Proteomics and Metabolomics for Mechanistic Insights and Biomarker Discovery in Cancer Disease

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The early detection of human cancers is still one of the great challenges in the battle against these diseases and biomarker research is continuously expanding in the field of clinical OMICS. To improve the clinical course of cancer diseases, more accurate diagnostic and assessment methods are required as early as possible. In order to achieve this, metabolomics offers new opportunities for biomarker discovery and may provide pathological understanding of cancers diseases beyond traditional technologies. Metabolomics, the systematic analysis of low-molecular-weight metabolites in biological samples, can serve as an effective tool for cancer translational research allowing for early diagnosis and personalized treatment. Combining metabolomics and proteomics to quantify changes in metabolites and their corresponding enzymes may advance our understanding of pathophysiological mechanisms and aid the identification of novel biomarker candidates applicable for disease diagnosis and/ or prognosis for cancer diseases and patient stratification. In this study, using proteomics and metabolomics approaches, we found that the level of several enzymes and their related metabolic intermediates involved in a particular metabolic pathway were deregulated in cancer patients.