中文題目：以串聯質譜法分析食管癌患者血紅蛋白上穀胱甘肽的修飾變化

英文題目：Analysis of glutathione modification of hemoglobin in patients with esophageal carcinoma by ultraviolet tandem mass spectrometry

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Background: Oxidative stress plays an essential role in a wide range of diseases, and it may cause protein modifications, which can regulate protein functions. Glutathionylation is an important post-translational modification of proteins, in which the side chain of cysteine residues in a protein react with glutathione and form disulfide bonds. As it indicates the reduction-oxidation status in a cell, protein glutathionylation has been proven to affect the structure of protein and it can cause protein dysfunction.

Method and Material: In this study, we used nanoflow LC-nanospray ionization linear ion trap tandem mass spectrometry (nanoLC-NSI/MS/MS) to analyze glutathionylation in human hemoglobin.

Result: We reported that the extent of glutathionylation is significantly higher in smokers than in nonsmokers. In this study, we examine the extent of glutathionylation in hemoglobin from smoking esophageal cancer patients and from smoking normal controls. Hemoglobin was freshly isolated from their blood, followed by alkylation with iodoacetic acid and trypsin digestion. We quantified the extent of glutathionylation in peptides containing α-Cys-104, β-Cys-93, and β-Cys-112 residues. The relative quantification of each glutathionylated peptide was calculated as the peak area ratio of the modified peptide versus the sum of the peak areas of the modified and the alkylated parent peptide in the selected reaction monitoring (SRM) chromatograms. Using this method, we found that the extent of glutathionylation at β-Cys-93 in hemoglobin from 14 esophageal cancer patients were significantly higher than that from 8 normal individuals with a p value of 0.0265.

Conclusion: Although the numbers of subjects studied are limited, the results suggest the possibility of using the extent of glutathionylation at β-Cys-93 in hemoglobin as a biomarker candidate for esophageal cancer.