Medical Microbiology

Swine Influenza

Swine influenza was first proposed to be a disease related to human flu during the 1918 flu pandemic, when pigs became ill at the same time as humans

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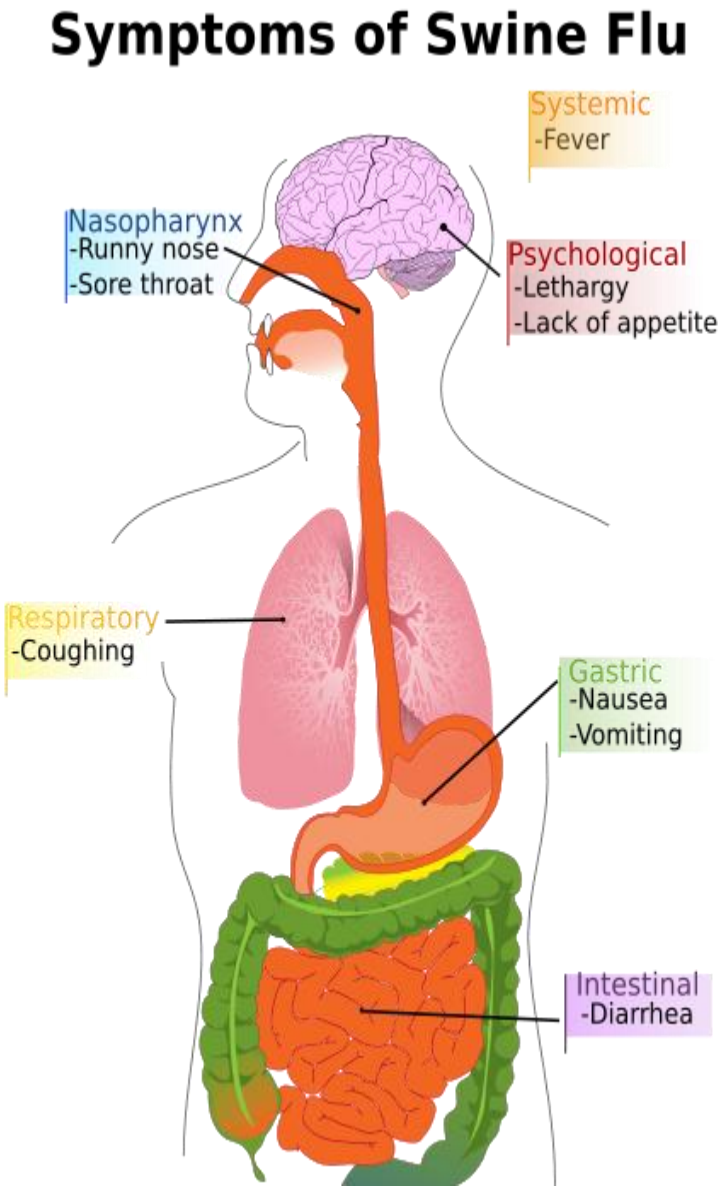
Swine influenza

- **SIV** or **S-OIV** is any strain of the influenza family of viruses that is endemic in pigs.
- As of 2009, the known SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H2N1, H3N1, H3N2, and H2N3.
- People with regular exposure to pigs are at increased risk of swine flu infection.

Epidemiology

- In the 2009 flu pandemic 11–21% of the then global population (of about 6.8 billion), or around 700 million to 1.4 billion people, contracted the illness.
- In a 2012 study, the CDC estimated more than 284,000 possible fatalities worldwide,
- In August 2010, the World Health Organization declared the swine flu pandemic officially over.
- Subsequent cases of swine flu were reported in India in 2015, with over 31,156 positive test cases and 1,841 deaths up to March 2015.

