

This year's Crafoord Prize is awarded for fundamental discoveries in immune regulation

The Royal Swedish Academy of Sciences has decided to award the 2017 Crafoord Prize in Polyarthritis to

Shimon Sakaguchi

Osaka University, Japan

Fred Ramsdell

Parker Institute for Cancer Immunotherapy, San Francisco, CA, USA

Alexander Rudensky

Memorial Sloan Kettering Cancer Center, New York, NY, USA

"for their discoveries relating to regulatory T cells, which counteract harmful immune reactions in arthritis and other autoimmune diseases".

Three immunology researchers share 2017's Crafoord Prize in Polyarthritis, for which the prize money is 6 million Swedish krona. The research being rewarded deals with the discovery of regulatory T cells, cells that can be regarded as our immune system's security guards. They put a brake on cells that are overzealous and attack the body's own tissue. There are hopes that their discoveries will lead the way to new, highly effective treatment methods for autoimmune diseases, such as rheumatoid arthritis, MS and type 1 diabetes.

Autoimmune diseases arise when the body's immune system malfunctions, attacking normal tissue. Globally, these diseases cause great suffering and premature death for millions of people. Autoimmune diseases include multiple sclerosis (MS), type 1 diabetes and polyarthritis. The latter is a term used for rheumatic diseases in which multiple joints are affected.

There are great hopes that highly effective treatments for autoimmune diseases will be possible, based on new knowledge about the immune system that was gained over the last few decades. Three researchers are now being rewarded for their fundamental discoveries in the field: Shimon Sakaguchi, Fred Ramsdell, and Alexander Rudensky.

The Laureates' discoveries relate to regulatory T cells, which are the immune system's security guards. Their task is to keep an eye on other white blood cells that are overzealous in their task of defending the body from intruders and could harm things they should leave alone, such as healthy cells in joints, the pancreas or brain.

Even back in the 1960s, researchers were searching for suppressor cells in the immune system, but the research results were contradictory. Accordingly, over time, the consensus became that no such cells existed.

Despite this, Shimon Sakaguchi persevered with the search and, after many years, he succeeded in identifying the cells that are now called regulatory T cells. Some years later, Fred Ramsdell approached the same area from a different direction; he isolated and identified the gene that is linked to severe autoimmune disease in a particular strain of mice. He also demonstrated that mutation in the same gene in humans, now known as FOXP3, causes a severe congenital disease called IPEX. Shortly afterwards, decisive findings were made, linking these two pieces of knowledge together. Alexander Rudensky, Shimon Sakaguchi and Fred Ramsdell each described how the FOXP3 gene is vital to a process that results in some T cells becoming security guards in the immune system. These are the regulatory T cells, which can prevent autoimmune reactions because they detect and suppress overzealous colleagues in the immune system.

A great number of clinical trials are now being conducted globally, with research teams testing various ways of using regulatory T cells to subdue the immune system's attacks that cause autoimmune diseases. The long-term vision is that of a breakthrough in the treatment of polyarthritis and other autoimmune syndromes, which could be treated more effectively than they are today.

Additional information

A video about this year's prize and illustrations for editorial use are available at:

<http://kva.se/crafoordprize>
www.crafoordprize.se

This year's Crafoord Prize

The Crafoord Prize is awarded as a partnership between the Royal Swedish Academy of Sciences and the Crafoord Foundation in Lund. The Royal Swedish Academy of Sciences is responsible for deciding upon the Crafoord Laureates.

The prize is awarded in one discipline each year, according to a set schedule for Mathematics and Astronomy, Geosciences, and Biosciences. The prize for Polyarthrititis is awarded only when a special committee has demonstrated that scientific progress in this field has been such that an award is justified.

The prize amount is 6 million Swedish krona to be shared equally between the Laureates.

The award ceremony will be held at the Royal Swedish Academy of Sciences on 18 May 2017, in the presence of H.R.H. Crown Princess Victoria.

The Crafoord Days are 15–18 May 2017 in Stockholm and Lund. A detailed programme will be available at <http://kva.se/events>

Prize lecture: 16 May, Lund University.

Prize symposium: 17 May, Stockholm. Please register via <http://kva.se/events>

Prize ceremony: 18 May, Beijer Hall, Royal Swedish Academy of Sciences, Stockholm.

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The Laureates

Shimon Sakaguchi, Professor, Osaka University, Osaka, Japan. Discovered and documented the occurrence of regulatory T cells by systematically investigating cells that develop in the thymus of young mice, in a series of experiments from 1985 onwards. Born 1951.

www.ifrec.osaka-u.ac.jp/en/laboratory/experimentalimmunology/

Fred Ramsdell, Head of Research, Parker Institute for Cancer Immunotherapy, San Francisco, CA, USA. Identified the faulty gene in some mice and children that are born with IPEX, a severe autoimmune disease, in 2001. This gene, FOXP3, has proven to be vital in the development of regulatory T cells. Born 1961.

www.parkerici.org/about

Alexander Rudensky, Professor, Memorial Sloan Kettering Cancer Center, New York, NY, USA. Knocked out the FOXP3 gene in mice in 2003, so they were unable to form regulatory T cells and thus suffered from severe autoimmune diseases.

At about the same time, Sakaguchi and Ramsdell independently presented evidence that FOXP3 governs the formation of regulatory T cells and, at a stroke, a dynamic new field of research arose. Born 1956.

www.mskcc.org/research-areas/labs/alexander-rudensky

More information about the Crafoord Prize

<http://kva.se/crafoordprize>

www.crafoordprize.se

The Royal Swedish Academy of Sciences, founded in 1739, is an independent organisation whose overall objective is to promote the sciences and strengthen their influence in society. The Academy takes special responsibility for the natural sciences and mathematics, but endeavours to promote the exchange of ideas between various disciplines.

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