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Fear the measles virus – not the vaccine, says virologist

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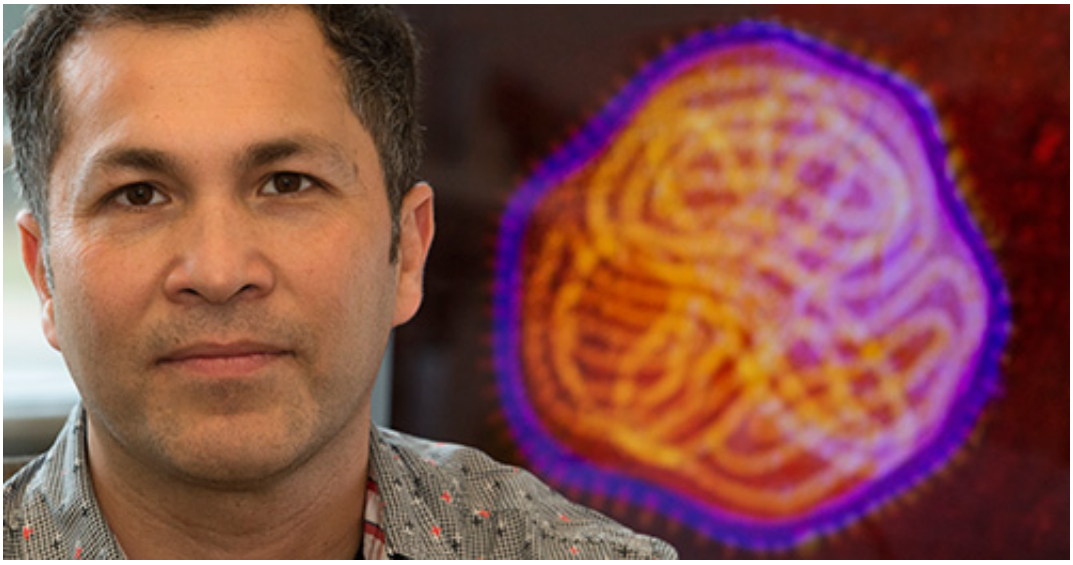

The measles virus, a bundle of single-strand RNA, is highly contagious in several ways, says WSU molecular virologist Hector Aguilar-Carreno. Credit: Shelly Hanks, WSU Photo Services

When it comes to the measles outbreak that originated at California's Disneyland, it truly is a small world after all.

The virus that took hold at the resort shortly before Christmas has journeyed beyond the "happiest place on earth" to sicken people in 14 states, including Washington, Oregon, Utah and Arizona.

The disease's swift spread comes as no surprise to molecular virologist Hector Aguilar-Carreno of Washington State University. Aguilar-Carreno researches the viral family Paramyxoviridae – of which measles and other respiratory diseases, including the deadly Nipah virus, are members.

"Measles is one of the most contagious viruses known on the planet, and in recent years childhood immunizations against it have been dropping," he said. "Add those factors to a crowded theme park and you've got prime conditions for the virus to spread among visitors and travel with them after they leave."

New case in Washington state

With the number of measles cases now exceeding 100, the nation is facing a possible "large outbreak," according to the U.S. Centers for Disease Control and Prevention. The majority of people infected are unvaccinated, officials said this week.

In Washington state, the most recent case involves an infant who was too young to receive an immunization, according to the state's health department. In the state's other two cases, an unvaccinated teenager contracted the disease after visiting Disneyland in December and then infected her brother after she returned home.

What makes this minuscule microbe – inert as a statue while outside a compatible host – so contagious?

Hard to outwit

Map of confirmed cases.

At the petri-dish level, the measles virus is extremely stable, said Aguilar-Carreno. Whether suspended in air space or waiting on a table top, it can survive and remain infectious for up to two hours, he explained.

"Unlike Ebola, measles is spread through the air," he said. "It can linger long after an infected person leaves a room and then be transmitted to another person who simply walks in."

If that person is unvaccinated, he or she will discover a week or two later that, even without complications, measles is typically not a mild illness. What's more, by the time the telltale red, itchy, skin rash erupts, the person will have been unknowingly dispersing the virus for several days.

"Until that rash appears, people can easily confuse the symptoms of fatigue, coughing, runny nose and fever with a bad cold or early flu,"

Aguilar-Carreno said. "All the while, they can be walking around and infecting people not immunized against measles."

Launching an attack

And there's more. Not only is the measles virus hardy in the environment and able to mask its contagiousness, but it also uses a "strategy of diabolic elegance" to exit one sick person and potentially infect many more, said microbiologist Roberto Cattaneo at the Mayo Clinic in Rochester, Minn. Cattaneo, like Aguilar-Carreno, studies the mechanisms by which Paramyxoviruses infect cell hosts.

In a well-known 2011 study published in the journal *Nature*, Cattaneo and his colleagues discovered that the virus lodges in the trachea, or windpipe, where it replicates millions of times. There, it induces spasms of coughing to launch virus copies out of the sick person and into a bystander – or possibly many bystanders.

"All those virus copies expelled from the infected host's trachea are in just the right position to ride out into the air – ionized into the finest droplets – to infect their next hosts," Cattaneo explained.

No cure; only prevention

All of which demonstrates that the measles virus has evolved to spread rapidly and efficiently among humans, said Aguilar-Carreno.

"This current outbreak illustrates what can happen as more and more people don't get immunized against the disease," he said. "Last month in this country, we saw more measles infections linked to Disneyland than we used to see in an entire year."

Provided by Washington State University