

Characterization of liquid-biopsy based microRNA profiles of BRCA1/BRCA2 positive patients – a preliminary study.

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MicroRNAs (miRNAs or miRs) are small non-coding RNAs that play a crucial role in both cell development and differentiation, by influencing post-transcriptional regulation of several protein-coding genes. In the past, it was thought that miRNAs could only limit the expression of target genes by interacting with the mRNA transcript. However, more recent studies have shown that miRNAs may also be responsible for a post-transcriptional increase in gene expression. The final effect of miRNA's influence on mRNA and the resulting increase in expression seems to be dependent on specific cell conditions, mRNA sequence and other cofactors. There are numerous mechanisms responsible for the miRNA-dependent reduction of gene expression, which include both translation initiation as well as post-initiation mechanisms. In both types of interactions, miRNPs play a key role in reducing gene expression. The literature suggests that there are several microRNAs (miRNAs, miRs) that exhibit either increase or decrease of expression in liquid-biopsy samples during early onset of several malignancies including breast and ovarian cancer. It is important to mention that scientific literature suggests ethnic-related changes in the expression of microRNA molecules, which requires tailoring of the assays to local requirements. By selecting proper miR molecules, it is possible to develop highly specific and sensitive test for cancer detection, prognosis or even selecting tailored therapy.

In this presentation we are demonstrating preliminary results covering four patients assessed in two different timepoints over the span of monitoring and therapy period as a part of National Prevention Programme of BRCA1/BRCA2 positive patients.

Testing was performed on freshly collected serum samples that undergo microRNA extraction process and expression assessment utilising gold standard for miR detection – Real-Time RT-PCR with TaqMan® Array Card: TaqMan™ Advanced miRNA Human Serum/Plasma Cards able to detect 188 distinctive microRNAs.

Obtained results are promising, exhibiting the ability to differentiate expression profiles for two different timepoints when compared to healthy individuals. This might enable differentiation between early onset of disease and progression in the future. In order to fully evaluate the preliminary results, in the next step we plan to evaluate additional samples of BRCA1/BRCA2 positive patients both not exhibiting symptoms of malignancies as well as on different stages of active cancer therapy out of over 140 currently banked with array screening together with additional healthy patients which will allow exclusion of both individual and environmental factors.