1067-92-48 **Marco A Huertas** (`huertas.marco@gmail.com`) and **Gregory Douglas Smith***
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whole cell calcium responses.*

Localized Ca elevations known as Ca puffs and sparks are cellular signals that arise from the cooperative activity of clusters of inositol 1,4,5-trisphosphate receptors and ryanodine receptors on the surface of the endoplasmic reticulum or sarcoplasmic reticulum. When Markov chain models of intracellular Ca regulated Ca channels are coupled via a mathematical representation of a Ca microdomain, simulated Ca release sites may exhibit the phenomenon of stochastic Ca excitability. Such mathematical models provide insight into the relationship between single-channel kinetics and the statistics of puff/spark duration, and clarify the role of stochastic attrition, Ca inactivation, luminal depletion, and allosteric interactions in the dynamics of puff/spark termination. The stochastic dynamics of local Ca is an important aspect of excitation-contraction coupling in cardiac myocytes, where sarcoplasmic reticulum Ca-induced Ca release is locally controlled by trigger Ca influx via L-type channels of the plasma membrane. A recently developed whole cell modeling approach is able to avoid the computationally demanding task of resolving spatial aspects of global Ca signaling, while accurately representing heterogeneous local Ca signals in a population of Ca release units. (Received June 22, 2010)

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