

MOL231: Revealing pre- and postsynaptic gene expressions in *Oikopleura dioica*

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Abstract & Aim

Molecular cross-talk between nerve synapses is necessary to maintain important bodily functions. Studies regarding pre- and postsynaptic genes are therefore important for further understanding of the nervous system. In this study we took advantage of the simplified nervous system of *Oikopleura dioica*, a planktonic tunicate closely related to vertebrates, to study the synapsis. The aim of this study was to find marker genes for pre- and postsynaptic cells in *O. dioica*. A set of 18 genes were chosen; 11 of them are well-known presynaptic genes in other species, and 7 are postsynaptic genes. A total of 17 genes were successfully cloned and used for probe synthesis to do in situ hybridization in *O. dioica*.

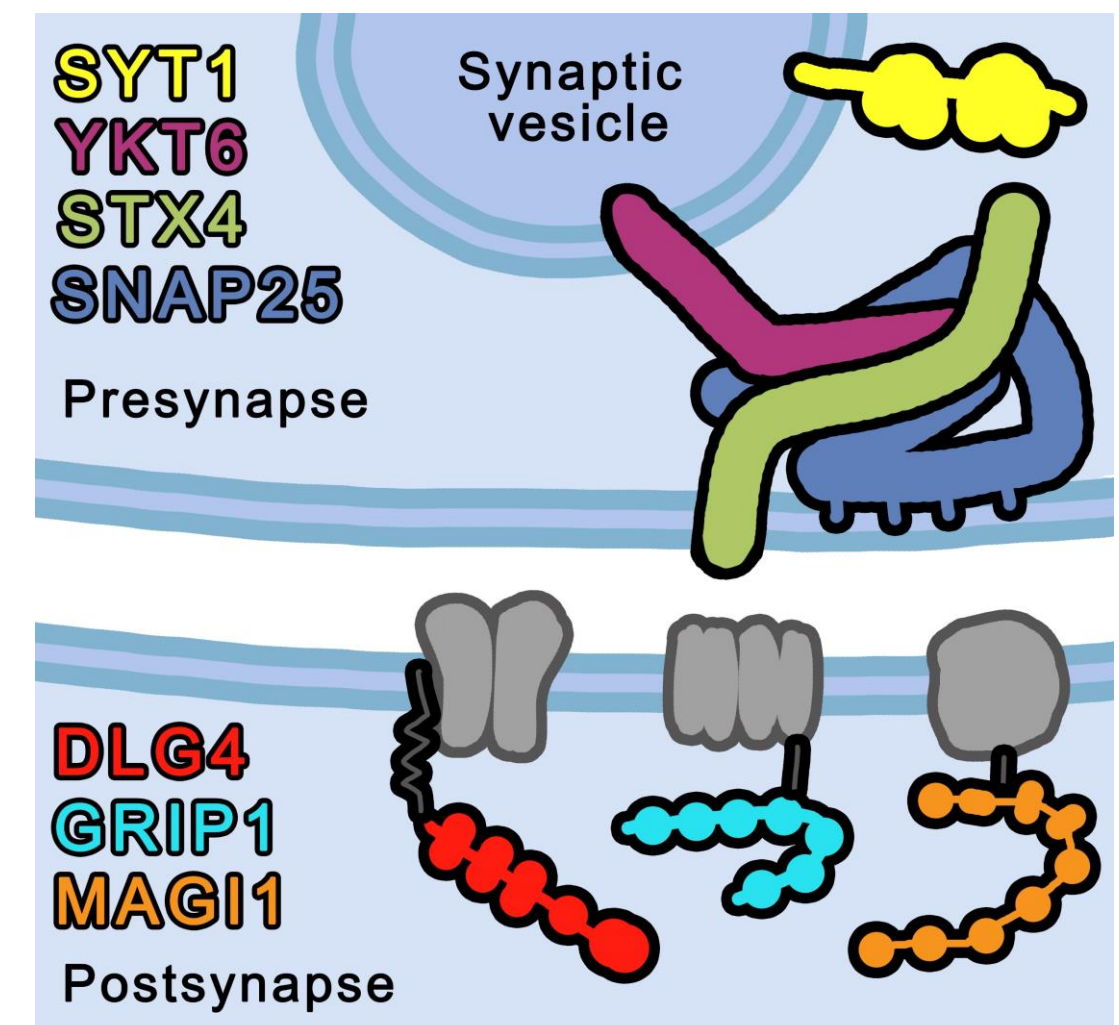
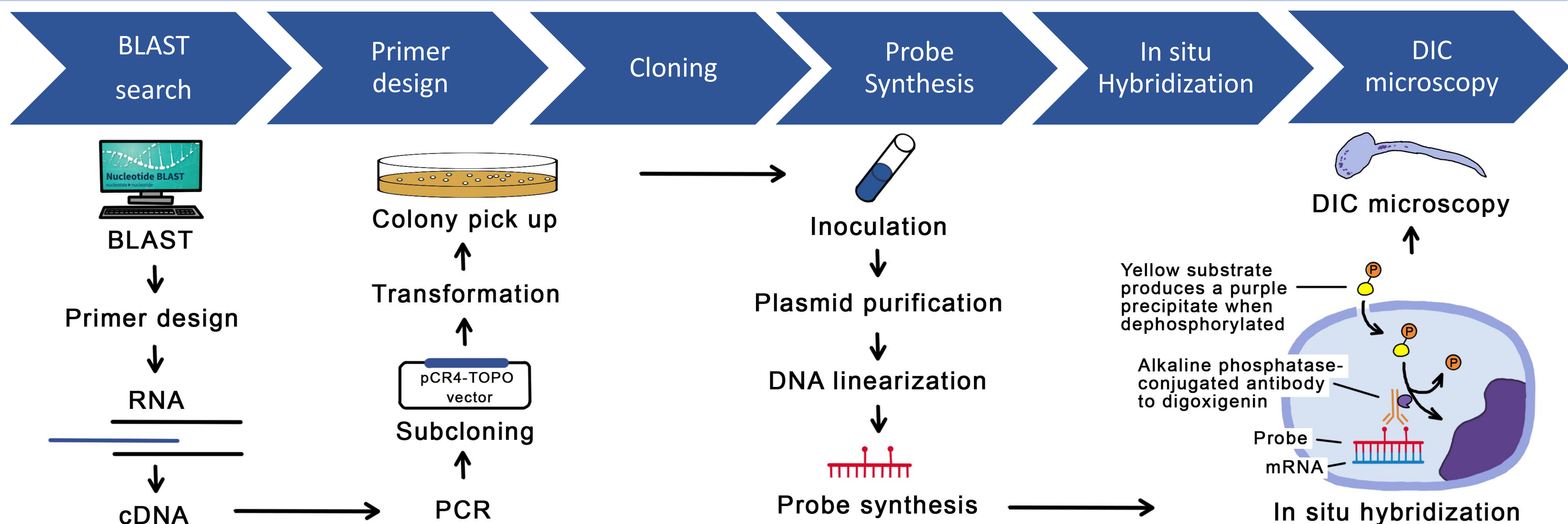


