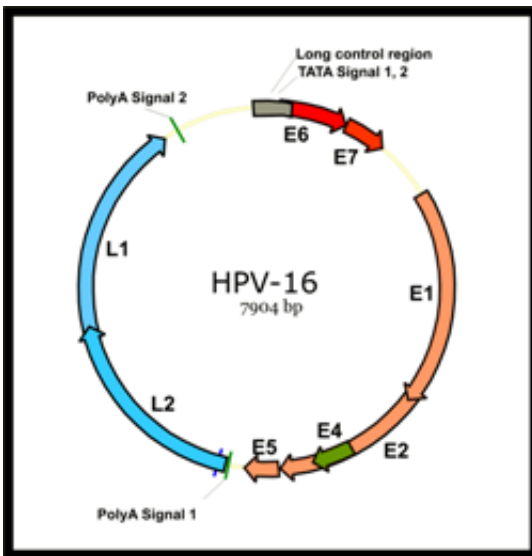


Scientists find promising biomarker for predicting HPV-related oropharynx cancer

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This graphic shows the genomic structure of HPV. Credit: National Cancer Institute

Researchers have found that antibodies against the human papillomavirus (HPV) may help identify individuals who are at greatly increased risk of HPV-related cancer of the oropharynx, which is a portion of the throat that contains the tonsils.

In their study, at least 1 in 3 individuals with oropharyngeal cancer had antibodies to HPV, compared to fewer than 1 in 100 individuals without cancer. When present, these antibodies were detectable many years

before the onset of disease. These findings raise the possibility that a blood test might one day be used to identify patients with this type of cancer.

The results of this study, carried out by scientists at the [National Cancer Institute](#) (NCI), part of the National Institutes of Health, in collaboration with the International Agency for Research on Cancer (IARC), were published online June 17, 2013, in the *Journal of Clinical Oncology*.

Historically, the majority of oropharyngeal cancers could be explained by [tobacco use](#) and [alcohol consumption](#) rather than HPV infection. However, incidence of this malignancy is increasing in many parts of the world, especially in the United States and Europe, because of increased infection with HPV type 16 ([HPV16](#)). In the United States it is estimated that more than 60 percent of current cases of oropharyngeal cancer are due to HPV16. [Persistent infection](#) with HPV16 induces [cellular changes](#) that lead to cancer.

HPV E6 is one of the viral genes that contribute to [tumor formation](#). Previous studies of patients with HPV-related oropharynx cancer found antibodies to E6 in their blood.

"Our study shows not only that the E6 antibodies are present prior to diagnosis—but that in many cases, the antibodies are there more than a decade before the cancer was clinically detectable, an important feature of a successful screening biomarker," said Aimee R. Kreimer, Ph.D., the lead Investigator from the Division of [Cancer Epidemiology](#) and Genetics, NCI.

Kreimer and her colleagues tested samples from participants in the European Prospective Investigation into Cancer and Nutrition Study, a long-term study of more than 500,000 healthy adults in 10 European countries. Participants gave a blood sample at the start of the study and

have been followed since their initial contribution.

The researchers analyzed blood from 135 individuals who developed oropharyngeal cancer between one and 13 years later, and nearly 1,600 control individuals who did not develop cancer. The study found antibodies against the HPV16 E6 protein in 35 percent of the individuals with cancer, compared to less than 1 percent of the samples from the cancer-free individuals. The blood samples had been collected on average, six years before diagnosis, but the relationship was independent of the time between blood collection and diagnosis. Antibodies to HPV16 E6 protein were even found in blood samples collected more than 10 years before diagnosis.

The scientists also report that HPV16 E6 antibodies may be a biomarker for improved survival, consistent with previous reports. Patients in the study with oropharyngeal cancer who tested positive for HPV16 E6 antibodies prior to diagnosis were 70 percent more likely to be alive at the end of follow-up, compared to patients who tested negative.

"Although promising, these findings should be considered preliminary," said Paul Brennan, Ph.D., the lead investigator from IARC. "If the predictive capability of the HPV16 E6 antibody holds up in other studies, we may want to consider developing a screening tool based on this result."

Provided by NIH/National Cancer Institute

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