

Scientists unleash power of genetic data to identify disease risk

January 16 2018

Massive banks of genetic information are being harnessed to shed new light on modifiable health risks that underlie common diseases.

University of Queensland researchers have pioneered a method to integrate data from multiple large-scale studies to assess risk factors such as [body mass index](#) (BMI) and cholesterol levels, and their association with diseases including type two diabetes and heart [disease](#).

Professor Jian Yang, from UQ's Institute for Molecular Bioscience and Queensland Brain Institute, said the new method was more powerful than earlier techniques and enabled scientists to identify risk associations that were difficult to detect in smaller samples.

"Identifying new risk factors provides an avenue to look at diseases from a different angle," Professor Yang said.

"For example, LDL-cholesterol is known to be a risk factor for cardiovascular disease, but we were surprised to see that it actually lowers your risk of type two diabetes.

"Discoveries like this could have significant implications for medical research, the pharmaceutical industry and [public health policy](#)."

The study looked at seven known health risk factors and more than 30 [common diseases](#), in genetic data from more than 400,000 people.

Professor Yang said the method identified 45 potentially causal associations between health [risk factors](#) and diseases.

"Some of these associations – such as the link between BMI and type 2 diabetes and cardiovascular disease—have already been confirmed in randomised controlled trials, which validates our methods," Professor Yang said.

"Others identified in this study provide candidates for prioritisation in future trials, and fundamental knowledge to understand the biology of the diseases.

"For example, we identified a highly significant risk effect of HDL-cholesterol on [age-related macular degeneration](#)."

Professor Yang said the method was particularly valuable where clinical trials to investigate associations would be impractical or even unethical.

"Years of education is one trait we looked at in the study, and it had a protective effect against most diseases, particularly for Alzheimer's and [coronary artery disease](#) – but it is something that needs to be carefully investigated in the future," Professor Yang said.

The paper is published in *Nature Communications*.

More information: Zhihong Zhu et al. Causal associations between risk factors and common diseases inferred from GWAS summary data, *Nature Communications* (2018). [DOI: 10.1038/s41467-017-02317-2](https://doi.org/10.1038/s41467-017-02317-2)

Provided by University of Queensland

Citation: Scientists unleash power of genetic data to identify disease risk (2018, January 16)
retrieved 2 May 2024 from

<https://medicalxpress.com/news/2018-01-scientists-unleash-power-genetic-disease.html>

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