

Review of: "Depolarization block of interneurons"

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Potential competing interests: No potential competing interests to declare.

The article "Depolarization block of interneurons", by Tirozzi et al, uses a previously existing mathematical model to predict how excitatory and inhibitory inputs of different strengths may cooperate to the firing properties of fast spiking interneuron in the hippocampus. While large depolarizing inputs reproduce the blockade of activity seen in many other neurons, inhibitory activation may restore excitability. In general terms the paper adds very little to direct experimental evidence and makes some statements that need being reviewed. Following is a list of observations for the authors to consider.

SUMMARY

The first sentence needs to be more specific: In this paper we study the behavior of a hippocampal interneuron model.

Avoid adjectives such as "important" along the text, since they add nothing to the science and are only subjective judgement on the author's work.

Please state the reasons that sustain the following statement: "can have a significant impact in the study of epilepsy and other uncontrolled activity of the neurons"

INTRODUCTION

Authors mention: In whole generality the term interneuron is referred to a GABAergic non-principal neuron..." In general terms, an interneuron is considered a neuron that is not sensory or motor...

Authors mention: interneurons usually have short axons and a dendritic tree which lays in the same region where the cellular body rests and mainly plays an inhibitory role (synapses mediated by GABA_A or GABA_B receptors using gamma-aminobutyric acid - GABA - as neurotransmitter).

I suggest: inhibitory interneurons usually have short axons and a dendritic tree which lays in the same region where the cellular body rests. GABAergic synapses incorporate GABA_A or GABA_B receptors.

The E_{syn} at -80 mV used in the model does not seem physiological (see Table 2)

Figure 2. Action potential generated in the firsts 100 ms of activity of the basket cell as a function of the applied current I_{ext}. I suggest to change to: "Action potentials generated in the first 100 ms of current application (I_{ext}) into basket cell."

Results

Authors state “In this situation the neuron emits an infinite train of action potentials.” Such statement is unrealistic.

Discussion:

The statement in the first line needs references: The depolarization block plays an important role in the regulation of neuronal activity when CA1 pyramidal cell of the hippocampus receives an excessive amount of excitatory inputs (e.g. in case of epilepsy).

The third paragraph of the discussion needs references.