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Title: Decreased anti-oxidant capacity with fiber free diet during exposure to cigarette smoke was related with changes in proportion of cecal organic acids in mice

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Body: Background :Dietary fiber mitigates cough and sputum in smokers. Intake of dietary fiber is associated with a better lung function and reduced prevalence of COPD. These effects may partially come from anti-oxidant capacity by dietary fiber. However, it has not been elucidated how dietary fiber changes the anti-oxidant capacity during exposure to cigarette smoke. Dietary fibers are metabolized to organic acids in the large intestine. We hypothesized that the changes in anti-oxidant capacity by dietary fiber may be partially related with those in organic acids levels in the gut and investigated whether a fiber-free diet changes the anti-oxidant capacity and organic acid levels. Methods:The anti-oxidant capacity as well as cecal levels of organic acids and population of micro-flora in the gut was measured after 4 months' exposure to cigarette smoke in mice fed with a fiber-free diet. Results: The anti-oxidant capacity was significantly suppressed by the fiber-free diet in the non-exposed mice. The suppression in the anti-oxidant capacity further declined following exposure to cigarette smoke. In the non-smoking groups the fiber-free diet significantly increased succinic acid levels in the cecum, while in the fiber-free diet groups cigarette smoke significantly decreased acetic acid levels. The anti-oxidant capacity was correlated inversely with the ratio of succinic acid to acetic acid levels. Conclusion:The fiber-free diet suppressed the anti-oxidant capacity in mice, and the suppression further decreased by exposure to cigarette smoke. These changes may be related with those of proportion of organic acids.