVE 'LEARNED' IMMUNITY

- The cells of the adaptive immune system are a type of leukocyte, called a **lymphocyte.**
- **B cells and T cells are the major types of lymphocytes**.

Surface Barriers

First Level of Defence

- Barriers **protect the body from infection**, including mechanical, chemical and biological barriers.
- These barriers include **skin and mucous membranes**, which line all body cavities.
- Chemical barriers such as enzymes in **saliva and tears** also protect against infection by destroying harmful bacteria.



Innate Immunity

Second Line of Defence

- The **innate immune system** comprises the cells and mechanisms that defend the host from infection by other organisms, in a non-specific manner. This means that the cells of the innate system recognize, and respond to, pathogens in a generic way, but unlike the adaptive immune system, it does not confer long-lasting or protective immunity to the host. Innate immune systems provide immediate defense against infection.

FUNCTION

- Recruiting immune cells to sites of infection and inflammation, through the production of chemical factors, including specialized chemical mediators, called cytokins.
- To identify bacteria, activate cells and to promote clearance of dead cells.
- The identification and removal of foreign substances present in organs, tissues, the blood and lymph, by specialized white blood cells.
- Activation of the adaptive immune system.

Adaptive Immunity

Third Line of Defence

- The cells of the adaptive immune system are a type of leukocyte, called a **lymphocyte**.
- B cells and T cells are the major types of lymphocytes.
- The human body has about 2 trillion lymphocytes, constituting 20–40% of the body's white blood cells; their total mass is about the same as the brain or liver.
- The peripheral blood contains 20–50% of circulating lymphocytes; the rest move within the lymphatic system.

FUNCTON

- Recognize the pathogen and become activated
- Multiply rapidly to fight the pathogen
- Assign various tasks to destroy infected or diseased cells
- Activated lymphocytes multiply quickly in greater numbers (billions) to produce antibody as well as killer cells to wipe out the enemy
- Memory cells – the long-lived survivors of past infections live on to activate the immune system faster when the pathogen invades again

When things go wrong with your immune system

- The immune system can sometimes go awry. When this happens, the results can be anything from a mere irritation to a **deadly disease**.
- Immune firepower is reduced with **advancing age**, which is why the elderly are more likely to catch an **infection** or to be more afflicted with **serious disease states.**
- **Reduced immune function** can also occur in healthy individuals if they become **'run down'** or exposed to chronic stressors (eg.depression, relationships). These people become more susceptible to infections.
- **Lifestyle Factors –** smoking, alcohol, lack of sleep, poor diet, lack of exercise or excessive exercise.

A decreased immune function is vulnerable to infection and can make you sick

What can you do to rejuvenate the power of your immune system?

- Raise the immune function of a person with reduced immunity
- Naturally increase the body's production of molecules called cytokines which regulate the immune system to achieve optimal function

Vitamins, minerals alone cannot reliably do this

Boost Your Immune System the Natural Way with Lactoferrin & PSK