Researchers Win Nobel Prize for Hepatitis C Discovery

The blood-borne virus, which can lead to cirrhosis and liver cancer, remains a major global health threat.

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This year's Nobel Prize in Physiology or Medicine was awarded to three scientists who contributed to the discovery of hepatitis C virus (HCV), paving the way for research that would lead to the development of effective treatment and, potentially, the eventual elimination of the global health threat.

The award winners, Harvey Alter, MD, of the National Institutes of Health, Michael Houghton, PhD, of the University of Alberta in Canada, and Charles Rice, PhD, of Rockefeller University in New York City, will share the $1.07 million prize equally.

"Prior to their work, the discovery of the hepatitis A and B viruses had been critical steps forward, but the majority of blood-borne hepatitis cases remained unexplained," the the Nobel Assembly said in its announcement of the award. "The discovery of hepatitis C virus revealed the cause of the remaining cases of chronic hepatitis and made possible blood tests and new medicines that have saved millions of lives."

Prior to the identification of HCV, hepatitis C was called "non-A/non-B hepatitis" because it was clearly a separate disease not caused by the two hepatitis viruses recognized at the time. Over years or decades, chronic hepatitis C can lead to serious liver complications, including cirrhosis, liver cancer and the need for a liver transplant.

Concerned about unexplained cases of hepatitis among blood transfusion recipients who tested negative for hepatitis A and B viruses, Alter and his team at the National Institutes of Health showed that blood from these patients could transmit the disease to chimpanzees—the only other susceptible host besides humans. But the new virus eluded detection for more than a decade.

Houghton, then at Chiron Corporation, and his colleagues worked to crack the genetic code of the virus, using antibodies from patients with the mysterious disease to identify bits of viral genetic material. Ultimately, they identified a novel RNA virus in the Flavivirus family.

Rice and his team at Washington University in St. Louis then used genetic engineering to create a

replication-competent variant of HCV that, when injected into the livers of chimps, led to pathological changes similar to those seen in people with the unexplained illness.

The researchers' work led to the development of blood tests for HCV which, along with screening tests for hepatitis B, have essentially eliminated post-transfusion hepatitis in many parts of the world, according to the Nobel Assembly.

Before the advent of direct-acting antiviral drugs in 2013, the standard of care for hepatitis C was interferon-based therapy, which usually involved weekly injections for six months to a year, caused difficult side effects and cured only about half of treated patients. Today, almost everyone with HCV can be cured in two or three months with well-tolerated oral medications, leading experts and advocates to look toward the elimination of hep C as a public health problem worldwide.

Alter and Houghton previously shared a Lasker Award—considered "America's Nobel"—for their hep C research in 2000, and Rice was awarded that prize in 2016, along with Ralf Bartenschlager, PhD, of University Hospital Heidelberg, and Michael Sofia, PhD, of Arbutus Biopharma. In 2013, Houghton famously turned down a prestigious Canadian award because it did not recognize two of his colleagues at Chiron, Qui-Lim Choo, PhD, and George Kuo, PhD, who played an integral part in the discovery research.

Speaking to reporters this week, Houghton said he would accept the Nobel Prize, but he again emphasized the collaborative nature of scientific research. "Most big inventions—not all of them, but most—involve many people," he said.

Click here to learn more about hepatitis C.
