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Title: LSC 2013 abstract - Volatile organic compounds may provide a new and promising tool for diagnosing interstitial lung diseases

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Body: Although hematological markers may indicate interstitial lung diseases (ILD), ultimate diagnosis requires invasive techniques such as lung biopsy. Therefore, there's an urgent need for a non-invasive diagnostic tool such as the analysis of exhaled air, containing volatile organic compounds (VOCs) useful as biomarkers of pulmonary damaging conditions such as oxidative stress and inflammation. In vitro, the pro-inflammatory and pro-oxidative effects of bleomycin have been explored in the human epithelial cell line BEAS-2B. Endpoints included the volatome, cytotoxicity and markers of oxidative stress (production of oxidants and malondialdehyde (MDA)) and inflammation (interleukin(IL)-8 and 6). To in vivo identify ILD-specific VOC patterns, the breath of 50 ILD patients and 50 healthy controls was analyzed. In vitro, 5 VOCs were sufficient to correctly classify control and bleomycin-treated cells with 95% correctness using the original data set and 85% using cross-validated observations. These discriminating VOCs are mainly oxygen-containing poly-unsaturated hydrocarbons resulting from lipid peroxidation. Additionally, oxidant production and MDA, IL-8 and IL-6 levels were dose-dependently elevated upon bleomycin treatment whereas no cytotoxicity was observed. The in vivo ILD volatome is currently under analysis. Preliminary data show that discrimination between patients and healthy controls, as well as between the various severity stages of ILD, is possible based on a limited VOC number. VOC analysis appears to be very promising in detecting ILD-like changes in vitro and is currently investigated as a new tool for diagnosing ILD in vivo.