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Tissue glycopeptide profiling by mass spectrometry and potential applications to colorectal cancer biomarker discovery

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Colorectal cancer (CRC) is a common cause of cancer-related death in the industrialized countries, and its early detection and accurate monitoring in followed up oncological patients would greatly benefit from reliable and non-invasive biomarkers. Post-translational modifications are known to play an important role in cancer progression. Particularly, glycosylation has also been increasingly recognized as one of the most prominent biochemical alterations associated with cancer and other diseases. Starting from these assumptions, we profiled differentially expressed glycoproteins in CRC tissue using quantitative proteomic technique based on ^{18}O stable isotope labeling. CRC tissues were dissected from surgically excised tumors (n=12) and adjacent normal mucosa (n=12). N-linked glycopeptides were initially isolated from tissue samples and analyzed with nano-LC-MS/MS. Quantitative analysis was obtained labeling a pooled sample of CRC tissues and of their matched normal tissues.

We identified and quantified glycoproteins differentially expressed between normal and cancer tissues. Preliminary data showed global alteration in the glycoprotein profile of CRC tissues compared to normal tissues. Our findings suggest that glycoprotein differentially expressed at specific cancer stages might be potential biomarkers to be employed for stage-specific diagnosis and prognosis.

Biography

Annalisa Nicastri is a Ph.D. student in Molecular Oncology, Experimental Immunology and Development of Innovative Therapies at "Magna Graecia" University of Catanzaro, Italy. After her Master Degree in Medical Biotechnologies, she collaborated with the Nanotechnology research group of the University of Catanzaro to the synthesis and analysis of purified BRCA-1 protein by Mass Spectrometry and Raman Spectroscopy. Subsequently, she worked in Zurich at the Institute of Molecular Systems Biology, ETH, where she contributed to the identification of serum biomarkers of mesothelioma. Currently, her research focuses on proteomic approaches for the discovery of new biomarkers of colorectal cancer.

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