Microglia lining the lateral ventricles contribute to a unique neuroinflammatory niche

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Microglia are becoming better and better understood in terms of transcriptomics, morphological variations, developmental functions and subtypes of responses to disease. Neverthess their phenotypic variations and full functional repertoire is still poorly understood. Although traditionally thought to respond to disease by clearing debris they are now known to progress through many phenotypic phases in disease and can be neuroprotective. There is also evidence that microglial activation can precede disease implicating them as potential causative agents and thus of interest for pharmacotherapeutic targeting. Microglia in the ventricular-subventricular zone (V-SVZ) are in contact with all cells in the neurogenic lineage as well as with ependymal and epithelial cells and are thus positioned to have broad functions in the niche. Even in the absence of disease, V-SVZ microglial cells have semi-activated morphology, marker expression and division rates - distinguishing them from microglia outside of the niche. The pro-inflammatory protein Galectin-3, which is normally expressed in microglia during pathological insults is constitutively expressed in the V-SVZ stem cell niche. These data suggest that cells lining the lateral ventricle have a specialise and poised neuroinflammatory phenotype during homeostasis. V-SVZ microglia become even more activated, less activated or remain stable in different models of disease. Surprisingly, they can respond to brain injury divergently compared to microglia in the non-neurogenic niche. These data together suggest that V-SVZ microglia exhibit unique phenotypes and functions.