



Tackling Viral Hepatitis With Artificial Intelligence

Dr Joe Grove

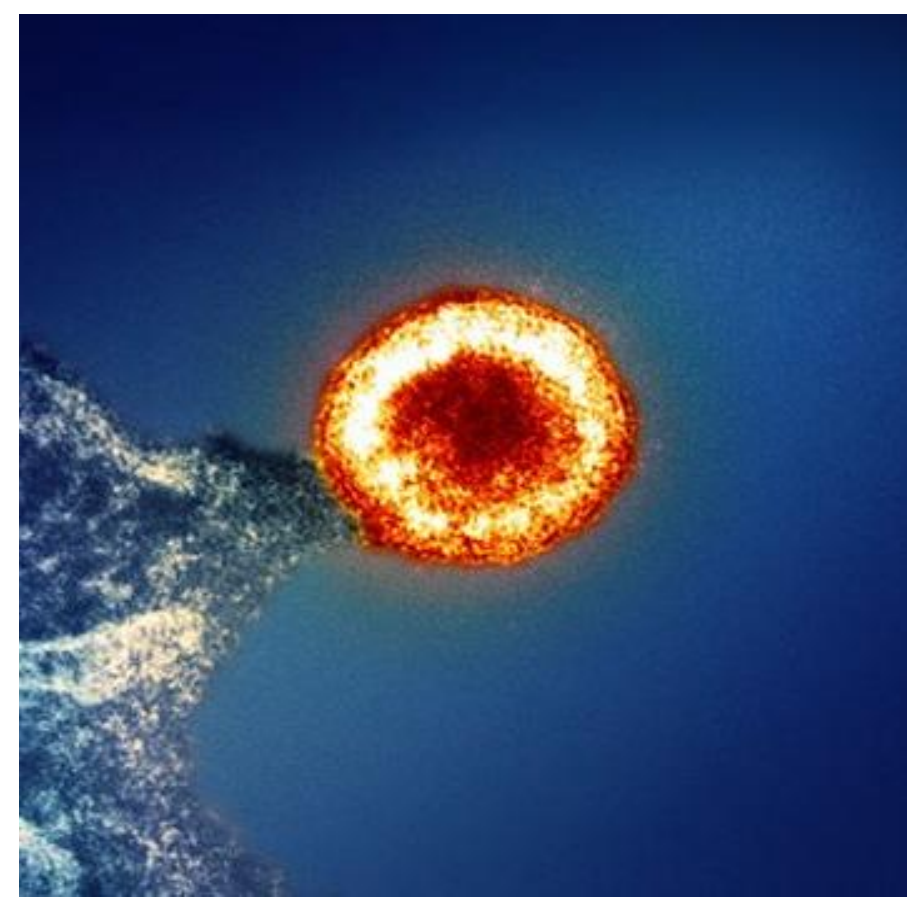
MRC-University of Glasgow Centre for Virus Research

Biography

I have been fascinated by viruses since I was 14. I graduated with a BSc in virology from the University of Warwick, followed by a PhD at the University of Birmingham. After three years of post-doctoral work at the MRC Laboratory for Molecular and Cell Biology, I established an independent research group at University College London. In 2021 I joined the MRC-University of Glasgow Centre for Virus Research.

What is your main research focus?

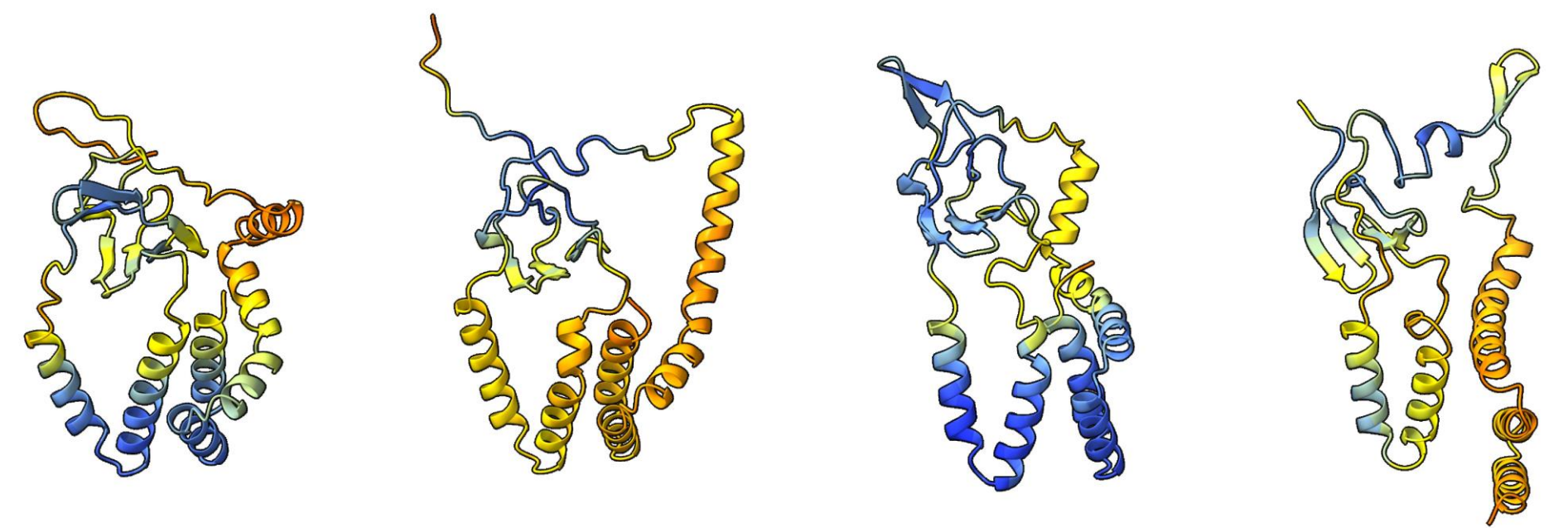
Virus particles spread infection from one cell to another. They are, essentially, microscopic machines with moving parts called entry proteins, with which they break into cells.



It is unknown how the entry proteins of hepatitis C virus (HCV) and hepatitis B virus (HBV) allow them to invade liver cells. This knowledge gap is holding back the development of vaccines and anti-viral drugs.

I have been investigating the entry proteins of HCV for over 15 years. My team and I combine laboratory experiments with advanced computing to understand the nuts and bolts of how these proteins work.

What impact has your research had?



Recently, using state-of-the-art artificial intelligence (AI), we have predicted structures for the entry proteins of HCV and all its known relatives. This work suggests that HCV has a previously unknown type of entry mechanism.

This is an important discovery that will guide laboratory experiments to understand protein mechanism, and potentially inform the design of new HCV vaccines.

We are now ready to apply our AI-guided research approach to other hepatitis viruses.

How will you use the Emerging Leaders Prize funding?

This Emerging Leaders Prize will fund powerful computing hardware to accelerate our AI-guided research and allow us to expand our studies to the entry proteins of HBV.

We will use these initial AI studies to pump-prime a new programme of laboratory experiments focused on understanding HBV entry.

We expect this will generate new knowledge that will act as a foundation for future development of vaccines and drugs against viral hepatitis.

The image, right, displays a preliminary AI-predicted protein structure for HBV surface antigen, the critical viral entry protein.

