A number of neurodegenerative diseases like Multiple Sclerosis, Parkinson’s and Alzheimer’s have been linked with iron accumulation in the brain. Iron plays an important role in neural metabolism. However, mechanisms of neural degeneration in iron overload are complex and not clearly understood. We proposed that iron overload may lead to demyelination in B6.Cg-Tg (Thy1-YFPH) 2Jrs/J mice. These mice express spectral variants of GFP (yellow-YFP) at high levels in motor and sensory neurons. Serum iron levels were significantly higher in experimental versus control animals. Brain and spinal cords were harvested and fixed after 4 weeks of iron dextran injections. Tissue slices were stained with Prussian blue, H&E and fluromyelin for light and confocal microscopy. Immunological profile by Flow Cytometric analysis revealed significantly high numbers of CD3+T cells with no differences in CD4:CD8 ratio. This study indicates that iron overload caused a significant inflammation without demyelination in the CNS.