Fig. 1: Scheme of synapse showing the selected genes for this study.

Method



Results

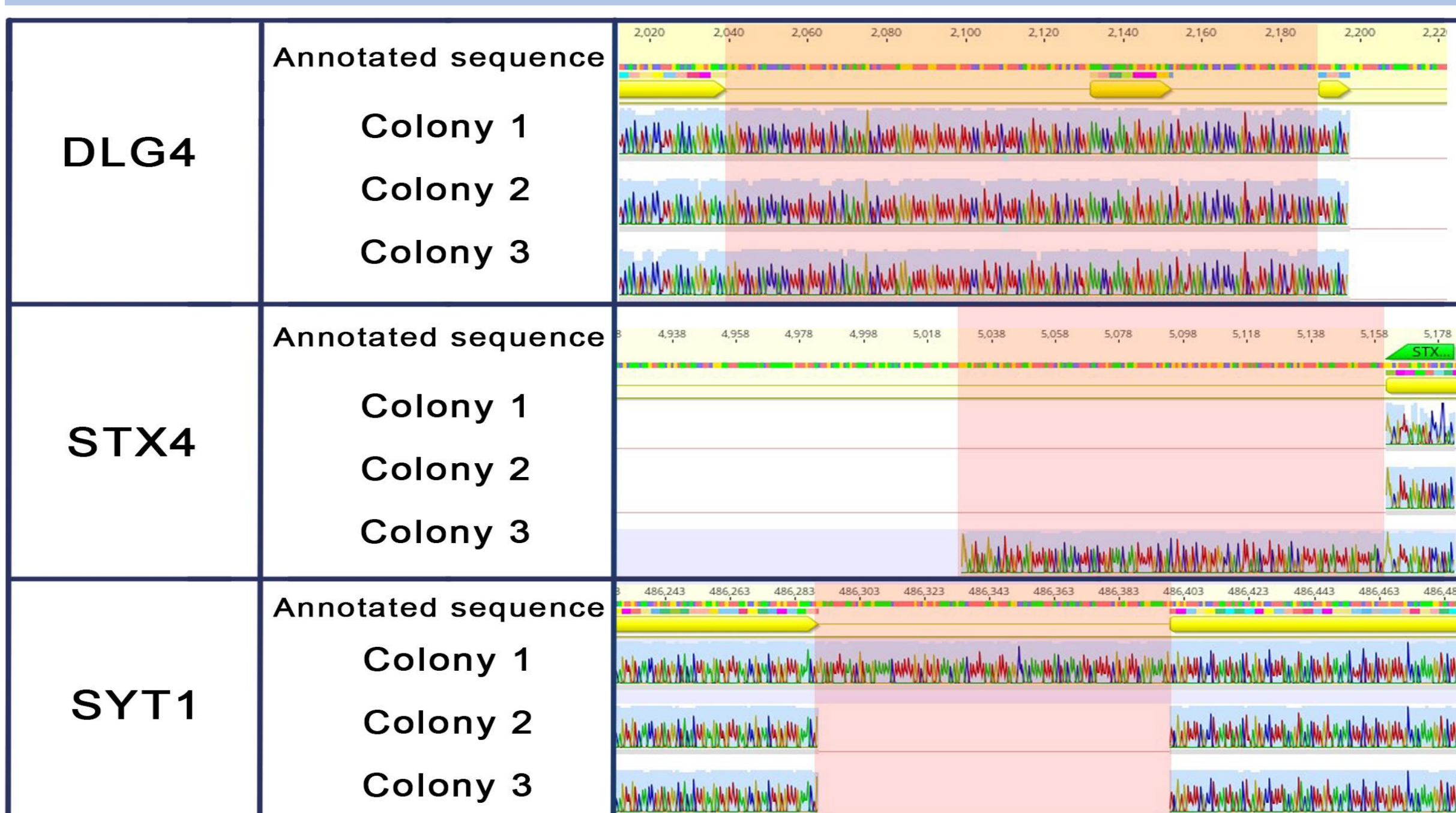


Figure 2: Gene sequences compared to their annotated sequence from Oikobase (yellow boxes), with red areas showing discrepancies. DLG4 demonstrates wrong annotation in Oikobase; STX4, alternative splicing; SYT1, intron retention.

