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Sexual Health Vaccines

by Heather Boerner

When Jonas Salk discovered a vaccine for polio in the 1950s, he changed the lives of millions of children and their parents. No longer did the public live in fear of disfigurement or death from the disease. As the country commemorates Salk's birthday on October 28, researchers and scientists are making breakthroughs of their own with vaccines that have the potential to improve the lives of people at risk for sexually transmitted infections (STIs) — just about everybody on the planet at some time in their lives.

"This is a very exciting time and I'm very heartened by the research," said Jeanne Marrazzo, associate professor of medicine at the University of Washington in Seattle. "It's a very wide open field right now. Sexual health vaccines need to be very strongly developed over the next 10 years."

That development is underway across the globe. In some areas, science has made tremendous strides; in others, the process has been more challenging.

Biggest Breakthrough

The HPV vaccine known as Gardasil, manufactured by the pharmaceutical company Merck, hits the market this fall. The vaccine, which protects against four strains of HPV, can prevent HPV infections that cause about 70 percent of cervical cancer cases in the U.S. as well as some that cause genital warts. Although availability is currently limited at Planned Parenthood and other health care centers, availability will become more widespread in the coming months as supplies of the vaccine are more widely distributed.

Genital HPV is among the most common STIs — by age 50, 80 percent of women are expected to have contracted some form of the virus and roughly 6.2 million people are infected with it every year. Marrazzo says that health care providers assume almost all women will have contracted the infection by 25, so vaccination is most effective before a girl first has sex. "Most [researchers] have viewed HPV acquisition as a rite of passage for sexual activity," she says.

The U.S. Centers for Disease Control and Prevention (CDC) recommends the HPV vaccine for all women between ages nine

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and 26. The Michigan state legislature, among other groups, considers HPV vaccination so important that it may mandate vaccination for all girls entering sixth grade.

There are also other HPV vaccines on the horizon. Another drug maker is developing an HPV vaccine that protects against eight strains of the virus — four more than Gardasil. That vaccine, so far, has been shown to protect women against strains of the virus that cause 90 percent of cervical cancer cases, says Marrazzo. Despite such advances, she adds, women should continue to use condoms to help prevent the transmission of HPV and get regular Pap tests to detect the early stages of cervical cancer.

Earlier Progress

Though the HPV vaccine has grabbed the latest headlines, an STI vaccine that can help prevent another type of cancer already exists. The hepatitis B (HBV) vaccine has been available since 1982. It protects against hepatitis B infection, which can cause liver damage and lead to liver cancer. HBV is easily transmitted through sexual activity, but can also be transmitted non-sexually. (There is also a vaccine for hepatitis A, which is less likely to be transmitted via sexual contact.) About 120,000 HBV infections happen through sexual activity annually. The CDC recommends all people be vaccinated for hepatitis B starting at birth.

More Good News

Meanwhile, researchers are close to cracking the code for vaccines that prevent other common STIs. The drug maker GlaxoSmithKline has developed a vaccine that appears to be 75 percent effective in preventing the spread of genital herpes infections to women, says Dr. Carolyn Deal, head of the sexually transmitted diseases branch of the National Institute for Allergies and Infectious Diseases at the National Institutes of Health. However, the vaccine, called Herpevac, only appears to be effective in women. "That's one of the things we don't quite understand yet about this vaccine," says Deal. "We're hoping to understand more about the mechanism of action in this vaccine."

GlaxoSmithKline is currently running a study to test the accuracy of the results from the last round of clinical trials. Still, says Deal, it will likely be several years before the herpes vaccine is available to the public.

Future Research

Research isn't as close to a breakthrough on other STIs, however. HIV/AIDS, syphilis, chlamydia, and gonorrhea each affect millions of lives, but no effective vaccines have yet been developed.

An HIV vaccine is the holy grail of vaccine science. Researchers have been working for more than 15 years to try to develop immunization to the virus that causes AIDS. Vaccine trials are underway worldwide, but researchers have said that the key to this virus remains elusive: Unlike other viruses, HIV changes its

outer layer so often that it effectively hides from vaccines.

For chlamydia — the most common sexually transmitted bacterial infection in the U.S., infecting three million men and women annually — Deal said researchers are attempting to find animal models that may provide clues to how to prevent infection in humans. Some research is also underway for gonorrhea, but it is not yet at clinic trial stage. Both infections can lead to pelvic inflammatory disease (PID), causing damage to the fallopian tubes, increased risk of ectopic — or tubal — pregnancies, sterility, and chronic pain.

Why is it so difficult to create vaccines for these STIs? Marrazzo says it is simple biology: HPV is a simple organism, with cells “shaped like a soccer ball.”

“[Researchers] looked at the panels on the virus and created a fake virus shaped like a soccer ball,” says Marrazzo. “That’s what immunizes people. With herpes and chlamydia, the organism is infinitely more complicated and it’s better at evading our immune system. That makes it very difficult to design a vaccine around.”

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