



READ, WRITE, UNDERSTAND THE CODE OF LIFE

microRNA Profiling

BIOMARKER SIGNATURE DISCOVERY





Profiling of miRNA biomarkers

MicroRNAs (miRNAs) are endogenous, non-coding RNAs that play a fundamental role in gene regulation and have critical functions across various biological processes. Pairing to mRNAs of protein-coding genes, they direct posttranscriptional repression by altering the stability or translational efficiency of their target mRNAs.

Recent studies indicate that miRNAs are involved in the development of human malignancies, suggesting that they represent a promising new class of biomarkers for cancer and other diseases. Identifying miRNAs involved in specific cancers could provide useful diagnostic information, allow disease classification and reveal potential treatment targets.

Whereas the value of a single biomarker is generally limited due to lack of specificity and sensitivity, miRNA profiles act as highly specific and informative biomarker sets. To define miRNAs as diagnostic biomarkers it is essential to perform multiplexed analyses.

The use of miRNA microarrays makes it possible to identify individual miRNAs as well as complete miRNA signatures with a high degree of accuracy.

miRNA profiling on the Geniom RT Analyzer requires minimal amounts of total RNA, taking into account that sample material is often limited due to typically small clinical samples such as core needle biopsies.

Independent from the sample source, fully automated microarray processing on the Geniom RT Analyzer platform enables reliable detection and accurate profiling of miRNA biomarker expression.

ADVANTAGES OF THE GENIOM RT ANALYZER miRNA PROFILING TECHNOLOGY

- RELIABLE DETECTION AND ACCURATE MEASUREMENT OF INDIVIDUAL miRNAs AND miRNA PROFILES
- EXCELLENT ARRAY-TO-ARRAY REPRODUCIBILITY
- MINIMAL SAMPLE AMOUNT REQUIRED
- FULLY AUTOMATED MICROARRAY PROCESSING
- MOST UP-TO-DATE miRNA ANALYSES: INSTANT ACCESS TO THE LATEST SANGER miRBASE VERSION FOR ANY SPECIES
- FLEXIBLE GENIOM miRNA BIOCHIP CUSTOMIZATION



BIOCHIPS FACTS

- Microfluidic Biochip with precise fluid control for reproducible hybridization and washing conditions
- Closed compartment eliminates evaporation and enables high temperature hybridization conditions
- 8 separate microchannels each with up to 15.624 features
- 124.992 features per Biochip
- Enables parallel hybridization of 8 different samples

Up-to-date miRNA Analysis

INSTANT ACCESS TO THE LATEST miRBASE UPDATE ON GENIOM BIOCHIPS

The heart of the Geniom Technology is the microfluidic Geniom Biochip. Catalog Geniom miRNA Biochips are available with validated and optimized probe design always based on the latest Sanger miRBase version for any species.

Thus, not a single miRNA biomarker escapes your signature assignment; and that might make the difference! Optionally, probe content can easily be customized to include proprietary, predicted or mutated miRNA sequences.

GENIOM miRNA BIOCHIPS ARE USEABLE WITH FEBIT'S ANALYTICAL SERVICES OR ON YOUR GENIOM RT ANALYZER

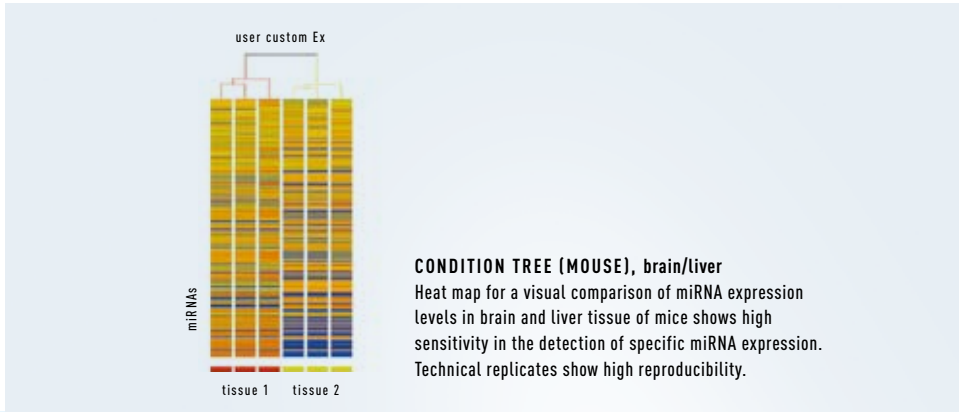
Full miRNA profiling service provided by febit

- From sample to ready-to-publish data
- Flexible biochip customization service
- Project consulting
- Sample quality control
- Sample labeling
- Microarray hybridization and read out
- Comprehensive data analysis and easy-to-understand bioinformatics report

Profiling with Geniom RT Analyzer in your lab

- Fully automated microarray processing for your fast and easy analysis
- Intuitive software
- Short hands-on time
- Flexible biochip design
- Bioinformatics support

miRNA PROFILING AND BIOMARKER SIGNATURE ASSESSMENT



On-Chip Labeling for Highest Sensitivity

MPEA BENEFITS

- HIGHER SENSITIVITY AND SPECIFICITY
- miRNA HYBRIDIZATION WITHOUT PRECEDING TREATMENT LIKE ENRICHMENT, PCR-BASED AMPLIFICATION OR LABELING ELIMINATES POTENTIAL BIAS
- HIGH DISCRIMINATORY POWER
- MINIMAL AMOUNT OF SAMPLE RNA NEEDED (≥ 20 NG TOTAL RNA)
- EASY TO USE PROTOCOL FOR GENIOM RT ANALYZER

