

"Meningeal immunity and lymphatics in CNS function"

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Abstract:



The central nervous system (CNS) was considered to be devoid of classical lymphatic drainage. We recently challenged that paradigm by demonstrating the presence of a lymphatic vasculature in the surrounding of the brain called the meninges. We demonstrated that lymphatic vessels, expressing hall the markers for lymphatic endothelial cells (LEC; i.e Lyve-1, Prox1, podoplanin, VEGFR3 and CCL21) are located along the dural sinuses. They present features of initial lymphatic through the absence of surrounding smooth muscle cells and lymphatic valves, along with presenting a punctate expression pattern for adhesion molecules (Claudin-5 and VE-Cadherin). Finally, we demonstrated that these vessels drain fluids, macromolecules and immune cells from the cerebrospinal fluid into the deep cervical lymph nodes. Our recent efforts are concentrated on understanding the role of meningeal lymphatic vessels in CNS function in health and disease. Our results suggest that the drainage into the deep cervical lymph nodes might play different roles at different stages of several neurological diseases. Understanding the function of the lymphatic drainage in CNS might shed a new light on neurological disorders and offer new therapeutic targets.

Recent relevant publications:

- Structural and functional features of central nervous system lymphatic vessels. Louveau A, Smirnov I, Keyes TJ, Eccles JD, Rouhani SJ, Peske JD, Derecki NC, Castle D, Mandell JW, Lee KS, Harris TH, Kipnis J. Nature. 2015 Jul 16;523(7560):337-41. doi: 10.1038/nature14432. Epub 2015 Jun 1.
- 2) The glia-derived alarmin IL-33 orchestrates the immune response and promotes recovery following CNS injury. Gadani SP, Walsh JT, Smirnov I, Zheng J, **Kipnis J**.
 - Neuron. 2015 Feb 18;85(4):703-9. doi: 10.1016/j.neuron.2015.01.013. Epub 2015 Feb 5.
- Revisiting the Mechanisms of CNS Immune Privilege. Louveau A, Harris TH, Kipnis J. Trends Immunol. 2015 Oct;36(10):569-77. doi: 10.1016/j.it.2015.08.006. Review.



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