

Media Backgrounder

How SOCS1 fights infection

What is SOCS1?

Suppressor of Cytokine Signaling 1, or SOCS1, is a protein found in most cells in our body. It was discovered by scientists at Melbourne's Walter and Eliza Hall Institute 10 years ago. SOCS1 plays a role in fighting bacterial infection by regulating the immune system's response to bacteria.

How does SOCS1 help fight bacterial infection?

Mal is a key protein involved in the body's fight against bacterial infection. It carries the message that an immune response is needed from outside the cell into the cell's nucleus. Once Mal is activated, it sets off a chain reaction which turns on an inflammatory response; the immune system's way of fighting infection.

SOCS1 acts as a 'brake' on this immune response. Because the innate immune response is so powerful and causes side effects, it is imperative that it is tightly controlled to stop it snowballing into an inflammatory avalanche that can manifest itself in emergency wards as severe sepsis or septic shock. Therefore, once Mal has passed on the message that the immune system needs to kick itself into gear to fight the bacterial infection, it must be quickly shut off so the message doesn't continue and lapse into a dangerous game of 'Chinese Whispers'.

SOCS1 carries out this brake-like action by recognizing that Mal has become 'altered' by passing on the message. SOCS1 begins to attach 'tags' to Mal that tells it to degrade, therefore removing Mal's ability to pass on further messages to the immune system. This is important because the immune system, only needs to be told once otherwise it starts to misbehave.

In septic shock cases, Mal does not receive the message from SOCS1 to break down, so the immune system keeps fighting cells in the body, leading to serious infection.

What are the implications of this study?

Dr Mansell's research has shown that by manipulating SOCS1 in bacterial infections and inducing the breakdown of Mal, the strong immune response that causes septic shock can be dramatically slowed.

How an immune cell detects bacteria

