Researchers find common mutation in the genetics behind eczema

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Scientists of the A*STAR Singapore Immunology Network Olaf Rotzschke group who participated in the study (from left: Puan Kia Joo, Nurhashikin Binti Yusof, Dilip Kumar, Olaf Rotzschke). Credit: A*STAR Singapore Immunology Network

Everyone who has ever had to endure eczema knows just how irritating the symptoms are. Now A*STAR researchers have pinpointed a genetic predisposition to the condition, opening possibilities for new treatments.

The itchy, red and cracked skin typical of atopic dermatitis, otherwise known as eczema, is an inflammatory condition which affects up to one in five children, many of whom continue to suffer into adulthood.

Topical corticosteroid creams and other medication can treat persistent symptoms and severe cases, but can induce side-effects. With the number of cases increasing, scientists are searching for what causes the condition.

Now, Olaf Rotzschke and his team at the A*STAR Singapore Immunology Network have uncovered a common genetic mutation which increases the risk of atopic dermatitis. As part of a large study aimed at identifying drug targets for allergies and other immune conditions, Rotzschke's team collected blood samples and clinical data from 600 Singaporean residents.

The scientists analyzed the activity of more than 30,000 genes in each of the blood samples and compared this to 5 million common genetic mutations, referred to as single nucleotide polymorphisms (SNPs), for each individual.

After analyzing this extensive database, the researchers discovered that the activity of the gene VSTM1, which encodes a protein called SIRL-1, was heavily dependent on a specific SNP. This mutation, analysis revealed, lowered SIRL-1 levels on a subset of immune cells called monocytes and increased the risk of atopic dermatitis by 30 per cent.

SIRL-1 is a molecule found on the surface of monocytes, and other immune cells, and functions to regulate the defense against invading pathogens. It is not currently known which molecule, or ligand, naturally docks to SIRL-1 inside the human body, but identifying such a molecule could result in new intervention strategies for eczema, Rotzschke explains.

"Our Dutch colleagues are very active in the hunt of the ligand," he says. "Topical application of this compound through a cream or ointment could help suppress rashes and other symptoms."

His own team is casting a wider net, investigating the genetic profile of VSTM1 and how this gene could be involved in other conditions. "We have already looked in a subset of potential diseases but the search is by no means exhausted," he says.

More information: Dilip Kumar et al. A functional SNP associated with atopic dermatitis controls cell type-specific methylation of the VSTM1 gene locus, *Genome Medicine* (2017). DOI: 10.1186/s13073-017-0404-6

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