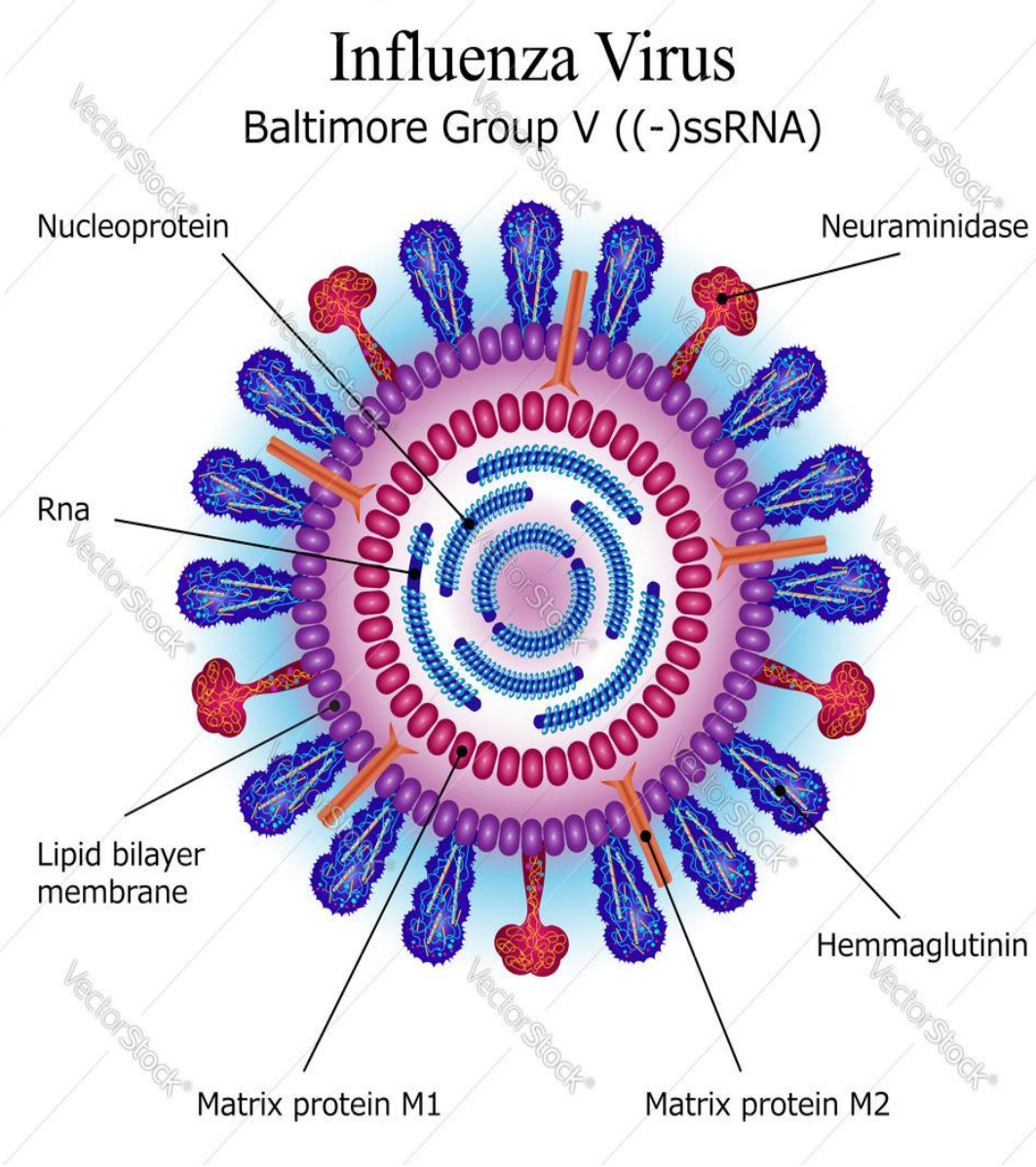


CDC published in May 2009 found that children had no preexisting immunity to the new strain but that adults, particularly those older than 60, had some degree of immunity

Outbreaks

1976 U.S, 1988 U.S., 2007 Philippines, 2009 Northern Ireland, 2015 and 2017 India, 2015 Nepal, 2016 Pakistan, 2017 Maldives, 2020 G4 EA H1N1

Although mortality is usually low (around 1–4%), the virus can produce weight loss in pigs. The most common cause of death is respiratory failure.



