

Identifying miRNA in biofluids to be applied as robust biomarkers for disease, toxicology or injury studies: The case of minimally invasive colorectal cancer detection

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MicroRNAs represent the most well described class of small RNAs (21-23nt) and have been shown to function as post-transcriptional regulators of gene expression. The high relative stability of miRNA in common clinical source materials (e.g. FFPE blocks, plasma, serum, urine, saliva, etc.) and the ability of miRNA expression profiles to accurately classify discrete tissue types and specific disease states have positioned miRNA quantification as a promising new tool for a wide range of diagnostic applications. Furthermore miRNAs have been shown to be rapidly released from tissues into the circulation with the development of pathology.

To facilitate discovery and clinical development of miRNA-based biomarkers, we developed a genome-wide LNA™-based miRNA qPCR platform with unparalleled sensitivity and robustness. The platform requires a single RT reaction to profile human or rodent miRNAs and therefore facilitates high-throughput miRNA profiling in important clinical sources without the need for pre-amplification.

Using this system, we have profiled thousands of biofluid samples including blood derived plasma/serum and urine. Specifically we have developed normal reference ranges for circulating miRNAs in several biofluids as well as tissue specific miRNAs to build panels with the relevant miRNA subsets. This will support the development of robust biomarkers in disease, as well as toxicology and injury studies. An extensive QC system has been implemented in order to secure technical excellence and reveal any unwanted bias in the dataset. Approaches to data normalization and extensive studies of pre analytical variables will be discussed.

We will demonstrate how the system can be quickly and robustly applied in biomarker discovery and validation projects using the specific case of colorectal cancer early detection from blood plasma.

Biography

Peter Mouritzen, M.Sc., Ph.D. is Vice President for Research and Development at Exiqon A/S - a market leader in miRNA diagnostics and analysis technologies. He is heading the two divisions Diagnostics and Life Science Product Development. A major undertaking within Exiqon Diagnostics is the development of a minimally invasive screening assay for early detection of colorectal cancer. He is serving as an editorial board member of the Journal Silence.

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