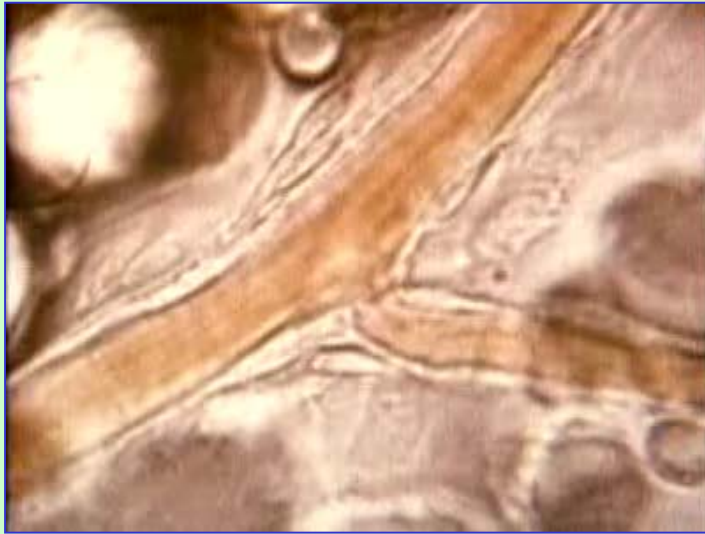


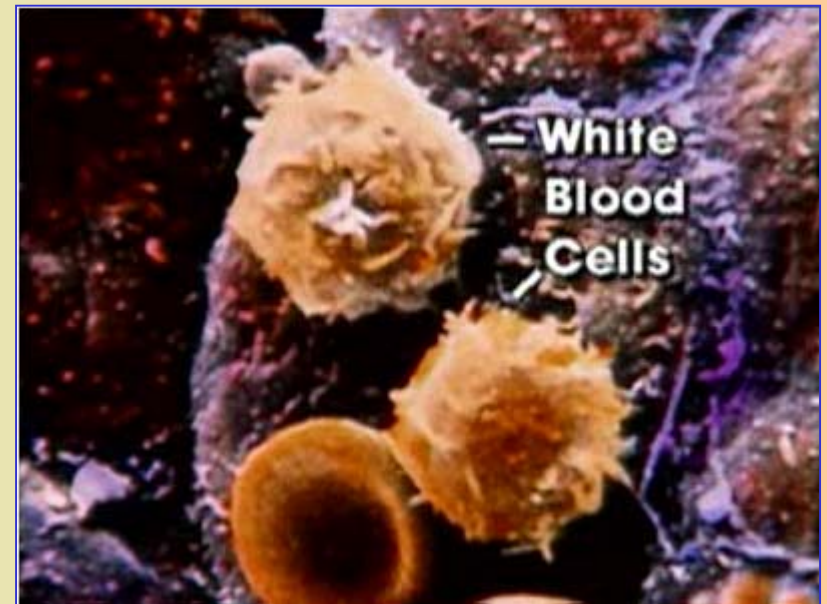
# The immune system



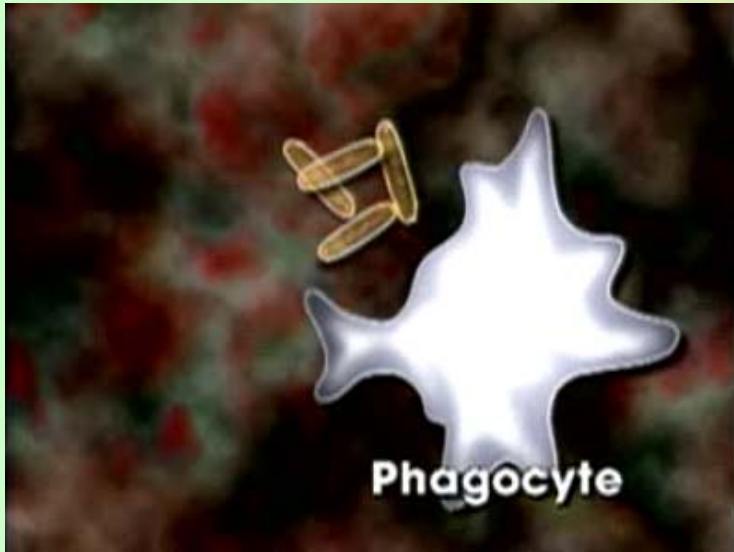
## The immune system

Many of the weapons of the immune system are found in the blood, that reaches almost every part of the body.

White blood cells defend us against diseases.



# The immune system



## The immune system

Let's suppose that a certain kind of bacteria enters the bloodstream. It will emit certain type of chemicals (chemical signals) that will alert a type of white blood cell called phagocytes.

Phagocytes surround pathogens by sending out extensions of its cell bodies called pseudopods .



