Food allergy linked to hyperactive immune system at birth

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Credit: Anna Langova/public domain

The Australian research team discovered a new pattern of immune activation at birth that was associated with an increased risk of babies developing food allergies in early life. The finding could lead to future treatments for babies and infants to prevent childhood food allergies.

The research, led by Dr Yuxia Zhang and Professor Len Harrison from

the Walter and Eliza Hall Institute, and Associate Professor Peter Vuillermin from Barwon Health, Deakin University and the Murdoch Childrens Research Institute, was published today in the journal *Science Translational Medicine*.

Professor Harrison said the team had described a new immune 'signature' found in cord blood at birth that identified babies at risk of developing food allergies. "We found a link between children who had hyperactive immune cells at birth and the development of allergies to milk, eggs, peanuts, wheat and other common foods in their first years of life," Professor Harrison said.

Dr Zhang said babies at risk of developing food allergies had activated immune cells at birth. "In at-risk babies, immune cells called monocytes were activated before or during birth," Dr Zhang said. "Signals from these cells encouraged the development of immune responses by specialised immune cells called T cells that were predisposed to cause allergic reactions to some foods."

The research used well-documented food allergy information collected by the Barwon Infant Study (BIS), a collaboration between Barwon Health, Deakin University and Murdoch Childrens Research Institute. BIS is a infant health study of more than 1000 pregnant women and their babies from the Barwon region of Victoria, looking at immunity and allergy as well as respiratory, cardiovascular and neurological development.

Associate Professor Vuillermin, a paediatrician who leads the BIS, said childhood food allergies had become very common in Australia.

"There has been a three-fold increase in hospital presentations due to food allergy over recent decades, and most of this increase has been among children under five years of age," Associate Professor Vuillermin

said. "In fact up to one in every 10 babies in Melbourne develop food allergy during the first year of life.

"We don't know why the increase in food allergy has occurred. The important thing about this study is that we've shown the immune systems of babies who develop food allergy are in a sense 'primed' for allergic disease by the time they are born," Associate Professor Vuillermin said.

Professor Harrison said one of the next steps for the research team would be to identify why these babies have hyperactive immune cells.

"Are the immune cells inherently activated because of the baby's genes or do they become activated at the time of birth or earlier in pregnancy, and how?" Professor Harrison said.

"This study really emphasises how critical it is to look at pregnancy and early life to really understand why chronic immune and inflammatory disorders such as allergies develop in childhood and later."

More information: "Cord blood monocyte–derived inflammatory cytokines suppress IL-2 and induce nonclassic "TH2-type" immunity associated with development of food allergy," DOI: 10.1126/scitranslmed.aad4322

Provided by Walter and Eliza Hall Institute

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