

How does the myotomal extracellular matrix influence motor axon pathfinding: lessons from zebrafish

Pr Florence Ruggiero

From spinal cord exit, motor axons are guided by attractive and repulsive cues along a stereotyped path and navigate with remarkable precision to their muscle target. In addition to the archetypal axon guidance cues, the extracellular matrix (ECM) has been shown to provide local positional information for developing motor axons. However, the key components and topology of the motor path ECM and their cellular source(s) are poorly documented. In an attempt to fill this gap, we used zebrafish, one of the leading models to study development biology and molecular genetics that has been instrumental in understanding the development of the neuromuscular system. Using loss and gain of function and combined biochemical, mechanical, imaging and behavioral approaches, we found that developing muscle cells spatially and temporally shape a unique collagen-containing matrix critical for motor axon navigation during the development of the neuromuscular system.