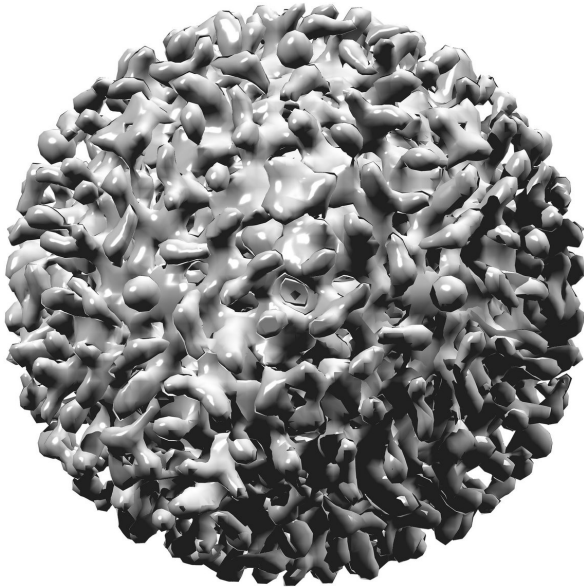


How the immune system reacts to hepatitis C viruses

24 April 2020



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If a virus penetrates a cell, the immune system reacts immediately and produces the signaling protein interferon. This protein activates hundreds of highly specialized defence mechanisms in all surrounding cells, which can inhibit various steps in the replication of the virus. Even though these so-called interferon-stimulated genes form the backbone of the innate immune system, the mechanisms of action of only a few of them are understood as yet.

The interferon-stimulated gene C19orf66 plays an important role in the defense against [hepatitis C](#) viruses. A research team at Ruhr-Universität Bochum (RUB) headed by Professor Eike Steinmann from the Department for Molecular and Medical Virology has now studied how C19orf66 works. The results show that C19orf66 disrupts the formation of the viral replication machinery.

The researchers published their study on 12 April 2020 in the *Journal of Hepatology*.

Hepatitis C patients produce more of the gene than healthy individuals

"In order to find out whether the C19orf66 gene is increasingly activated in samples from hepatitis C patients, we first examined liver tissue samples from infected and healthy people," explains Ph.D. student Volker Kinast. The analysis showed that the production of C19orf66 is increased in hepatitis C patients.

"In the next step, we checked whether C19orf66 has an antiviral effect against hepatitis C viruses. We conducted experiments using [cells](#) that contained a lot of C19orf66 and cells that contained only a little of it. We then observed that the hepatitis C [virus](#) replicates much more slowly in cells that contain a lot of C19orf66 than in control cells," says Kinast.

Virological and molecular biological analyses

Additional experiments with cells in which the gene C19orf66 was completely switched off confirmed: C19orf66 inhibits the replication of the hepatitis C virus. In order to understand how C19orf66 does this, the researchers conducted numerous virological and molecular biological analyses.

The results show that C19orf66 disrupts the formation of the viral replication machinery. The hepatitis C virus has the ability to manipulate [liver cells](#) in such a way that an accumulation of membrane vesicles occurs within the cell. The virus uses these membrane vesicles as a scaffold to replicate effectively. C19orf66 disrupts and alters the structure of the scaffold and thus inhibits the replication of the virus.

Many people don't know that they are infected

An estimated 71 million people have a chronic hepatitis C infection, and a large percentage of them are not aware of this fact. Over the years, the virus damages the liver, resulting in severe liver disease that often requires liver transplantation.

More information: Volker Kinast et al. C19orf66 is an interferon-induced inhibitor of HCV replication that restricts formation of the viral replication organelle, *Journal of Hepatology* (2020). [DOI: 10.1016/j.jhep.2020.03.047](https://doi.org/10.1016/j.jhep.2020.03.047)

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