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Active Motion Control of Tetrahymena pyriformis by Galvanotaxis and Geotaxis[1] JIHOON KIM, DOYOUNG BYUN, Sungkyunkwan University, MIN JUN KIM, Drexel University — Recently, there has been increasing interest in the swimming behavior of microorganisms and biologically inspired micro-robots. These microorganisms naturally accompanied by complex motions. Therefore it is important to understand the flow characteristics as well as control mechanisms. One of eukaryotic cells, the protozoa are a diverse group of unicellular organisms, many of which are motile cilia. Motile cilia are cover on the surface of cell in large numbers and beat in oriented waves. Sequential beating motions of a single cilium form metachronal strokes, producing a propagation wave, and therefore the body is achieved propulsion force. So preliminary studies are achieved to understand the flow induced by swimming microorganisms. Based on hydrodynamic results, the follow study of a few micro-scale protozoa cell, such as the Tetrahymena pyriformis, has provided active or passive control into several external stimuli. In typical control methods, the galvanotaxis and geotaxis were adopted active and passive control, respectively. The validation of galvanotaxis is used DC and AC voltage. In terms of geotaxis, corrugated microstructures were used to control in the microchannel.

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