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Inhibition of inflammatory reactions in 2,4-Dinitrochlorobenzene induced Nc/Nga atopic dermatitis mice by non-thermal plasma

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Abstract

Non-thermal plasma (NTP) has recently been introduced and reported as a novel tool with a range of medicinal and biological roles. Although many studies using NTP have been performed, none has investigated the direct relationship between NTP and immune responses yet. Especially, the effects of NTP on atopic dermatitis (AD) were not been explored. Here, NTP was tested whether it controls immune reactions of AD. NTP treatment was administered to pro-inflammatory cytokine-stimulated keratinocytes and DNCB (2,4-Dinitrochlorobenzene)-induced atopic dermatitis mice, then the immune reactions of cells and skin tissues were monitored. Cells treated with NTP showed decreased expression levels of CCL11, CCL13, and CCL17 along with down-regulation of NF-κB activity. Repeated administration of NTP to AD-induced mice reduced the numbers of mast cells and eosinophils, IgE, CCL17, IFNγ levels, and inhibited NF-κB activity in the skin lesion. Furthermore, combined treatment with NTP and 1% hydrocortisone cream significantly decreased the immune responses of AD than that with either of these two treatments individually. Overall, this study revealed that NTP significantly inhibits several immune reactions of AD by regulating NF-κB activity. Therefore, NTP could be useful to suppress the exaggerated immune reactions in severe skin inflammatory diseases such as AD.

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Figures



Figure 1. NTP inhibits the expression of...



Figure 2. NTP inhibits TNFα and IFNγ-mediated...

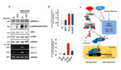

Figure 3. NTP treatment decreased NF-κB activity...

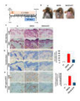

Figure 4. NTP treatment can block the...



Figure 5. NTP treatment inhibits the DNCB-induced...



Figure 6. Combined treatment with NTP and...

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