EVBO Publication highlight – Mar 2021

Oligodendrocyte precursor cell specification is regulated by bidirectional neural progenitor–endothelial cell crosstalk.

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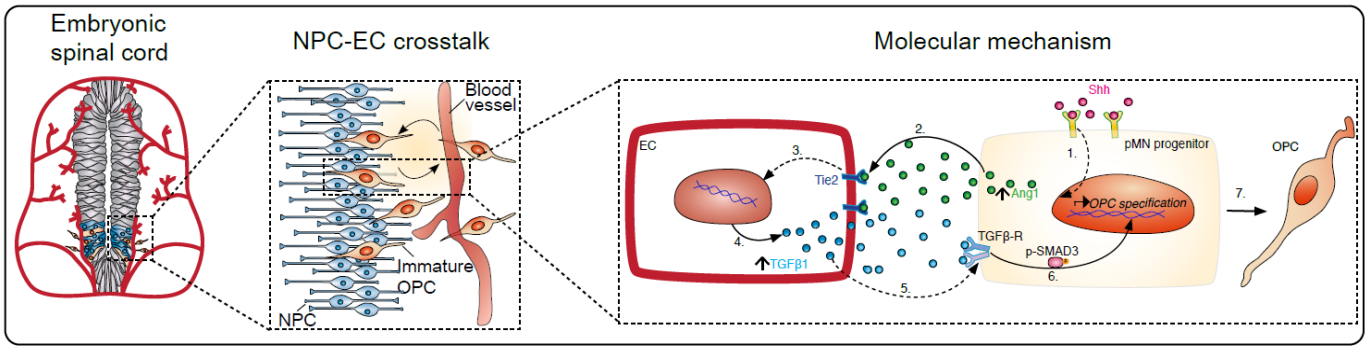

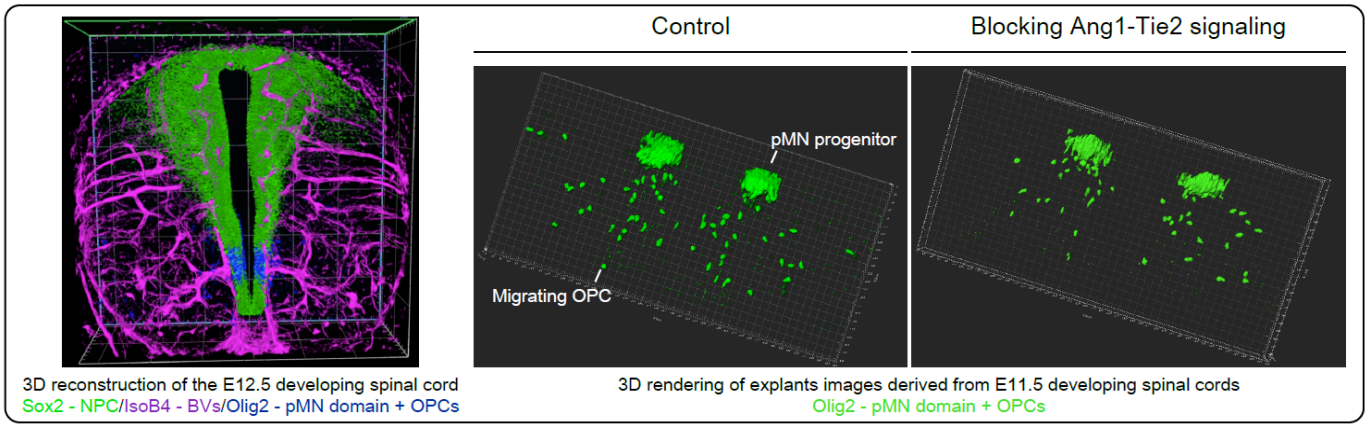

3D reconstruction of the E12.5 developing spinal cord
Sox2 - NPC/IsoB4 - BVs/Olig2 - pMN domain + OPCs

3D rendering of explants images derived from E11.5 developing spinal cords
Olig2 - pMN domain + OPCs

Key findings

1. Blood vessels grow in close vicinity to neural progenitor cells (NPCs) in the developing spinal cord.
2. Cell fate specification of NPCs results into the generation of different neural cell types, among them to oligodendrocyte precursor cells (OPC). OPCs give rise to oligodendrocytes, the myelinating cells of the central nervous system.
3. This study highlights how a precise coordination between the vascular and nervous system is required for OPC specification by identifying a bi-directional molecular cross-talk between NPCs and endothelial cells (ECs) during development.
4. This NPC-EC cross-talk is mediated by an Ang1 – Tie2 – TGFβ1 signaling axis: 1. and 2. Floor plate-derived Shh transcriptionally regulates Ang1 expression in NPCs. 3. NPC-derived Ang1 binds and activates Tie2 in ECs. 4 and 5. Tie2 activation triggers Tgfβ1 transcriptional upregulation in ECs. 6. TGFβ1 signals back to pMN NPCs inducing phosphorylation of its intracellular effector SMAD3. 7. NPCs are induced to specify their fate to OPCs.

Links to website: https://www.umm.uni-heidelberg.de/vascular-dysfunction/