

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Physiological role of stochastic calcium signaling in subcellar microdomains** YOHANNES SHIFERAW, California State University — Calcium (Ca) plays an important role in regulating various cellular processes. In a variety of cell types, Ca signaling occurs within microdomains where Ca channels deliver localized pulses of Ca which activate a nearby collection of Ca sensitive receptors. The small number of channels in these microdomains ensures that the signaling process is stochastic. The aggregate response of several thousand of these micro-domains yields a whole cell response which dictates the observable cell behavior. Here, we study analytically the statistical properties of a population of these micro-domains in response to a trigger signal. We apply these results to understand the relationship between Ca influx and Ca release in cardiac myocytes. In particular, we explain why the global response is graded with respect to total Ca influx, even though Ca response at the micro-domain level is all-or-none.

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Date submitted: 20 Nov 2006

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