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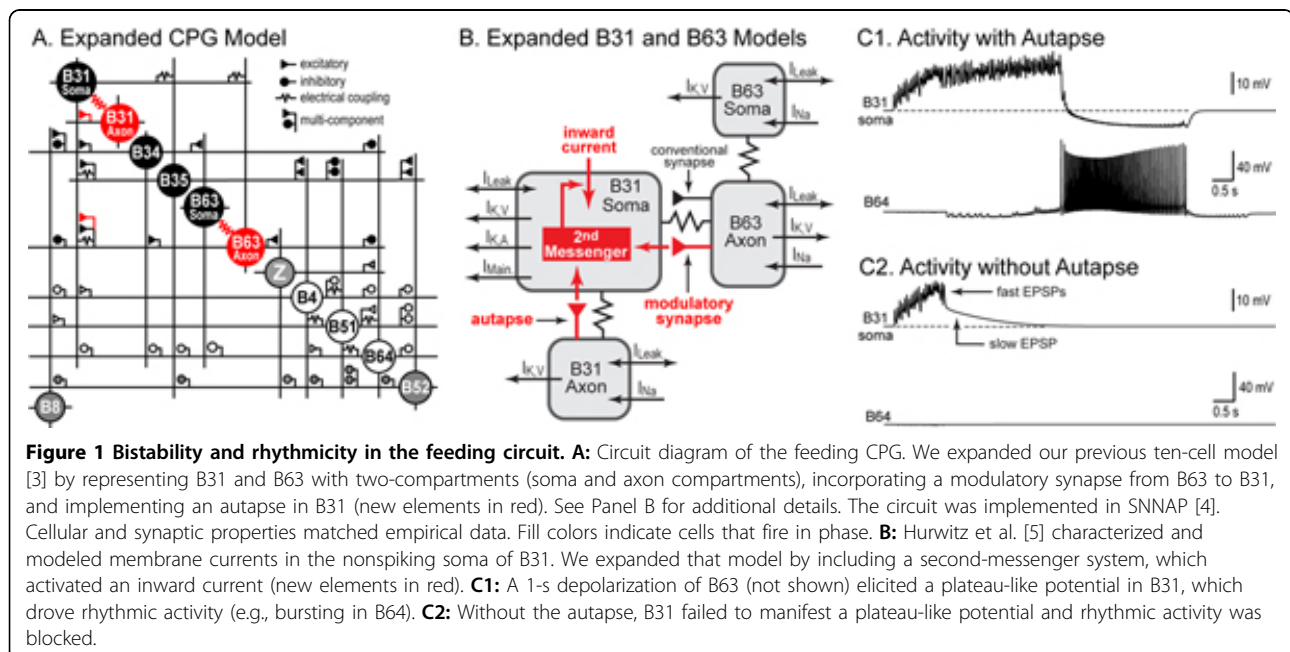
Autaptic excitation contributes to bistability and rhythmicity in the neural circuit for feeding in *Aplysia*

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The feeding circuit in *Aplysia* is a useful model system for studying the neuronal bases of cognitive functions such as sensory processing, generation of behavior, motivation, decision making, learning, and memory [1,2]. The goals of the present study are to develop a biologically-realistic model of the feeding circuit and to investigate the ways in which component processes contribute to circuit function. To begin, we developed a model of the central pattern generator (CPG) that

mediates rhythmicity in the feeding circuit (Fig. 1A). Simulations indicated that two positive-feedback loops (the B31 autapse and the synaptic interactions between B31 and B63) introduced bistability into the membrane potential of the B31 soma (Figures 1B, 1C1). In addition, simulations indicated that this plateau-like potential was the 'deciding factor' for initiating rhythmic activity (Fig. 1C). Simulations also helped identify features of the model that warrant further empirical investigation; e.g.,



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the simulated amplitude of the plateau-like potential was less than empirical observations.

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