Neuromesodermal Progenitors

During vertebrate development, the posterior end of the embryo progressively elongates in a head-to-tail direction to form the body plan. Recent lineage-tracing experiments revealed that bi-potent progenitors, called neuromesodermal progenitors (NMPs), produce caudal neural and mesodermal tissues during axial elongation. However, their precise location and contribution to spinal cord development remain elusive.

Shaker et al. used NMP-specific markers (Sox2 and BraT) and a genetic lineage tracing system to localize NMP progeny in vivo.

Key findings: Sox2 and BraT double-positive cells were initially located at the tail tip, but were later found in the caudal neural tube, which is a unique feature of mouse development. In the neural tube, they produced neural progenitors (NPCs) and contributed to the spinal cord gradually along the AP axis during axial elongation. Interestingly, NMP-derived NPCs preferentially contributed to the ventral side first and later to the dorsal side at the lumbar spinal cord level, which may be associated with atypical junctional neurulation in mice.

The current observations detail the contribution of NMP progeny to spinal cord elongation and provide insights into how different species uniquely execute caudal morphogenesis [1)].

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Shaker MR, Lee JH, Kim KH, Ban S, Kim VJ, Kim JY, Lee JY, Sun W. Spatiotemporal contribution of neuromesodermal progenitor-derived neural cells in the elongation of developing mouse spinal cord. Life Sci. 2021 May 15:119393. doi: 10.1016/j.lfs.2021.119393. Epub ahead of print. PMID: 34004249.