# EFFECT OF INHOMOGENEOUS STATIC MAGNETIC FIELD (iSMF) ON POLLEN-INDUCED ALLERGIC INFLAMMATION

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**Background:** Allergic airway inflammation triggered by ragweed pollen is closely associated with oxidative stress. Pollen NAD(P)H oxidases generate reactive oxygen species (ROS) immediately upon exposure inducing oxidative stress in the airways independent of adaptive immune responses. Subsequent oxidative stress derives from ROS released by inflammatory cells recruited into the airways several hours after pollen exposure. Our goal was to define the effects of iSMF on pollen-induced allergic airway inflammation since several lines of evidence suggest that iSMF is able to trigger biological responses at least partly through free radical reactions.

**Methods:** Moderate strength iSMF was generated with an apparatus optimized to small experimental animals. Balb/c mice were sensitized by i.p. injection of ragweed pollen extract (RWE) on day 0 and 4 and challenged with RWE intranasally (day 11). Inflammation was evaluated (day 14) by determining inflammatory cell counts and mucin levels in the bronchoalveolar lavage fluid, as well as by histological analysis of the lungs. Studying the mechanisms of iSMF action, experiments on RWE in cell-free environment and on human A549 airway epithelial cells were carried out using a redox sensitive fluorescent dye ($H_2$DCF-DA) for detection of changes in ROS levels.

**Results:** Exposure to iSMF during the sensitization phase did not affect the allergic responses. However, even a single 30-min iSMF-exposure immediately following intranasal RWE challenge significantly reduced the airway inflammation. In addition, prolonged exposure to iSMF (for 30 or 60 min on 3 consecutive days) after RWE challenge decreased more effectively the severity of allergic inflammation. In cell-free experiments exposure to various intensity of iSMF for 30 min did not alter ROS production by RWE, while the same exposure of cultured epithelial cells to iSMF diminished the RWE-induced increase in the intracellular ROS levels. Moreover, in mice exposed to iSMF for 30 min immediately after challenge, RWE treatment induced a significantly lower increase in the total antioxidant capacity of the airways, than in those exposed to sham field.

**Conclusions:** These data indicate that iSMF is able to reduce airway inflammation in the elicitation phase of the allergic reaction in an experimental model of pollen allergy. This beneficial effect of iSMF presumably is due to cellular ROS eliminating mechanisms rather than direct modulation of ROS production by pollen NAD(P)H oxidases.

Grants: TAMOP 4.2.4.A/2-11-1-2012-0001, TAMOP 4.2.2.A-11/1/KONV-2012-0023, Janos Bolyai Fellowship, Bridging Fund 2012 of UD.