

## **The effect of UV irradiated CD4 T cells on CD8 T cells during contact hypersensitivity**

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### **Abstract:**

Ultraviolet irradiation can induce immunosuppression of contact hypersensitivity (CHS). In the pathological process, CD8<sup>+</sup> T cells have been suggested to be the effectors while CD4<sup>+</sup> T cells have a regulatory effect. Three subsets of CD4<sup>+</sup> T cells were described in a CHS model to happen after UVB exposure. An in vitro experiment demonstrated that T cells stimulated by UVB irradiated dendritic cells shifted from a Th1 to a Th2 phenotype. The Th2 cytokine, IL-4 and IL-10 may play a role in UVB induced immunosuppression. The other two subtypes of CD4<sup>+</sup> T cells, CD4<sup>+</sup>DX5<sup>+</sup> natural killer cells (NKT) and CD4<sup>+</sup>CD25<sup>+</sup> regulatory T cells, were explored by transferring spleen cells from UVB exposed mice to naïve mice, which were then immunized and challenged with hapten. The recipient mice obtained antigen-specific immunosuppression from the transferred cells. However, it has been unclear how the UVB conditioned CD4<sup>+</sup> T cells affect CD8<sup>+</sup> T cells during the pathophysiologic process. To answer this question, we used a mimic contact hypersensitivity model, in which OT-I CD8<sup>+</sup> T cells or OT-I together with OT-II CD4<sup>+</sup> T cells were transferred into UVB<sup>±</sup> B6 mice and then epicutaneously immunized with epitope specific OVA peptide (OVA<sub>p</sub>) or OVA protein (OVA), respectively. The expansion of CD8<sup>+</sup> T cells was found in the mice epicutaneously immunized with OVA<sub>p</sub> regardless of treatment with UVB or not. These CD8<sup>+</sup> T cells secreted IFN- $\gamma$  and became cytolytic in vivo. However, when CD4<sup>+</sup> OT-II T cells were transferred into B6 mice together with OT-I CD8<sup>+</sup> T cells, the expansion of CD8<sup>+</sup> OT-I T cells induced by OVA was partly repressed only in mice that were UVB irradiated. CD4<sup>+</sup> OT-II T cells isolated from UVB irradiated and unirradiated controls were very similar in that they did not express CD25, downregulated CD62L and secreted similar levels of IFN- $\gamma$ .

Collectively, our current data show that under the condition of UVB irradiation, antigen related CD4<sup>+</sup> T cells partly suppress the expansions of CD8<sup>+</sup> T cells. Further investigations are needed to know the features of CD4<sup>+</sup> T cells after UVB irradiation, the pathway of CD4<sup>+</sup> T restricting CD8<sup>+</sup> T cell expansion, the continuous effect of CD4<sup>+</sup> T during the pathophysiologic process.