B cells and antibodies in multiple sclerosis pathogenesis and therapy

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B cells and antibodies account for the most prominent immunodiagnostic feature in patients with multiple sclerosis (MS), namely oligoclonal bands. Furthermore, evidence is accumulating that B cells and antibodies contribute to MS pathogenesis in at least a subset of patients. The CNS provides a B-cell-fostering environment that includes B-cell trophic factors such as BAFF (B-cell-activating factor of the TNF family), APRIL (a proliferation-inducing ligand), and the plasma-cell survival factor CXCL12. Owing to this environment, the CNS of patients with MS is not only the target of the immunopathological process, but also becomes the site of local antibody production. B cells can increase or dampen CNS inflammation, but their proinflammatory effects seem to be more prominent in most patients, as B-cell depletion is a promising therapeutic strategy. Other therapies not primarily designed to target B cells have numerous effects on the B-cell compartment. This Review summarizes key features of B-cell biology, the role of B cells and antibodies in CNS inflammation, and current attempts to identify the targets of pathogenic antibodies in MS. We also review the effects of approved and investigational interventions-including CD20-depleting antibodies, BAFF/APRIL-depleting agents, alemtuzumab, natalizumab, FTY720, IFN-beta, glatiramer acetate, steroids and plasma exchange-on B-cell immunology.
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