Relapsing Multiple Sclerosis: Immunopathogenesis

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Learning Objectives

At the conclusion of this activity, the participant will be able to do the following:

1. Describe the inflammatory aspect of relapsing MS
2. Recognize that progressive MS results from a neurodegenerative process that is not well understood
3. State what gadolinium enhancing lesions on a MRI in MS represent
Obtaining CME/CE Credit

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Relapsing Remitting and Secondary Progressive MS

- Relapsing Remitting Disease
- Secondary Progressive Disease

MRI

Neurologic Impairment

Time
Primary Progressive MS

- Primary Progressive Disease

Time

MRI

Neurologic Impairment
MS is an inflammatory demyelinating disease of the brain, spinal cord and optic nerves.
Joseph Babinski (1857-1932)
MS and brain lesions
MS is a Demyelinating Disease
Multiple Sclerosis and MRI
What is the Evidence about the Immunopathogenesis of MS?

- Pathologic studies of human tissue
- Genetics of MS
- Animal models
- Success of immunotherapies in treating relapsing MS
Inflammatory Pathology
Gadolinium Enhancement on MRI Shows Inflammation in MS
Acute MS Lesions: Macrophages
Acute MS Lesions: T Cells
Genetics of MS

- >50 genes known to increase the risk of developing MS
- Most genes are associated with immune function
Experimental Autoimmune Encephalomyelitis
FDA Approved Disease Modifying Therapies for MS

- Interferon beta (4 forms)
- Glatiramer acetate
- Natalizumab
- Fingolimod

- Mitoxantrone*
But MS is not just an inflammatory demyelinating disease....
Relapsing Remitting and Secondary Progressive MS

Neurologic Impairment

MRI

Time

Relapsing Remitting Disease

Secondary Progressive Disease
MS and Axonal Injury

Adams, A Colour Atlas of Multiple Sclerosis, 1989
MS Causes Brain Atrophy

Trapp and Stys, Lancet Neuro 8: 280–91, 2009
Treatments for MS Need to Target Different Mechanisms

Inflammation

Immunotherapies

Neurodegeneration

Neuroprotection/Neural Repair

RRMS

SPMS

PPMS