Scientists studying genetics of flu strain

Clues could point to potent vaccine

By Bruce Lieberman Union-Tribune Staff Writer
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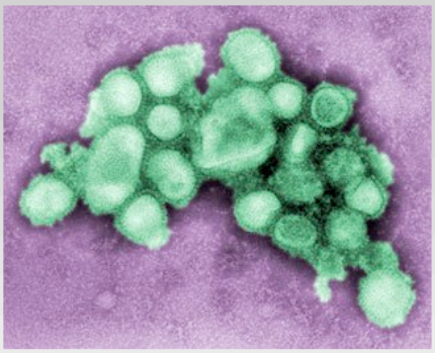

A negative-stained image of the current virus, seen with a microscope. (CDC / AP) -

Today's swine flu strain doesn't seem as dangerous as viruses that sparked some of the last century's flu pandemics, but the world might face a very different bug by fall.

In a few months, the strain raising alarms now may have mutated into a form more resistant to the best drugs available to stop it.

Scientists are trying to get a handle on the genetics behind the swine flu strain. The hope is that a vaccine can be developed that will prompt a strong human immune response against as many varieties of the swine flu virus as possible – even if it mutates.

Researchers around the country began examining the genetics of the virus this week after the federal government released information on its genetic sequence. Much of the analysis can be found at www.biohealthbase.org.

The current strain is the descendant of a flu virus that has circulated in pigs for more than a decade, said Adolfo Garcia-Sastre, a virologist at the Mount Sinai School of Medicine in New York City. It contains genes from human and avian as well as swine lineages.

"It's important to understand: This has not happened recently," Garcia-Sastre said of the virus's origins.

The precursors to the current virus appeared during a viral outbreak in pigs about a decade ago, Garcia-Sastre said. For 10 years, the virus traded genetic information with other viruses in the animals and evolved into the strain that jumped to humans, he said.

The current strain is something the human immune system has not seen before, and while the immune systems of some people can quickly learn how to attack the virus, others' immune systems can't, and people can die.

Scientists agree that, so far, the strain doesn't possess anywhere near the virulence of some previous flu strains – foremost among them the one that caused the 1918 flu pandemic that experts estimate killed 40 million to 50 million people worldwide.

Scientists have found that the current strain lacks a key protein called PB1-F2 that the strain in 1918 possessed, Garcia-Sastre said. The so-called virulent factor contributed greatly to how deadly that virus became.

As researchers continue to study the genetics of the current virus, they'll examine what is making the bug especially virulent in some people and how it transmits from one person to another. Those two factors contribute to how dangerous a virus can be – and they're not driven by the same genetics, Garcia-Sastre said.

Although the current strain doesn't appear to possess virulence factors as dangerous as past deadly flu strains, it could mutate and acquire some of their dangerous characteristics, said Richard Scheuermann, an immunologist at Southwestern Medical School at the University of Texas in Dallas.

The current virus will likely infect large numbers of people around the world, although its spread may be dampened this spring as schools are closed and other protective measures are taken, Scheuermann said.

"The flu tends to go into hiding over the summer months in the Northern Hemisphere," he added, referring to the flu's tendency not to be widespread in warmer weather. "This strain is likely to re-emerge next year."

That gives scientists and public health officials four to six months to develop a vaccine against the new strain of swine flu, he said.

In the meantime, a lot is unknown about the virus.

"Most people seem to be recovering, but we don't know why," Scheuermann said.

In San Diego, scientists are diving into the new genetic data to see how the virus can be defeated.

Bjoern Peters at the La Jolla Institute for Allergy & Immunology helps lead a project called the Immune Epitope Database. The database catalogs where on the surface of viruses the human immune system targets its attacks.

Peters and his colleagues have identified these sites, also known as antibody and T-cell epitopes, on the surface of other flu virus strains. They are now examining the new flu strain to see if it has some of the same epitopes.

Mapping out those epitopes on the new virus strain may reveal targets for drugs to short-circuit its virulence or deter how it's transmitted from person to person, Peters said.

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