# The immune system



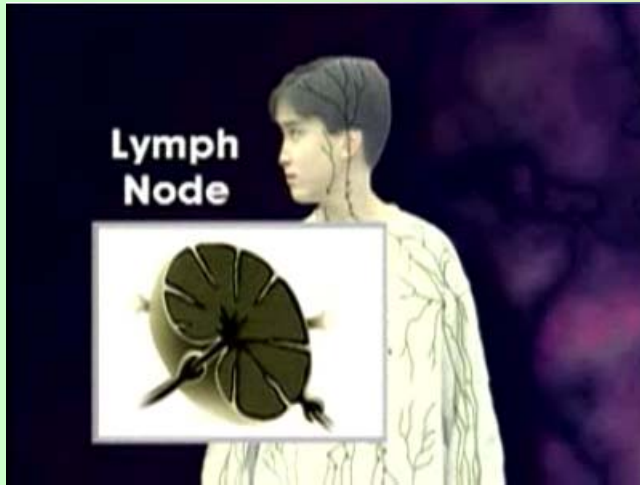
## The immune system

Once inside the phagocyte, the pathogens are dissolved. **One kind of phagocyte is called macrophage** ("big eater").

White blood cells are present not only in the blood but also in limph, a clear liquid that circulates throughout the body in the **lymphatic system**.



# The immune system

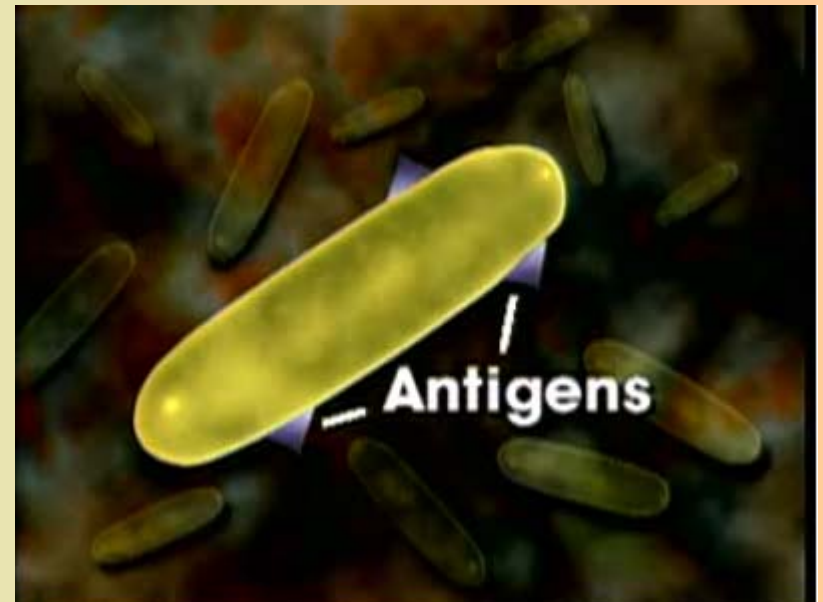


## The immune system

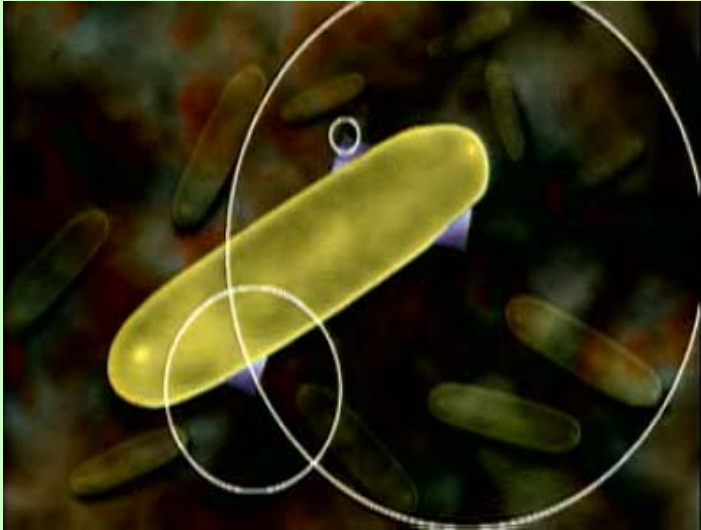
Lymphs provide nourishment for cells and also remove poisons and destroy germs (collected in lymph nodes).

Every cell in the body and every cell that invades the body have **special markers on their surface called antigens.**

**Antigens tell the immune system whether or not something is part of the body**



# The immune system



## The immune system

The first time a particular kind of pathogen invades the body, its antigen markers alert the immune system that it does not belong.

Inside lymph nodes special white blood cells called **lymphocytes** respond by manufacturing **antibodies**.



