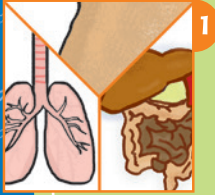


# YOUR BODY'S BEST DEFENSE

Every day, your body fights off infections, germs, bacteria and parasites. It is destroying these invaders, called *pathogens*, with the help of its number one defense: *the immune system*.

The immune system's job is to keep your body healthy. This requires many different parts of the body to work together against pathogens. Here are the main components of your immune system:



## 1 SKIN, AIRWAYS & GASTROINTESTINAL TRACT

The skin, respiratory tract (ear, nose, throat, sinuses, lungs) and gastrointestinal tract (mouth, esophagus, stomach, intestines) are the organs that are continuously exposed to intruders. The outermost layer of the skin functions as a barrier, whereas in the respiratory and the gastrointestinal tract, mucus protects from infections. The presence of healthy micro-organisms at all these sites is essential to fight attacks by pathogens.



## 2 LYMPH NODES

Small, bean-shaped nodules on the lymphatic vessels, lymph nodes are located primarily in your armpits and groin regions. They filter pathogens out of the lymphatic system.



## 3 SPLEEN

The largest lymphoid organ in the lymphatic system, the spleen is located to the left of your stomach. The spleen removes pathogens from the blood as it passes through.



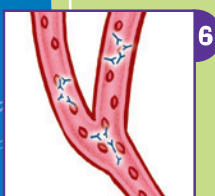
## 4 LIVER

Your body's largest internal organ, the liver contains white blood cells. These cells destroy bacteria in the blood as it passes through the liver. It also processes nutrients found in the blood and produces bile used in digestion.



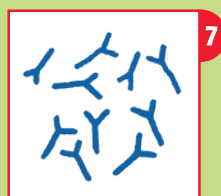
## 5 BONE MARROW

Located inside your body's bones, it produces red and white blood cells. Red blood cells carry oxygen to other cells and body parts, and remove carbon dioxide. White blood cells look for and destroy pathogens. The different types of white blood cells are phagocytes, B-cells and T-cells.



## 6 BLOOD

Red and white cells travel throughout your body's blood vessels. While white blood cells defend against pathogens, your red blood cells nourish your body.



## 7 ANTIBODIES

Antibodies are produced by specialized white blood cells: B-cells in the lymph nodes and also in the spleen. Through binding of antibodies to pathogens, white blood cells can neutralize and destroy the pathogens more efficiently. This process is especially important to fight bacteria, frequently causing pneumonia and septicemia. Antibodies are mainly secreted in your blood as IgM and IgG; and in the respiratory and the gastrointestinal tract as IgA.



Some people are born with immune systems that don't work as well as others. This might be caused by a genetic disorder called **Primary Immunodeficiency (PI)**. Some individuals develop immunodeficiency in adulthood; usually this results from a shortage of antibodies.

For more information, visit the Jeffrey Modell Foundation Website at [www.info4pi.org](http://www.info4pi.org)

# 10 **FOR ADULTS** Warning Signs of Primary Immunodeficiency

**Primary Immunodeficiency (PI) causes children and adults to have infections that come back frequently or are unusually hard to cure. 1:500 persons are affected by one of the known Primary Immunodeficiencies. If you or someone you know is affected by two or more of the following Warning Signs, speak to a physician about the possible presence of an underlying Primary Immunodeficiency.**

- 1** Two or more new ear infections within 1 year.
- 2** Two or more new sinus infections within 1 year, in the absence of allergy.
- 3** One pneumonia per year for more than 1 year.
- 4** Chronic diarrhea with weight loss.
- 5** Recurrent viral infections (colds, herpes, warts, condyloma).
- 6** Recurrent need for intravenous antibiotics to clear infections.
- 7** Recurrent, deep abscesses of the skin or internal organs.
- 8** Persistent thrush or fungal infection on skin or elsewhere.
- 9** Infection with normally harmless tuberculosis-like bacteria.
- 10** A family history of PI.

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Funding was made possible in part by a grant from the U.S. Centers for Disease Control and Prevention (CDC).



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& Human Development

These warning signs were developed by the Jeffrey Modell Foundation Medical Advisory Board. Consultation with Primary Immunodeficiency experts is strongly suggested. © 2015 Jeffrey Modell Foundation

For information or referrals, contact the Jeffrey Modell Foundation: [info4pi.org](http://info4pi.org)