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Proteomic profiling of exosomes from colon cancer cells by LC-MS/MS to identify diagnostic biomarkers

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Exosomes are informative vesicles containing unique information about the condition of cells. Therefore, many researchers have suggested that exosomal proteins can be potential biomarkers for diseases such as cancer. Colon cancer is one of the most common forms of cancer related death in the world. Despite current biomarkers such as carcinoembryonic antigen used in hospitals, demand for novel biomarkers for colon cancer diagnosis is increasing because of their low sensitivity. This study was focused on identification of biomarkers for diagnosis of colon cancer through proteomic approaches to investigating exosomes from HT-29 and HCT-116 colon cancer cell lines, which were isolated by differential ultracentrifugation. These exosomes were characterized by western blot analysis, nanoparticle tracking analysis, and transmission electron microscopy. Exosomal proteins were analyzed using LC-MS/MS. Five selected proteins were shown to be upregulated in colon cancer by western blot analysis. In addition, tetraspanin-1 among the candidate proteins was upregulated in exosomes from colon cancer patients compared with healthy controls. These results suggest that tetraspanin-1 is a potential diagnostic biomarker. Additionally, the experimental strategy described in this study is expected to help identify cancer-specific and body fluid-accessible biomarkers.

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