

## **What Have We Learned about MS from MRI?**

*Jeroen J.G. Geurts*

Dept. of Anatomy & Neurosciences, section of Clinical Neuroscience,  
VU University Medical Center, Amsterdam, The Netherlands.

Multiple sclerosis (MS) is a complex disease involving both the white matter (WM) and the grey matter (GM) of the central nervous system. In the early phases of the disease, its pathology is characterized by prototypical inflammatory demyelination around the ventricles, whereas in later stages, demyelination and inflammation spread throughout the WM and become more diffuse of character. With developing disease, involvement of the GM also becomes more prominent, which was shown to be relevant in understanding e.g. cognitive decline in MS. This presentation will highlight several MR imaging techniques that can be used to visualize different aspects of MS pathology, in different phases of the disease. These methods include conventional lesion load measurements of the WM and GM of brain and spinal cord, but also more quantitative techniques such as magnetization transfer ratio, diffusion tensor imaging, relaxation time measurements, brain atrophy and functional MRI. This will be complemented with a brief digression through the highly exciting and emerging field of 'connectomics'. Clinical relevance of the techniques will be discussed, as well as their sensitivity to damage and their pathological specificity.