Experimentally-constrained computational models of hippocampal CA1 pyramidal neurons

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Experimental advances continue to reveal new insights into the workings of the brain, but the views these methods can provide are still limited. At the same time, however, computational models of neurons have grown both in terms of relevance and capability. Such models, when constrained by experimental results, are able to provide fuller explanations of the data and also make new experimentally testable predictions.

This two-pronged approach has been used to investigate the function of CA1 pyramidal neurons in the hippocampus, one of the principal groups of cells in a region of the brain important for the formation of new memories. Both computational models and experiments suggest that a mode of operation of these neurons may be as coincidence detectors, comparing two distinct sets of excitatory inputs and preferentially producing output action potentials when both are active.