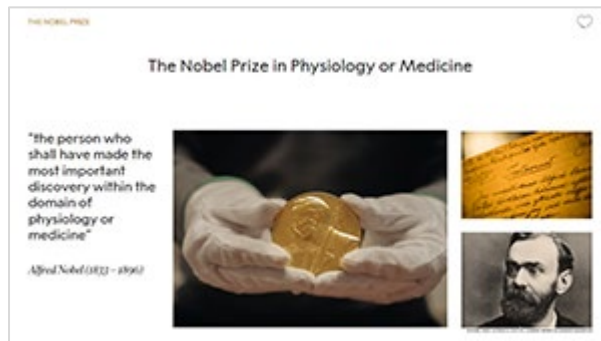


THE NOBEL PRIZE

Speaker's manuscript – 2025 medicine prize The immune system's security guards

The Nobel Prize in Physiology or Medicine

- The Nobel Prize was created by Alfred Nobel. He became very rich due to his invention of dynamite. Before his death in 1896, he wrote in his will that most of his wealth should be used as a prize to “those who, during the preceding year, shall have conferred the greatest benefit to humankind”.
- According to the will, this prize is to be awarded in five categories: physics, chemistry, physiology or medicine, literature and peace.
- The Nobel Prize in Physiology or Medicine is awarded to “the person who made the most important discovery within the domain of physiology or medicine”. The Nobel Prize in Physiology or Medicine is thus awarded to people who have either made a discovery about how organisms work or have helped find a cure for a disease.



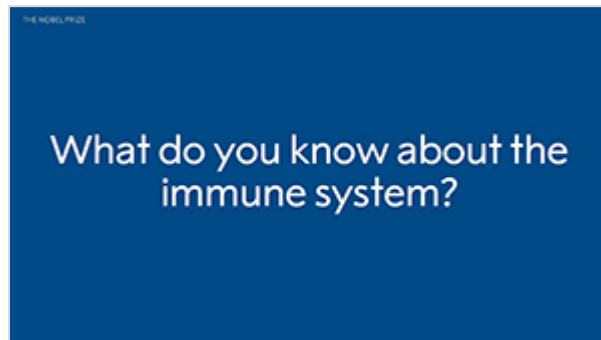
The 2025 medicine prize – The immune system's security guards

- The 2025 medicine prize is about our immune system.
- The immune system protects us from viruses, bacteria and other kinds of microorganisms. The laureates have discovered previously unknown immune cells, so-called regulatory T cells, which act as the immune system's security guards and prevent immune cells from attacking our own body.
- We will soon take a closer look at the discoveries made by the laureates. First, however, you will have to think on your own for a moment – what do you know about the immune system?



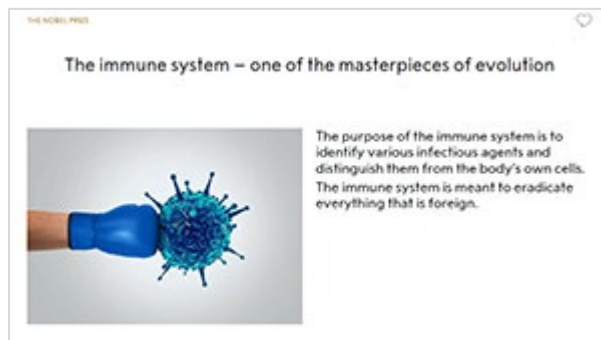
What do you know about the immune system?

- Ask the students to discuss what they know about the immune system, in pairs or smaller groups.
- Suggestions for more in-depth questions include: What is the purpose of the immune system? How does the immune system react when foreign substances attack the body? What can happen if the immune system does not work properly?



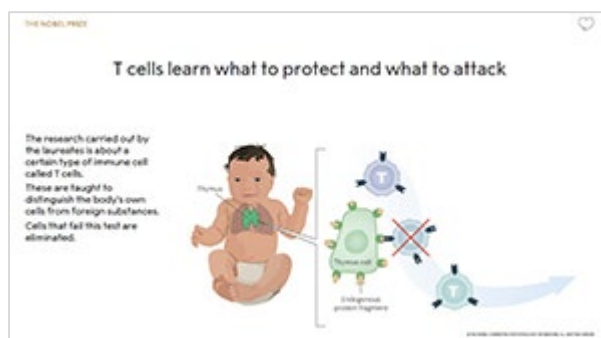
The immune system – one of the masterpieces of evolution

- The immune system is one of the masterpieces of evolution. We would not survive without a functioning immune system.
- Every single day, it protects us from thousands of different viruses, bacteria and other microbes trying to invade our bodies. Microbes are microorganisms found everywhere in nature. Some are a natural part of our bodies and are good for us. Others are substances trying to get into our bodies and which can make us sick.
- Microbes that attack our bodies may look very different. Some have even developed a kind of camouflage that makes them look like human cells. An important task for the immune cells in the immune system is to identify infectious agents and distinguish them from the body's own cells, so that they know what to attack and what to protect.
- In order to do this, the immune cells need to be trained. This is done in an organ in our bodies located just behind the ribcage, which is called the thymus. The thymus serves as a school for the immune cells.



