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US patent awarded for Rochester's pioneering HPV vaccine work

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The University of Rochester has been awarded a U.S. patent for research essential to both human papillomavirus vaccines on the market.

The patent is for the creation of virus-like particles that mimic HPV 16, the type of HPV that causes the majority of all cancers related to HPV –including about 50% of cervical cancers, more than 90% of oropharyngeal cancers, and also cancers that affect the vulva, vagina, penis, and anus.

The patent recognizes the work by three University virologists – Richard Reichman, M.D., William Bonnez, M.D., and Robert Rose, Ph.D. – for the discovery that HPV virus-like particles, a harmless mimic of the infectious virus with no risk of infection, provoke a protective immune response against the HPV types included in the current vaccines.

The Rochester team was the first to show that HPV virus-like particles created an immune response capable of preventing infection of human tissue by HPV, and the first to test an HPV vaccine in people.

The group's role in developing the HPV 16 virus-like particles, and virus-like particles mimicking other types of HPV, is also acknowledged through patents on three other continents – Australia, Europe, and Asia (Japan) – as well as Canada, underscoring the Rochester team's key role in the worldwide effort to develop an HPV vaccine.

"Any vaccine that is successful at preventing infection from the most

prevalent cancer-causing type of HPV, HPV 16, relies on technology developed here at the University of Rochester Medical Center," said Rose, who was a graduate student more than 20 years ago when he, Bonnez and Reichman made their initial findings.

"HPV 16 is the primary culprit at work in cancers caused by HPV," added Reichman. "Developing a way to protect people against it has been extremely rewarding."

While HPV – the most common sexually transmitted disease – has long been known as the cause of cervical cancer, its role in causing many other forms of cancer, such as cancer of the genitals and the anus, has become more widely known in recent years. In addition, the increased practice of oral sex is a factor in the growth of certain types of oropharyngeal cancers, which includes cancers of the tonsils, the base of the tongue, and the back of the throat.

In all of these cancers, it's more often than not HPV 16 at work. HPV 18 is also frequently involved in cancers caused by HPV, and Rochester holds patents related to this type in Australia and Europe.

Both available vaccines – Gardasil, made by Merck & Co., and Cervarix, made by GlaxoSmithKline – protect against both HPV 16 and HPV 18, as well as several other types. The vaccines have been extraordinarily effective. A study published earlier this month in Lancet Oncology showed that Cervarix was 100 percent effective protecting young women who were not previously infected with HPV from HPV-caused cervical cancer, and offered substantial protection against cancer even for women already exposed to HPV.

Last month, a Federal advisory panel recommended that the vaccine be used for boys as well as girls to prevent cancer.

The development of an HPV vaccine has involved many investigators throughout the world. In addition to the University of Rochester, other institutions that contributed to the effort include the National Institutes of Health, Georgetown University, and the University of Queensland in Australia, as well as several pharmaceutical firms, including GlaxoSmithKline and Merck.

Provided by University of Rochester Medical Center