

Early detection of human papilloma and other viral infections

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Scientists in Iowa are reporting development of a new, amazingly sensitive method for identifying the earliest stages of infection with human papilloma virus (HPV), a common virus that can increase the risk of cervical cancer in women. The test also has the potential for early identification of infection with other so-called DNA viruses, which cause a range of diseases that includes genital herpes and hepatitis. Their report is scheduled for the Nov. 1 issue of ACS' *Analytical Chemistry*.

In the study, Edward S. Yeung and colleagues point out that the most sensitive existing test for viral infections has drawbacks. That test is the Nobel Prize-winning polymerase chain reaction (PCR), used to detect DNA in settings ranging from medical labs to crime scenes.

PCR requires an initial step in which scientists “amplify,” or copy, a DNA sample a thousand-fold before virus detection can begin. However, amplification increases the risk of false-positives and false-negatives, especially when a sample has even a tiny amount of contaminants. Since over 50 million Pap smears are performed in the United States each year to test for HPV — the leading cause of cervical cancer — a fast, simple, accurate diagnosis is essential.

The new method skips the amplification step entirely, and yet can detect the presence of less than two copies of HPV per cell — a level corresponding to very early infection. The technique, called single-molecule spectroscopy, could be easily integrated into the Pap smear method. “It can become a good clinical screening or quantification

method for viral DNA in cells,” opening the door to improved screening tests for hepatitis B, herpes and other diseases.

Source: ACS

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