

Miniaturization**Scientists at Iowa State University Release New Data on Miniaturization**

2013 FEB 11 (VerticalNews) -- By a News Reporter-Staff News Editor at Nanotechnology Weekly -- Current study results on Miniaturization have been published. According to news reporting out of Ames, Iowa, by VerticalNews editors, research stated, "This paper reports on the development of a lens-less and image-sensor-less micro-electro-fluidic (MEF) approach for real-time monitoring of the locomotion of microscopic nematodes. The technology showed promise for overcoming the constraint of the limited field of view of conventional optical microscopy, with relatively low cost, good spatial resolution, and high portability." Our news journalists obtained a quote from the research from Iowa State University, "The core of the device was microelectrode grids formed by orthogonally arranging two identical arrays of microelectrode lines. The two microelectrode arrays were spaced by a microfluidic chamber containing a liquid medium of interest. As a nematode (e.g., *Caenorhabditis elegans*) moved inside the chamber, the invasion of part of its body into some intersection regions between the microelectrodes caused changes in the electrical resistance of these intersection regions. The worm's presence at, or absence from, a detection unit was determined by a comparison between the measured resistance variation of this unit and a pre-defined threshold resistance variation. An electronic readout circuit was designed to address all the detection units and read out their individual electrical resistances. By this means, it was possible to obtain the electrical resistance profile of the whole MEF grid, and thus, the physical pattern of the swimming nematode. We studied the influence of a worm's body on the resistance of an addressed unit. We also investigated how the full-frame scanning and readout rates of the electronic circuit and the dimensions of a detection unit posed an impact on the spatial resolution of the reconstructed images of the nematode. Other important issues, such as the manufacturing-induced initial non-uniformity of the grids and the electrotaxic behaviour of nematodes, were also studied. A drug resistance screening experiment was conducted by using the grids with a good resolution of 30 x 30 m(2). The phenotypic differences in the locomotion behaviours (e.g., moving speed and oscillation frequency extracted from the reconstructed images with the help of software) between the wild-type (N2) and mutant (lev-8) *C. elegans* worms in response to different doses of the anthelmintic drug, levamisole, were investigated. The locomotive parameters obtained by the MEF grids agreed well with those obtained by optical microscopy." According to the news editors, the research concluded: "Therefore, this technology will benefit whole-animal assays by providing a structurally simple, potentially cost-effective device capable of tracking the movement and phenotypes of important nematodes in various microenvironments." For more information on this research see: Micro-electro-fluidic grids for nematodes: a lens-less, image-sensor-less approach for on-chip tracking of nematode locomotion. *Lab On a Chip - Miniaturisation for Chemistry and Biology*, 2013;13(4):650-61. Our news journalists report that additional information may be obtained by contacting P. Liu, Dept. of Electrical and Computer Engineering, Iowa State University, Ames, Iowa, United States. Keywords for this news article include: Ames, Iowa, Technology, United States, Miniaturization, North and Central America. Our reports deliver fact-based news of research and discoveries from around the world. Copyright 2013, NewsRx LLC