T cells learn what to protect and what to attack

- There are many different types of immune cells with different functions. The discoveries made by the laureates are about a certain type of cell called T cells. The T comes from the word thymus, since this is the organ where these cells mature and are trained.
- In the thymus, the T cells are taught to distinguish the body's own cells from foreign substances. This is done by special cells in the thymus holding out a fragment of the body's own proteins. This test is meant to ensure that the T cells don't react to these proteins.

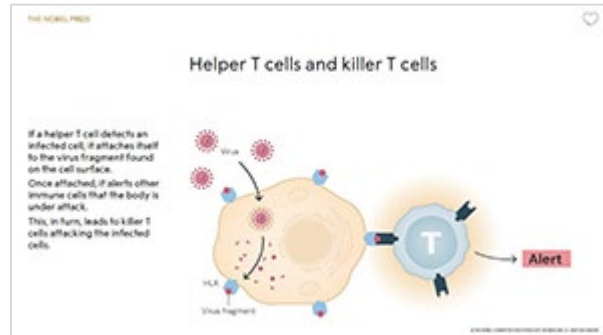


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- The cells that pass the test go out into the body and start looking for intruders, while the cells that fail the test are eliminated.

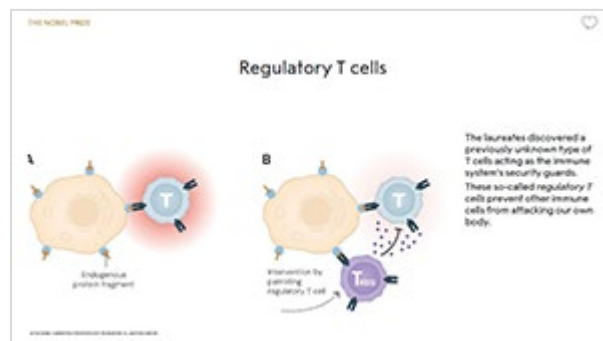
Helper T cells and killer T cells

- Scientists have for a long time known that there are two types of T cells: helper T cells and killer T cells.
- The helper T cells patrol the body. If they detect an intruder, they alert other immune cells, including killer T cells, which then attack the foreign substance.



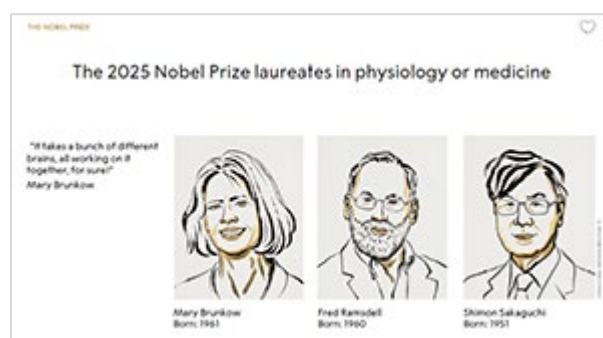
Regulatory T cells

- T cells that fail the test in the thymus sometimes still manage to slip through. In such a case, they go out into the body and may attack the body's own cells and cause autoimmune diseases. These are diseases that occur when the body's immune system believes that its own cells are enemies, thus causing damage to healthy tissues and organs.
- The laureates discovered a previously unknown type of T cells called regulatory T cells. The purpose of these cells is to prevent T cells that have slipped through the test in the thymus from attacking our own body. In the image, a T cell has attacked one of the body's own cells (A). A regulatory T cell intervenes and stops the T cell (B).
- Regulatory T cells also calm down the immune system after it has eliminated an intruder so that it doesn't continue working at a high level of intensity.
- In this way, regulatory T cells act as the immune system's security guards that prevent immune cells from damaging the body.



The 2025 Nobel Prize laureates in physiology or medicine

- Finding the new immune cell was a long and hard effort that began already in the 1980s and continued until the early 2000s.
- Shimon Sakaguchi from Japan was the one who discovered the regulatory T cells.



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- The Americans Mary Brunkow and Fred Ramsdell made the second key discovery in 2001. They found the explanation for why some mice suffer from autoimmune diseases. These mice have a defective gene that prevents them from forming regulatory T cells.
- In 2003, Shimon Sakaguchi combined their respective discoveries.
- In an interview shortly after having received the news that she had been awarded the Nobel Prize, Mary Brunkow said that she was happy and that she found this to be a great honour. She also said that these discoveries were made possible by the three laureates contributing with their different perspectives.

For the greatest benefit to humankind

- The discoveries made by the laureates have been crucial to our understanding of how the immune system works and why not everyone suffers from serious autoimmune diseases, such as type 1 diabetes, coeliac disease (gluten intolerance), rheumatoid arthritis or psoriasis.
- Their discoveries have spurred the development of medical treatments for cancer and autoimmune diseases.
- Now, let's watch a short video that tells us a little bit more about the discoveries made by the Nobel Prize laureates and why they confer the greatest benefit to humankind.

