were pre- and co-administered with a key cyclophosphamide metabolite (4-HC). Indeed, E2 shifted 4-HC-treated human HFs into the dystrophic catagen pathway *in vitro*, and potentiated the 4-HC-induced pigmentary disturbances. 4-HC-induced hair growth inhibition was further enhanced by E2, associated with an additional reduction of proliferation and increased apoptosis of matrix keratinocytes. These effects tended to be further enhanced by co-administration of prednisolon to the HF organ culture medium. These observations suggest that, just as in murine CIA *in vivo*, E2 and glucocorticoids can force chemotherapy-damaged human HFs into the dystrophic catagen pathway. The preclinical data provide first indications that a combination of E2 with prednisolone may indeed serve as an effective clinical tool for accelerating hair re-growth in human CIA.

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Stress protects from allergic sensitisation via Substance-P modified antigen presentation

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Stress is a potent immunomodulator and aggravator of atopic disease. In a combined murine model of atopic like-allergic dermatitis (AD) and perceived stress (noise) we previously demonstrated that stress increases Substance P (SP) immunoreactive nerve fiber number and subsequent neurogenic inflammation. Stress also induced an altered Th1/Th2 cytokine balance indicating modulation of antigen presentation. To investigate the effect of stress and SP on dendritic cell-T cell interaction during allergen sensitisation and the subsequent modification of allergic inflammation, we exposed AD mice to stress prior to sensitisation. Stress markedly increased dendritic cell (DC) migration and maturation in a SP dependent manner. Moreover, the effects of stress were selectively abolished when animals were treated with NK1 antagonist. Interestingly, in stressed AD mice, the number of regulatory $CD4^+CD25^+$ T cells (Tregs) was increased, while other T cell subsets were decreased. When dendritic cells from stressed AD mice were co-cultured with T lymphocytes we measured higher medium concentrations of TH1 (IFN? and TNF?) vs. TH2 (IL-4 and IL-5) cytokines, as well as higher levels of IL-2 indicating promotion of 'anti-allergic' TH1 and T regulatory phenotypes. Concordantly with the stress and SP dependent alterations in DC-T cell interaction disease severity (eosinophilic infiltrates, epidermal thickening) was significantly decreased. This reduction in skin inflammation was abrogated in mice treated with NK1 antagonist. Taken together, our data show that via SP-dependent mechanisms stress may be involved in the sensitisation of atopic individuals to allergen and thereby determine the course of the disease.

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Stress sensitive differentiation in expression of nerve fibers and antigen presenting cell and Substance P sensitive alteration of dendritic cell subpopulations in spleen

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Substance P (SP) – a sensory neuropeptide – was revealed as an important stress mediator with its own stress axis in the skin. In this context, we were able to show, that stress-dependent SP affects the migration of dendritic cell subpopulations to skin draining lymphnodes with subsequently altered T-cell activation and disease activity in a mouse model for allergic dermatitis (AD). Here we postulate that stress-dependent communication between nerve fibers and immune-competent cells with effect on the course of inflammatory skin diseases can also occur in spleen. To address this question, AD was induced in C57BL/6 mice by double sensitization (i.p) and an intradermal challenge using chicken egg ovalbumin. Animals were additionally exposed to sound stress for 24 h prior to challenge. In this model, stress lead to a relative hyperinnervation of the immune-competent areas of the spleen. At the same time, an increased number of antigen-presenting cells (APC) could be observed in these areas and contacts between nerve fibers and APC were found. Substance P *in vitro* had the capacity to raise the number of antigen presenting cells in spleen and increased the number of $CD4^+$ T-cell-stimulating $CD4^-CD8^-$ dendritic cells and further the number of $CD25^+$ T-regulatory cells. Further analysis of quality and function of neuro-immune interactions in the spleen will reveal the role of the

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