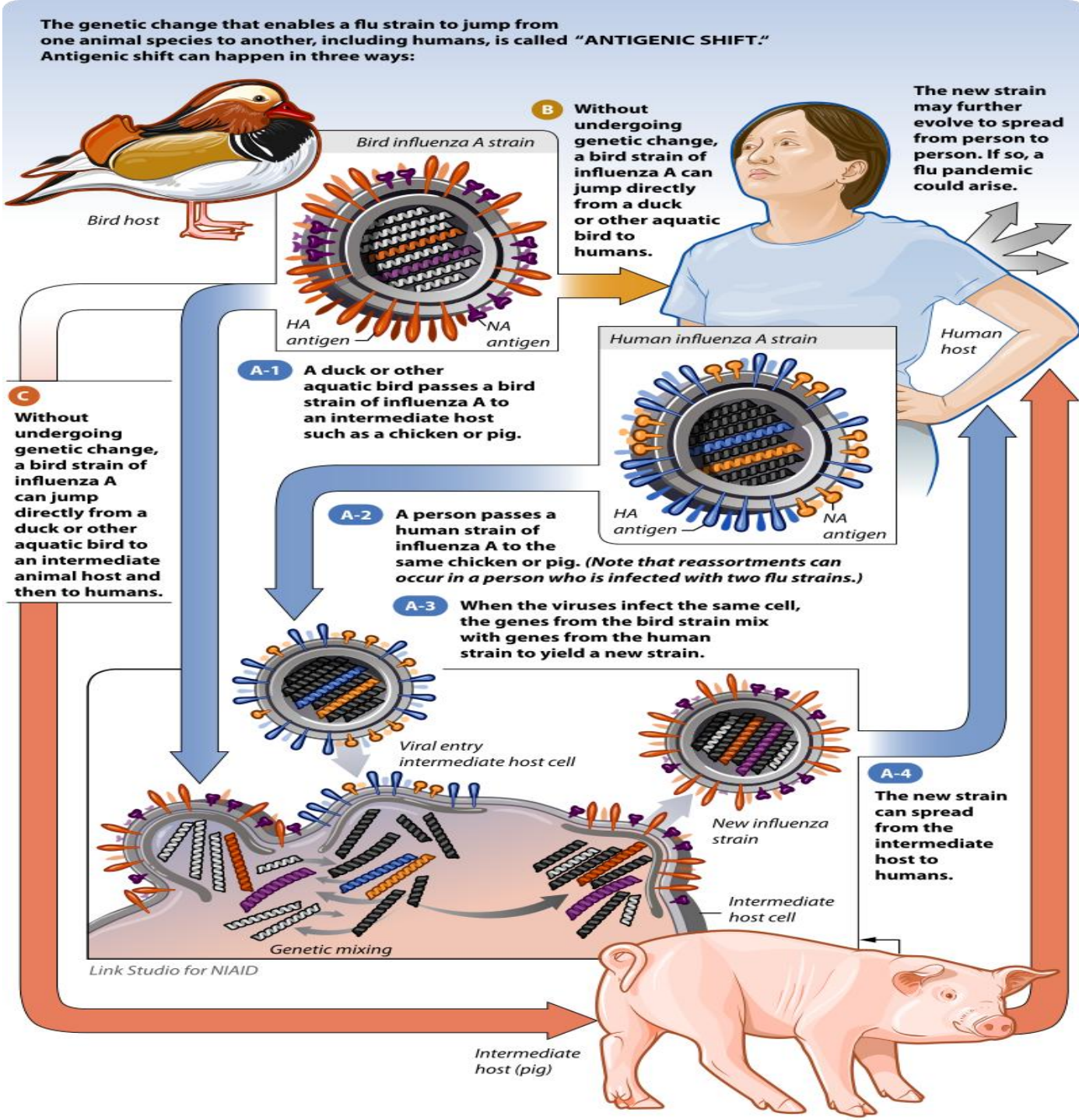
Pigs are unusual as they can be infected with influenza strains that usually infect three different species: pigs, birds, and humans

