NDS27, a hydrosoluble form of curcumin, modulates neutrophil activation in a horse model of LPS-induced lung neutrophilia

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Background: Recurrent airway obstruction (RAO) is a chronic respiratory disease in horses. It is characterized by neutrophilic inflammation and delayed neutrophilic apoptosis. Curcumin has inhibitory effects on neutrophilic migration and myeloperoxidase (MPO) release and induces neutrophilic apoptosis (1).

Aim: To assess the effects of inhalation of a hydrosoluble form of curcumin derivative, NDS27 (2), in a horse model of LPS-induced lung neutrophilia.

Method:
• Eight adult horses without any evidence of respiratory disease have been used.
• Neutrophil migration to the alveolar space was induced by the inhalation of 2 mg LPS in 4 ml of saline solution.
Horses were nebulized 3 times with 4 mg NDS27 diluted in 4 ml saline (treated group) or with 4 ml saline (control group): 1 hour before stimulation by LPS, 1 hour and 3 hours after stimulation.
• In blood samples and broncho-alveolar lavage fluids (BALF) drawn 6 hours after stimulation, cytokines (IL1, IL6, TNFalpha),
MPO and elastase (ELT) were measured by ELISA. 
- In BALF, the percentages of neutrophils and the MPO activity were also measured (3). Statistical analysis was performed by a T test on paired data to compare the mean values (+/- SEM) with significant level at P<0.05.

**Result:**
- In blood, IL6 (474 +/- 142 pg/ml) and MPO (91 +/- 15 ng/ml) values were significantly lower in the treated group compared to the control values of IL6 (672 +/- 199 pg/ml) and MPO (227 +/- 49 ng/ml).
- In BALF, total MPO (216 +/- 37 ng/ml), active MPO (8 +/- 2 ng/ml), ELT (6 +/- 1 ng/ml) and neutrophils (43 +/- 5 %) values were significantly lower in the treated group compared to the control values of total MPO (588 +/- 102 ng/ml), active MPO (30 +/- 8 ng/ml), ELT (27 +/- 5 ng/ml) and neutrophils (54 +/- 6%) values.
- Variations of TNF-alpha and IL1 values were not significant(data not shown).

**Conclusion:**
Overall, our findings clearly indicate that NDS27 reduces the systemic and alveolar activation of neutrophils induced by LPS inhalation.

![Figure](image-url)

**Figure:** Effects of the inhalation of NDS27 in saline solution or saline solution alone (NaCl) in horses with LPS induced lung neutrophilia. (A) IL-6 in plasma, (B) Total MPO in plasma, (C) Total MPO in BALF and (D) Active MPO and total elastase in BALF. * p< 0.05

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