



Home > Display > Nanotech Article Display

Advertisement

This article is from [Small Times](#)

Lab-on-chip project aims to diagnose cancer faster

(September 1, 2010) -- At the Engineering in Medicine and Biology Conference (EMBC), [imec](#) and its project partners launched the European Seventh Framework Project MIRACLE. The MIRACLE project aims to develop an operational lab-on-chip for the isolation and detection of circulating and disseminated tumor cells (CTCs and DTCs) in blood. The new lab-on-chip is an essential step towards faster and cost-efficient diagnosis of cancer. Imec has also worked on the [MASCOT lab-on-chip project to detect breast cancer](#).



Detection of circulating and disseminated tumor cells in blood is a promising methodology to diagnose cancer dissemination or to follow up cancer patients during therapy. Today, the detection analyses of these cells are performed in medical laboratories requiring labor-intensive, expensive, and time-consuming sample processing and cell isolation steps. A full tumor cell detection analysis can take more than a day. A lab-on-chip, integrating the many processing steps, would enable faster, easy-to-use, cost-effective detection of tumor cells in blood. They are minimally invasive, increasing the patient's comfort and the efficiency of today's healthcare.

In a preceding joint project by some of the partners (MASCOT FP6-027652), individual [microfluidic](#) modules for cell isolation, cell counting, DNA amplification and detection have been developed. Based on this expertise and strengthened by additional partners, the development of a fully automated lab-on-chip platform to isolate, count, and genotype CTCs is envisaged within the framework of the MIRACLE project. For genotyping, genetic material (i.e. the mRNA) will be extracted from the cells and multiple cancer-related markers will be amplified based on multiplex ligation dependent probe amplification (MLPA) followed by their detection using an array of electrochemical sensors. Full integration of all steps requires innovative research and processing steps that need a combination of the multidisciplinary and unique expertise of the different project partners (ranging from microfluidics to interfacing, miniaturization, and integration skills). The resulting lab-on-chip tumor detection system will be well ahead of the current state-of-the-art, revolutionizing cancer diagnostics and individualized theranostics.

Within the MIRACLE project framework, imec, as project coordinator, collaborates with the Universitat Rovira I Virgili (Spain), the Institut für Mikrotechnik Mainz, AdnaGen, ThinXXs and Consultech (Germany), MRC Holland (The Netherlands), the Oslo University Hospital (Norway), the KTH Royal Institute of Technology, Multi-D and Fujirebio Diagnostics (Sweden), ECCO - the European CanCer Organization and ICsense (Belgium) and Labman (UK). The project aims at developing a fully automated and integrated microsystem providing the genotype (gene expression profile) of CTCs and DTCs starting from clinical samples. MIRACLE is partly funded by the European Commission (FP7-ICT-2009.3.9). More information on the project is available at www.miracle-fp7.eu

Imec performs world-leading research in nanoelectronics. Further information on imec can be found at www.imec.be.

Other cancer research in the nano sector:
[Nanopharmaceutical cancer therapy trial data presented by Cerulean Pharma](#)

[Nano in biology: research for improved drug delivery, nanomaterial handling](#)

[Visit the Life Sciences and Medical Nano center on ElectroIQ.com](#)

Follow Small Times on Twitter.com by clicking www.twitter.com/smalltimes. Or join our Facebook group

Be the first of your friends to like this. · [Admin Page](#) · [Error](#) · [Unlike](#)

