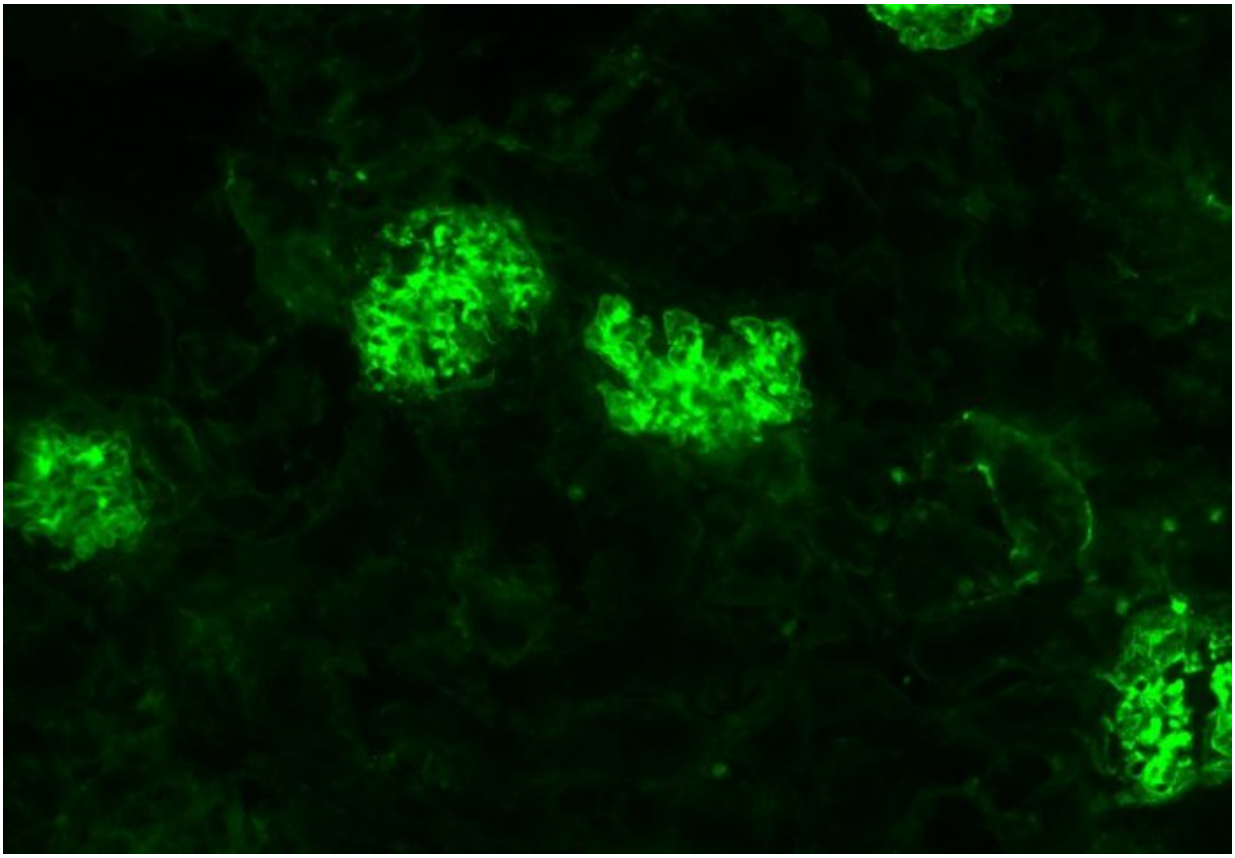
The virus-killing 'bodyguards' that make lupus worse

May 4 2018, by Kate Wighton



Immune cells (green) malfunctioning and attacking kidney cells. Credit: Imperial College London

A type of cell that protects the body from viruses and cancer may make lupus worse, and trigger flare ups of the condition.

These are the findings of a study led by Imperial College London, published in the journal *Science*.

The researchers say the findings provide insight into why viral infections can worsen the condition or trigger a resurgence of symptoms – known as a "flare".

Lupus affects around one in 1000 people – approximately 30,000 in the UK.

The condition is an autoimmune disease which triggers the immune system to malfunction and start attacking the body. This can lead to joint and skin problems, and in severe cases can cause damage to the heart, lungs, brain and kidneys.

The initial causes are unknown, but genes are thought to play a role. The condition is nine times more common in women than in men, and usually strikes between the ages of 20 and 49.

In the new study, researchers investigated a particular component of the immune system called C1q. This molecule is part of a system called the complement system. This system helps raise the alarm when the body is attacked by an invader, such as a bacteria or virus, and helps coordinate a defence.

A small number of individuals are unable to make the molecule C1q, and as a result of this they develop Lupus.

When our protection malfunctions

Using a combination of mouse models and human cell samples, the team found C1q is important for regulating how the virus-killing immune cells consume their energy—a process called metabolism.

Specifically, C1q controls the survival and functions of a type of cell called cytotoxic T-cells, or CD8 T cells. These are like the bodyguards of the immune system, and destroy threats to the body such as viruses, or cells that have turned cancerous.

The team found that when number of these cytotoxic T-cells became too high, the immune system starts malfunctioning and attacking the body – and lupus symptoms become worse. This may be why lupus patients may suffer a flare in symptoms when they contract a virus.

Viral trigger

Professor Marina Botto, lead author of the study from the Department of Medicine at Imperial, said:

"I've been working with lupus for many years, and we've only recently realised these cytotoxic cells – which have such a crucial role in protecting the body against viruses, may also play a key role in the disease."

Professor Botto explained that although the initial trigger for lupus remains unknown, the condition could be sustained by viral infections that trigger an expansion of the cytotoxic T-cells.

Professor Botto adds that other studies have suggested that patients with higher levels of these cytotoxic T-cells tend to have more severe forms of autoimmune diseases.

The team are now conducting further studies with lupus patients, to gain more insight into how these cells may be controlled.

More information: "C1q restrains autoimmunity and viral infection by regulating CD8+ T cell metabolism" *Science* (2018).

science.sciencemag.org/cgi/doi … 1126/science.aao4555

Provided by Imperial College London