ENCONTRO SCIENTIA

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Room 2.2.14, Ciências ULisboa

Peripheral-tissue stress signaling promotes developmental stability via brain neuron oscillation in *Drosophila*

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The ability to achieve a species-specific size and proportion despite developmental or environmental perturbations is termed developmental stability. The molecular and cellular processes behind this are best understood in insects. In *Drosophila*, a peripheral-tissue-stress signal, the relaxin/insulin-like peptide Dilp8, promotes developmental stability via its neuronal receptor, Lgr3, an ortholog of vertebrate relaxin receptors. Lgr3 signaling is widely accepted to occur in and activate (depolarize) the central brain growth-coordinating interneurons (PIL/GCL neurons) of developing larvae.

Here, using neurogenetic approaches, we unexpectedly find that PIL/GCL neurons require both silenced (hyperpolarized) and active (depolarized) states for an appropriate response to Dilp8. These results are most simply explained if Lgr3 activation by Dilp8 triggers PIL/GCL-neuron oscillatory activity, and such oscillations promote developmental stability. This system mirrors homeostasis-regulating, peptide-driven oscillatory circuits found in the vertebrate hypothalamus, a developmentally-homologous region to the one occupied by PIL/GCL neurons in the fly brain.

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