1. **No.**

   FP01804060

2. **Title**

   Proteomics of Peripheral Exosome Identifies Novel Biomarkers for COPD and Asthma

3. **Period**

   2016-2018

4. **Summary**

   Proteomic Profiling of Serum Exosomes to Identify Novel Biomarkers for COPD Introduction

   In spite of massive investment in the discovery of novel biomarkers (BM), there are no specific biomarkers for chronic obstructive pulmonary disease (COPD). Obstacles to discover BM involve the complexity of samples such as serum as well as immaturity of proteomic technology. To overcome these major problems, we focused on proteins of serum exosomes. In order to get novel BM for COPD, we performed a quantitative high throughput proteomics using isobaric tags, tandem mass tag system technique (TMT)-based analysis; and subsequent target proteomics, multiple reaction monitoring (MRM).

   Methods

   Ten COPD patients, and six healthy controls were included in this study. Serum exosomes were isolated by ultracentrifugation. A TMT-based quantitative proteomic analysis and subsequent MRM verification were performed. In addition, bioinformatics technology was applied to analyze the exosomal proteins using ingenuity pathway analysis (IPA).

   Results

   Isolated exosomes were confirmed by transmission electron microscope, immunoblot, and the qNano system. From TMT proteomics, we obtained 600 proteins. Among them, 34 proteins were upregulated in the COPD patients compared with healthy controls. Of note, serum exosomes contained abundant membrane proteins as well as extracellular matrix proteins. Moreover, exosomal proteins from COPD patients reflected its disease signature such as inflammatory response and metabolic disease by IPA. Among 34 BM candidates, we further verified several proteins in an independent set of samples by MRM.

   Conclusion

   We identified several BM candidates for COPD. Proteomic analyses of serum exosomes would provide novel strategy for biomarker discovery in the respiratory diseases.