

Examination of the Association of Galactose Oxidase Schiff's Reactivity in Sputum with Lung Cancer

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Introduction: The galactose oxidase Schiff's (GOS) reaction detects the Thomsen-Friedenreich antigen which is associated with malignant changes. We have previously reported an association between GOS reactivity and lung cancer based on a quantitative method for interpreting GOS reactivity. Here we report on an ongoing study intended to investigate the relationship between GOS reactivity and lung cancer.

Methods: Spontaneously produced sputum samples were obtained from 85 subjects: 38 lung cancer patients (19 stage 1, 8 stage 2, 2 stage 3, 6 stage 4, 3 not staged) 29 patients with benign lung disease, and 18 healthy smokers. Sputum samples were treated with dithiothreitol and diluted to 1mg/mL protein. 50uL of sputum sample were applied to a glass fiber membrane (attached to a microscope slide-shaped plastic support) and allowed to air dry. The sample was then treated sequentially with galactose oxidase and Schiff's reagent. The GOS reaction was quantified by determining the hue:chroma ratio of the resultant color measured by a portable spectrophotometer. In our previous report we simply measured chroma to quantify GOS, however this measurement did not adequately differentiate smokers in the current study from cancer patients. Hue:chroma was empirically determined as a better measure for differentiating smokers from cancer patients.

Results: Patients with cancer had significantly higher hue:chroma values than those without (25.99+/-8.48 vs. 21.37+/-6.77, $p=0.007$). The cancer rate increased in approximately linear fashion with hue:chroma ratio quartile ($0<0.001$). After adjustment for age and gender, GOS reactivity remained a significant ($p=0.003$) predictor of cancer.

Conclusion: These findings further support the relationship between GOS reactivity and lung cancer. The GOS reactivity of sputum samples may be useful as an initial screening test to identify high risk subjects who would benefit from imaging tests such as spiral computed tomography.

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