

Layer-specific transcriptome analysis of microglia in the medial prefrontal cortex

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Recent studies in mice started to reveal brain region-specific transcriptome and epigenome profiles of microglia. The heterogeneity of microglia might even exist across different layers of the cerebral cortex, since microglia are regulated by various receptors for neurotransmitters that are distributed preferentially in specific layers of the cerebral cortex. We also suspect the layer-dependent heterogeneity of microglia in the medial prefrontal cortex (mPFC), since repeated social defeat stress (R-SDS) induces microglial activation in the mPFC, leading to dendritic shrinkage of pyramidal neurons preferentially in its superficial layer. However, the heterogeneity of microglia across different cortical layers has not been elucidated, perhaps due to technical difficulty. To address this issue, here we developed a technique based on laser microdissection microscopy to perform transcriptome analyses with RNA-seq for microglia in the superficial and deep layers of the mPFC. Our preliminary findings suggest that mPFC microglia in adult mouse brains show layer-specific gene expression profiles even under the resting condition. We are currently investigating whether and how R-SDS affects layer-specific gene expression profiles of mPFC microglia.