

Resistant starch looms as a key in battle against stunting

February 20 2018

The addition of a prebiotic called resistant starch to the diets of infants in low-income countries is showing the potential to reduce stunting and malnutrition.

Researchers at Flinders University in South Australia have completed a lab study in conjunction with the University of Malawi where they added the prebiotic to stools collected from 11 pre-weaning and 23 early weaning infants in a remote African village.

The study found the stools from both groups had the ability to ferment resistant starch to produce the short-chain fatty acid acetate, which is essential for gut health.

Flinders GI Global Health Unit Project Manager Mortimer found acetate played a role in reducing gut inflammation, regulating lipid and glucose metabolism and providing an energy source.

"Prior to this study it had been thought that pre-weaning infants did not have the ability to ferment resistant starch but we have shown that they do," Mortimer said, who worked with Dr. Yanan Wang, Post-Doctoral Research Fellow with the South Australian Health and Medical Research Institute Infection and Immunity Theme.

"It is the point of conception to the first two years of life that is considered the most important for nutrition and growth.

"United Nations agencies talk about the first 1000 days of life, which covers that period so if you're stunted at age two then there's very little that can be done to help reverse the mental and physical effects of stunting."

Globally, the World Health Organisation (WHO) estimated 155 million children under 5 years of age were stunted in 2016.

In Africa, India and other low-income countries, more than 50 per cent of deaths in children under the age of five years can be attributed to under-nutrition.

"On a day-to-day basis people in low-to-middle income countries are exposed to environmental pathogens through the water they drink, the food they eat and there are also a limited number of toilets so open defecation is often practised," Mortimer said.

"So you can imagine the burden on the gastrointestinal system in that context and you can get an idea of the inflammation of their gut, which then results in problems with absorption of nutrients and can ultimately lead to stunting."

A clinical trial is also underway in India where infants and women of child-bearing age are being fed resistant starch. The faecal samples have been collected from that study and the samples are undergoing sequencing to determine bacterial composition.

"If there is something that can be introduced into the diet that is affordable and acceptable as a food supplement then we could have the ability to reduce that inflammation," Mortimer said.

"What we need to now look at also is how do the changes in short chain fatty acids influence health outcomes – is it only through the reduction in

inflammation or is it also because there's another energy source being provided in diets that are marginal?

"That's why we thought another study involving young children actually consuming resistant starch was the next step."

However, Mortimer said developing food products supplemented with resistant starch was not the only solution.

She said resistant starch was present in a number of common foods, such as corn used to make maize meal porridge, and could be increased through preparation techniques.

"Resistant starch has quite a lot going for it because it is very affordable, it's easy to transport and it doesn't interfere with palatability so it is ticking a lot of boxes," Mortimer said.

"There are different cooking techniques such as repeated heating and cooling that mothers at home could use to increase the resistant starch in the foods they typically consume.

"The timeline to getting it into a commercial product that most of the population is consuming is potentially long so in the interim there is a possibility for interventions based more on education."

The researchers hope to publish the in vitro study by the end of the year while the results of the trial in India will not be known for about six months.

Mortimer said the next steps involved making an association between the changes in the short-chain fatty acids, the bacterial species and then the health outcomes such as growth, micronutrient deficiencies and immune measures.

"In order to get the big players such as the UN to pay attention you need to show strong evidence for all of those steps in the middle," Mortimer said.

"There are a lot of studies going on in probiotics and prebiotics at the moment so it's a very interesting time to be working in this area and it is something that the UN agencies are looking at.

"We are certainly looking at [resistant starch](#) in a lot of detail, not just in this study but in other work that our team is doing as well."

Provided by Flinders University

Citation: Resistant starch looms as a key in battle against stunting (2018, February 20) retrieved 25 April 2024 from

<https://medicalxpress.com/news/2018-02-resistant-starch-looms-key-stunting.html>

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