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Researchers develop new, safer method for making vaccines

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While vaccines are perhaps medicine's most important success story, there is always room for improvement. Researchers at Oregon Health & Science University's Oregon National Primate Research Center (ONPRC) appear to have done just that. As explained in a newly published research paper, Mark Slifka, Ph.D., and colleagues have discovered a new method for creating vaccines that is thought to be safer and more effective than current approaches. The research results are published online in the journal *Nature Medicine*.

"Most vaccines have an outstanding safety record," explained Slifka. "It is important to keep in mind that no medical achievement has saved more lives than the simple act of vaccination. However, for many diseases, we have struggled to develop an effective vaccine. In other cases, vaccines may be protective, but come with rare but serious side effects. For instance, the live oral polio vaccine was very effective at stopping polio outbreaks and transmission, but was also responsible for eight to 10 cases of vaccine-associated polio in the United States each year. This problem was solved in 2000 when the U.S. switched to a formaldehyde-fixed 'dead' form of the vaccine. Our goal is to make vaccines like these safer and potentially even more effective by pioneering an entirely new approach to vaccine development."

Slifka's approach is remarkable because it is the first to demonstrate that hydrogen peroxide can inactivate viruses for use as vaccines. Although hydrogen peroxide has long been known as an effective antiseptic and is often used to sterilize medical equipment, it was believed that it would

be too damaging to be useful in vaccine development. It turns out that this previous notion was incorrect. In fact, peroxide may turn out to be one of the best new approaches to future vaccine design.

In the study published this week, Slifka's lab generated not one, but three vaccines.

"We wanted to demonstrate that this is truly a platform technology and not just a one-hit-wonder," explained Slifka. "For this reason, we chose three unrelated model systems and demonstrated protective vaccine-induced immunity in all three cases."

The three diseases targeted by these viruses are West Nile virus, Lymphocytic choriomeningitis virus (a relative of lassa fever virus, known to cause hemorrhagic fever in Africa) and vaccinia virus (widely known for its previous use in the smallpox vaccine.)

An Oregon-based biotech company, Najít Technologies, Inc., is hoping that these advances in vaccine technology will result not only in new vaccines but also new jobs in the Portland area.

"This new approach really gives a boost to an area of vaccine development that's been stagnant for some time," said Ian Amanna, Ph.D., associate vice president for research at Najít Technologies.

"Because of these advances, we've been increasing our workforce and putting together a group of very talented researchers. In partnership with OHSU, we're excited to have the opportunity to further develop this technology into commercial vaccines that can offer protection for at-risk individuals. These vaccines will not only be important to international travelers, but also to the people living in endemic regions. These places are often in developing countries with limited resources for preparing and testing life-saving vaccines and we are looking forward to the day

that we can bring these new vaccines to the countries that need them the most."

Najít Technologies, founded by Slifka and colleagues using methods first discovered at OHSU, hopes to continue working together with academic institutions such as OHSU, ONPRC, and Washington University-St. Louis to create new and better vaccines for some of the world's biggest problems including West Nile virus, yellow fever and dengue hemorrhagic fever.

Provided by Oregon Health & Science University