

DIVERSITY OF OPSINS AND PHOTSENSORY STRUCTURES IN SEA CUCUMBERS (HOLOTHUROIDEA, ECHINODERMATA)

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Photoreception mediated by opsins is a fundamental sense in most Eumetazoans. These opsins are generally expressed in visual structures (eyes or ocelli). However, it is not the case for the most echinoderm species which present an extraocular photoreception. Currently, photoreception was poorly studied in sea cucumbers (Holothuroidea). Although most sea cucumber species are eyeless, many of them remain sensitive to daylight. On the other hand, the possible presence of ocelli has been suggested in several species belonging to the order of Apodida. We have conducted comparative morpho-functional and molecular study of the photosensory structures in these Holothurians. The comparative genomic study carried in 3 different lineages of sea cucumbers revealed the presence of a large diversity of opsin genes almost equivalent to those of other echinoderms (5 to 6 different opsin types). Immunostaining performed in an European eyeless sea cucumber species: *Holothuria forskali*, revealed the expression of rhabdomeric opsins at the tips of its oral tentacles and tube feet. We have also investigated a great epibenthic Apodida species from Madagascar which presents dark spots at the base of oral tentacles: *Euapta godeffroyi*. The morphological study of these ocelli by light and electron microscopy revealed the presence of a dense neuroepithelium composed of sensory cells with numerous apical elongated microvilli and some atypical cilium. Immunolabelling highlighted the expression of one ciliary opsin inside these photosensory cells. Finally, we have investigated a small European burrowing species: *Oestergrenia digitata*. This species is devoid of eyespots but presents sensory cups on the oral face of tentacles. Immunostaining has highlighted the presence of a ciliary opsin in these cupules that could be involved in light perception in this species.

Presentation type: ORAL

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Degree: PhD student

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Scientific thematic: Evolution and development – Ecology – Ecophysiology