MALDI-TOF MS Combined With Magnetic Beads for Detecting Serum Protein Biomarkers and Establishment of Boosting Decision Tree Model for Diagnosis of Colorectal Cancer

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Abstarc :

The aim of present study is to study the serum protein fingerprint of patients with colorectal cancer (CRC) and to screen protein molecules that are closely related to colorectal cancer during the onset and progression of the disease with Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS). Serum samples from 144 patients with CRC and 120 healthy volunteers were adopted in present study. Weak cation exchange (WCX) magnetic beads and PBSII-C protein chips reader (Ciphergen Biosystems Ins.) were used. The protein fingerprint expression of all the Serum samples and the resulted profiles between cancer and normal groups were analyzed with Biomarker Wizard system. Several proteomic peaks were detected and four potential biomarkers with different expression profiles were identified with their relative molecular weights of 2870.7Da, 3084Da, 9180.5Da, and 13748.8Da, respectively. Among the four proteins, two proteins with m/z 2870.7 and 3084 were down-regulated, and the other two with m/z 9180.5 and 13748.8 were up-regulated in serum samples from CRC patients. The present diagnostic model could distinguish CRC from healthy controls with the sensitivity of 92.85% and the specificity of 91.25%. Blind test data indicated a sensitivity of 86.95% and a specificity of 85%. The result suggested that MALDI technology could be used to screen critical proteins with differential expression in the serum of CRC patients. These differentially regulated proteins were considered as potential biomarkers for the patients with CRC in the serum and of the potential value for further investigation.

Key Word :
MALDI, colorectal cancer, Biomarker, Protein, serum Introduction