Spiking and Bursting in a biophysical model of excitable cell

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Abstract

Spiking and bursting are core features of the functional physiology of all excitable cells. Only after firing a spike will a cell perform its task. Furthermore, the rate, timing and patterns of spike generation have important effects on the strength of downstream events such as neurotransmitter release. Thus understanding how these facets of action potential firing arise is crucial in helping us understand the functional physiology of these cells. Here we present bifurcation analysis of a detailed biophysical model that accounts for sppikng, bursting as well as mixed firing patterns observed in real cells. We study the dependence of these dynamics on key model parameters and discuss the underlying mathematical mechanisms.

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