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Title: Analysis of reactive oxygen species in sputum neutrophils during acute exacerbation of COPD

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Body: Background. Chronic airway inflammation in COPD can be mediated by enhanced oxidative burst in neutrophils. Our previous study showed enhanced production of reactive oxygen species (ROS) in peripheral blood neutrophils (PBN) in stable COPD (SCOPD) and during acute exacerbation of COPD (AECOPD). Aim of the study. To analyze ROS production in sputum neutrophils during AECOPD. Methods. Thirty-five patients during AECOPD and the same patients in SCOPD, as well as 10 healthy individuals (HI) were involved in to the study. Neutrophils were isolated by high density gradient centrifugation and stimulated with PMA (0.1-30 nM) and S. aureus (1-167 bacteria/neutrophil). ROS production was analysed by flow cytometer. Results. Spontaneous ROS production in sputum neutrophils was 45.8±3.8% and in PBN 29.7±4.1% higher during AECOPD than in SCOPD ($p<0.05$). The most significant increase of ROS production was documented after neutrophil stimulation with 30 nM of PMA (in sputum neutrophils – during AECOPD 450±28-fold, in SCOPD 188±19.2-fold, HI 80±11.5-fold, respectively, ($p=0.01$); in PBN - during AECOPD 246±19-fold, in SCOPD 162±24.2-fold, HI 118±18-fold, respectively, ($p<0.05$)).The intensive ROS production in neutrophils after stimulation with S. aureus was found in AECOPD group compared with SCOPD and HI ($p=0.01$). Conclusions. ROS production in sputum and peripheral blood neutrophils after stimulation with PMA and S. aureus was more intensive during AECOPD compared with SCOPD. Sputum neutrophils produce higher levels of ROS compare with PBN.