

## ADVANCED IMMUNOLOGY

This is an interactive, downloadable PDF that has been produced and funded by Biogen. Please download and keep a copy for your personal records. No copies of this will be made or held through this website or by Biogen.

This content has been adapted from a plenary originally delivered at a Biogen meeting in 2018. Permission kindly provided by Professor Ralf Gold, Director Neurological Clinic, Bochum Germany.

### Learning objectives

At the end of this three-part module you should:

- Understand the role of T cells and B cells in the underlying pathology of MS
- Appreciate the importance of early management of MS
- Be aware of the main factors that might influence MS progression
- Appreciate the risk of progressive multifocal leukoencephalopathy (PML) and lymphopenia associated with disease modifying therapies

### Reflective questions

Before taking the module, please think about your current general understanding of immunology. What are the three or four most important questions you have? What are your main areas of uncertainty?

What are the three most important 'take-home messages' you learnt in the module? How will these influence your practice?

Think about your important questions and areas of uncertainty. Have these been answered or resolved? If not, how will you find the answers? If they have been answered or resolved, how will you expand your knowledge and understanding? How do the principles outlined in this module apply to the management of your patients with MS?

### Further reading

Dziedzic T, Metz I, Dallenga T et al Wallerian degeneration: A major component of early axonal pathology in multiple sclerosis *Brain Pathology* 2010;20:976-985

Haider L, Simeonidou C, Steinberger G et al Multiple sclerosis deep grey matter: The relation between demyelination, neurodegeneration, inflammation and iron *Journal of Neurology, Neurosurgery & Psychiatry* 2014;85:1386-1395

Howell OW, Reeves CA, Nicholas R et al Meningeal inflammation is widespread and linked to cortical pathology in multiple sclerosis *Brain* 2011;134:2755-2771

Marrie RA, Rudick R, Horwitz R et al Vascular comorbidity is associated with more rapid disability progression in multiple sclerosis *Neurology* 2010;74:1041-1047

Wilson HL B cells contribute to MS pathogenesis through antibody-dependent and antibody-independent mechanisms *Biologics: Targets & Therapy* 2012;6:117-123