

The glycan binding region of PTP δ is involved in Sema3A signaling by reinforcing the binding with NRP1

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During development, neurons require axon guidance to the appropriate target cells. This mechanism is regulated by synaptic secretory and adhesion molecules. We have recently reported that protein tyrosine phosphatase δ (PTP δ) mediates semaphorin 3A (Sema3A) signaling. As PTP δ possesses a sulfated glycan binding region at the N-terminus, we examined the role of this regions in Sema3A-signaling. We constructed a PTP δ mutant harbouring sulfated glycan binding region mutation (AAGAA). Alkaline-phosphatase fused PTP δ ectodomain (AP-PTP δ) bound to Sema3A receptor neuropilin-1 (NRP1) expressed in COS-7 cells. This binding was significantly attenuated in AP-PTP δ (AAGAA) mutant compared with the wild type (Wt). We next investigated Sema3A-induced growth cone collapse activity for cultured dorsal root ganglion (DRG) neurons expressed Wt or AAGAA. As we previously reported, Sema3A response was attenuated in *Ptp δ ^{-/-}* DRG neurons and rescued with the overexpression of Wt. In contrast, AAGAA did not rescue the phenotype. The mutant showed no alteration of the protein localization in the growth cones. These results suggest that glycan binding region of PTP δ may participate in the Sema3A-signaling through the interaction with NRP1.