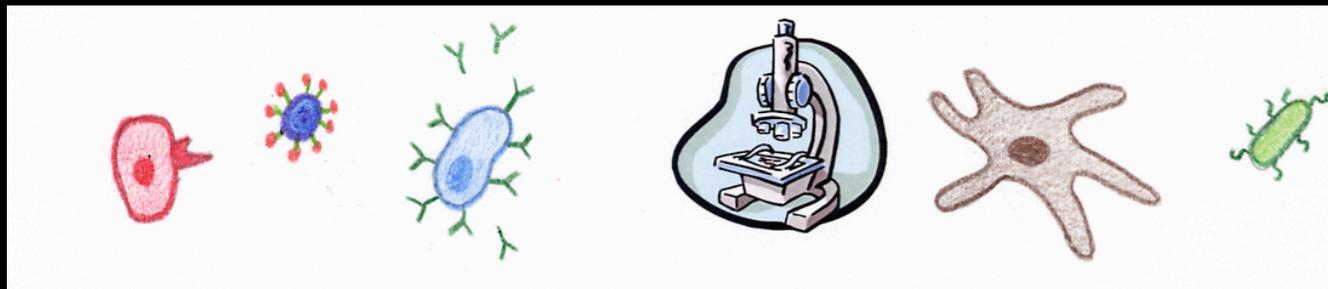


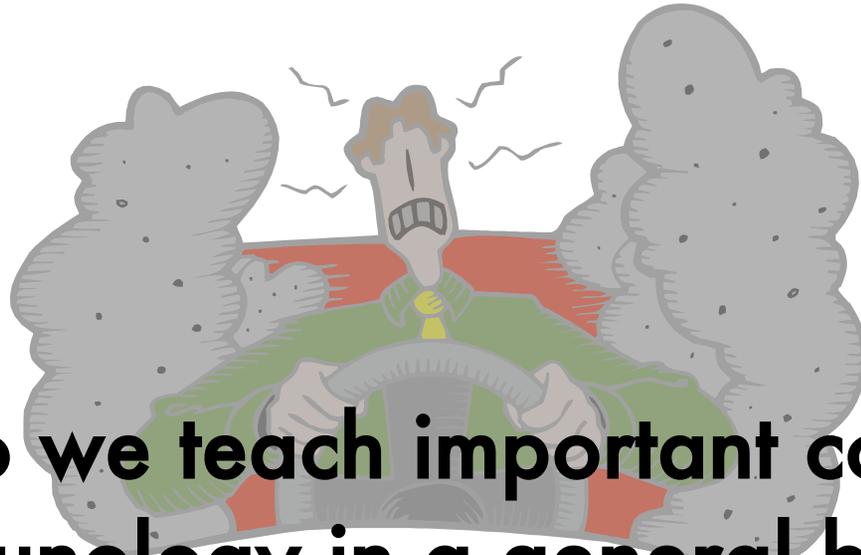
What's so great about a little Cell?
Relating Cell Structure to Function in the
Immune System



Immunology Lesson Plan

Harvard MCB / HHMI Outreach Program
Summer Teacher Program
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How do we teach important concepts of immunology in a general biology curriculum already packed with “required” learning?

Important Concept

When our bodies are presented with invading pathogens, such as bacteria, viruses or parasites, our cells of the immune system must respond quickly and with purpose in order to overcome the infection. Structure and function play an important role in the specificity of the immune response. What is invading the body? How will the cells respond? And how will the infection be controlled? Our immune system makes good sense! Form fits function.



STANDARDS BASED

National Science Educational Standards

Life Science

Cells have particular structures that underlie their functions. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules which form a variety of specialized structures that carry out such cell functions as energy production, transport of molecules, waste disposal, synthesis of new molecules, and the storage of genetic material.



STANDARDS BASED



Massachusetts State Standards

CELLULAR:

Broad Concept: All living things are composed of cells. Life processes in a cell are based on molecular interactions.

- ✓• **Relate cell parts/organelles to their functions.**
- ✓• Differentiate between prokaryotic cells and eukaryotic cells, in terms of their general structures and degrees of complexity.
- ✓• Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport).

ANATOMY:

Broad Concept: There is a relationship between structure and function in organ systems of humans.

Overview:

This activity focuses learning on cell structure and function in the immune system. Learning occurs through independent web research. Students will choose a cell in the immune system. After reviewing websites on the immune system, students apply their knowledge and critical thinking to address prompts around cell structure and function.

This lesson could be used within a unit on: The cell, Anatomy and Physiology or Immunology

In the end, what will students know and be able to do?

Objectives:

1. Use internet resources to understand the way specific cells function in the immune system.
2. Create an annotated bibliography for resources used
3. Apply knowledge to address connections around cell structure and function

Concepts:

- Organelles structure and function
- Structure of the cell membrane
- Transport across the cell membrane: Diffusion, Osmosis, Active transport
- **Connections between cell structure and function**
- Variation of cells in the immune system

What it Looks Like

Self Guided Powerpoint Activity

Student Sheet

How will teachers know students get it?



Assessment Options

- 1. Immune Response Teams:** Students are broken up into collaborative groups. Each student in the group is responsible for one cell type. After completing this activity, students teach their peers about their cell. In groups, or individually, students create story boards, cartoons or books that show their understanding of cell players in the immune system.
- 2.** This lesson as it is can serve as an assessment.
- 3.** Students can demonstrate their understanding by presenting their information in pamphlets, to an audience or integrated into a larger project on disease.