

First trial of a new hepatitis C vaccine shows promise

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(Medical Xpress) -- A new vaccine against the chronic liver disease hepatitis C has shown promising results in a first clinical trial in humans, Oxford University researchers report.

The vaccine generated immune responses similar to those seen in the minority of people who are naturally able to clear any infection with the [hepatitis C virus](#).

The findings suggest it might be possible to develop a vaccine that will be broadly effective against hepatitis C and offer lasting protection.

The researchers are hopeful that in time, this work could lead to a vaccine that protects those at risk from the disease or helps in treating those with hepatitis C infections. They caution that many more studies over a number of years would be needed in developing such a vaccine.

‘We’ve found that it’s possible to prime large cellular immune responses against hepatitis C that last for at least a year,’ says Professor Paul Klenerman of the Nuffield Department of Clinical Medicine at Oxford University.

‘The immune responses we’ve seen are exciting and we are beginning the next stage of trials. While we are hopeful, it could be a long road to any vaccine that protects people against hepatitis C,’ he adds.

The study is published in the journal *Science Translational Medicine*. It was funded by the European Commission along with support from the UK Medical Research Council, the Wellcome Trust, the Oxford Biomedical Research Centre, and the Oxford Martin School at the University of Oxford.

Hepatitis C is caused by a virus transmitted through the blood, with infection typically remaining hidden for many years. Many people do not know they are infected because they do not show any symptoms.

It is estimated that about 250,000 people are infected with hepatitis C in England and Wales, and the disease is now the leading reason in the West for liver transplants.

The course of hepatitis C is unpredictable. In a number of people, infection with hepatitis C leads to gradual damage to the liver than can

eventually lead to cirrhosis. Some people's immune responses, however, are sufficient to clear the virus soon after infection, which gives hope that a vaccine might be possible.

However, hepatitis C is a virus that constantly changes its make-up, like HIV. This makes it a very difficult target for designing a vaccine.

The Oxford researchers, along with colleagues from an Italian biotech company and the University of Birmingham, have used a new approach to stimulate a different arm of the body's immune system from previous attempts at a vaccine.

Their vaccine is designed to generate a T cell response to the more constant internal parts of the hepatitis C virus, rather than looking to prime an antibody attack on the ever-changing outer coat of the virus.

'The outside shell of the hepatitis C virus is very variable but the inside of the virus is much more stable. That's where the engine of the virus is, where we may be able to successfully target many of the crucial pieces of machinery,' explains Professor Klenerman. 'But we need T cells and not antibodies to be able to react to the inner components of the virus.'

The Oxford University researchers, led by Professor Klenerman and Dr Ellie Barnes, carried out a first clinical trial in humans with the new vaccine.

The phase 1 study was done primarily to gain safety data on the vaccine. It also recorded what kind of immune response was generated. In total, 41 healthy adults participated in the study.

The vaccine appeared safe in this group: there were no significant adverse effects reported.

The researchers found that the vaccine could stimulate a large T cell response against hepatitis C that lasted for at least a year (the length of the study).

The [immune response](#) was of a similar type and size to that reported in people who naturally clear the virus from their bodies after infection.

The Oxford researchers are now carrying out a trial to see if the vaccine can help treat those already infected with hepatitis C, as well as continuing to develop the vaccine to get better immune responses.

‘T cell responses often become weak in those with chronic [hepatitis C](#) infections,’ explains Professor Klenerman. ‘It may be that using a vaccine to boost their immunity could become part of any treatment with other drugs.’

A US team is also looking to carry out a larger trial in at-risk groups to see if the [vaccine](#) can offer any protection against infection with [hepatitis C](#).

More information: E. Barnes et al., “Novel adenovirus-based vaccines induce broad and sustained T cell responses to HCV in man,” *Science Translational Medicine*, 4(115):115ra1, 2012.

Related paper:

S. Colloca et al., “Vaccine vectors derived from a large collection of simian adenoviruses induce potent cellular immunity across multiple species,” *Science Translational Medicine*, 4(115):115ra2, 2012.

Provided by Oxford University

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