Your students will learn:
◊ What diabetes type I is.
◊ What insulin does in the body.
◊ What the immune system does.
◊ Three types of cells in the immune system.
◊ How the immune system is involved in the development of juvenile diabetes.

Full educational standards available at www.sepa.duq.edu/education
Discover eating and being from the depths of the ocean to inside the human body in “Our Cells, Our Selves.”

Movie Guide

In “Our Cells, Our Selves”, join 7-year old Sylvie in discovering the wonders of the immune system. Sylvie’s mother tells a story that takes us on a journey starting hundreds of millions of years ago with a few familiar (and some very unfamiliar) organisms to learn how the balance between access to food and immune protection evolved to what we have in humans. We learn that under rare circumstances things can go wrong, leading to auto-immune diseases like Type 1 Juvenile Diabetes. The story closes with a look at the future of regenerative medicine and the potential for cures!

Time
45 minutes

More Resources
Find more information about the immune system on-line at www.sepa.duq.edu/regmed

Viewing Guide
Here is a viewing guide with suggestions of places to stop and discuss. Ask your students to take notes in the “Your notes” section of their worksheets as they watch the movie and during discussion. Then, allow them to work in groups of 2-3 to compare notes and complete the worksheet.

TIP: The movie starts with a brief introductory text. You may want to read this text to the students, or ask for student volunteers to read it. You may need to pause it to allow the students enough time to read it. The intro lasts 27 seconds.

<table>
<thead>
<tr>
<th>Stop Point</th>
<th>Discussion questions and answers</th>
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<tbody>
<tr>
<td>2:05</td>
<td>What disease does Sylvie have? Diabetes.</td>
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<tr>
<td></td>
<td>Why does she have to pay attention to her diet? To make sure she has the right amount of sugar in her blood.</td>
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<td></td>
<td>What does insulin do? Helps the body to use the sugar in the blood for energy.</td>
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<tr>
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<td>Why does Sylvie need to take insulin? Her body destroyed her special islet cells – these are the cells that produce insulin.</td>
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How did early cells get energy? First, they got energy and nutrients from their surroundings. Later, new cells gained the ability to eat the smaller cells and break them down for energy.

What do swallowing cells do? They eat other cells and particles.

What is the job of the immune system? To figure out what is part of the body and what is not.

How do larger animals spread energy to their bodies? They have guts (digestive systems) devoted to eating and blood vessels that can let nutrients travel through the body.

Why can eating be dangerous? When you eat, you take in food, but you also take in bacteria and viruses.

How did early animals protect themselves? Swallowing cells lived in the gut.

Name a type of immune cell that can recognize a specific germ. T cells or B cells.

What happens when a B cell is activated? It divides and releases antibodies.

Which organ makes insulin? The pancreas.

Where are T and B cells born? The bone marrow.

Where do your immune cells hang out and talk to other immune cells? The lymph nodes.

Why is it good that your T and B cells can remember germs they’ve seen? You don’t get the same disease twice.

What do doctors think causes Diabetes? Some T cells make a mistake. They think that the insulin-making islet cells are a germ and destroy them.

How can stem cells help cure diabetes? They can grow into new islet cells.

Answers to Student Worksheet

Sylvie’s Diagnosis

1. **Insulin** is naturally produced by the body’s islet cells and helps your body use the sugar in your blood for energy.

2. **Diabetes Type 1** is a disease that occurs when the body’s islet cells have been destroyed and so cannot produce insulin.
The History of the Immune System

3. Billions of years ago, all living things lived in the ocean as single cells, such as __bacteria__.  
   a. B-cells  b. bacteria  c. nuclei

4. The __immune system__ determines which cells belong in the human body and which do not.

5. Swallowing cells began to line the gut to stop what two types of harmful things from entering the body? Answer this question with a complete sentence.  
   __Swallowing cells keep harmful things, like bacteria and viruses, from__ entering the body.  

How the Immune System Works

6. Write the letter of the answer that is described by each sentence.

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<tr>
<td>I. c</td>
<td>These immune cells work together with swallowing cells to gather information about intruders in the body.</td>
<td>a. antibodies</td>
</tr>
<tr>
<td>II. a</td>
<td>When a B-cell is activated, it begins to divide and release these proteins, which mark outsiders to be swallowed.</td>
<td>b. B cells</td>
</tr>
<tr>
<td>III. b</td>
<td>These cells act like swallowing cells but can only swallow one type of outsider.</td>
<td>c. T cells</td>
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B cells, T cells and the Immune System

7. B cells and T cells travel through the lymph system and patrol the body. Draw a B cell releasing antibodies.

_When the B cell gets ready to release antibodies it becomes more elongated than the regular representation of a circular cell.  
Antibodies are released in a cloud around the B cell. Antibodies can be represented as dots or as small Y's depending on the material covered._

8. __Memory__ is the most important part of our immune system’s intelligence and keeps you from getting sick from the same thing twice.
The Immune System and Diabetes

9. When a person has diabetes, islet cells are destroyed by a person’s own immune system. Why do doctors think this happens? Answer this question with a complete sentence.

   *Doctors think that sometimes B cells and T cells become confused and turn against your body. When this happens, T cells destroy islet cells because they look like infected cells.*

10. Once islet cells are attacked, the pancreas stops producing insulin. What two effects happen as a result?

   1. *Cells can’t get energy from sugar.*
   2. *The person can become very sick, feel very tired, and are usually diagnosed as having diabetes.*

11. Type 1, or Juvenile, Diabetes occurs in about 1 out of **500** kids worldwide.