

**Hearing of the House Energy and Commerce Committee,
Subcommittee on Oversight and Investigations**

**The Role of the National
Institutes of Health in
Research Addressing Seasonal
and Pandemic Influenza**

Anthony S. Fauci, M.D.

Director

**National Institute of Allergy and
Infectious Diseases**

National Institutes of Health

December 4, 2019



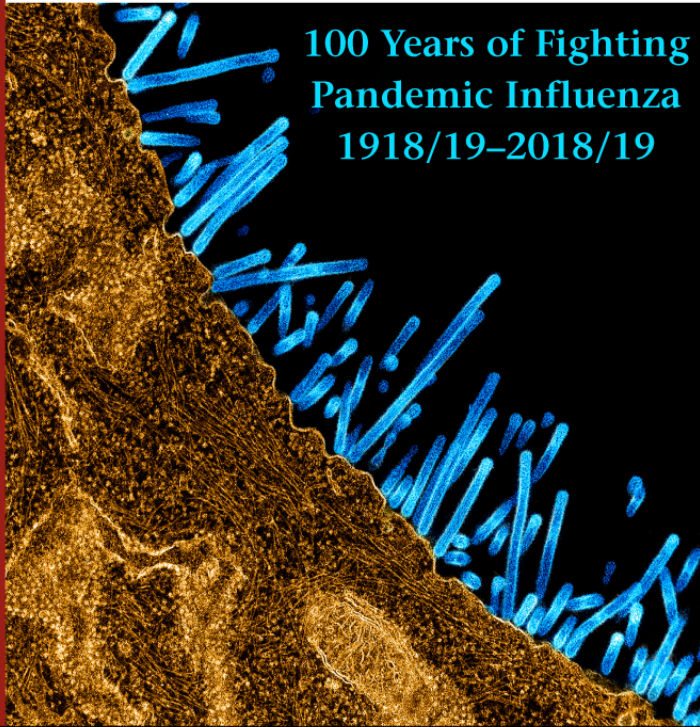
- **Current seasonal influenza vaccines are not consistently effective**
- **Pandemics do occur and response after the fact is not effective**
- **“Chasing after” potential pandemic outbreaks (pre-pandemic viruses) is costly and ineffective**

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The Journal of Infectious Diseases

100 Years of Fighting
Pandemic Influenza
1918/19–2018/19



Influenza Vaccines: Good, but We Can Do Better

Cl Paules and AS Fauci

- 15 articles discuss research toward goal of developing a universal influenza vaccine

