

On-chip Analysis and Control of *C. elegans*



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Abstract

The increase of the usage of heavy metal grows the environmental crisis and health problem from the heavy metal exposure to the soil and water. We proposed a micro fluidic chip to analyze the condition of *Caenorhabditis elegans* (*C. elegans*) for a bioindicator application. In this device, we can culture and test *C. elegans* and measure the capacitance change to analyze the condition of *C. elegans*. Because the capacitance change has the correlation with the body volume of *C. elegans*, it is possible to estimate the concentration of heavy metal inside the solution. The locomotion of *C. elegans* is also evaluated inside micro fluidic chip by controlling its taxis.

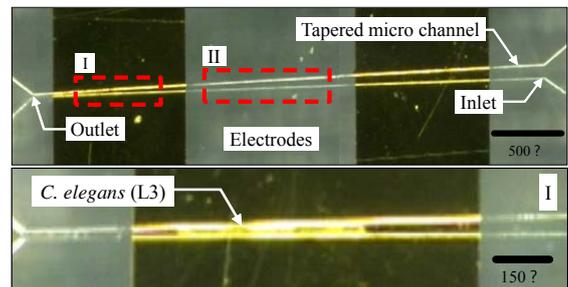


Fig. Tapered micro-channel for the body volume measurement of *C. elegans* from its capacitance in some heavy metal solutions.

Biography

Toshio Fukuda graduated from Waseda University, Tokyo, Japan in 1971 and received the Master of Engineering degree and the Doctor of Engineering degree both from the University of Tokyo, in 1973 and 1977, respectively. Meanwhile, he studied at the graduate school of Yale University from 1973 to 1975. In 1977, he joined the National Mechanical Engineering Laboratory in Japan. From 1979 to 1980, he was a Visiting Research Fellow at the University of Stuttgart, Germany. He joined the Science University of Tokyo in 1981, and then joined Department of Mechanical Engineering, Nagoya University, Japan in 1989. From 2009 to 2012, he was a Director of Center for Micro-Nano Mechatronics at Nagoya University. At present, he is Professor Emeritus and Visiting Professor in Nagoya University, and working in Meijo University, and Beijing Institute of Technology.

He is mainly involved in the research fields of intelligent robotic and mechatronic system, cellular robotic system, and micro-nanorobotic system.

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