

THE SCIENCE BEHIND THE FLU SHOT

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manufacturers several months to create a vaccine with the proper antigens for these three strains. The strains are typically Type A H1N1, Type A H3N2 and a Type B strain. Since there are three strains, this flu shot is called the trivalent vaccine. There is also a quadrivalent vaccine that covers an additional Type B strain. If the WHO correctly predicts which strains will hit the public, the flu shot will be more effective. If they don't predict correctly, then the flu shot is less effective.

(8) The flu vaccine is made by injecting the flu virus into fertilized chicken eggs. Eggs that are 11 to 12 days old are chosen and disinfected.

A small hole is poked into the egg shell and the flu virus strains are injected inside. The hole is then sealed with wax. The virus incubates within the egg at 37°C/99°F for 48 hours during which time the virus will multiply. After 48 hours, the egg is cracked open and the flu virus is obtained in the fluid. The flu virus is then deactivated and the antigens in the viral coating are isolated and purified. The antigens are then used to make the vaccine which is put into an injectable needle or nasal spray. There are also methods to grow viruses in cell cultures that don't involve chicken eggs. This is to prevent some allergic reactions that can occur in people who may be allergic to eggs.

Article Questions

- 1) A virus (2) is a non-living infectious particle. The different varieties of flu viruses are called strains (2). The Spanish flu outbreak occurred in 1918 (3). The World Health Organization (7) determines which strains of influenza virus will most likely be those that are the most active during the flu season. An antigen (6) is a part of the viral coating that the immune system recognizes. Trivalent (7) flu shots contain antigens from three strains of flu virus.
- 2) When are you the most likely to get the flu if you live in North America?
Between October and May and of those months, most likely in February.(1)
- 3) If a certain strain of bacteria was called "highly virulent", what does this mean?
It means that it has a high ability to cause disease.(3)
- 4) How was the Spanish flu different from the regular flu?
The Spanish flu targeted healthy individuals and could kill them whereas the regular flu targets young, old and sick people who mostly experience flu symptoms, but don't usually die.(3)
- 5) What is a host?
A host is the species that a virus infects.(4)
- 6) How does your immune system remember a virus that you've been exposed to?
It will produce memory cells that will remember and recognize the antigens on the coating of a virus. If that virus is present in the future, the immune system will be able to recognize the antigens and destroy the virus before it can multiply.(5)
- 7) Why does a new flu shot need to be made each year?
The influenza virus mutates quickly which changes its antigens, therefore a new vaccine containing the new antigens must be created to teach the immune system which new strains of the virus to identify during the flu season.(5 and 6)
- 8) What host is used to make the flu vaccine and why can this host be a problem for some people?
Chicken eggs are used as hosts and this can be a problem for those with egg allergies.(8)