New use for old drugs in treating hepatitis C

June 7 2010

Common drugs used to treat conditions such as diabetes and obesity could be used to successfully treat hepatitis C virus infection.

Research led by the University of Leeds has found drugs such as anti-diabetic drug Metformin and AICAR, used to combat obesity, can prevent the hepatitis C virus from replicating in the body.

Hepatitis C virus affects an estimated three per cent of the world's population and there are four million carriers of the virus in Europe alone. The virus affects the liver and recovery rates are low: only around 40 per cent of hepatitis C sufferers will fully recover, with others developing cirrhosis and in many cases, liver cancer.

"We're very excited about these findings," says Professor Mark Harris from the University's Faculty of Biological Sciences. "These drugs are already on the market, and whilst substantial clinical trials still need to take place before they can be used to treat hepatitis C infection, we think it could be an enormous step forward in the battle against the virus."

The research was supported by the Wellcome Trust, the Medical Research Council and the Biotechnology and Biological Sciences Research Council.

Drugs such as Metformin and AICAR work by stimulating an enzyme called AMP kinase (AMPK) which regulates energy within our cells - the very enzyme that hepatitis C virus represses to enable it to replicate.

AMPK's usual function is to conserve the energy balance in cells, which it does by temporarily shutting down the production of lipids (fats) and membranes when it senses an increase in energy requirements. Professor Harris and his team have now shown that the hepatitis C virus switches off AMPK so that the cell continues production of lipids and membranes, both of which are vital to its survival.

"You'd expect AMPK to be activated when a cell becomes infected by a virus, because it would sense the increase in energy required to enable the virus to replicate. In such cases, AMPK would shut down certain functions of the cell temporarily until the cell's energy is rebalanced," says Prof Harris. "We found that hepatitis C virus, because it needs lipids and membranes, causes the opposite to happen."

Building on this finding, the research team were able to examine how cells would react when treated with common drugs that stimulate AMPK. They found that in infected cells, the drugs were able to halt virus replication, enabling cells to clear the infection.

A patent has been filed on the discovery and the team will shortly embark on a small-scale clinical trial with The University of Nottingham. This will provide a greater evidence base upon which future clinical trials can be based.

More information: This research is published in a paper entitled Enhanced hepatitis C virus genome replication and lipid accumulation mediated by inhibition of AMP-activated protein kinase in the latest edition of Proceedings of the National Academy of Sciences (PNAS). Statistics about Hepatitis C from the World Health Organisation: www.who.int/csr/disease/hepati … o2003/en/index1.html

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