

# Effects of Low - Level Laser Irradiation in a Mouse Model of Allergic Rhinitis

Jun - Sang Bae, <sup>1,2</sup> Sang Hyub Kim, <sup>2</sup> Jie Hye Kim, <sup>1,2</sup> Eun Hee Kim, <sup>1,2</sup> Lele Lyu, <sup>1,2</sup>

Phil Sang Chung, <sup>1,2,3</sup> and Ji - Hun Mo <sup>1,2,3\*</sup>

<sup>1</sup>Department of Otorhinolaryngology, Dankook University College of Medicine, Cheonan, 31116, Republic of Korea

<sup>2</sup>Beckman Laser Institute Korea, Dankook University College of Medicine, Cheonan, 31116, Republic of Korea

<sup>3</sup>Laser Translational Clinical Trial Center, Dankook University Hospital, Cheonan, 31116, Republic of Korea

**Background and Objectives:** To evaluate the antiallergic effect of low - level laser irradiation (LLLI) at 650 nm in a mouse model of allergic rhinitis (AR), and to examine the underlying mechanisms. **Study Design/Materials and Methods:** BALB/c mice were sensitized with ovalbumin (OVA) and alum and challenged intranasally with OVA. Straight- and diffusion type LLLI were applied directly into the intranasal cavity of the mice once daily for 10 days (650 nm, 5mW, 15min/day) and multiple allergic parameters were evaluated.

**Results:** LLLI reduced allergic symptoms, such as rubbing and sneezing, and suppressed the serum total immunoglobulin E (IgE), OVA - specific IgE, and OVA specific IgG1 levels. Diffusion - type LLLI significantly reduced eosinophil infiltration of nasal mucosa and lymph nodes (LNs). LLLI reduced the expression of interleukin - 4 (IL - 4) and IL - 17 in cervical LN and splenocyte culture supernatant, as well as their messenger RNA levels in nasal mucosa. However, the expression of interferon  $\gamma$  (IFN -  $\gamma$ ) and IL - 6 was unaffected by LLLI. The levels of reactive oxygen species (ROS) and nitric oxide (NO) in LN cells and the nasal mucosa, which were increased in the AR group, were reduced by LLLI, suggesting involvement of ROS and NO within their mechanism.

**Conclusions:** LLLI exerted an antiallergic effect by decreasing local and systemic IL - 4, IL - 17, and IgE levels, as well as eosinophilic infiltration into the nasal mucosa, in a mouse model of AR by modulating ROS and NO levels. Diffusion - type LLLI exhibited greater efficacy against AR than straight - type LLLI.

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