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From Melanopsins to clock genes: Hormone regulation and signal transduction

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Abstract

The photopigment melanopsin has been initially cloned from the frog, *Xenopus laevis*, melanophore. It has since then been found in the retina of all vertebrates, including humans. In mammals, melanopsin is expressed in a subpopulation of retinal ganglion cells and is responsible for capturing light to entrain the biological clock, the suprachiasmatic nucleus, located in the hypothalamus. It is now well accepted that many organs and tissues possess the molecular machinery to express the clock proteins and are, therefore, considered as peripheral clocks. We have been using cultured cells of the teleost *Danio rerio*, the frog *Xenopus laevis* and the mouse *Mus musculus* (C57black) to investigate the regulation of the photopigments rhodopsin and melanopsin, and the clock genes *Per, Cry, Clock* and *Bmal1* by light and hormones. *Danio rerio* cell line ZEM-2S possesses 5 melanopsins, *Xenopus laevis* melanophores express 2 melanopsins and the mouse melanocyte cell line B16-F10 expresses rhodopsin, what enable these cells to respond to light. We will discuss the effects of glucocorticoids - a known mammalian fibroblast synchronizer - on *Danio* ZEM-2S cells and on mouse melanocytes, and of endothelin, melatonin and α-MSH - agonists of pigment cell granule translocation - on *Xenopus* melanophores. To conclude, we will compare the light- and hormone-activated signaling pathways leading to clock gene modulation in these two cell lines.

Biography

Ana Maria de Lauro Castrucci has completed her PH.D. at the age of 26 years from the University of São Paulo, Brazil and postdoctoral studies with Professor Mac E. Hadley from University of Arizona, USA. She is full professor in the Department of Physiology, Institute of Biosciences, University of São Paulo. She has been a visiting professor at the Uniformed Services University of the Health Sciences, in Maryland and at the University of Virginia, in Virginia. She has tutored 17 master and 10 Ph.D. students, and published more than 128 papers in reputed journals. http://scholar.google.com.br/citations?hl=pt-BR&user=sgnC0ncAAAAJ