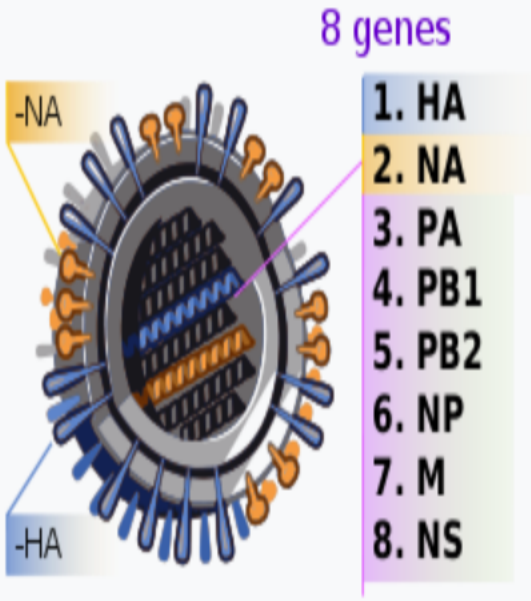
Avian influenza virus H3N2 is endemic in pigs in China. H3N2 evolved from H2N2 by antigenic shift. In August 2004, researchers in China found H5N1 in pigs.

Influenza A being common in pigs and human and influenza C being rare in pigs.

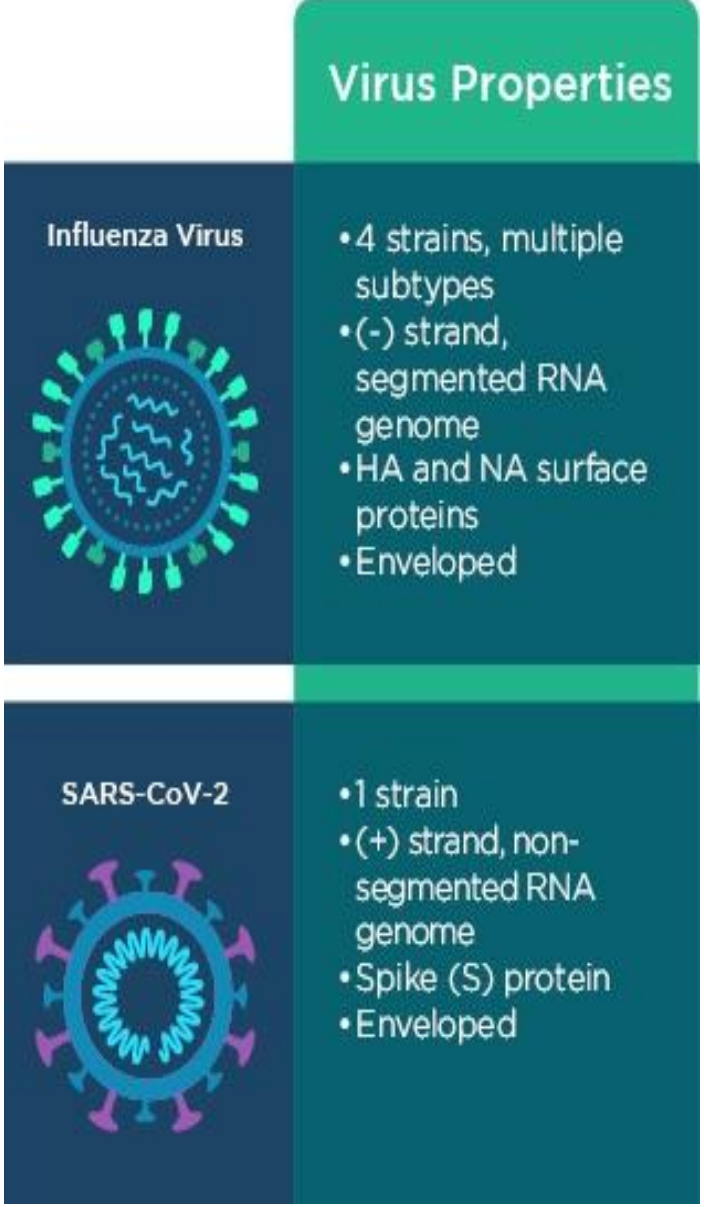
Influenza B has not been reported in pigs.

