Antibody prevents hepatitis C in animal model

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A monoclonal antibody developed by MassBiologics of the University of Massachusetts Medical School (UMMS) and tested in an animal model at the Texas Biomedical Research Institute, prevents infection by the hepatitis C virus (HCV).

Researchers found that the human monoclonal antibody targeting the virus protected chimpanzees from HCV infection in a dose-dependent manner in a study conducted at Texas Biomed's Southwest National Primate Research Center. Chimpanzees are the only species other than humans that can be infected by HCV and therefore the results from this study were critical in the development of the monoclonal antibody.

The new report by scientists from MassBiologics; Texas Biomed; the National Institutes of Health (NIH); and Merck Research Laboratories, and funded by MassBiologics and NIH, appears in the August 30th issue of *PLoS Pathogens*. Researchers had previously demonstrated that the monoclonal antibody, called HCV1, blocks HCV from infecting liver cells in laboratory tissue culture.

"This is an important preclinical proof-of-concept study demonstrating a high dose of neutralizing antibody can protect the liver from HCV infection using monoclonal antibodies in a study that was designed to mimic the transplantation setting," said study co-author Robert E. Lanford, Ph.D., of Texas Biomed.

"One can envision improving on these results with a cocktail of

antibodies or by using this antibody with some of the newer antivirals currently in clinical trials. Infection of the new donor liver by residual virus in the patient is one of the major obstacles preventing a full recovery in these patients," Lanford added.

MassBiologics has been pursuing the development of HCV1 as a therapy for patients with end-stage liver disease undergoing liver transplantation as a result of HCV infection. HCV1 is a monoclonal antibody that binds to the surface of the HCV virus and blocks the ability of the virus to enter liver cells.

HCV damages the liver and is the leading indication for liver transplantation, diagnosed in about half of the 6,000 patients who receive liver transplants each year in the United States. According to the US Centers for Disease Control and Prevention (CDC), 3.2 million Americans are chronically infected with HCV and approximately 10,000 die annually of the disease. Globally, as many as 170 million people are estimated to suffer from HCV infection. The CDC recently recommended that everyone born from 1945 to 1965 should be screened for HCV regardless of whether they have known risk factors.

For patients with end-stage liver disease from HCV infection, liver transplantation is the only option. While it can be a life-saving treatment, transplantation does not cure the disease. In nearly all cases, the patient's new liver is eventually infected by HCV because the virus remains in the patient's bloodstream during surgery. The course of recurrent HCV disease is accelerated after transplantation and up to 20 percent of transplant patients develop cirrhosis within five years. Unfortunately, the standard antiviral drugs currently used to treat HCV prior to the onset of end-stage liver disease are poorly tolerated after liver transplantation, leaving these patients with few options.

More information: dx.plos.org/10.1371/journal.ppat.1002895