Tracing pre-cancer

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Date 30. Oktober 2008

From basic research into clinical practise

Each year approximately 500.000 women develop invasive cervical cancer. This disease is induced by abnormal human papilloma viruses (HPV) and the Nobel Prize for medicine was given for the discovery of this correlation. Accordingly, confirmation or exclusion of oncogene expression from abnormal HPV infections should be part of a solid check-up for pre-cancer. For this, Pap smears are currently analyzed in central laboratories – an operation, that can take several weeks.

Against this background, the Institut für Mikrotechnik Mainz GmbH (IMM) has developed a microfluidic chip device in collaboration with other European partners. This disposable chip including instrument allows point of care detection of oncogene expression from the dangerous HPV types. The actual prototype consists of two modules: The first one controls the isolation of nucleic acids from cervical cell smears. The second module is responsible for the

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specific isothermal real-time amplification and detection (Nucleic Acid Sequence Based Amplification; NASBA) of multiple mRNA mirroring the presence of pre-cancer inducing HPV types. All chemicals and reactants needed are included inside the disposable chips.

International as well as interdisciplinary collaboration was an important element of the success story of this EU funded project “MicroActive”. Hereby, research and development institutes (IMM, SINTEF, IMTEK, BIOFLUIDIX) worked closely with a hospital (Coombe Women’s Hospital) and the Biotech enterprise (NORCHIP). Meanwhile, both modules have been tested against relevant clinical samples and cancer cell lines (detect less than 5 cancer cells) and the results correlate well with one of the current screening methods (PreTect HPV-Proofer from NorChip).

IMM is a worldwide operating service company for research and development in microtechnology and is specialised to develop customised solutions.

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