

Promising HPV Test: Fast, Precise and Low-Cost

Researchers at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) in the group of Markus Schmitt have developed a detection method for human papillomaviruses (HPV) which allows them to identify, in a quick and highly reliable manner, high-risk viruses that cause cervical cancer.

The prime risk factor for cervical cancer is an infection with human papillomaviruses. However, not all HPV types are a health hazard. Scientists distinguish between high-risk types and more harmless family members. There are detection methods available that basically allow one to precisely identify the virus type. However, current methods are not really suitable for large-scale use. In addition, it is not possible to unambiguously detect multiple infections with several different virus types.

An approach developed by virus researchers of the German Cancer Research Center now provides a promising alternative. **Markus Schmitt** and his colleagues describe their test method in the latest issue of the *Journal of Clinical Microbiology**: They first isolate the viral genetic material from a tissue sample, amplify and label it. The enriched DNA material is subsequently mixed with different probes, i.e. small DNA fragments each of which is typical for a specific virus type. If the DNA sequences of the viral DNA under study and the probe are identical, they will bind to each other. The probe thus isolates the unknown DNA from the mixture – a process called hybridization. The probes, in turn, are coupled to tiny plastic beads of different colors, with each type of probe attached to beads of the same color. A reading device measures the amount of hybridized viral DNA on the beads. By their characteristic color, the beads tell us which viral DNA was present in the sample.

Schmitt and his colleagues have developed 22 highly sensitive probes which even make it possible to distinguish HPV types whose genomes vary ever so slightly. In addition, a “universal” probe facilitates detection of yet unknown HPV types. The researchers found out that the genotyping is in no way inferior to previous, more complex investigation methods. It is even more sensitive (a minimum of six different virus types can be detected in one sample) and less error-prone (the results are reproducible at any time). These are excellent prerequisites for using the test as a high-throughput method.

The enriched DNA material from 500 tissue samples can be tested for up to 100 HPV types – all in just one day. Since the test can be performed with relatively little effort and at low costs it is suitable for use in large-scale population studies to investigate distribution, variety and infection behavior of the cancer causing viruses. Moreover, the detection method can help to better assess the effectiveness of a vaccination against the virus. Finally, virus typing would be a useful supplement in routine diagnostics. Particularly women with chronic high-risk HPV infection might benefit from a combination of the new HPV test and a Pap smear, which is part of early cancer diagnosis measures covered by the statutory health insurance.

Cervical cancer is the second most frequent cancer among women worldwide. For 2002, an estimated 493,000 new cases were expected and more than 273,000 women died of cervical cancer in the same year (International Agency for Research on Cancer). The Robert Koch Institute estimated in 2000 that slightly over 6,500 women are newly diagnosed with the disease each year in Germany. The tumor usually develops slowly; precancerous changes are diagnosed in about 50% of cases. If detected early, cervical cancer can be treated and cured without difficulty.

*Markus Schmitt et al.: “Bead-Based Multiplex Genotyping of Human Papillomaviruses”, *Journal of Clinical Microbiology*, 2006 Feb; 44(2):504-12

of this basic research are expected to lead to new approaches in the prevention, diagnosis and treatment of cancer. The Center is financed to 90 percent by the Federal Ministry of Education and Research and to 10 percent by the State of Baden-Wuerttemberg. It is a member of the Helmholtz Association of National Research Centers (Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V., HGF).

This press release is available at www.dkfz.de/pressemitteilungen

Dr. Julia Rautenstrauch
Division of Press and Public Relations
Deutsches Krebsforschungszentrum
Im Neuenheimer Feld 280
D-69120 Heidelberg
T: +49 6221 42 2854
F: +49 6221 42 2968