

The Living
BODY

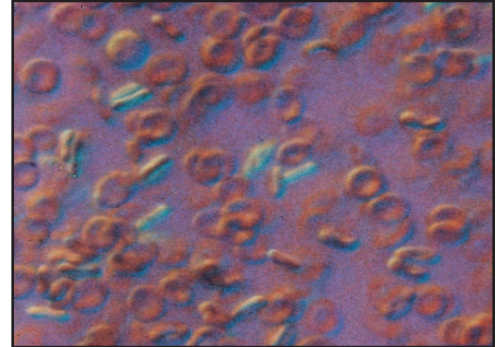
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Internal Defenses

Summary

This program focuses on the extraordinarily complex and efficient immune mechanism that constitutes the body's internal defense system. The dramatic framework shows what happens when a man is infected with the common cold.



The environment is filled with microbes, some of which can do considerable damage if they enter the human body. Cold viruses can be transferred from an infected person by physical contact. The virus needs a warm, moist environment in which to live and reproduce; this it finds in the human nose. The virus infects the body's cells by injecting its own genetic material into them, making millions of copies of itself.

The key to the body's immune response is the lymphatic system. Lymph nodes contain white blood cells that can detect and destroy invading microbes. The lymphatic circulation drains tissues of bacteria, viruses, and broken-down cells, which are carried away to the lymph nodes. The spleen is the largest organ of the lymphatic system.

The blood and lymphatic circulation systems contain many different types of white blood cells. Some of these, called lymphocytes, seek out infectious viruses, destroying an infected cell when they find it. There are thousands of types of lymphocytes, each equipped to produce an antibody against just one particular invading microbe. When activated, the lymphocyte multiplies to produce many copies of itself so that enough antibodies are produced to immobilize the invader. This means that there are many infections that the body is able to fight off successfully before they gain hold in the body; a vaccine enables the immune system to develop antibodies against a particular disease without actually developing that disease.

Viruses and bacteria have the ability to change their outer coats, which is the structure by which the immune system identifies them. A single cold virus can have 90 or 100 different coats, each of which must be "recognized" individually if antibodies against it are to be produced.

Objectives

1. To illustrate how microbes from the environment can bypass the body's protective layer of skin and gain entry to internal tissues.
2. To introduce the workings of the internal defense system that protects the body from harmful microorganisms.
3. To describe the basic structure of cold viruses and how they use and destroy the body's cells to reproduce themselves.
4. To examine the lymphatic system and the key role it plays in the body's immune response.
5. To explain the various functions of white blood cells in identifying and destroying foreign microbes and manufacturing antibodies.

Recall Questions

1. List some ordinary activities that can allow harmful microbes to enter the body.
2. A cold often produces swollen glands in the neck. Identify these glands and explain why they swell.
3. Name the fluid that circulates in the lymphatic system and describe its various functions.
4. Describe how old red blood cells are identified and destroyed in the spleen.
5. What are lymphocytes? How do they protect the body from invading microbes?
6. Explain how vaccines work to immunize the body against diseases it has never contracted.

Interpretive Questions

1. Given an understanding of how the body's internal defenses work, explain why transplanted organs are often rejected by the recipient's body.
2. Explain why, despite all the wonders of modern medical science, there is still no cure for the common cold.

Vocabulary Required for Effective Viewing

- antibody
- bacteria
- cell
- immune system
- lymphatic system
- lymphocyte
- microbe
- molecule
- spleen
- vaccine
- virus
- white blood cells



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