Improving seasonal influenza vaccines



Pandemic influenza vaccines



Universal influenza vaccines

Published online
February 28, 2018

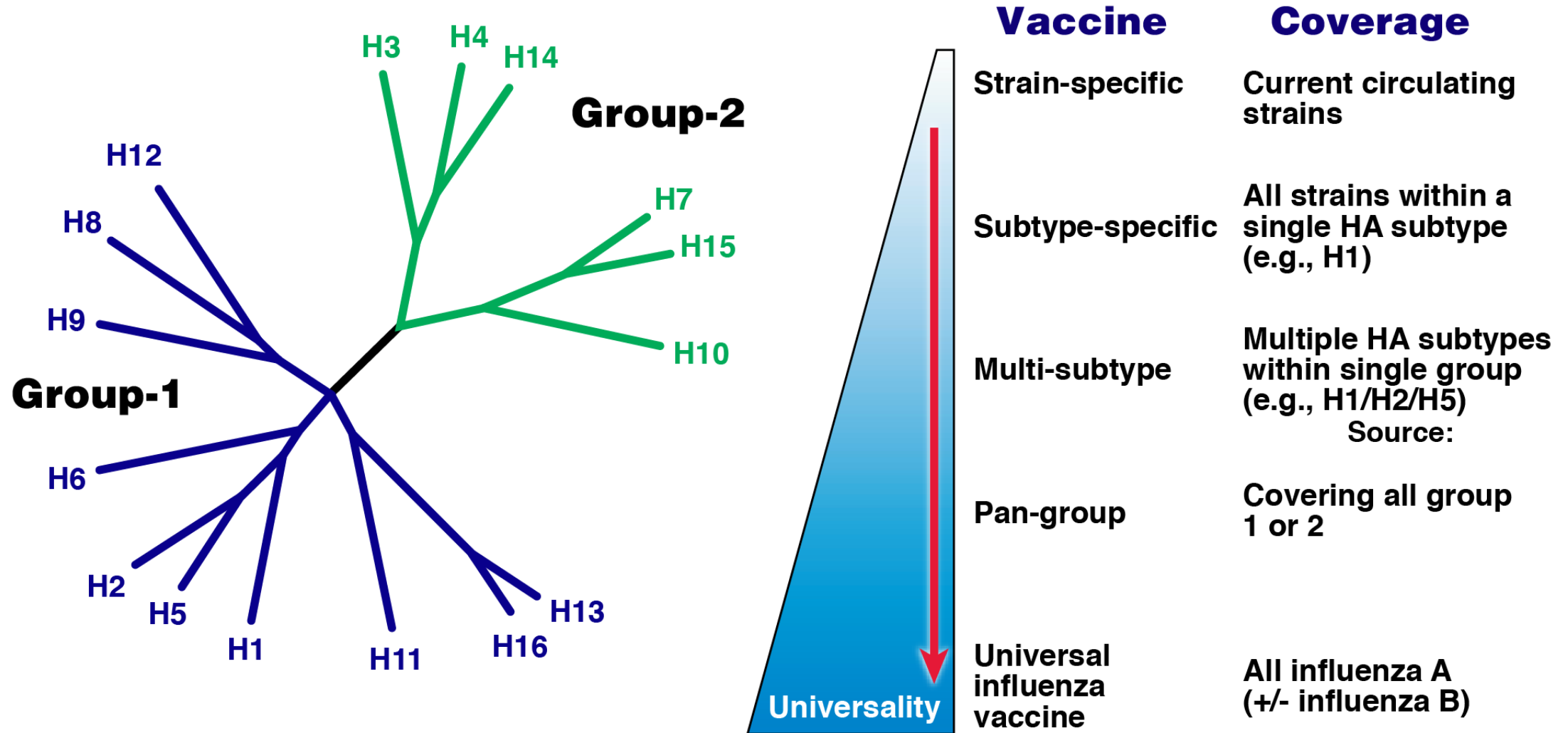


The Journal of Infectious Diseases

A Universal Influenza Vaccine: The Strategic Plan for the National Institute of Allergy and Infectious Diseases

**EJ Erbeiding, D Post, E Stemmy, PC Roberts, A Deckhut Augustine,
S Ferguson, CI Paules, BS Graham, AS Fauci**

Iterative Expansion of Breadth on the Path to a Universal Influenza Vaccine



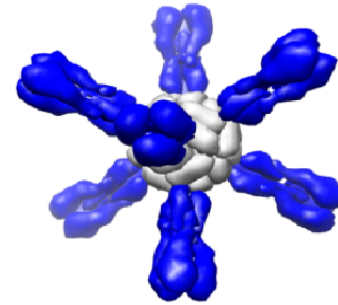
Source: Russell et al. *PNAS* 105(46), 2008;
Paules et al. *Immunity* 47(4), 2017.

