

Autoimmune disease



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The complex network of cells and proteins that make up our immune system is an invaluable ally. Foreign invaders that would do us harm, such as viruses, are subject to intense assault by immune cells to keep us safe. Sometimes, however, this powerful defensive armoury turns against us. Immune attack against healthy tissues, known as autoimmunity, is thought to play a part in more than 80 different diseases, including type 1 diabetes, rheumatoid arthritis, Crohn's disease, multiple sclerosis and lupus. Tens of millions of people are affected by these chronic disorders in the United States alone, and although it is often possible to manage the debilitating symptoms, they cannot typically be cured. But researchers are getting closer to working out how to bring the immune system back on side.

The understanding of what goes wrong in autoimmune disease, and why, is advancing on numerous fronts (see page S46). One key question is what makes some people more likely to experience autoimmunity than others. Sex plays a significant part – autoimmune disease is around three times more common in women than in men – but the reasons for this are unclear (S51). Genetic variants that increase the risk of autoimmunity are also being identified (S57). And researchers are investigating environmental factors that might trigger disease. Among the suspected culprits are the microbes in our gut (S54) and viral infections – the phenomenon of long COVID, for instance, has been linked to autoimmunity (S48).

As the mechanisms behind autoimmune disease become clearer, so do opportunities for new treatments. Electrical stimulation of the vagus nerve is being explored as an alternative to anti-inflammatory and immunosuppressant drugs (S63). Therapy based on engineered immune cells, meanwhile, could bring errant immune activity to a halt entirely (S60). In some autoimmune diseases, such as alopecia areata, calming the immune system should allow the affected tissues to naturally recover (S56). But in others, such as type 1 diabetes, stopping the attack might be only half the battle: damaged tissues might still need to be replaced to restore normal function (S64).

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Richard Hodson

Senior supplements editor

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Contents

S46 CLINICAL TRIALS
Research round-up
The latest studies

S48 VIRUSES
Infectious triggers
The link between viruses and autoimmunity

S51 SEX DIFFERENCE
The importance of sex
Why autoimmune disease is more prevalent in women than in men

S54 MICROBES
A gut feeling
The gut microbes that can shape the course of disease

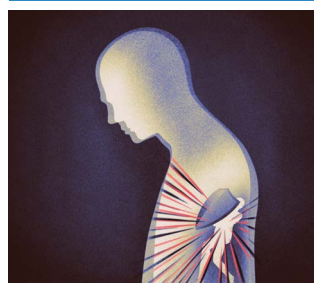
S56 Q&A
More than skin deep
Angela Christiano explains the mechanisms behind alopecia areata

S57 GENETICS
Cracking the code of autoimmunity
Uncovering the genes involved in autoimmune disease

S60 CELL THERAPY
Pitting cell against cell
Tailoring the body's immune defence

S63 Q&A
Electrifying therapy
Kevin J. Tracey sheds light on the role of inflammation in disease

S64 ISLET REGENERATION
Beta testing
Searching for a cure for type 1 diabetes

**On the cover**

Protecting the body from attacking itself.
Credit: Daniel Stolle