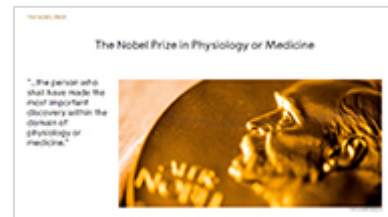


## Speaker's manuscript – Medicine Prize 2020 The fight against one of our greatest global health problems – blood-borne hepatitis

### The Nobel Prize in Physiology or Medicine

- The Nobel Prize in Physiology or Medicine is one of the five prizes founded by Alfred Nobel and awarded on 10 December every year.
- Before Alfred Nobel died on 10 December, 1896, he wrote in his will that the largest part of his fortune should be placed in a fund. The yearly interest on this fund would pay for a prize given to "those who, during the preceding year, shall have conferred the greatest benefit to humankind."



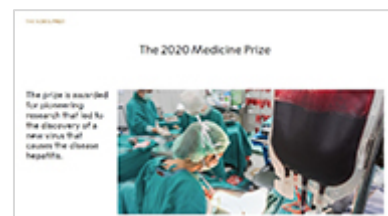
### Who is rewarded with the Medicine Prize?

- The Nobel Prize in Physiology or Medicine is thus awarded to people who have either made a discovery about how organisms work or have helped find a cure for a disease.
- This is May-Britt Moser, 2014 Nobel Laureate in Medicine. In 2005 she and Edvard Moser discovered a type of cell in the brain that is important for determining one's position. They also found that those cells cooperate with different nerve cells in the brain that help us to navigate. You can say that the Laureates discovered and explained a kind of GPS system in the brain.
- Other Medicine Laureates include: Francis Crick, James Watson and Maurice Wilkins, who received the 1962 prize for their discoveries and descriptions about the structure of DNA molecules. Alexander Fleming, Ernst Chain and Howard Florey, who received the 1945 Prize for the discovery of penicillin and its curative effects on bacterial diseases.



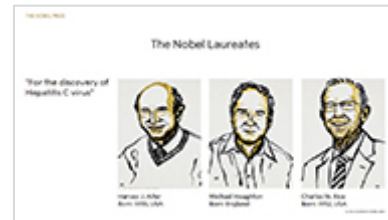
### The 2020 Medicine Prize

- The 2020 Nobel Prize in Physiology or Medicine is awarded for the discovery of a completely new virus that causes the disease hepatitis.
- What is hepatitis? Hepatitis is an inflammation of the liver.
- This inflammation is caused primarily by a virus and leads to chronic liver damage and cancer in people all over the world.
- More than a million people die of hepatitis every year, which is about as many as die of tuberculosis and HIV infection.



## The Nobel Laureates

- This year's Nobel Laureates, Harvey J. Alter, Michael Houghton and Charles M. Rice, made their Nobel Prize-awarded research contributions from the early 1970s through the late 1990s.
- The work of each researcher built upon the work the others had done, and together they made it possible for us today to detect and treat infections caused by the hepatitis C virus.



## Different types of hepatitis virus

- As early as the 1940s, it became clear that there were two main kinds of hepatitis infections:
  - The first is infections that are transmitted through polluted water and food, and these usually heal on their own. This kind of infection is caused by the hepatitis A virus.
  - The second kind are transmitted through the blood and are caused by some kind of infectious agent that was unknown at that time.
- In the 1960s, researchers identified an infectious agent in the blood that causes inflammation of the liver, a disease known as chronic hepatitis. They called this the hepatitis B virus.
- The scientists who discovered the hepatitis B virus were awarded the 1976 Nobel Prize in Physiology or Medicine.
- With the discovery of the hepatitis B virus, it became possible to test a person's blood before giving a blood transfusion; nevertheless, some people still contracted hepatitis after receiving blood. Could there be yet another kind of unknown infectious agent?



## The hepatitis C virus is identified – the contributions of the three laureates

- The three Nobel Laureates have all contributed in different ways to the identification of the unknown infectious agent – the hepatitis C virus:
- Harvey J. Alter: Alter realised that the unknown infectious agent could transmit the disease to chimpanzees and that it was a virus. The disease was given the working name of ‘non-A, non-B’ hepatitis.
- Michael Houghton: Now the unknown virus needed to be identified, and Houghton’s research involved a painstaking effort to isolate the genetic code of the new virus – that is, its genome. When someone gets infected by a virus, their body often forms so-called antibodies to fight the virus. When Houghton discovered antibodies for the virus in infected people, it was further evidence that it was the new virus that was causing the hepatitis. The virus was given the name hepatitis C.
- Charles M. Rice: One final question remained: could the virus cause hepatitis on its own? Yes. Rice demonstrated this by injecting hepatitis C virus into the livers of chimpanzees. The chimpanzees developed chronic hepatitis.



## For the benefit of humankind

- The Nobel Laureates' discoveries have led to the development of sensitive blood tests that have eliminated the risk of infection through blood transfusion.
- The discoveries have made possible the development of effective medications that can cure a chronic hepatitis C infection.
- Around the world, however, some challenges remain, such as identifying people who are carrying the virus and giving patients in all parts of the world access to the medications, which are often very expensive.



## “To see so many people get cured is astounding.”

- In an interview, one of the laureates, Harvey J. Alter, describes how the Nobel Prize-awarded discoveries were the result of basic research, which is conducted by scientists without always knowing what the results of their work might be. Alter could never have imagined that their discoveries would make it possible to save the lives of so many people.

