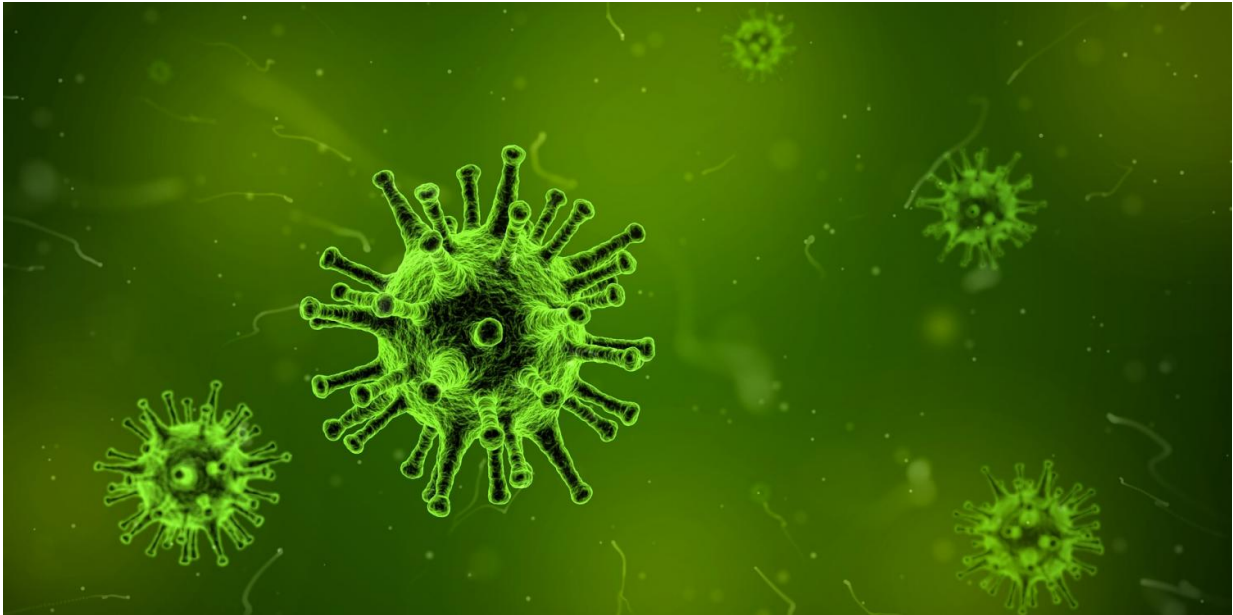


Fighting another virus? Blame your parents

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Genetics may play a bigger role in the body's disease-fighting ability than scientists previously thought, according to the results from a new study of twins in Queensland, Australia.

Scientists have long known that people build their own immune defence networks using antibodies—which are disease-fighting molecules that are deployed when our bodies are exposed to different viruses and other pathogens.

There is strong evidence, however, that [genetic factors](#) play a key role in how effectively and efficiently the body builds and deploys these disease-fighting molecules.

Researchers from James Cook University's Australian Institute of Tropical Health and Medicine (AITHM) and the University of Queensland's (UQ) Diamantina Institute have analysed [blood samples](#) from 1835 twins and thousands of their siblings.

The participants were recruited as part of the Brisbane Adolescent Twin Sample (BATS, also known as the Brisbane Longitudinal Twin Study; BLTS) conducted at the QIMR Berghofer Medical Research Institute (QIMRB).

AITHM Principal Research Fellow, Associate Professor John Miles of JCU said the team looked at the body's immune response to six common human viruses, including the Human Herpes [virus](#), Parvovirus, Epstein Barr virus and the Cocksackie virus.

"We were surprised to see that the 'power' of your immune system is predominantly controlled by the [genes](#) passed down from your mother or father," said Associate Professor Miles.

"These genes determine whether you mount an intense or weak immune response when confronted with a viral infection."

Professor David Evans, from UQ's Diamantina Translational Research Institute said environmental factors shared between the twins appeared to be more important in determining whether individuals had been exposed, and generated an antibody response, to a virus in the first place.

"The classic twin study compares trait similarity between [identical twins](#), (who are derived from the same fertilised egg and therefore share

identical genomes), with the trait similarity between fraternal twins (who are derived from different eggs and therefore are as genetically similar to each other as ordinary siblings)," said Professor Evans.

"Demonstrating that antibody response is heritable is the first step in the eventual identification of individual genes that affect antibody response."

The next step in the research is to identify the exact genes that are involved in tuning the strength of the immune response, said Dr. Miles.

"If we can identify these genes we can imitate 'super defenders' when we design next generation vaccines. Likewise, if we can identify the genes that are failing in an immune response we could possibly correct that dysfunction using immunomodulation," he said.

Professor Evans said the findings had very important implications for research into auto-immune disease.

"In the future, we are interested in seeing whether the genes that affect antibody response to particular viruses are also the same genes that affect risk of autoimmune disease (diseases where the body's immune system attacks itself).

"Demonstrating that the same genes underlie both [response](#) to viral infection and risk of autoimmune disease would provide powerful evidence that infection by certain viruses are involved in triggering or maintaining disease."

Queensland Minister for Science Leeanne Enoch said these results showed the high quality of science being conducted in Queensland. "It is wonderful that Queensland scientists have been able to generate ground-breaking research such as this," Ms Enoch said.

"These results highlight the importance of scientific collaboration and shows how Queensland is a leader in science and innovation."

The research was published in *The Journal of Allergy and Clinical Immunology* and was conducted in partnership with JCU's AITHM, UQ's Diamantina Institute and QIMRB. The work was supported by the National Health and Medical Research Council of Australia (NHMRC) and the Australian Infectious Diseases Network.

More information: Tanisha A. Hayward et al, Antibody response to common human viruses is shaped by genetic factors, *Journal of Allergy and Clinical Immunology* (2018). [DOI: 10.1016/j.jaci.2018.11.039](https://doi.org/10.1016/j.jaci.2018.11.039)

Provided by James Cook University

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