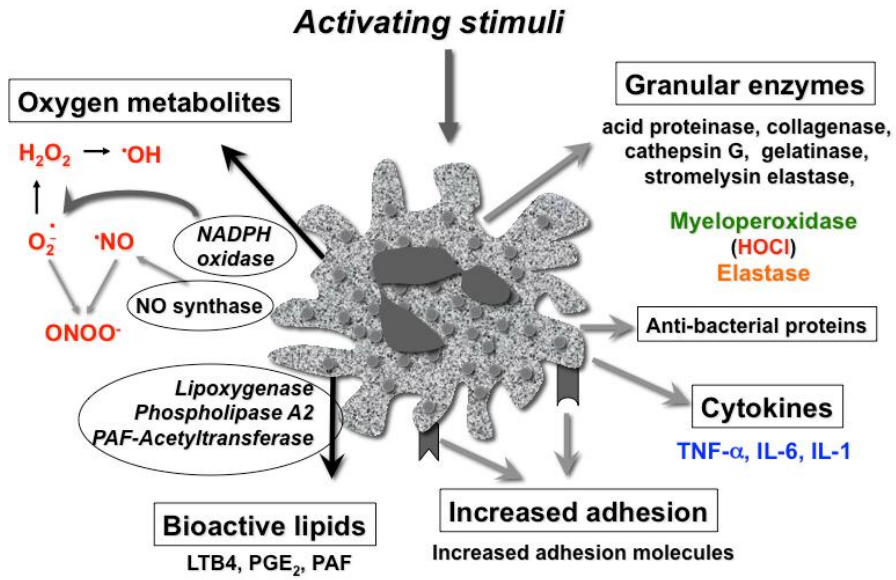
NDS27, a hydrosoluble form of curcumin, modulates neutrophil activation in a horse model of LPSinduced lung neutrophilia

D. Serteyn, T. Franck, P. Neven, A. Mouithys-Mickalad, C. Sandersen
Centre de l'Oxygène, Recherche et Développement (CORD), Université de Liège, B6a, 4000 Sart Tilman, Belgium – cord@ulg.ac.be

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



The neutrophil, a key cell involved in immunological defence and inflammation

Aim: To assess the effects of inhalation of a hydrosoluble formof curcumin derivate, NDS27 (2), in a horse model of LPS inducedlung 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) drawned 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 thesystemic and alveolar activation of neutrophils induced by LPS inhalation.

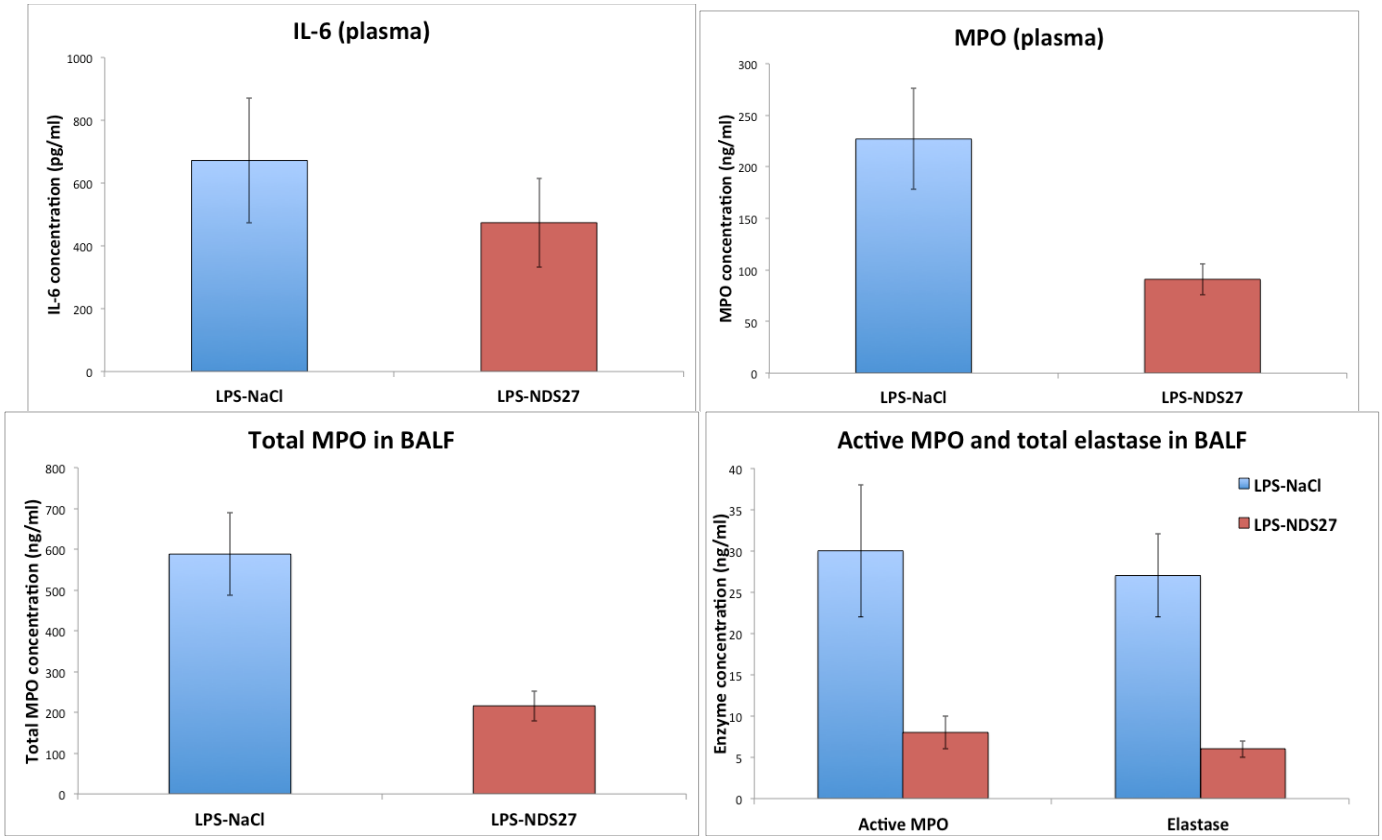


Figure: Effects of the the inhalation of NDS27 in saline solution or saline solution alone (NaCl) in horses with LPS induced lung neutrophilia. (A) IL-6 in plasma, (B) Total MPO in plasma, (C) Total MPO in BALF and (D) Active MPO and total elastase in BALF. * p< 0.05

(1) Sandersen et al. Vet Rec. 2011, 169 :101.
(2) Neven et al. WO/2009/144220
(3) Franck et al. J Vet Diagn Invest. 2006, 18: 326-334.