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Origins of the pandemic: Study reveals lessons of H1N1

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As H1N1 'Swine Flu' returns to the national headlines a new research paper reveals the key lessons about the origins of the 2009 pandemic. The paper, published today in *BioEssays*, reveals how the pandemic challenges the traditional understanding of 'antigenic shift' , given that the virus emerged from an existing influenza subtype.

"H1N1 emerged in February 2009 in Mexico and swept around the globe within 6 months." said Professor Hans Dieter Klenk from Philipps-Universität Marburg. "The conventional ideal is that pandemics are fuelled by new strands which emerge in the human population, yet it was because H1N1 did not conform to this ideal that its spread was so unexpected."

Professor Klenk's review of the pandemic focuses on antigens, substances which trigger the immune system when introduced into the body. Influenza viruses have two antigens, hemagglutinin (HA) and neuraminidase (NA).

"It was widely believed that a pandemic occurs when a virus with a new HA, or a new HA and a new NA that are not recognised by the human immune system emerges and spreads throughout the population," said Klenk, "this is known as antigenic shift."

While it was believed that this process has always involved the introduction of a new NA or HA subtype, the 2009 pandemic revealed that a pandemic can result from a shift within the lineages of the existing

subtypes.

"There are 16 HA and 9 NA subtypes, which differ significantly, but contain multiple lineages that were always believed to be too similar to allow antigenic shift. However, this is exactly what occurred in 2009," said Klenk.

In the 2009 outbreak a strain of H1N1 containing new HA and NA lineages caused a pandemic even though H1N1 had already circulated through the human population, thus revealing an antigenic shift from within the same subtype.

"From studying the influenza outbreaks of 1918, 1957 or 1977 it looks as if pandemics only occur when a new HA or NA subtype enters the population. This meant that vaccination against the previous viruses offered little protection against infection by the new strain," concluded Klenk. "However, the 2009 outbreak overturns this rule, revealing that a pandemic may not depend on the introduction of a virus with a new HA subtype. This means future research should not simply monitor one or a few viruses and that plans to deal with pandemics must be flexible enough to handle the unexpected."

Provided by Wiley

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