

# Researchers visualize herpes virus' tactical maneuver

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For the first time, researchers have developed a 3D picture of a herpes virus protein interacting with a key part of the human cellular machinery, enhancing our understanding of how it hijacks human cells to spread infection and opening up new possibilities for stepping in to prevent or treat infection. This discovery uncovers one of the many tactical manoeuvres employed by the virus.

The [Biotechnology](#) and Biological Sciences Research Council (BBSRC)-funded team, led by The University of Manchester, have used NMR - a technique related to the one used in MRI body scanners and capable of visualising [molecules](#) at the smallest scales – to produce images of a herpes [virus protein](#) interacting with a mouse cellular protein. These images were then used to develop a 3D model of this [herpes virus](#) protein interacting with human protein. The research is published this evening (06 January) in *PLoS Pathogens*.

Lead researcher Dr Alexander Golovanov from Manchester's Interdisciplinary Biocentre and Faculty of Life Sciences said "There are quite a few types of herpes viruses that cause problems as mild as cold sores through to some quite serious illnesses, such as shingles or even cancer. Viruses cannot survive or replicate on their own – they need the resources and apparatus within a human cell to do so. To prevent or treat diseases caused by viruses we need to know as much as possible about how they do this so that we can spot weak points or take out key tactical manoeuvres."

The 3D model shows how the viral protein piggybacks onto the molecular machinery components inside human [cells](#), promoting virus replication and spread of infection through the body.

"When you look at the image, it's like a backpack on an elephant: the small compact fragment of viral protein fits nicely on the back of the human protein," said Dr Golovanov.

By studying the images along with biochemical experiments using the human version of the cellular [protein](#), the team has uncovered the mechanism by which the viral and cellular proteins work together to guide the viral genetic material out of the cell's nucleus. Once there, the genetic material can be utilized to make proteins that are used as building blocks for new viruses. The researchers have also confirmed that this relationship between the two proteins exists for related herpes viruses that infect monkeys.

Dr Golovanov continued "Our discovery gives us a whole step more detail on how herpes viruses use the human cell to survive and replicate. This opens up the possibilities for asking new questions about how to prevent or treat the diseases they cause."

Professor Janet Allen, BBSRC Director of Research said "This new research gives us an important piece of the jigsaw for how a particular viral infection works on a molecular level, which is great news. Understanding the relationship between a human, animal or plant – the host – and the organisms that cause disease – pathogens – is a fundamental step toward successful strategies to minimise the impact of infection. To study host-pathogen relationships we have to look in detail at the smallest scale of molecules – as this study does – and also right through to the largest scale of how diseases work in whole systems – a crop disease in the context of a whole area of agricultural land, for example. BBSRC's broad portfolio of research into host-pathogen

relationships facilitates this well."

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