

# Abstract

Light detection is one of the crucial abilities of all animals. The light cues are important e.g. for maintaining of circadian rhythms, regulation of spawning cycles, changes of pigmentation and arguably most importantly for vision. Most animals detect light by opsins, members of the G protein coupled receptors superfamily.

Amphioxus belongs to earliest branching chordate clade, cephalochordates. Thanks to their phylogenetic position, physiology and morphology, cephalochordates became the most relevant model organism for understanding the evolutionary origins of vertebrate specific traits. Amphioxus evince various reactions to light throughout its development.

In the presented thesis light detecting systems of amphioxus were studied thoroughly. More specifically characterization of the opsin gene repertoire of two amphioxus species *Branchiostoma floridae* and *Branchiostoma lanceolatum* and their comparison with opsins from other animals is presented. In addition, remarkable similarity on the gene expression level between one of amphioxus visual organs, so called frontal eye, and neurons and retinal pigmented epithelium in vertebrate retina was shown. These data confirm the long time ago proposed homology between amphioxus frontal eye and vertebrate lateral eyes.

Taken together all the presented data help with getting insights into the evolution of light detection in vertebrates and more broadly in putative chordate ancestor.