Courtesy Gary Nabel

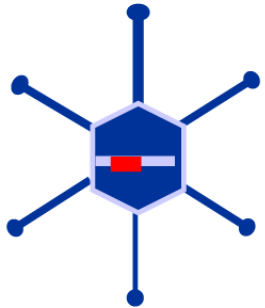
New Platforms for Seasonal and Pandemic Influenza Vaccines



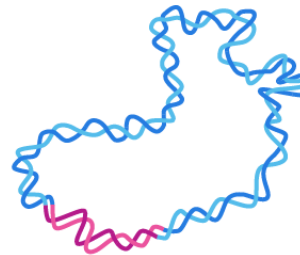
Recombinant protein



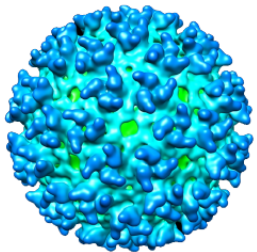
**Nanoparticles
(protein on particle)**



**Viral vector
(e.g.,
adenovirus)**

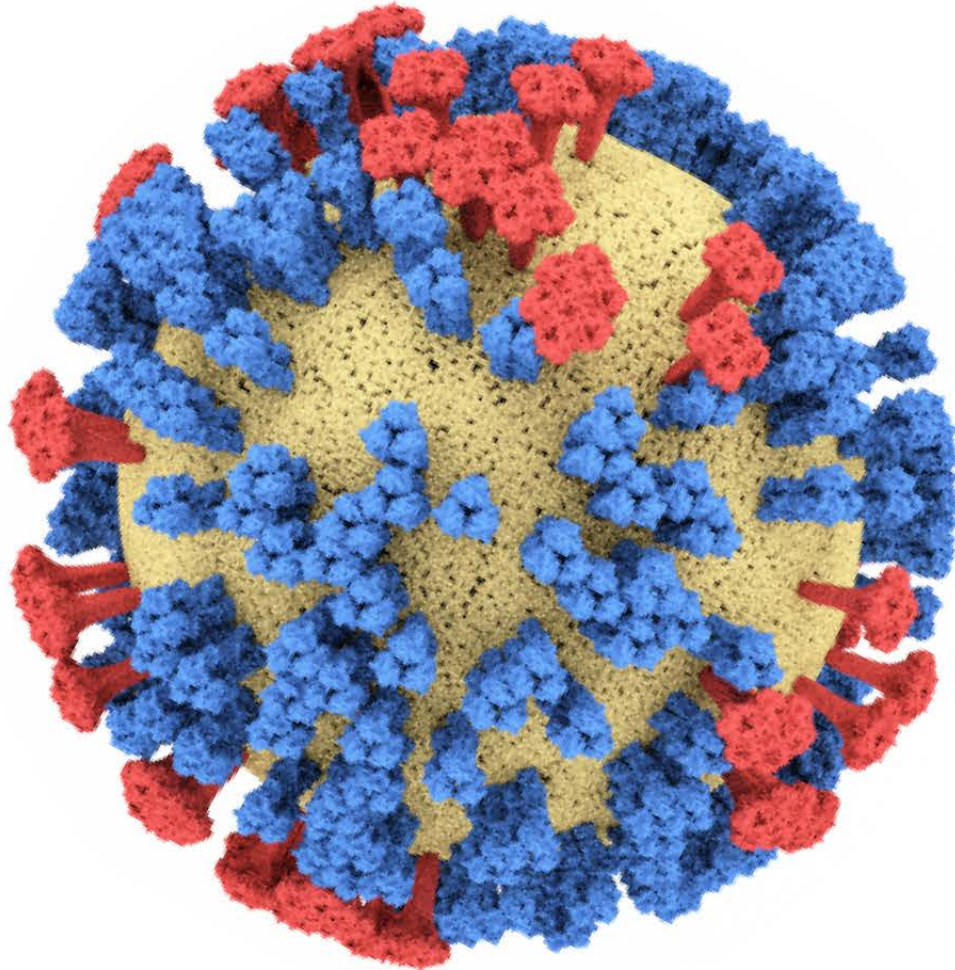


