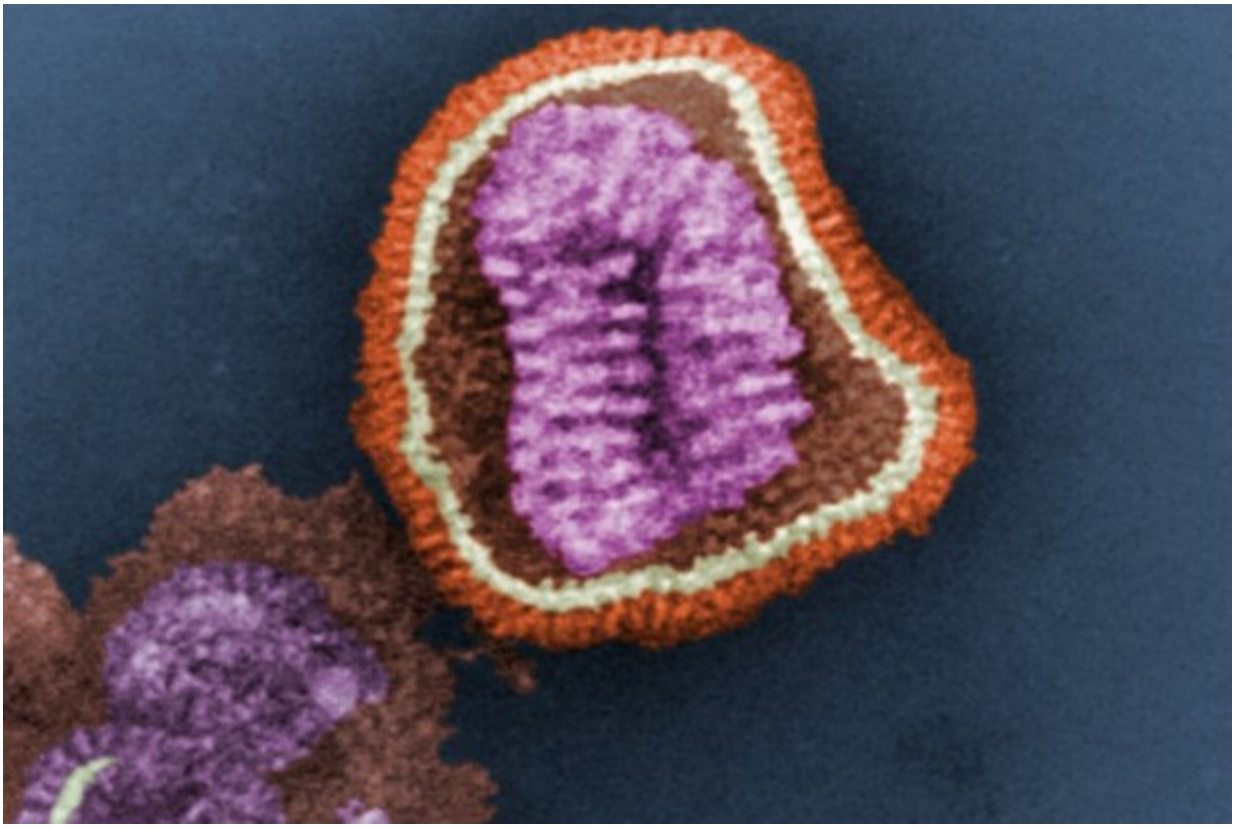
Virus transmission: New animation gives insight to viral spread

May 27 2021



This digitally-colorized transmission electron microscopic image depicts the ultrastructural details of an influenza virus particle. Credit: CDC, Frederick Murphy

How can an influenza virus transfer from animals to humans even

though the molecules on which they land at the cell surface are different? To find out, researchers of the University of Twente developed a sensor chip that mimics the cell surface and has an increasing number of binding sites along the way. The virus rolls across the surface until the binding is strong enough. For visualizing and better understanding of the mechanisms involved, the researchers created an animation, together with Dutch veterinary lab Royal GD.

Influenza viruses like H5N8, which is rapidly emerging now, mainly come from wild birds. In many cases, the virus doesn't jump to humans, but of course, there are epidemics and even pandemics caused by a bird flu virus. Zoonosis, transfer from wild animals to humans, is often indirect. Chickens or pigs held in large numbers can accelerate the transfer.

Enough sugars to stick

Still, the sugars on the respective cell surfaces of animals and humans are not the same. It is these sugars to which the protein spikes on the virus surface connect. To find out the characteristics of the binding, the UT researchers developed a method called multivalent affinitiy profiling. They developed a special fluidic chip that has a varying concentration of sugars. A virus could bind only to one sugar molecule, but it will use more to strengthen the bond, encapsulate, and do its damaging work. If there aren't enough sugars nearby, the binding will be unsuccessful—the virus may leave the surface or start rolling along in the direction of the higher concentrations of sugars. This method has now been visualized in an animation for gaining better insight in zoonosis. It is made specifically for understanding influenza A viruses, but also reveals more about corona and other types of viruses.

The animation is bases on years of scientific work by the Molecular

Nanofabrication group of Prof Jurriaan Huskens, together with a multidisciplinary team of nanotechnologists, virologists and drug specialists. The most recent publication is "Multivalent Affinity Profiling: direct visualization of the superselective binding of influenza viruses" in *ACS Nano*.

More information: Nico J. Overeem et al, Multivalent Affinity Profiling: Direct Visualization of the Superselective Binding of Influenza Viruses, *ACS Nano* (2021). DOI: 10.1021/acsnano.1c00166

Provided by University of Twente

Citation: Virus transmission: New animation gives insight to viral spread (2021, May 27) retrieved 24 April 2024 from https://phys.org/news/2021-05-virus-transmission-animation-insight-viral.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.