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Oral Presentation  
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S404

### **New Blood Test Shows Promise for Early Detection of Lung Cancer**

*Summary contains updated data not in the abstract*

Researchers in Germany have developed a blood test that is sensitive and specific for detecting early-stage lung cancer in smokers, who are at significantly increased risk for the disease. This test uses an RNA “fingerprint” that was created by comparing the blood of lung cancer patients to a control group of people without the disease.

In a preliminary study, researchers assessed the blood test in smokers who developed lung cancer within two years after joining the European Prospective Investigation on Cancer and Nutrition, as well as a set of matched controls. They found that the RNA blood test had a sensitivity of 75 percent (accurately detected lung cancer) and 85 percent specific (accurately identified patients who did not have lung cancer).

The authors conclude that the lung cancer RNA fingerprint may eventually be suitable for identifying patients with early lung cancer and predicting the occurrence of lung cancer within two years.

#### **Abstract #1509**

##### **Predictive value of transcriptional changes in peripheral blood for future clinical onset of lung cancer in asymptomatic smokers**

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**Background:** The disastrous 2-year survival rate of only about 15% in lung cancer is mainly due to diagnosis of the disease in advanced stages. Early detection thus may be a promising strategy to improve survival rates. We aimed at the identification of lung cancer specific expression profiles in blood samples prior to clinical manifestation of the disease.

**Methods:** A lung cancer associated RNA-fingerprint was generated in peripheral blood samples of a cohort of smokers with prevalent lung cancer (13 cases, 11 controls). This fingerprint was validated in a second cohort of smokers with prevalent lung cancer (22 cases, 15 controls).

Next, from 25,000 healthy individuals recruited in the area of Heidelberg, Germany, into the European Prospective Investigation on Cancer and Nutrition (EPIC) all smokers (12) developing lung cancer within 2 years after study inclusion (incident cases) and respective matched controls were identified. The RNA-fingerprint established in the two prevalent cohorts was used to predict future onset of lung cancer in the incident cohort. The results were validated on two different array platform.

**Results:** Using the human WG-6 array (Illumina) in the cohort of smokers with prevalent lung cancer sensitivity and specificity of the test were estimated to be 86% and 86%, respectively. Class prediction was highly significant using KNN based algorithms or hierarchical clustering ( $p < 0.0001$  Fisher's exact test). When further applying the test in the cohort with incident lung cancer we significantly predicted the clinical manifestation of lung cancer ( $p < 0.05$ ). Using identical test criteria on data generated on a different technical platform (Illumina human WG-6 V2) similar results were obtained (odds ratio of 17 [95% CI: 2.2 to 121]  $p < 0.05$ ). Permutation analysis further supports the validity of the data ( $p < 0.01$ ).

**Conclusion:** The blood-based lung cancer RNA-fingerprint is suitable to identify lung cancer patients and to predict the occurrence of clinical manifest lung cancer within 2 years. Remarkable most of the relevant transcripts are derived from immune response related genes. These results may form the basis for the further development of a blood-based lung cancer early detection test.

**Disclosures for research team:** Nothing to disclose