6 - Neurobiology

OC-021 - (23837) - NMDA RECEPTOR SUBUNIT GLUN3A INFLUENCES REGIONAL AND LAMINAR TARGETING OF INTERHEMISPHERIC CALLOSAL AXONS

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Callosal projections connect the cortical hemispheres via the corpus callosum, enabling sensory integration. In the mouse somatosensory cortex, layer (L) 2/3 pyramidal neurons project contralaterally in a precise, activity-dependent manner during early postnatal development. However, the molecular mechanisms remain unclear. This study examines the role of **GluN3A**, an NMDA receptor subunit encoded by *Grin3a*, in regulating callosal axonal targeting and synaptic refinement.

Using **in utero electroporation (IUE)**, we fluorescently labeled L2/3 neurons in wild-type and **Grin3a** knockout (**KO**) mice of different postnatal ages to track axonal and dendritic development. Axonal projections were analyzed by antibody staining and confocal microscopy across primary (S1) and secondary (S2) somatosensory cortices to assess targeting.

In wild-type P13 mice, callosal axons mainly targeted outer portions within the **S1/S2 border** with minimal targeting to S2. In **Grin3a KO** mice, axons mis-targeted, forming a significnat column in **S2** and arbors shifted from more outer portions to deeper **L2/3**. Early axon growth and midline crossin was unaffected. Additionally, **Grin3a KO** mice exhibited altered apical dendritic branching that coincide with altered axonal targeting.

GluN3A plays a role within the devloping brain for the precise targeting of callosal axons and proper dendritic patterning of L2/3 callosal projection neurons. These findings highlight **GluN3A** as a regulator of callosal circuit organization and synaptic specificity. The matching changes in both axonal and dendritic morphology suggest a coordinated presynaptic and postsynaptic refinement for this circuit.

Palavras-chave : Brain, Axon, NMDA receptor