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Neural modulation of stress response in *C. elegans*

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In response to environmental challenges, such as high temperature, starvation, oxidative stress or pathogenic infection, unicellular organisms and isolated cells in culture have the intrinsic capacity to cell autonomously trigger widely conserved mechanisms with the aim of maintaining the protein homeostasis and minimize intracellular protein aggregation. These mechanisms of stress response include the induction of heat-shock proteins (HSPs), molecular chaperons that prevent protein misfolding, and the up-regulation of superoxide dismutase (SOD) and catalase, enzymes that protect the cells against reactive oxygen species protein damage. Another process that is triggered in cells exposed to stress is the autophagy, which permits the degradation of different biomolecules with the aim of both, satisfying cell energy demands and maintaining the proteostasis under these unfavorable conditions.

Activation of these mechanisms in a purely autonomously way could have serious deleterious effects in the context of a multicellular organism. Nevertheless, the mechanisms that allow the metazoos to integrate and coordinate the cellular response to stress is poorly understood. Studies in *C.elegans* have shown that sensory neurons play a key role in the coordination of this intrinsic capacity of cells. However, the signals and molecular mechanisms that integrate stress perception with the up-regulation of HSPs, SODs and/or autophagy in non-neuronal cells are completely unknown. Our analysis of the *C.elegans* wiring map reveals that the circuits activated upon stress converge in RIM, an interneuron located in the worm nerve ring, leading to the intriguing hypothesis that this neuron integrates the sensory information and coordinates the stress response through neuroendocrine signals. In this talk, we will describe molecular and cellular pathways underlaying the central coordination of the stress response in worms. Our final aim is to completely understand how the nervous system controls the stress response against life threatening environmental conditions in a complete organism as *C.elegans*.

A genomic analysis of the pathogenic relationship of *P. aeruginosa* with *C. elegans*

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