

Intelligent decision support system-based biomarker discovery

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The successful treatment of cancer depends on early and accurate detection. Molecular diagnosis is expected to greatly improve current diagnostic processes. Biomarkers are molecular signatures that can be used to identify the presence or absence of a particular disease. The high through put experimental methods, including microarrays, provide an excellent tool for parallel measurement of expression of biological molecules such as genes, proteins and metabolites. Though many methods already exist for the determination of markers and tumor diagnosis using high through put data, more precise and accurate methods for feature selection as well as tumor classification are still needed. In this paper we present a general overview of a new strategy for gene expression-based biomarker discovery. By applying our strategy to data from tissue samples, we were able to identify the patterns of gene expression-biomarkers unique to prostate and colon. The prostate biomarker panel consists of 8 genes. This panel was able to detect prostate cancer with over 96% specificity and sensitivity in leave-one-out cross validation. The colon biomarker panel consists of 17 genes. This panel was able to detect colon cancer with over 95% specificity and sensitivity in leave-one-out cross validation. Independent validation on clinical samples confirmed the discriminatory power of this gene panel as well, yielding over 95% accuracy of diagnosis. Independent validation on clinical samples confirmed, once again, the discriminatory power of this gene panel, yielding over 95% accuracy of diagnosis for both colon and prostate. We are currently seeking partners for further validation, and licensing of these technologies, and partners interested in collaboration leading to discovery of biomarker panels for other applications using our intelligent decision support system for biomarker discovery.

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