Influenza C viruses infect both humans and pigs, but do not infect birds.



Genetic origins of the en:2009 swine flu outbreak, 8 genes:[1]	
	HA: Hemagglutinine type 1 (or H1), swine, also in the 1918 influenza. Catch host's cell receptors.
	NA: Neuraminidase type 1 (or N1), swine, eurasian, help start the infection.
	PA: avian, north america.
	PB1: human, likely from the 1993 H3N2 influenza.
	PB2: avian, from north america.
	NP: swine, north america.
	M: swine, eurasia.
	NS: swine, north america.

Source: La fiche d'identité d'un virus inédit, LEMONDE.FR, 30.04.2009.



Diagnosis

Nasopharyngeal, nasal, or oropharyngeal tissue swab

Rapid influenza diagnostic test

Diagnosis of influenza and not H1N1 flu specifically

There are high rate of RIDT false negative

4.8 Reverse transcription polymerase chain reaction (RT-PCR)

In RT-PCR, The RNA population is converted to cDNA by reverse transcription (RT), and then the cDNA is amplified by the polymerase chain reaction .The cDNA amplification step provides opportunities to further study the original RNA species, even when they are limited in amount or expressed in low abundance. Common applications of RT-PCR include detection of expressed genes, examination of transcript variants, and generation of cDNA templates for cloning and sequencing.

1 a. **RNA**
RNA consist of Start codon AUG and ends with poly A tail

b. **Oligo dT Primer**
Oligo dT Primer is binding to RNA poly A tail

c. **Reverse Transcriptase and dNTPs**

d. **Reverse Transcriptase** is an enzymes binds to oligo dT primer and synthesises the cDNA by adding dNTPs

e. **RNA hybrid formation :**
First - strand cDNA synthesis

f. **complimentary DNA**

2 a. **Amplification of cDNA** with Specific Primers and Taq Polymerase

Prevention

Prevention of swine influenza has three components: prevention in pigs, prevention of transmission to humans, and prevention of its spread among humans.

Treatment

The U.S. Centers for Disease Control and Prevention recommends the use of oseltamivir (Tamiflu) or zanamivir (Relenza) for the treatment and/or prevention of infection with swine influenza viruses.

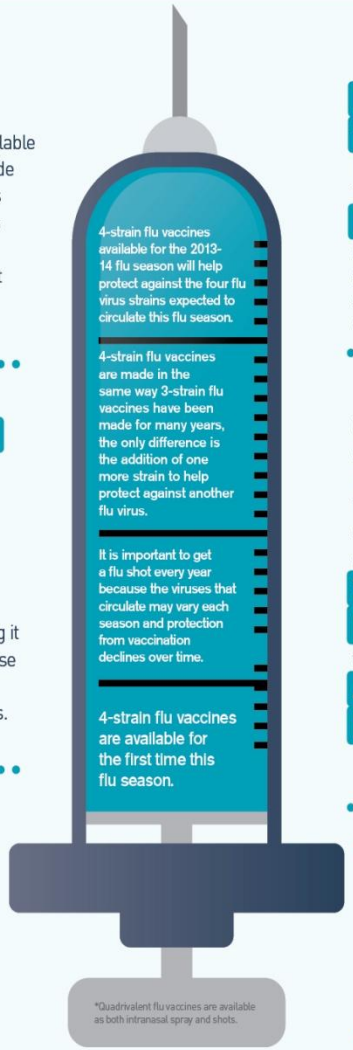
A GUIDE TO NEW 4-STRAIN FLU VACCINES

A QUADRIVALENT (4-STRAIN) VACCINE

is a new type of flu vaccine available this flu season that helps provide protection against four flu virus strains. Previously, flu vaccines helped to protect against three flu virus strains, out of four that typically circulate.