**Genetic
immunization
(DNA and RNA
vaccines)**

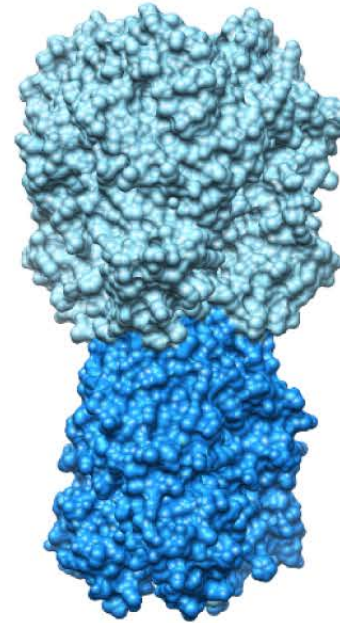


**Virus-like
particle (VLP)
(no RNA;
non-infectious)**

Hemagglutinin Protein: Major Target of Influenza Vaccines

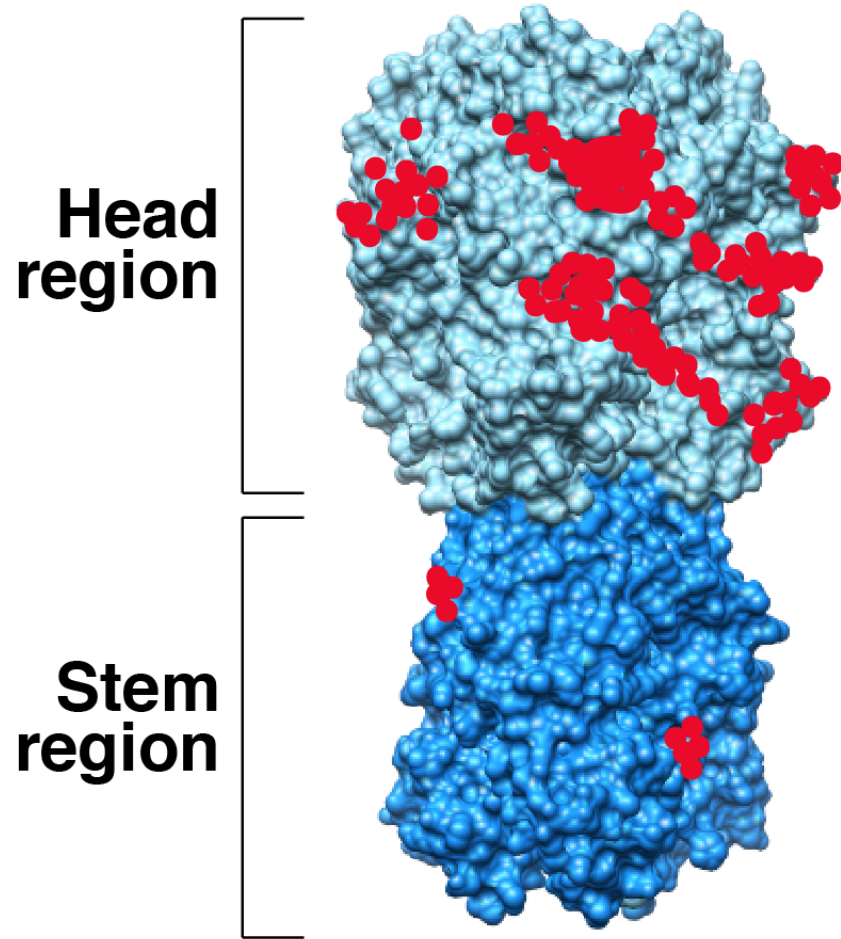


Influenza Virus



**Hemagglutinin (HA)
Protein**

Influenza A Hemagglutinin (HA)



