

Immune modulatory effects of sex hormones and leptin on monocytes and CD4+ T cells

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Gender differences in the prevalence and outcome of some diseases point to an influence of sex hormones on the immune system. Here female gender seems to be an independent risk factor for allergic – and autoimmune diseases. Observations pointing to a higher immune reactivity in females may be due to higher concentrations of the female sex hormones. However female gender is not solely characterized by higher levels of estrogens, also higher leptin (L) concentrations can be observed. The aim of this study is to clarify the question how sex hormones and L can be involved in the observed sex differences in diseases. For this approach the effect of the sex hormones 17 β -estradiol (E2), testosterone (T) and the adipokine L alone and in combination on monocytes and CD4⁺ T cells was investigated. Monocytes (n = 7) and CD4⁺ T cells (n = 6) were isolated from female donors and stimulated (LPS; anti-CD3/anti-CD28) under incubation with the sex hormones E2, T or L. To determine antagonistic, additive or synergistic effects incubations of the sex hormones with L were performed. Readout was the cytokine profile determined by ELISA and the survival analyzed by PI staining. Additionally the proliferation of CD4⁺ T cells was measured (H³-Incorporation Assay). Analysis revealed an immune stimulating effect of E2 on monocytes and CD4⁺ T cells characterized by the induction of a proinflammatory cytokine profile. Moreover incubation of monocytes with E2 and L showed a synergistic effect leading to a strengthening of the proinflammatory cytokine profile whereas L alone had no effect. In summary E2 showed an immune stimulating effect of E2 on monocytes and CD4⁺ T cells pointing to both a stronger innate and adaptive immune response in females. Moreover a synergistic effect of E2 and L in monocytes points to an involvement of L in the observed differences in the immune response between the sexes.