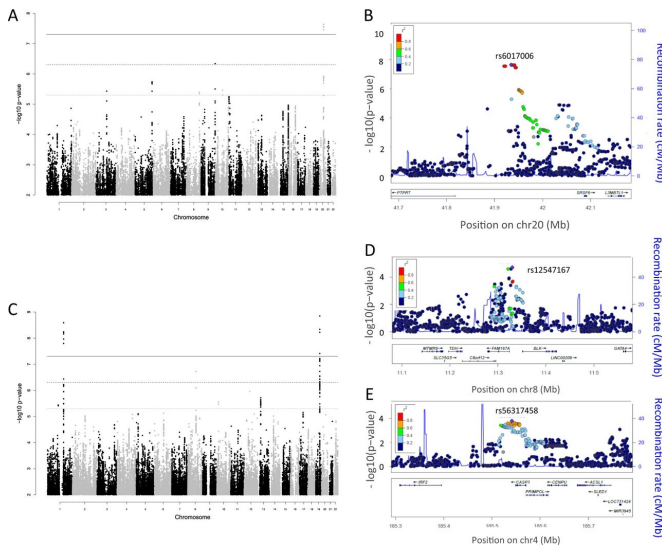


Researchers identify genes that make children susceptible to severe Kawasaki disease

14 April 2021, by Hayley Dunning



Severity and susceptibility GWAS results. Credit: *European Journal of Human Genetics* (2021). DOI: 10.1038/s41431-021-00838-5

Researchers have found genes that make children susceptible to the disease, and those associated with the heart damage it can cause in severe cases.

The findings could help clinicians identify which [children](#) with Kawasaki disease (KD) are at risk of developing coronary artery aneurysms, which can cause permanent [heart](#) damage and raise the lifetime risk of heart attacks.

They could also be relevant to a new inflammatory condition some children develop as a result of COVID-19, which has some similarities to Kawasaki disease. The results are published in the *European Journal of Human Genetics*.

Lead researcher Professor Michael Levin, Chair in

Pediatrics & International Child Health at Imperial, said: "Our findings suggest that children who develop KD are genetically determined to respond differently to one or more infections than the rest of the childhood population.

"The additional identification of genes underlying development of coronary artery aneurysms is a step towards identifying why some children suffer this severe consequence of the disease."

Heart attack risk

Kawasaki disease is a rare inflammatory syndrome known to affect young children, mainly under the age of five. It causes the [blood vessels](#) to become inflamed and swollen, which can lead to complications in the coronary arteries and the heart.

Without treatment, thirty percent of children with KD develop aneurysms in their coronary [arteries](#) (dilatations of the wall of the artery), which carry a risk of blood clotting, or later develop narrowing of the artery as healing occurs, which can lead to a heart attack. Children with severe aneurysms are at life-long risk of heart attack.

The risk of coronary artery aneurysms can be reduced with the use of antibody treatments and anti-inflammatory agents, but even with treatment around 10–20% of children with KD suffer long-term coronary artery damage.

It is therefore important to identify which children may be at risk of these most severe consequences of KD, and why. Now, an international research team led by Imperial College London and the University of San Diego have searched the genomes of children with KD, finding two distinct sets of gene variants that affect their outcomes.

Discovering genetic variants

One set of variants was discovered by comparing the genomes of children with KD with healthy individuals, using a database of genetic information collected from the UK, U.S. and Europe. These variants are associated with immune responses to infectious diseases and appear to increase the susceptibility of children to developing KD.

The team also compared the genomes of children with KD that developed coronary artery aneurysms with those that did not, finding a second set of genetic variants that were more common in those who develop aneurysms. These newly discovered variants appear to predispose KD patients to developing coronary artery aneurysms.

Kawasaki disease also shares some of the same symptoms and outcomes as the newly identified multisystem inflammatory syndrome in children that follows SARS-CoV-2 infection (known as PIMS-TS or MIS-C). The researchers say their new genetic findings may therefore have relevance to the new inflammatory disease, which also can cause coronary artery aneurysms.

"Identification of novel locus associated with [coronary artery](#) aneurysms and validation of loci for susceptibility to Kawasaki [disease](#)," by Clive Hoggart et al., is published in the *European Journal of Human Genetics*.

More information: Identification of novel locus associated with coronary artery aneurysms and validation of loci for susceptibility to Kawasaki disease, *European Journal of Human Genetics* (2021). [DOI: 10.1038/s41431-021-00838-5](https://doi.org/10.1038/s41431-021-00838-5)

Provided by Imperial College London

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