Effect of Interferon-beta Treatment on Meta-immunological Profiling and Intracellular Metabolism of T Cells from Patients with Multiple Sclerosis

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We investigated the effect of interferon-beta (IFN-β) on the modulation of immune cell subpopulations and serum levels of multiple immune/metabolic markers in patients with multiple sclerosis (MS). In addition we evaluated the glycolytic rate of T cells to understand whether there could be a correlation between immunological alteration and the metabolic asset of MS patients.

We performed a peripheral blood immunephenotype and measured serum levels of multiple immune/metabolic markers in 15 controls, 15 naive-to treatment and 15 IFN-β treated MS patients. In addition functional metabolic changes were evaluated by measuring the extracellular acidification rate (ECAR), a method for detection and quantitation of glycolytic flux, in CD4+ T cells. IFN-β treatment decreases the number of lymphocytes and CD3+ T cells and increases the levels of CD4+CD8+ and CD4+CD45RO+ cells. MS patients show a higher serum leptin level when compared with healthy controls and IFN-β treatment did not change these values but increased the level of Leptin receptor (Lep-R). After IFN-β treatment there is a decrease of sCD40L and OPG levels. Basal glucose metabolism was higher in CD4+ T cell from healthy controls when compared to naive-to treatment MS patients and IFN-β in vitro is able to increase glucose oxidation in CD4+ T cell from both MS patients and controls. In agreement with these observations, basal glucose metabolism was higher in CD4+ T cell from IFN-β treated when compared with naive-to-treatment MS patients. These data suggest the presence of a specific meta-immunological profile associated with MS and may contribute to a better understanding of disease pathogenesis and progression. In addition these data unveil novel mechanisms potentially underlying the effects of IFN-β in MS.