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Class I antigen presentation by oligodendroglia mediates proliferation and accumulation of antigen specific CD8 T cells within the CNS

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CNS glial cells, predominantly oligodendroglia, are primary targets for persistent infections by neurotropic coronavirus, leading to demyelinating disease resembling multiple sclerosis. As CD8 T cells control virus in microglia and astrocytes more effectively than oligodendroglia, an *in vivo* role of class I antigen presentation by oligodendrocytes was investigated. The restriction element Ld, which primes the dominant antiviral CD8 T cell response in BALB/c mice, was expressed under control of the proteolipid protein (PLP) promoter in Ld deficient dm2 mice to exclude peripheral presentation. Transfer of CSFE labeled memory CD8 T cells from immune wt and IFN$\beta^{/-}$ BALB/c donors into transgenic and control dm2 mice 3 days post infection revealed that virus specific Ld tetramer^{+} T cells accumulated only in the CNS of PLP-Ld transgenic mice. The majority of donor tetramer^{+} cells had undergone >6 divisions within 5 days of transfer, demonstrating antigen driven proliferation within the CNS. Although IFN$\beta^{/-}$ donor cells accumulated more efficiently, they exhibited similar proliferation profiles compared to wt donors. Peripheral proliferation was excluded by the absence of tetramer^{+} donor T cell enrichment following peripheral infection of PLP-Ld transgenic mice, but rapid expansion in control BALB/c mice. The results indicate that oligodendrocytes can process and present viral antigen at levels sufficient to trigger local proliferation, activation of cytolytic function, and retention of virus specific CD8 T cells within the CNS.

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