Stroke causes cell death but also birth and migration of new neurons within sites of ischemic damage. The cellular environment that induces neuronal regeneration and migration after stroke has not been defined.

1/1

The role of the neurovascular niche in CNS myelin regeneration is incompletely understood.

De La Fuente et al. showed that, upon demyelination, CNS-resident pericytes (PCs) proliferate, and parenchymal non-vessel-associated PC-like cells (PLCs) rapidly develop. During remyelination, mature oligodendrocytes were found in close proximity to PCs. In Pdgfbret/ret mice, which have reduced PC numbers, oligodendrocyte progenitor cell (OPC) differentiation was delayed, although remyelination proceeded to completion. PC-conditioned medium accelerated and enhanced OPC differentiation in vitro and increased the rate of remyelination in an ex vivo cerebellar slice model of demyelination. We identified Lama2 as a PC-derived factor that promotes OPC differentiation. Thus, the functional role of PCs is not restricted to vascular homeostasis but includes the modulation of adult CNS progenitor cells involved in regeneration ¹⁾

Ohab et al. used a model of long-distance migration of newly born neurons from the subventricular zone to cortex after stroke to define the cellular cues that induce neuronal regeneration after CNS injury. Mitotic, genetic, and viral labeling and chemokine/growth factor gain- and loss-of-function studies show that stroke induces neurogenesis from a GFAP-expressing progenitor cell in the subventricular zone and migration of newly born neurons into a unique neurovascular niche in peri-infarct cortex. Within this neurovascular niche, newly born, immature neurons closely associate with the remodeling vasculature. Neurogenesis and angiogenesis are causally linked through vascular production of stromal-derived factor 1 (SDF1) and angiopoietin 1 (Ang1). Furthermore, SDF1 and Ang1 promote post-stroke neuroblast migration after stroke and identify molecular mechanisms that are shared between angiogenesis and neurogenesis during functional recovery from brain injury ².

1)

De La Fuente AG, Lange S, Silva ME, Gonzalez GA, Tempfer H, van Wijngaarden P, Zhao C, Di Canio L, Trost A, Bieler L, Zaunmair P, Rotheneichner P, O'Sullivan A, Couillard-Despres S, Errea O, Mäe MA, Andrae J, He L, Keller A, Bátiz LF, Betsholtz C, Aigner L, Franklin RJM, Rivera FJ. Pericytes Stimulate Oligodendrocyte Progenitor Cell Differentiation during CNS Remyelination. Cell Rep. 2017 Aug 22;20(8):1755-1764. doi: 10.1016/j.celrep.2017.08.007. PubMed PMID: 28834740.

Ohab JJ, Fleming S, Blesch A, Carmichael ST. A neurovascular niche for neurogenesis after stroke. J Neurosci. 2006 Dec 13;26(50):13007-16. PubMed PMID: 17167090.

From: https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki**

Permanent link: https://neurosurgerywiki.com/wiki/doku.php?id=neurovascular_niche

Last update: 2024/06/07 02:59