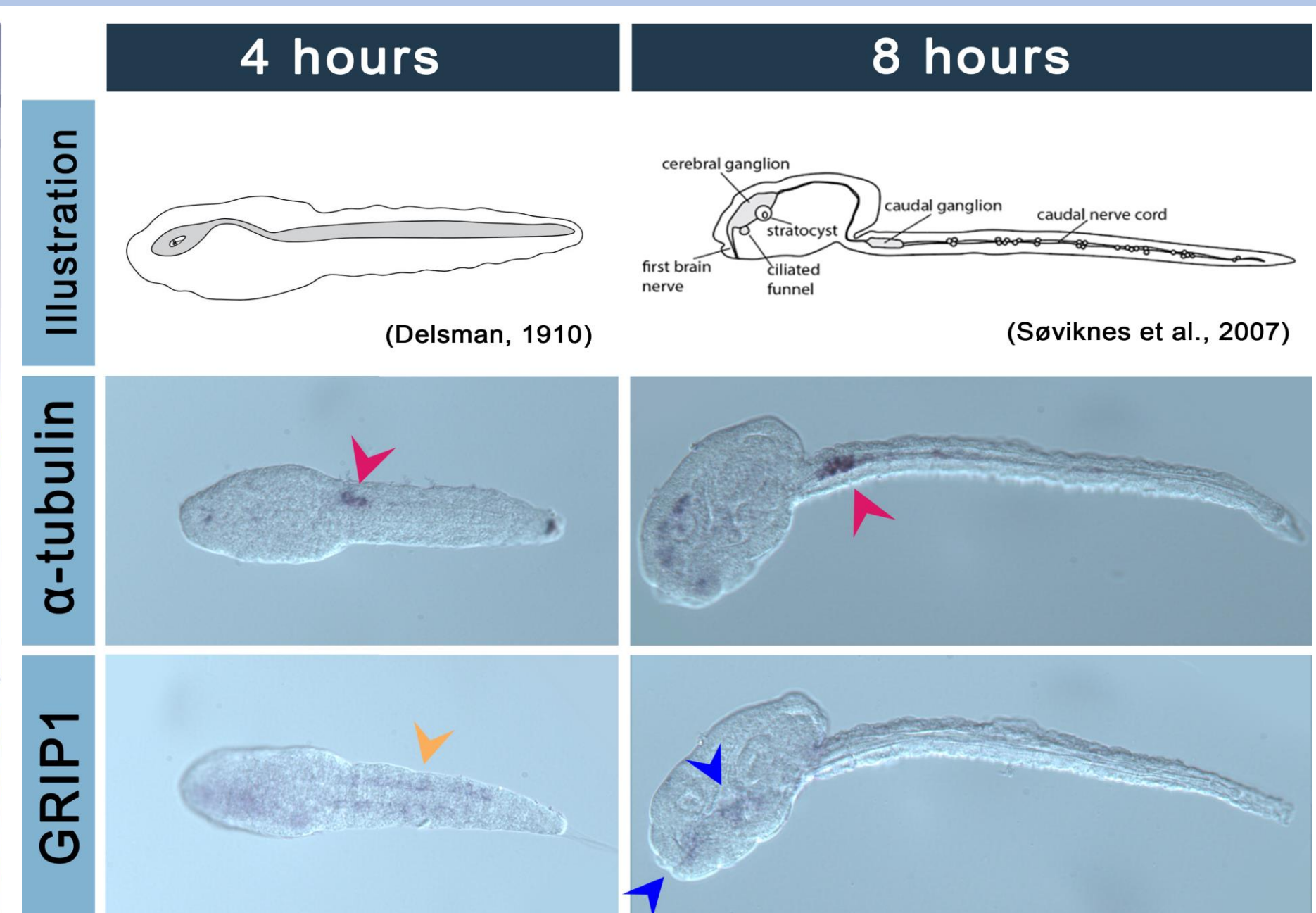


Figure 3: In situ hybridization *O. dioica*. The left panel shows a ventral view, while right panels show a left lateral view. Top panels illustrate morphology and nervous system. Pink arrows indicate caudal ganglion; orange arrows, stained muscle cells; blue arrows, digestive tract expression.

Discussion & Conclusion

- The presence of different splice variants and uncomplete processed transcripts show the high transcription levels of the synaptic genes in *O. dioica* in the selected developmental stages.
- Preliminary expression analysis revealed the presence of putative postsynaptic cells in the muscles, mouth, and ciliary rings confirming in situ hybridization as a good approximation to map cell types.



References:

- Delsman, H.C. (1910). "Beiträge zur Entwicklungsgeschichte von *Oikopleura dioica* in: Verhandlungen unit het voor het Onderzoek der Zee, 3, 1-24.
- Søviknes, A. M., et al. (2007). "Development of the caudal nerve cord, motoneurons, and muscle innervation in the appendicularian urochordate *Oikopleura dioica*." *J Comp Neurol* 503(2): 224-243.