Glycyrrhizin (GL), a major component of licorice, could be considered as a new effective drug candidate to treatment of allergy, based on its anti-inflammatory activity anti-vital effects. It has been reported that GL binds directly to high mobility group box 1 (HMGB1), and inhibits its activities. The HMGB1 is a novel pro-inflammatory cytokine that has been shown to play a role in the pathogenesis of several diseases. HMGB1 is a ubiquitous nuclear protein which, under normal conditions, is located in the cell nucleus, where it organizes the chromatin structure, DNA replication, and transcription. However, it has been recognized that HMGB1 can be actively secreted into the extracellular space by activated monocytes/macrophages, or passively released from the nuclei of necrotic or damaged cells. The active secretion of HMGB1 involves translocation from the nucleus to secretory lysosomes in the cytoplasm, and then exocytosis. In the extracellular area, HMGB1 regulates several different biologic processes, such as cell differentiation, cell migration, metastasis, and inflammatory responses. HMGB1 up-regulates pro-inflammatory cytokines in several inflammatory diseases.

This study aimed at verifying whether GL nasal treatment could change nasal mucus levels of high mobility group box 1 (HMGB1) in children with allergic rhinitis. Globally, 35 children (19 males and 16 females, median age 9.3±3.7 years), with allergic rhinitis and monosensitized to parietaria, were evaluated. The control group consisted of 24 healthy children (11 males and 13 females, median age 9.1±4.1 years). Allergic children were randomly assigned to receive, for seven days, nasal GL treatment (n=12), nasal corticosteroids treatment (n=12) or placebo (n=11). Nasal mucus HMGB1 levels were measured at baseline (T0), after seven days (T1) of treatment.

At baseline, HMGB1 levels in nasal mucus were higher in children with allergic rhinitis than in control group (96.9±19.3 ng/ml vs 9.27±4.01 ng/ml; p<0.001) in children treated with nasal GL and CS (23.5±6.3 ng/ml and 28.14±7.2 ng/ml respectively) compared to the placebo group (72.6±12.7 ng/ml), fig2. Moreover, the symptom scores were significantly decreased (p<0.001) in children treated compared to the placebo group (96.9±19.3 ng/ml vs 9.27±4.01 ng/ml; p<0.001, fig1). At T1, nasal mucus HMGB1 levels were significantly diminished (p<0.001) in children treated with nasal GL and CS (23.5±6.3 ng/ml vs 28.14±7.2 ng/ml) compared to the control group (96.9±19.3 ng/ml vs 9.27±4.01 ng/ml; p<0.001). At T1, HMGB1 levels in nasal mucus were significantly diminished (p<0.001) in children treated with nasal GL and CS (23.5±6.3 ng/ml vs 28.14±7.2 ng/ml) compared to the placebo group (72.6±12.7 ng/ml), fig2. Moreover, the symptom scores were significantly decreased (p<0.001) in children treated compared to the placebo group, whereas no significant difference was observed between the two treatment groups. The present study provides evidence that: 1) nasal mucus HMGB1 levels could be a suitable markers of inflammation in allergic rhinitis; 2) GL nasal treatment could have glucocorticoid-like anti-inflammatory effects.