B-1a lymphocytes promote oligodendrogenesis during brain development

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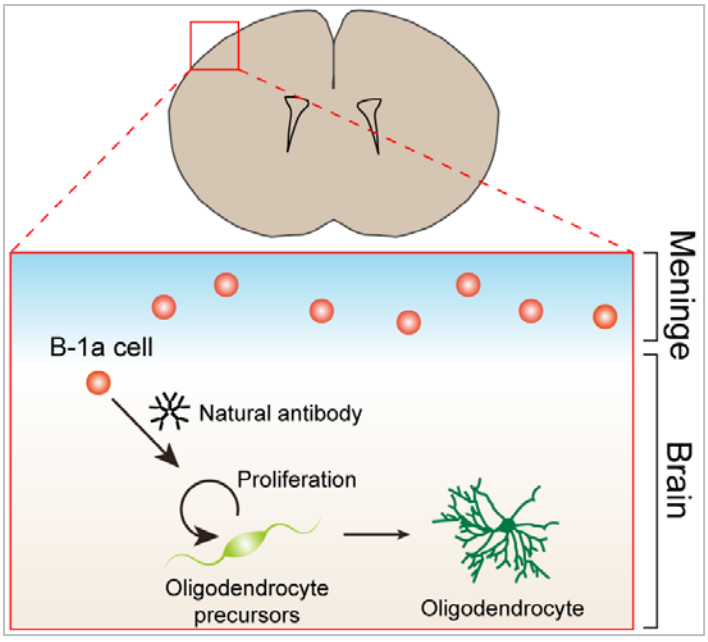
Toshiihide Yamashita (Molecular Neuroscience, IFReC) and his research group identified the subtypes of lymphocytes that are present in neonatal mouse brains and investigated their functions. They found that B-1a cells, a subtype of B cells, were abundant in the neonatal mouse brain and infiltrated into the brain in a CXCL13–CXCR5-dependent manner. B-1a cells promoted the proliferation of oligodendrocyte-precursor cells (OPCs) in vitro, and depletion of B-1a cells from developing brains resulted in a reduction of numbers of OPCs and mature oligodendrocytes. Furthermore, neutralizing Fcα/μR, the receptor for the Fc region of IgM secreted by B-1a cells, inhibited OPC proliferation and reduced the proportion of myelinated axons in neonatal mouse brains. These results demonstrate that B-1a cells infiltrate into the brain and contribute to oligodendrogenesis and myelination by promoting OPC proliferation via IgM–Fcα/μR signaling.



Schematic diagram of the study
B-1a cells in meningeal space secrete natural antibodies, which promote the proliferation of oligodendrocyte precorsors. With this mechanism, B-1a cells support the brain development.

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