Surprising findings about Hepatitis C and insulin resistance

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We have known for several years that Hepatitis C, a common cause of liver cirrhosis and cancer, also makes people three to four times more likely to develop Type 2 diabetes.

In studying the insulin resistance of 29 people with Hepatitis C, Australian researchers have confirmed that they have high insulin resistance, a precursor to diabetes. However, almost all insulin resistance was in muscle, with little or none in the liver, a very surprising finding given that Hepatitis C is a liver disease.

Dr Kerry Lee Milner and Professor Don Chisholm from Sydney's Garvan Institute of Medical Research, in collaboration with Professor Jacob George from the Storr Liver Unit, University of Sydney at Westmead Hospital, have published their study in the prestigious international journal, *Gastroenterology*, now online.

Insulin, a hormone made by the pancreas, helps the body use glucose for energy. The two most important organs that respond to insulin are the liver and muscle. A healthy liver responds to insulin by not producing glucose, while healthy muscle responds by using glucose. An insulin resistant liver produces unwanted glucose, while insulin resistant muscle cannot absorb it from the bloodstream, leading to high levels of sugar in the blood.

"Contrary to all expectations, not only did we find no significant insulin resistance in the liver of the patients in the study, half of them suffered

from a strain of Hepatitis C that causes about three times the normal level of fat to accumulate in the liver," said Professor Chisholm.

"The fifteen people with very high levels of fat in the liver had the same degree of insulin resistance as the fourteen that didn't have fatty livers."

"A number of important investigators around the world have been arguing that fat in the liver is an extremely important determinant of insulin resistance, perhaps the most important. At least in this context, we've shown that not to be the case."

"Before you get Type 2 diabetes, you must become insulin resistant and your insulin producing cells must also fail to compensate. Insulin resistance alone will not give you diabetes."

"In our study, we gave intravenous glucose, a specific stimulus to insulin secretion, and showed that insulin secretion was not impaired in Hepatitis C patients compared to our control group."

"This finding tells us that people with Hepatitis C who develop diabetes probably have susceptible insulin-producing cells, and would probably get it anyway - but much later in life. The extra insulin resistance caused by Hepatitis C apparently brings on diabetes at 35 or 40, instead of 65 or 70."

"More work now needs to be done into why Hepatitis C causes insulin resistance in muscle. That will give us better insight into the behaviour of the disease."

"At this stage, it is helpful for people with Hepatitis C to understand insulin resistance and what it can mean for them. If they have relatives with Type 2 diabetes, they will be genetically prone to developing it themselves and so would be advised to manage their diets very carefully

and take plenty of exercise - to slow onset."

Hepatitis C is a blood-borne virus and in Australia is caused mainly by drug users sharing needles, but also by unsterile tattooing or body piercing. There is no vaccine for Hepatitis C, unlike Hepatitis A and B.

Provided by Research Australia