

Molecular Characterization of Cancer Patient Samples using Mutational Analysis and Glycomic Profiles

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Galectins are a family of β -galactoside binding proteins which are involved in many cellular pathways and are upregulated and aid in cancer pathologies. Neoplasms are caused by accumulated mutations that allow a cell to undergo unregulated growth. Personalized treatment of these cancers involves mutation-specific medications. Tumor glycobiology is also altered and specific glycans are used as markers of tumor progression. Our study investigates galectin, mutation, and glycomic profiles in an effort to create molecular signatures for cancer types and stages. The serum levels of five galectins (-1, -3, -7, -8, and -9) in 35 breast and 39 lung cancer patients were determined using ELISA assays. We analyzed the patients' mutation information from a 50 cancer-critical gene panel. The galectin levels were analyzed in reference to gene mutations, and by the affected cellular pathway of the mutation to find correlations. Second, a comprehensive glycomic profile of 40 breast cancer patient neoplasms and adjacent healthy tissues is being analyzed using MALDI TOF mass spectroscopy. Our current findings show that patients with mutations in the *FLT3* and *KIT* genes have significantly different levels of serum galectin-1 than other cancer patients. Work is currently underway for the survey of glycomic profiles. Together, these three molecular profile sets (gene mutations, glycomic profiles, and serum galectin levels) can potentially provide signatures for stages of cancer and will also inform the personalized care of the patients of the Prisma Health Cancer Institute.

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