Australian Government
Department of Industry, Innovation and Science

Science

CASE STUDY

# A new hepatitis C vaccine

**Hepatitis C afflicts an estimated 150 million people worldwide.** It is a viral infection of the liver which often presents as a chronic disease. It persists for decades and can cause great harm to infected individuals, including cirrhosis and liver cancer. There are 12 million people in India infected with hepatitis C and 300,000 Australians. In Australia another 10,000 people are infected each year. Treatment can cost up to $70,000 per person and Australia's health system spends approximately $252 million each year on the disease.

Image: Researchers at the University of Adelaide, beside an ELIspot machine used to measure vaccinated animals' immune response

**At present there is no effective vaccine for hepatitis C**. As a result our ability to control the disease's spread through at-risk populations is limited. An effective vaccine could prevent tens of thousands of new infections each year, provide an alternative treatment option for those already infected, and save the Australian and Indian health systems millions of dollars.

## The Australia-India Strategic Research Fund

A team of Australian scientists, based at the University of Adelaide and led by Professor Eric Gowans, is working towards that goal. To help them achieve it, they have teamed up with Indian researchers at the Indian Institute of Science. With the help of the **Australia-India Strategic Research Fund** they are working to get a vaccine ready for clinical trials. Their plan is to collaborate to develop two distinct types of vaccination and then combine them into a single 'cocktail' vaccine capable of providing immunity against all known strains of hepatitis C.

The first type of vaccination relies on synthesised virus-like particles which mimic the hepatitis C virus. These particles can't cause an infection but are close enough to hepatitis C to train the immune system to generate free floating antibodies to neutralise the real virus.

The second type of vaccination is an emerging method which extracts sections of the virus' DNA and then uses the DNA to create a protein profile of the virus. The immune system remembers the protein profile and is then able to use it to identify and destroy cells infected with hepatitis C.

**The initial results are promising**. The teams have successfully refined the method for producing virus-like particles which mimic hepatitis C and have demonstrated that the DNA vaccination method

can generate immunity in small and large animal models. The next step is to check that both types of vaccination continue to work in larger animal models.

Should the results hold up on the larger animal models the intent is to bring together both techniques into a final ‘cocktail’ vaccine. That cocktail vaccine will then undergo preliminary safety tests before continuing to human clinical trials. If those trials are successful then Australia and India will have another tool to help them combat the spread of hepatitis C.

**Australian Team Leaders**:
Professor Eric Gowans
University of Adelaide

Assoc Professor Joseph Torresi
University of Melbourne

**Indian Team Leader:**
Prof Saumitra Das
Indian Institute of Science

## Find out more

For more information on the Australia-India Strategic Research Fund visit science.gov.au/aisrf