Personalized medicine and proteomics: our experience with non-small cell lung cancer and gastric cancer

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Abstract

Currently, diagnosis of most cancer is heavily based on morphological assessments. Few screening tests enable diagnosis of cancers so early that near 100% survival rates after treatment can be found. Further, once cancer diagnosis was being made, most oncologists relied on their years of clinical correlations and clinical trials to decide on treatment regimen, including chemotherapy. However, there is not much tools that can be used to predict outcome of the chemotherapy. On the other hand, personalized medicine promises to improve patient evaluations and care. Application of proteomic technologies allows identification of biomarkers for early diagnosis as well as predicting prognosis. Comparing clinical samples from patients already diagnosed with non-small-cell lung cancer (NSCLC) and normal control with proteomic technologies, several candidate protein biomarkers can be found. They can be used for the early identification of NSCLC. It should be stressed that biopsy samples obtained clinically is usually not the earliest stage for treatment to ensure 100% survival rate after treatment. Therefore, animal studies were also conducted to obtain tissues samples with the earliest signs of cancer. In a chemically-induced gastric cancer model in the rat, stomach samples with dysplasia (the earliest stage of gastric cancer with observable histological changes) were obtained. Comparing samples with dysplasia and control, several protein biomarkers related to dysplasia were found. Relevance of these biomarkers to dysplasia is currently being studied. Nonetheless, the contribution of proteomic technologies to the advance of personalized medicine is enormous.

Bio

Prof. Samuel Lo graduated with his Ph.D. from the Department of Medicine, Alfred Hospital, Monash University, Australia in 1990. He was trained as a protein chemist looking at the interactions of antiphospholipid antibodies with the natural anticoagulant system of the body. He joined the Hong Kong Polytechnic University in 1990. His research interest had branched out from the study of anti-phospholipid antibodies to nitric oxide synthase in both mammals and plants. In the past 10 years, he became very interested in the application of proteomic technologies. He had successfully applied proteomic technologies to search for useful protein biomarkers in early cancer diagnosis and prognosis, fast identification of harmful and toxic algae etc.