



SINS

FIRST MEETING OF ITALIAN DOCTORATE STUDENTS
AND BURSARS
IN NEUROSCIENCE AND RELATED SUBJECTS



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Molecular Biotechnology Center
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PROGRAM OF THE MEETING

A NEW DEVICE TO STUDY EX-VIVO THE EFFECTS OF EXTRACORPOREAL PHOTOCHEMOTHERAPY ON THE IMMUNE SYSTEM: EARLY EXPERIENCE IN HEALTHY CONTROLS AND A MULTIPLE SCLEROSIS PATIENT.

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Extracorporeal photochemotherapy (ECP) is a procedure effective in the treatment of several human T-cell mediated diseases. During ECP treatment the patient's blood is processed by means of a cell separator to collect leukocytes, mostly lymphocytes and monocytes (PBMC), which are then added with the photoactive drug 8-methoxypsoralen (8-MOP), exposed to ultraviolet-A light (UV-A) and reinfused into the patient. Even if the mechanisms of action of ECP remain elusive, it has been shown that ECP has an in-vivo immunomodulatory effect in experimental autoimmune encephalomyelitis (EAE) and in a small pilot study in multiple sclerosis (MS) patients.

It has been suggested that during ECP not only UV-A irradiation but also the environmental condition changes may be relevant. Therefore, we developed a new device which mimics the complete ECP cycle including blood transit through the cell separator. Using this strategy we investigated 8-MOP and/or UV-A effect on the production of the pro-inflammatory cytokines interferon- γ (IFN- γ), interleukine-2 (IL-2) and tumor necrosis factor- α (TNF- α) in PBMC of both healthy controls and a MS patient

We firstly demonstrated that our device does not affect total red and white blood cell counts. We then observed a significant decrease in activated CD4⁺ and CD8⁺ T-lymphocytes producing cytokines after UV-A irradiation and a further decrease in the presence of 8-MOP + UV-A.

The decrease in cytokines production seemed to be both cytokine- and cell type-related. In fact TNF- α production was reduced to a lesser extent than IFN- γ and IL-2 ones by both UV-A and the co-treatment, while CD4⁺ T-cells seemed to be more sensitive than CD8⁺ lymphocytes when IFN- γ and IL-2 production was considered. Both T-cell population showed similar behaviour when TNF- α production was evaluated.

This ex-vivo protocol will be used to reproduce these observations in a larger series of healthy controls and MS patients and to deeply investigate the effect of ECP on the rodent model for MS (EAE).