The chemical elements in lung tissue and lung cancer subtypes

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Abstract

Background: Several studies have suggested that some trace elements may affect the onset of lung cancer. However, the effect of trace elements on lung cancer carcinogenesis is poorly understood. The aim of this study was to assess if trace elements may be the cause of carcinogenesis in lung cancer tissues of patients with lung cancer with a non-smoking history, driver mutations, or histology.

Methods: The study included patients with non-small cell lung cancer who had undergone surgical resection. For the measurement of trace elements, surgically resected samples were studied using particle induced X-ray emission analysis. In total, 54 elements were investigated in each sample. Based on the pathology and driver mutation status, samples were classified into the following groups: lung adenocarcinoma (LADC) with EGFR mutation (LADC EGFRm+); LADC with KRAS mutation (LADC KRASm+); LADC without EGFR mutation, KRAS mutation, and ALK rearrangement (LADC wt); and lung squamous cell carcinoma (SCC). Tissues from 20 patients with a non-malignant disease were also analyzed for trace elements as controls.

Results: The levels of 6 trace elements were increased in the LADC wt group. Copper was increased in the LADC EGFRm+ group. Cobalt and zinc were increased in the LADC KRASm+ group. There were no differences in trace element levels between the SCC group and the control group.

Conclusion: Trace elements may play a role in the pathology and molecular signature of lung cancer.