

## A Robotic Beetle for Detecting Cancer in the Stomach and Bowel – Magneto Sensors from Lahnau in the Medicine of the Future –



[ Photo: Innovent e.V. ]

[ The idea sounds revolutionary, but it could become part of everyday clinical practice in the near future: an actively controllable miniature capsule endoscope equipped with an optical system and operating instruments, which can be used not only to detect stomach and bowel cancer in the early stages but to actually treat it at the site. From the initial draft sketches, it resembles a beetle with legs and gripping tools and it will now be developed using the latest in micro and nanotechnology. ]

This is the VECTOR research project, supported by the European Union and launched on 01.09.2006. Its stated objective is „Eliminating gastrointestinal cancers through breakthrough medical microtechnology“ and

it will involve the development of intelligent capsules that will be taken orally and will then look for early stage cancers in the digestive tract. Unlike existing capsule endoscopes, the VECTOR capsules can be actively controlled by the doctor and, like a beetle, have legs for moving around in the stomach and bowel. The VECTOR capsules have optical sensors for detecting diseases – these analyse the tissue, greatly improving early detection of cancer. The VECTOR capsules will also be able to treat early stage tumours, as they are equipped with grippers and operating instruments that can be used to remove diseased tissue or destroy it inside the body.

Early cancer detection using endoscopic capsules could help to drastically increase the

currently low level of acceptance of the examinations. More than 30 million people worldwide should be examined for bowel cancer every year because of genetic disposition or initial symptoms, but less than ten percent of them currently visit the doctor, although bowel cancer can be cured relatively easily if diagnosed at an early stage.“

The VECTOR consortium includes Sensitec GmbH and 17 other leading European research institutions and companies, as well as the Korean Institute of Science and Technology. Sensitec GmbH and Innovent e.V., Jena, will be working on the use of a jointly developed magnetic monitoring system for locating and navigating the endoscope capsule. The capsule will be marked with a small

magnet and located using external MR sensor modules, ensuring that neither the patient nor the doctor will be exposed to harmful radiation (e.g. X-rays) during the examination.

*Dr. Joachim Hölzl  
Sensitec GmbH*

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