Abstract Submitted
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The propensity to bi-stability of bursting and silence of the leech heart interneuron[1] TATIANA MALASCHENKO, DIANA WILLIAMS, Physics and Astronomy, ANDREY SHILNIKOV, GENNADY CYMBALYUK, Neuroscience Institute — Bursting is one of primary activity regimes of neurons. Our previous study was focused on determining a generic biophysical mechanism underlying the transition between bursting and silence and the co-existence of these two regimes observed in a neuron model. We show that this co-existence can be explained by the unstable sub-threshold oscillations (USTO) separating silence and bursting. The range of the controlling parameters, where the co-existence is observed, is limited by the critical values of the system at which the Andronov-Hopf and homoclinic bifurcations occur. We investigate how different parameters of the model affect the width of the co-existence area. We study the effects of the variations of maximal conductances of every voltage-dependent current. The influence of each current was tested individually, one at the time. We found that only two of them had a significant effect on the range of co-existence. The increase of the maximal conductance of the hyperpolarization-activated cationic current I_h would expand the area of co-existence. The decrease of the conductance of the LVA fast Ca^{2+} current has the opposite effect.

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