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Adjuvant-free animal model for studying CNS autoimmunity

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Multiple sclerosis is a chronic inflammatory, demyelinating, and neurodegenerative disorder of the central nervous system. More than 2.5 million people suffer from this disease worldwide. It is assumed that the autoimmune response to myelin antigens in the CNS is the main cause of the disease. Experimental autoimmune encephalomyelitis (EAE) is a widely used animal model for studying MS. However, EAEmodels resemble only particular aspects of the MS pathogenesis. EAE is classically induced with the CNS antigens emulsified in complete Freund's adjuvant (CFA). CFA consist of paraffin oil supplemented with *Mycobacterium,* and its application potentiates innate immune response, prolongs the presence and effective transport of antigen in the lymphatic system. However, CFA has a confounding influence on the results and the translational capacity as a multiple sclerosis model. Our group has successfully excluded CFA from immunization regime. In a recent study, we compared clinical, histological, cellular and molecular properties between spinal cord homogenate (SCH) and SCH+CFA immunized Dark Agouti rats. We have observed higher clinical score in rats without CFA and greater number of immune cell infiltrates at the peak of EAE in the same animals. Further, stronger myelin basic protein-specific T cell immune response is evokedin the draining lymph nodes of CFA-free compared to CFA immunized rats. In the CNS, high abundance of CD8+T cells is detected at the onset of disease. Also, enrichment in CD8+ and CD4+ macrophageswas observed in the CNS during EAE. Therefore, CFA-free EAE is a reliable model for studying CNS autoimmunity.