



סמינר מחלקתי (מיוחד) – הנדסה ביורפואית
1.1.2013 יום שלישי בשעה 14:00 בנין 30 חדר 300
Special BME Seminar, Tuesday 14:00, Building 30, room 300

Calcium homeostasis and mitochondrial oxidant stress in neurons at risk in Parkinson's disease

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Mitochondrial oxidant stress is critical to pathogenesis in Parkinson's disease. But the origins of this stress are poorly understood. One possibility is that it arises from the metabolic demands associated with regenerative activity (autonomous spiking). To test this hypothesis, we combined two-photon laser scanning microscopy, calcium imaging and slice electrophysiology to characterize neurons in the dorsal motor nucleus of the vagus (DMV), a population of cholinergic neurons that show signs of pathology in the early stages of Parkinson's disease. DMV neurons were slow, autonomous pacemakers with broad spikes, leading to calcium entry that was weakly buffered. Using a novel transgenic mouse expressing a redox-sensitive optical probe targeted to the mitochondrial matrix, we found that calcium entry during pacemaking created a basal mitochondrial oxidant stress. Knocking out DJ-1, a gene associated with early-onset Parkinson's disease, exacerbated this stress. These results point to a common mechanism underlying mitochondrial oxidant stress in Parkinson's disease and suggest that brain-penetrant and well-tolerated calcium channel blockers could ameliorate it.

About the Lecturer

Joshua Goldberg is a Research Assistant Professor at Northwestern University, Chicago, IL (USA). He obtained his PhD in Computational and Systems Neuroscience at the Hebrew University of Jerusalem in 2004. Dr. Goldberg research interests include study of the relationship between physiological phenotype, calcium disposition and vulnerability to neurodegeneration and investigation of the cholinergic systems in neurodegenerative disease. Dr. Goldberg has published 20 Peer-reviewed articles (2 Nature Neuroscience, 2 Neuron, 8 J Neurosci, 3 J Neurophysiol) and several invited (peer-reviewed) reviews as well as several book chapters.