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George G Chen

The Chinese University of Hong Kong, China

15-lipoxygenases and their metabolites as biomarkers for the early detection of smoking-induced non-small cell lung cancer

Lung cancer is one of the most prevalent and lethal cancers in the world. The majority of lung cancer is associated with cigarette smoking. Most patients are usually at the advanced stage when diagnosis and thus not eligible for surgical resection, a curable treatment for lung cancer. Therefore, it is critical to diagnosis of lung cancer at early stage. However, so far, there is not a reliable and practicable method for early detection of lung cancer. In this study, we tried to test whether 15-lipoxygenase-1 (15-LOX1) and 15-lipoxygenase-2 (15-LOX2) and their metabolites, 15(S)-hydroxyeicosatetraenoic acid (15S-HETE) and 13-S-hydroxyoctadecadienoic acid (13S-HODE) could be used for the early detection of lung cancer. We found that the levels of 15-LOX1, 15-LOX2, 15S-HETE and 13S-HODE were significantly decreased in non-small cell lung carcinoma (NSCLC), especially those who smoke. Animal experiments were also evident that smoking-induced lung tumor in mice were associated with marked increase of both 15S-HETE and 13S-HODE. Importantly these reductions predated the formation of lung cancer in mice. We have also measured these biomarkers in smokers, smokers with chronic obstructive pulmonary disease (COPD) because both smokers and COPD are known risk factors for NSCLC. We found the levels of 15S-HETE were decreased in some smokers, particularly smokers with COPD. Taken together, our finding suggests that 15-LOXs and 15S-HETE are significantly decreased in NSCLC and that the reduction may serve as biomarkers for the early detection of lung cancer.

Biography

George G Chen is a Professor in the Department of Surgery, Director of Surgical Research Laboratories, Faculty of Medicine, the Chinese University of Hong Kong, China. He has extensive experience in cancer research. He has authored or co-authored more than 190 papers and has written a number of books or book chapters.

gchen@cuhk.edu.hk

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