

# A universal influenza vaccine



Oxford researchers have developed a universal vaccine that targets an epitope on the surface of the H1 haemagglutinin that is both highly immunogenic and has limited variability.

Influenza is a highly contagious respiratory infection which the World Health Organisation (WHO) estimates causes 3-5 million cases of severe illness and 250,000-500,000 deaths each year. Two types of influenza infect humans: the H1 and H3 subtypes of influenza A and the Yamagata and Victoria lineages of influenza B.

## Prevention of influenza

The most effective way to prevent influenza infection is through vaccination. Current vaccines induce an immune response to surface antigens, particularly the major influenza antigen haemagglutinin. Haemagglutinin is highly variable and rapidly mutates making it necessary to develop new vaccines and administer them each year.

Development of the annual vaccine is based on a WHO prediction of which strains will be prevalent during the next season. This process has to be undertaken at least 6 months prior to the influenza season, and because of this, the strains prevalent in the actual flu season do not always match the strains used in the vaccine.

Influenza vaccines use whole inactivated or live attenuated influenza viruses to trigger a recipient's immune response. Typically, the H1 and H3 subtypes of influenza A and one or two lineages of influenza B are included in the vaccine to confer broad protection against the circulating flu viruses. However, mutations of the circulating influenza virus often mean that the vaccine no longer provides adequate protection against infection in subsequent years.

For example, Public Health England figures showed having the vaccine did not reduce the chance of elderly developing the influenza last year emphasising the need for more effective vaccines.

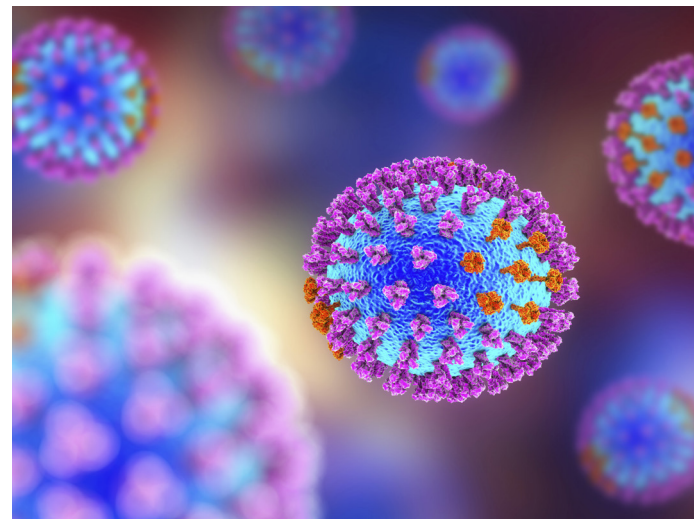
## A universal vaccine

Oxford researchers have identified a highly immunogenic epitope of limited variability in the head domain of the haemagglutinin protein of the H1N1 influenza virus. This is an area previously assumed to be exclusively highly variable due to strong immune selection.

The researchers created a 'universal' vaccine which has shown promising results, inducing immunity to all historical H1N1 strains by vaccinating against the four conformations of the epitope of limited variability. This is the first time that mathematical modelling studies have led to the development of a new influenza vaccine.

## Commercialisation

Oxford University Innovation has filed a patent application on this technology.



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## Technology Transfer from the University of Oxford

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