

Dendritic Fields of Ventrolateral Spinal Motor Column Motor Neurons Show Scaled Growth During Anterior Transposition Of The Western Mosquitofish, *Gambusia affinis affinis* Sexually Dimorphic Anal Fin: A Study Of Morphometric Properties.

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In the present study, we examined the structural and organizational changes of the dendritic fields (da) of ventrolateral spinal motor column motor neurons (mn) resulting from the anterior transposition of the sexually dimorphic anal fin and its appendicular support in the Western Mosquitofish, *Gambusia affinis affinis* [1, 2]. This anterior transposition results in a radical change in the teleost axial skeletal formulae and nervous system [2].

3000 MW Texas Red Amino Dextran (TDA) dye coated filter paper strips were inserted into the rhizotomized ventral nerves within the spinal cord (SP) and allowed to transport 8 hrs. Each spinal cord segment, defined by the presence of a ventral root, is roughly 100 μm long and 60 μm in diameter and corresponds in length to a myotomal segment. TDA was found to be an excellent dye for retrograde labeling of secondary motor neurons, including their entire soma, dendritic branching points, patterning, and elongation within the ventrolateral motor column (vLMC) of female and male *G. a. affinis* spinal cord (see Figure 1). TDA whole-mount preparations of the SP combined with fractal analysis showed that the vLMC dendritic field in this region of transposition (vertebrae 14-16) is more complex in males in terms of branching and lengthening than it is in the same region in females. Ventral medial column (vMC) and vLMC motor neurons anterior to the 14th nerve of the 14th vertebrae and spinal cord segments posterior to the 16th nerve of the 16th vertebrae in female and male *G. a. affinis* are similar.

The results of this study show that vLMC motor neurons radically reorganize their dendritic structure and organization and this is probably related to the novel function for teleost, internal fertilization.

References

- [1] Kiernan, J. A. *Barr's The Human Nervous System An Anatomical Viewpoint*, Lippincott Williams and Wilkins, Eighth Edition, 2004.
- [2] Rosa-Molinar, E. *Proc. of the First International Symposium on Livebearing Fishes*, New Life Publications, Inc., Homestead, Florida (*book chapter in press*) 2005.
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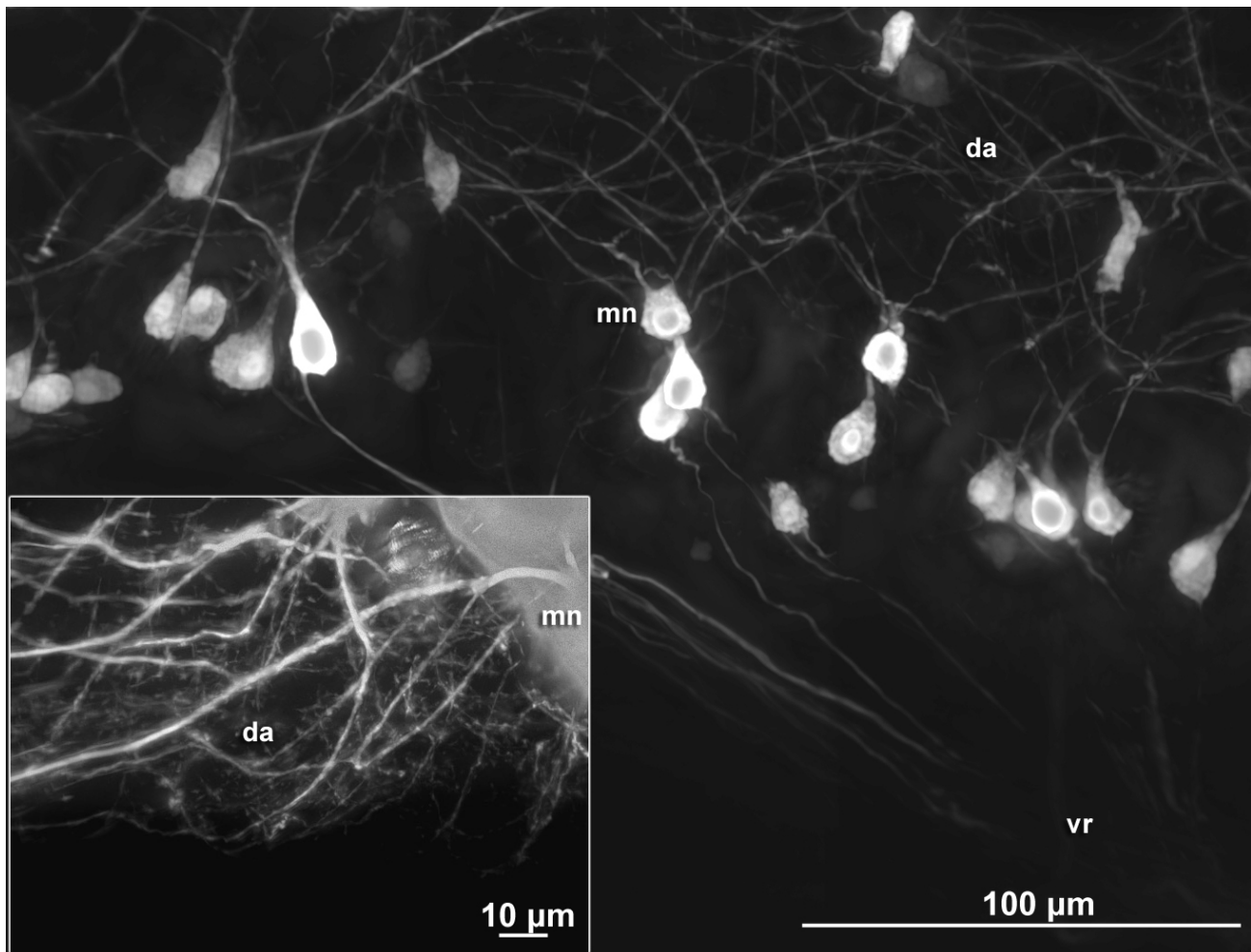


Figure 1. TDA retrograde filled vLMC motor neurons (mn) in spinal cord of a male *G. a. affinis* viewed using wide-field fluorescence 3D deconvolution microscopy. Note the dendritic field (da) pattern (dense fan radiation; Insert: Higher magnification view of the dense fan radiation pattern of vLMC motor neurons)