IDENTIFYING POTENTIAL DIAGNOSTIC AND THERAPEUTIC MICRONA FOR CANCER-ASSOCIATED KALLIKREIN GENES

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Abstract: MicroRNA (miRNA) are protein regulators. They have the ability to silence genes, or control cell death and have been linked to disease processes. Accumulating evidence reveals that miRNAs are associated with cancer. These regulators were originally found in Caenorhabditis elegans, which is a small soil nematode found in temperate regions. miRNAs are also found in most eukaryotes, including humans, and it is estimated that miRNA accounts for 1-5% of the human genome and regulates expression of up to 1/3 of all human genes, regulating the expression of genes. The Kallikrein gene family, containing 15 genes, is the largest family of proteases and many of the genes have been reported as potential tumor markers. For example, KLK3 is the biomarker for prostate cancer. The objective of the reported research was to use visual analytics approaches to identify patterns of enriched biological concepts such as miRNA that are mapped to Kallikrein genes. The enriched concepts (e.g. miRNAs, Gene Expression) for each Kallikrein gene was downloaded from ConceptGen (http://conceptgen.ncibi.org/), and was then processed in formats suitable for two visual analytics software: Tableau Public and Parallel Sets. The visual analytics software enabled integrated and interactive views of data from multiple perspectives. Parallel Sets allowed for categorical analysis of the data to interactively identify proportions of miRNA in the data obtained from ConceptGen. Tableau Public showed patterns of certain miRNA annotation in specific Kallikrein genes. For example, Kallikrein gene KLK8 was the only gene with enriched for miRNA, hsa-mir-15a. This miRNA is associated with human diseases such as leukemia, liver diseases and schizophrenia. The KLK8 gene was also the only gene annotated for miRNA has-mir-15b. This miRNA share similar human disease associations as to that of miRNA has-mir-15b. The gene KLK3, which is a potential biomarker for prostate cancer, is the only Kallikrein gene that contains miRNA hsa-mir-182. This miRNA is known to be highly expressed in breast cancer cells. These findings provide candidate miRNAs for validation as diagnostic and therapeutic miRNAs.

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