The role of feedback in determining the stability of the lobster heart in response to temperature perturbations

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The Dickinson lab studies central pattern generators, which are neuronal circuits that control rhythmic behaviors, such as walking, breathing and heartbeat, without the need for sensory input. The lobster cardiac ganglion is a simple central pattern generator responsible for the lobster's heartbeat. As a result, the lobster cardiac ganglion is a good subject of study in order to understand central pattern generators at the simplest level. These findings can then be applied to more complex central pattern generators, such as those in humans.

The *Homarus americanus* lobster inhabits the north east shore of North America and can survive in temperatures ranging from 0-30˚C. As a result, my project used the changing condition of temperature to identify the feedback systems at play in helping the lobster heart maintain stability. This is to say, how does the cardiac ganglion, a neuronal circuit that requires no sensory input, continue firing at 0˚C as well as 30˚C?

There are two known feedback loops present in the lobster cardiac system: the positive stretch feedback system and the nitric oxide negative feedback loop. My project focused on the nitric oxide negative feedback loop because it is a feedback pathway that has been shown to be conserved across invertebrates and vertebrates, namely humans. When the heart muscles contract