

Researchers make significant discovery around how inflammation works

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Credit: Queen's University Belfast

A research team from Queen's University Belfast, in collaboration with an international team of experts, have made ground-breaking insights into how inflammatory diseases work.

This development could in time lead to new treatments for a range of diseases caused by inflammation, including sepsis, Crohn's disease, psoriasis and Multiple Sclerosis.

The findings have recently been published in the highly prestigious scientific journal, *Nature Communications*.

The team, led by Professor Paul Moynagh, Professor of Immunology at the Wellcome-Wolfson Institute for Experimental Medicine at Queen's University Belfast alongside Researchers from the Wellcome-Wolfson Institute for Experimental Medicine at Queen's, Dr. Alice Dubois and Dr. Rebecca Ingram found that a protein called Pellino 2 plays an important role in how the body starts the inflammatory response.

Professor Moynagh, explains: "Inflammation is the body's response to infection by disease-causing micro-organisms. This involves the movement of [white blood cells](#), such as neutrophils, from blood vessels, into the infected tissue where they destroy the invading micro-organism.

"However, the recruitment of neutrophils into tissues needs to be tightly controlled since prolonged tissue infiltration of these cells will lead to damage of normal healthy tissue. In the case of sepsis, we see inflammation spread rapidly throughout the body as a response to a [bacterial infection](#) in the blood, which can lead to life-threatening organ dysfunction."

The protein discovered by the researchers is involved in the triggering of the movement of white blood cells called neutrophils from blood vessels into the tissue that is infected by invading micro-organisms. Neutrophils kill the infection, but if they linger for too long they can also damage healthy tissue. If a method can be found to effectively and safely block or control the protein, then it could in future be developed into a specific therapy.

The research team has already had success with stopping the protein in lab-based models and is now exploring molecules that could potentially be turned into a therapy.

Inflammatory diseases are regarded as amongst some of the most difficult to treat, with sepsis in particular posing a critical challenge to frontline health care professionals. Understanding how the body promotes the migration of neutrophils into [tissue](#) may provide important clues for designing new drugs to control [chronic inflammatory diseases](#) such as sepsis.

Studies suggest that vulnerability to sepsis is on the rise around the world, as more people undergo invasive procedures or take immunosuppressive drugs to treat other chronic conditions, due to both aging populations and increased access to healthcare. A global rise in resistance to antibiotics also has increased the risk of blood poisoning, driving a growth in sepsis cases.

Dr. Alice Dubois, Researcher at the Wellcome-Wolfson Institute for Experimental Medicine at Queen's, commented on the breakthrough: "Our team at Queen's University demonstrated that the Pellino 2 protein was involved in the production of molecules that promote inflammation during bacterial infection. Blocking this particular protein could therefore be a strategy to treat [inflammatory diseases](#) caused by bacteria. This is a key step forward in improving treatment and patient outcomes in a wide range of diseases.

"Queen's University is committed to tackling global health issues. Inflammatory [disease](#) is prevalent, problematic and difficult to treat; understanding it is one of the most important challenges in medical research today."

Professor Moynagh's team includes Dr. Fiachra Humphries, Dr. Ronan

Bergin, Dr. Nezira Delagic; Dr. Bingwei Wang and Ruaidhri Jackson of Maynooth University; and Dr. Shuo Yang of the Nanjing Medical University, China.

Provided by Queen's University Belfast

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