The peripheral network between oxidative stress and inflammation in Multiple Sclerosis

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ABSTRACT
INTRODUCTION
Reactive oxygen species (ROS) are mainly produced by activated microglia and macrophages during oxidative burst inflammation-driven. However, ROS themselves can tune the reactivity of T cells, affecting their functionality.
For the first time the relationship between these two key factors involved in Multiple Sclerosis was together evaluated at peripheral level
METHODS
In 32 untreated MS patients (MSnoTP), 21 MS treated (MSTP) with Disease Modifying Drugs (DMDs) and 39 matched controls (HC), phenotypic analysis of MBP-stimulated PBMC was performed by flow cytometry, together with blood Coenzyme-Q10 (CoQ10), total-oxidized and reduced-glutathione (GSTOT, GSSG,

GSH), malondialdehyde (MDA), ROS, anti-oxidized-low-density-lipoproteins antibodies (anti-oxLDL), and anti-oxidant-power (PAO). Focus of our study was the correlation between these biomarkers

RESULTS

In MSnoTP an inverse correlation between MDA and apoptotic cells (CD4+AV+ TIM3+) was detected (r_s = - 0.50,p = 0.01). M1 functional phenotype (CD14+IL+6) and TH17 cells (CD4+IL22+) correlated (r_s :- 0.48 and r_s :+0.46 p: 0.01) with Anti-oxLDL and GSSG, respectively. The latter direct correlation was shown also in MSTP. In this group, we also measured a direct correlation between CD4+IL4+ and CD4+IL25+ (TH2 phenotype) with Coq10 (r_s :+0.54) and GSH (r_s :+0.46) (p: $\leq$ 0.03). Again, a direct correlation was found between CD8+BDNF+ (suppressor phenotype) and Anti-oxLDL (r_s :+0.48 p: 0.03). Surprisingly, we measured an inverse correlation between CD14+IL10+ (immunoregulatory cells) with GSH (r_s :- 0.59, p < 0.001)

CONCLUSIONS

Our findings endorse the idea of a relationship between pro-inflammatory cells and pro-oxidative environment, even at peripheral level

Interestingly, the correlation between $CD4^{+}IL10^{+}$ and defective anti-oxidant equipment, might be regarded as an evidence of their involvement during an inflammatory/oxidative phase that they try to control. The finding of this link only in MSTP patients might suggest that DMDs can provide an alternative way to counteract inflammation, regardless of an increase of immunoregulatory cells.