Abstract Submitted
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Electromagnetic Sensors of Biological Motors[1] JIE FANG, K. RAJAPAKSHE, D. PADMARAJ, H. INFANTE, V. VAJRALA, G. MERCIER, W. WIDGER, W. WOSIK, J. MILLER — Biological motors operate on time scales that readily couple to oscillatory electric fields. Modest ac fields applied to cells in an aqueous medium lead to greatly enhanced fields across the plasma membrane or (at kHz frequencies) internal membranes. Membrane complexes thus contribute to both linear and nonlinear responses to sinusoidal fields. For example, activity of motors in mitochondrial and (for chloroplasts) photosynthetic electron transport chains correlate with frequency-dependent second and third harmonics. Our electrode-based biosensors are scalable for micro- and nano-fluidic biochips. At low frequencies (less than 100Hz) we find it advantageous to use SQUIDs, which reduce contact effects and could lead to clinical applications.

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