WHAT'S THE BIG DEAL?

Since the late 1980s, scientists have noted **FOUR MAJOR FLU STRAINS THAT HAVE CIRCULATED** and spread each flu season, making it challenging for experts to choose which three flu virus strains to include in seasonal flu vaccines.



IN 6 OF THE LAST 11 FLU SEASONS,

(2001-2 through 2011-12) there was a **MISMATCH** and a fourth flu virus strain not included in seasonal flu vaccines circulated and spread.

Of the 135-139 million doses of flu vaccine projected to be available for the 2013-14 flu season, manufacturers estimate that **30-32 MILLION DOSES** will be **4-STRAIN FLU VACCINES.**

For more information on quadrivalent (4-strain) flu vaccines, go to www.cdc.gov/flu/protect/vaccine/quadrivalent.htm

gsk do more feel better live longer

FLU MYTHS VS. FLU FACTS

MYTH: THE FLU SHOT CAN GIVE ME THE FLU

FACT: FLU VIRUSES USED IN FLU SHOTS ARE INACTIVATED, SO THEY CANNOT CAUSE INFECTION

FACT: IF YOU GET THE FLU VACCINE, YOU ARE ABOUT 60% LESS LIKELY TO NEED TREATMENT FOR THE FLU

MYTH: I SHOULD WAIT TO GET VACCINATED SO THAT I'M COVERED THROUGH THE END OF THE SEASON

MYTH: VACCINES ARE NOT PROVEN TO PREVENT THE FLU

FACT: PEOPLE SHOULD GET A FLU SHOT AS SOON AS THEY ARE AVAILABLE BECAUSE IT TAKES ABOUT TWO WEEKS FOR ANTIBODIES TO DEVELOP

FACT: GETTING THE FLU SHOT PROVIDES BENEFITS SUCH AS THE POTENTIAL TO REDUCE ILLNESS AND PREVENT TIME LOST FROM WORK

MYTH: IT IS BETTER TO GET THE FLU THAN TO GET A FLU VACCINE

For more flu myths and facts, go to www.cdc.gov/flu/keyfacts.htm or www.cdc.gov/flu/about/qa/misconceptions.htm

http://www.multivu.com/players/English/62662-gsk-quadrivalent-influenza-vaccines/links/62662-both.jpg

RESEARCH ARTICLE

Prevalent Eurasian avian-like H1N1 swine influenza virus with 2009 pandemic viral genes facilitating human infection

Honglei Sun, Yihong Xiao, Jiyu Liu, Dayan Wang, Fangtao Li, Chenxi Wang, Chong Li, Junda Zhu, Jingwei Song, Haoran Sun, Zhimin Jiang, Litao Liu, Xin Zhang, Kai Wei, Dongjun Hou, Juan Pu, Yipeng Sun, Qi Tong, Yuhai Bi, Kin-Chow Chang, Sidang Liu, George F. Gao, and Jinhua Liu

PNAS July 21, 2020 117 (29) 17204-17210; first published June 29, 2020; https://doi.org/10.1073/pnas.1921186117
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Contributed by George F. Gao, April 28, 2020 (sent for review December 9, 2019; reviewed by Ian H. Brown and Xiu-Feng Henry Wan)

https://www.pnas.org/content/117/29/17204

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In Focus

Recommended composition of influenza virus vaccines for use in the 2021 Southern Hemisphere influenza season announced

Experts taking part in the WHO vaccine composition and information meeting (VCM) between 16-24 September 2020, organized by the WHO Global Influenza Programme, announced on 25. September the recommended components for vaccines for the 2021 Southern Hemisphere influenza season.

These recommendations are used by the national vaccine regulatory agencies and the pharmaceutical companies to develop, produce and license influenza vaccines.

read more:

GISRS
GLOBAL INFLUENZA SURVEILLANCE & RESPONSE SYSTEM
Uniting the world in the fight against influenza

Genomic epidemiology of hCoV-19

COVID-19 Global Cases

https://www.gisaid.org/ and https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5388101/