

Enhanced Microsphere Transport in Capillary by Conditioned Cells of Green Paramecia Used as Living Micromachines Controlled by Electric Stimuli

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Some researchers have described the cells of *Paramecium* species as “swimming sensory cells” or “swimming neurons” applicable to micro-biorobotics and biological micro-electromechanical systems (BioMEMS). *Paramecium* species including green paramecia (*Paramecium bursaria*) migrate towards the anodic electrode when exposed to an electric field. This type of cellular movement is known as galvanotaxis. Because the ideal micromachines designed for microparticle transport must have a capacity for loading certain numbers of particles, *P. bursaria* was chosen as a model organism. In this study, we show enhanced microparticle transport by overcoming (i) the particle size limitation for the cell-mediated transport of microspheres of up to *ca.* 10 μm size (doubling the size of particles ever reported) and (ii) the limit of cellular migration distance manifested by galvanotactically stimulated cells.

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