



Media Release

Attention: Science/Medical reporters

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Human diet gives pathogens something to eat

An international research team led by Monash University scientists has uncovered the first example of a bacterium causing disease in humans by targeting a molecule that is incorporated into our bodies through what we eat.

Their discovery was published today in the international journal *Nature*. It shows that a potent bacterial toxin, subtilase cytotoxin, specifically targets human cells that have incorporated a sugar called Neu5Gc on their surface.

Humans can not make Neu5Gc and so should be resistant to the toxin. However, consuming foods that have high levels of Neu5Gc, such as red meat and dairy products, leads to humans 'expressing' the sugar on to the surface of cells lining the intestines and blood vessels. This makes the cells vulnerable to attack by the toxin.

Subtilase cytotoxin is produced by Shiga-toxigenic *E. coli*, a bacterium which, in humans, causes bloody diarrhoea and the potentially fatal disease haemolytic uraemic syndrome (HUS; also known as "hamburger disease"). In HUS, toxin-induced damage to the delicate cells lining the blood vessels causes clots, damage to red blood cells and kidney failure. Humans usually become infected after eating contaminated food.

Dr Travis Beddoe from Monash's Department of Biochemistry and Molecular Biology said it was ironic that red meat and dairy products, the richest dietary sources of Neu5Gc, were also the foods most commonly contaminated with the *E. coli* bacteria that produce the toxin. "Through dietary choices, humans may expose themselves to an increased risk of infection with the *E. coli* bacterium, and simultaneously sensitise themselves to the potentially lethal actions of the toxin it produces," Dr Beddoe said.

The international research team included Professor Jamie Rossjohn from Monash and scientists from The University of Adelaide, the University of California, Davis, the University of California, San Diego and the Emory University School of Medicine in Atlanta, Georgia.

"This research emphasises the need for people to eat only well-cooked burgers, or pasteurised dairy products, as these processes destroy contaminating bacteria", Dr Beddoe said.

The research was funded by Australia's National Health and Medical Research Council, ARC Centre of Excellence in Structural and Functional Microbial Genomics and the National Institutes of Health in the US.

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