

Introduction

We have already learned that cells can vary a great deal in their sizes and shapes. In your body alone, cells may vary from only a few micrometers across to nearly 1 m in length. One example of the diversity in cell size and shape and function can be found in your blood and specifically by looking at those cells that help your body fight disease.

Basic Information

1. Define the term pathogen and give an example of a pathogen that might be in your body: _____
2. On the diagram of the human body, what are two structures that you would not generally think of as part of your immune system?

Barriers to infection

3. What are three barriers that the body can use to stop invading pathogens:

Blood

The typical human body contains 5 liters of blood.

4. How much of this volume would be fluid? _____
5. How large a container would you need to hold just the red blood cells from a person's body? _____
6. What would be the volume of just platelets in a typical body? _____
7. What would be the volume of just white blood cells? _____

Cell Sizes

Under low power, a typical light microscope has a field of view of ~1400 μm .

8. How many red blood cells would fit across this field of view? _____
9. Cell nuclei tend to stain darker than the rest of a cell as you can see in the stained slide of the human cheek cell. What do you notice about the red blood cells?
- _____

Neutrophil

10. What is the term that describes cells taking in and breaking down large molecules by an inward folding of the cell membrane? _____

Eosinophils

11. How does the eosinophil differ in appearance from the neutrophil?
- _____

Basophils

Chemicals that are released by one immune cell, such as a basophil, to induce an effect on other immune cells are called cytokines.

12. Why do you think this is an important function in the immune system?
- _____

Macrophages

13. What does the term "macrophage" mean? _____

Lymphocytes

14. What seems to be a common function of all three types of lymphocytes (natural killer cells, T-cells and B-cells)? _____

Why should I care?

There is currently a great deal of evidence that suggests that people who are routinely exposed to many pathogens have a much lower chance of developing an autoimmune disease. This is known as the "hygiene hypothesis".

15. Suggest a possible explanation for this observed phenomenon:
- _____