# The immune system



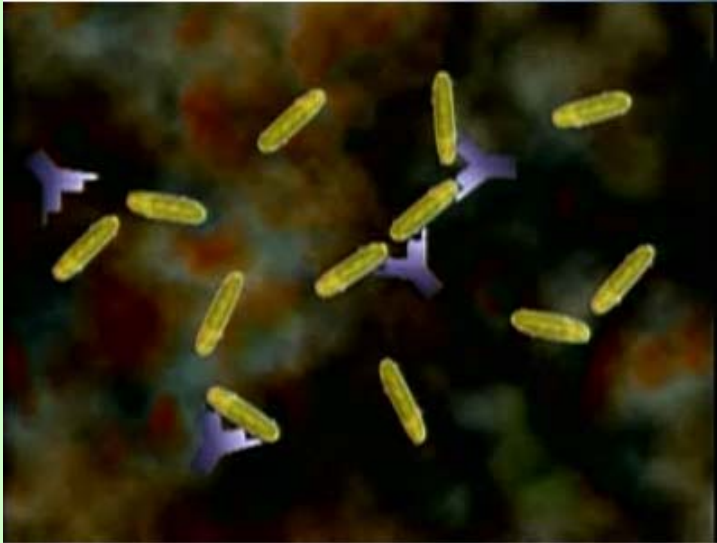
Like pieces of a jigsaw puzzle, each kind of antibody fits with only a particular kind of antigen.

## The immune system

Antibodies are 'W'-shaped molecules that are **custom-designed** so that their ends will **fit on the antigen markers** on their invading bacteria or other germ.



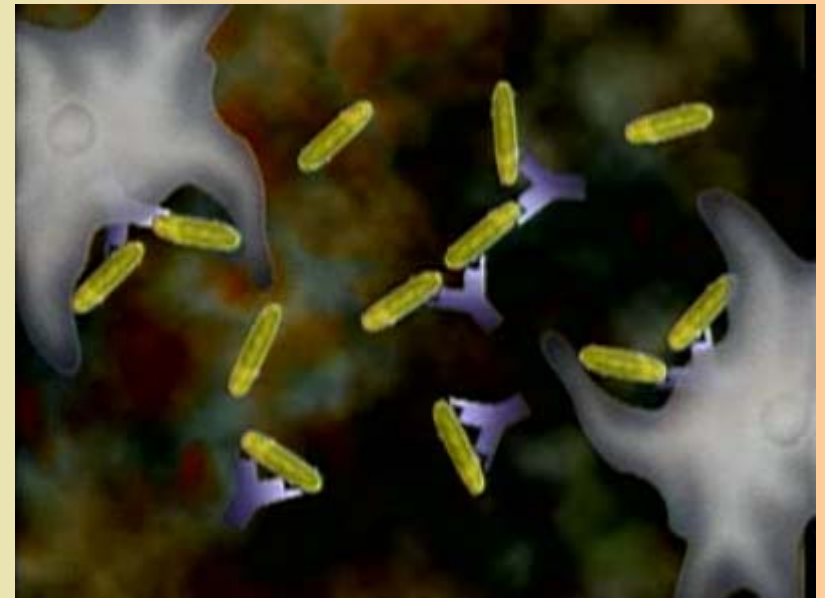
# The immune system



## The immune system

After they are manufactured by lymphocytes, antibodies rush to the site of an infection and latch onto the invading pathogens and make them harmless.

In some instances antibodies clump the pathogens together and make it easier for phagocytes to eat them. Antibodies also enable chemicals in the blood to destroy pathogens.



# The immune system

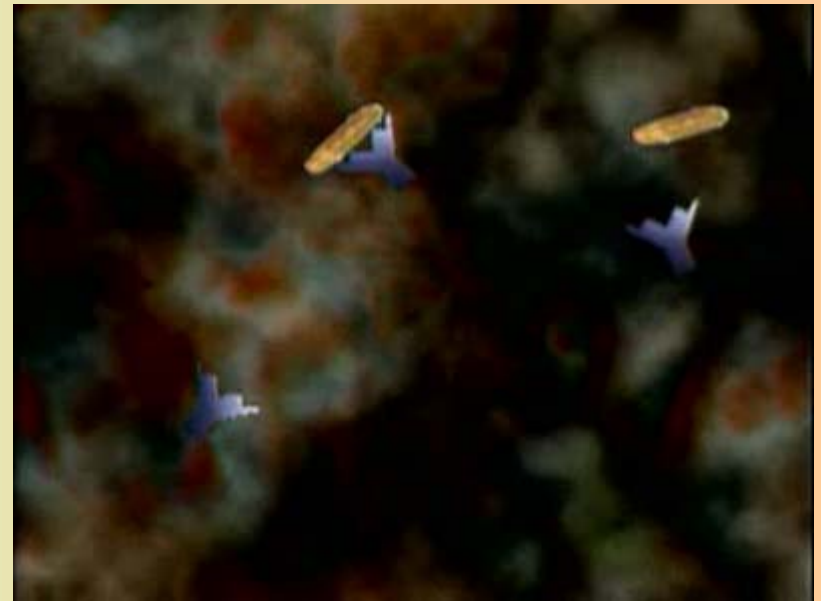


## The immune system

The first time a pathogen invades the body it takes time for antibodies to be manufactured and do their job.

In the meantime, the pathogens may have time to do damage and the person becomes sick.

However, once attacked by a particular kind of pathogen, some antibodies remain in the bloodstream and are ready to respond if the same kind of pathogen attacks again.



# The immune system



## The immune system

Also, the lymphocytes remember the germ antigen markers and are ready to make the right kind of antibodies quickly.

Notes based on this video:

<http://videos.howstuffworks.com/hsw/6074-disease-defense-the-immune-system-video.htm>

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