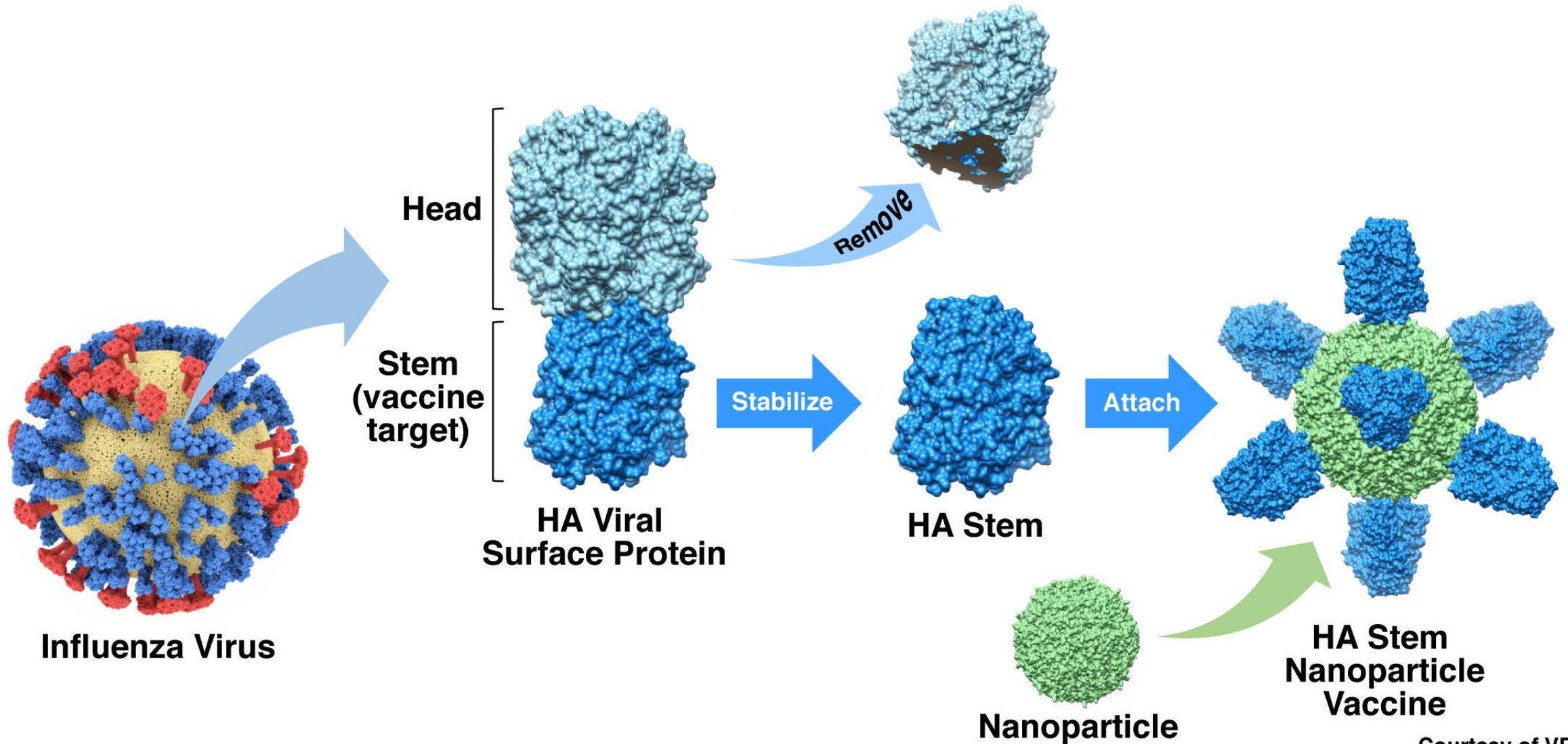
Head region

- Target of current influenza vaccines
- Differs among influenza strains
- Many mutations (●) each season

Stem region

- Target of universal influenza vaccines
- Similar among influenza strains
- Few mutations each season

Representative Approach to the Development of a Universal Influenza Vaccine





News Release

NIH Begins First-in-Human Trial of a Universal Influenza Vaccine Candidate

*Investigational vaccine
designed to provide
durable protection from
Group 1 influenza strains*

