

Medical Update Memo

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Wallerian Degeneration: A Major Component of Early Axonal Pathology in Multiple Sclerosis. Dziedzic T, Metz I, et al; *Brain Pathol.* 2010 Apr 14. [Epub ahead of print]

Summary

Nerve fibre loss is a major component of the pathology of multiple sclerosis (MS) and the morphological basis of permanent clinical disability. The authors studied the brain pathological findings of 63 people with MS and found that, in early MS, the white matter surrounding lesions showed a specific type of degeneration. It may contribute to radiological changes observed in early MS and it is likely to play a major role in the development of disability.

Details

Abstract Axonal loss is a major component of the pathology of multiple sclerosis (MS) and the morphological basis of permanent clinical disability. It occurs in demyelinating plaques but also in the so-called normal-appearing white matter (NAWM). However, the contribution of Wallerian degeneration to axonal pathology is not known. Here, authors analyzed the extent of Wallerian degeneration and axonal pathology in periplaque white matter (PPWM) and lesions in early multiple sclerosis biopsy tissue from 63 MS patients. Wallerian degeneration was visualized using an antibody against the neuropeptide Y receptor Y1 (NPY-Y1R). The number of SMI-32-positive axons with non-phosphorylated neurofilaments was significantly higher in both PPWM and plaques compared to control

white matter. APP-positive, acutely damaged axons were found in significantly higher numbers in plaques compared to PPWM. Strikingly, the number of NPY-Y1R-positive axons undergoing Wallerian degeneration was significantly higher in PPWM and plaques than in control WM. NPY-Y1R-positive axons in PPWM were strongly correlated to those in the lesions. The authors conclude that Wallerian degeneration is a major component of axonal pathology in the periplaque white matter in early MS. It may contribute to radiological changes observed in early MS and most likely plays a major role in the development of disability.

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