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**Title:** Assessment of malondialdehyde in the airways during treatment of COPD exacerbations

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**Body:** Background: Oxidative stress plays an important role in the pathogenesis of chronic obstructive pulmonary disease (COPD). In this longitudinal study malondialdehyde (MDA), an end-product of lipid peroxidation was investigated in the airways of COPD patients with exacerbations. Methods: Levels of MDA in exhaled breath condensate (EBC) and sputum were measured in 34 COPD patients at the time of hospital admission due to an acute exacerbation of the disease, and again at the time of hospital discharge following treatment. MDA was also assessed in 21 stable COPD patients and 20 healthy controls. Measurement was performed by high-performance liquid chromatography. Data are presented as mean±SEM. Results: Sputum MDA levels have increased significantly at the time of exacerbation compared with stable COPD patients and healthy controls (ex: 220.0±17.5 vs. stable: 144.6±14.3 or control: 85.9±11.3 nmol/L, p<0.01) and decreased with treatment (treat: 190.7±16.3, p<0.05). In contrast to sputum, EBC MDA levels were comparable between stable and exacerbated COPD patients and controls (ex: 93.3±7.6 vs. stable: 96.1±11.6 or control: 73.1±5.1 nmol/L, p=NS). No correlations were observed between sputum MDA values and lung function parameters or sputum total and differential cell counts. Measurement of MDA had a good repeatability both in sputum and EBC, but the between-day variability of MDA readings was considerably higher in EBC than sputum (CV: 24.3 vs. 9.3%, p<0.05; limits of agreements by the Bland Altman test: EBC: -85.5 and 56.0 vs. sputum: -47.5 and 39.2). Conclusions: MDA in sputum appears to be a useful marker for monitoring exacerbation-associated oxidative stress within the airways of patients with COPD.