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T-cell responsiveness to myelin sheath proteins (MSP)-derived peptides in multiple sclerosis patients of different disease types for a randomized, double-blind T cell vaccination clinical trial

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Background: T-cell vaccination (TCV) for multiple sclerosis (MS) refers to treatment with autologous anti-myelin T-cells, attenuated by irradiation.

Aim: In order to test anti-MSP autoimmunity in MS patients, T-cell specific responsiveness to the myelin sheath protein (MSP)-derived peptides were tested. Accordingly, a tailor-made specific vaccine was prepared for patients.

Methodology: Here we report a cohort study testing T-cells isolated from 92 MS patients of 3 different disease types. The T-cell responsiveness to nine synthetic peptides derived from the major immunogenic epitopes - MSP, MBP, MOG and PLP, were tested. The results of this prescreening study were used for enrollment eligibility and for tailor-made (each patient received his own responsive T-cell lines) vaccine preparation.

Results and Suggestions: Of the 92 patients tested, 54 were RR-MS, 38 RP-MS, SP-MS; EDSS disease ranged from 1 to 7.0. Of the 54 RR-MS patients, 59% responded to at least one of the protein peptides; 28% responded to MBP, 40% to MOG and 42% to PLP. Of the 38 RP-MS, SP MS patients, 31% responded to at least one of the protein peptides with 18% to MBP, 21% to MOG and 23% to PLP. RR-MS patients' response to myelin proteins was significantly higher than that of the RP-MS group suggesting a higher level of autoimmune activity in RR-MS patients. It is apparent that MOG is highly relevant as a primary target antigen in MS in spite of its minute quantity in the brain (0.01%). As a result of the screening described above, 26 patients with progressive MS were enrolled in the study (mean age: 39+9.8years; mean EDSS: 4.4±1.7). T-cell lines reactive to 9 different peptides of the myelin antigens, MBP, MOG and PLP, were raised from the patients' peripheral blood, each patient according to the specific responsiveness data. The clinical outcome of the study was recently reported as "*T-cell vaccination befits relapsing progressive multiple sclerosis patients in a randomized, double blind Clinical trial*," *PLoS ONE clinical trials* 7 (12); 1-10, 2012. In addition, a correlation was done between the T-cell responsiveness and the HLA-genotype from each patient for future peptide vaccine design.

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