VRK2

During postnatal neurodevelopment, excessive synapses must be eliminated by microglia to complete the establishment of neural circuits in the brain. The lack of synaptic regulation by microglia has been implicated in neurodevelopmental disorders such as autism, schizophrenia, and intellectual disability. Here we suggest that vaccinia-related kinase 2 (VRK2), which is expressed in microglia, may stimulate synaptic elimination by microglia. In VRK2-deficient mice (VRK2KO), reduced numbers of presynaptic puncta within microglia were observed. Moreover, the numbers of presynaptic puncta and synapses were abnormally increased in VRK2KO mice by the second postnatal week. These differences did not persist into adulthood. Even though an increase in the number of synapses was normalized, adult VRK2KO mice showed behavioral defects in social behaviors, contextual fear memory, and spatial memory [1)].

1)
Lee J, Lee S, Ryu YJ, Lee D, Kim S, Seo JY, Oh E, Paek SH, Kim SU, Ha CM, Choi SY, Kim KT. Vaccinia-related kinase 2 plays a critical role in microglia-mediated synapse elimination during neurodevelopment. Glia. 2019 May 3. doi: 10.1002/glia.23638. [Epub ahead of print] PubMed PMID: 31050055.