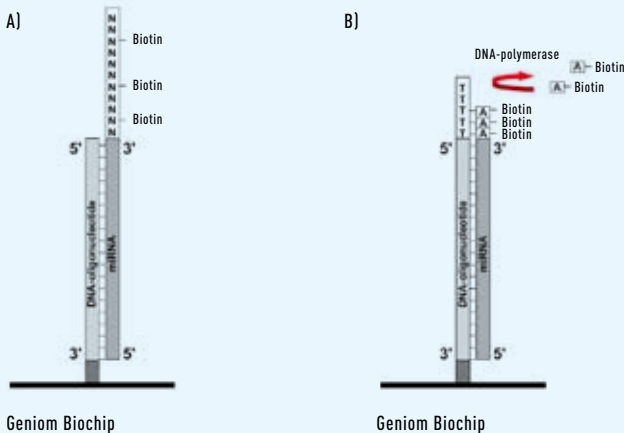
ENZYMATIC LABELING ASSAY REQUIRES MINIMAL SAMPLE AMOUNT

In addition to the standard hybridization of pre-labeled RNA, the microfluidic Geniom Biochip enables a highly sensitive enzymatic labeling protocol.

The unique Microfluidic Primer Extension Assay (MPEA) uses unlabeled miRNAs for hybridization. In a second step, Klenow fragment of DNA polymerase I is added directly into the channels of the microfluidic chip, where the specific elongation of the bound miRNAs takes place.

The method combines the specificity of a hybridization assay with the discriminatory power of an enzymatic extension and reduces the required sample amount to a minimum.

MICROARRAY-BASED ASSAYS FOR miRNA PROFILING



A) Conventional hybridization assay:
miRNAs are labeled first and hybridized afterwards to the microarray containing reverse complementary oligonucleotides.

B) Principle of MPEA: The hybridized, unlabeled miRNA functions as primer for an enzymatic elongation in which biotinylated nucleotides are incorporated.

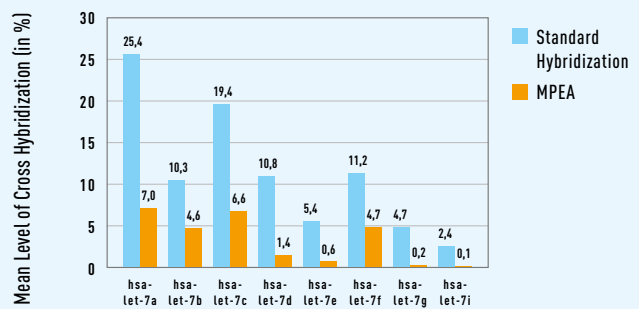


Distinctive miRNA Biomarker Identification

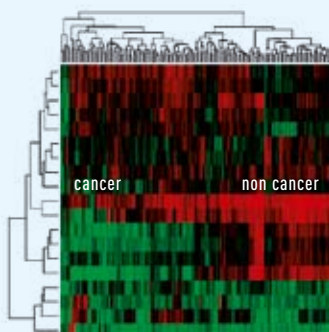
ESTABLISHED MPEA PROTOCOL FURTHER INCREASES DISCRIMINATORY POWER

The Microfluidic Primer Extension Assay (MPEA) based on febit's Geniom microarray technology shows several outstanding advantages over any other microarray-based miRNA profiling method. Compared to the conventional hybridization assay, which is most suitable to discriminate mismatches in the central position of the hybridized target, MPEA provides an additional level of specificity due to the fact that the enzymatic elongation can only occur with nearly perfect matches at the 3'-end, resulting in significantly less cross-hybridization signals. Thus, MPEA further increases sensitivity of miRNA profiling experiments and ensures highest discrimination power. Even miRNA biomarkers that show strong sequence conservation among miRNA family members are unmistakably identified.

MPEA FOR RELIABLE miRNA FAMILY MEMBER ANALYSIS



CLUSTER ANALYSIS



Clustering of 20 most variable miRNAs from different tumor and normal tissues.

Analysis of the hsa-let-7 miRNA family illustrates the significant reduction of cross hybridization, highlighting the reliable detection of even single nucleotide mismatches with MPEA labeling of miRNA samples.

febit's microRNA Profiling Service

YOUR BENEFITS	SAMPLE ANALYSIS REQUIRES MINIMAL ...	FEBIT'S FULL SERVICE INCLUDES	BIOINFORMATICS DATA SERVICE
<ul style="list-style-type: none"> - Fast service from sample to ready-to-publish data - Up-to-date miRNA arrays based on the latest miRBase version (http://microrna.sanger.ac.uk/) - Flexible and fast biochip design for custom biochips - Comprehensive analysis report of your results 	<ul style="list-style-type: none"> - TIME from sample submission to data results report in 2-3 weeks - EFFORT total RNA as starting material - SAMPLE AMOUNT only 130 ng total RNA needed 	<ul style="list-style-type: none"> - Project consulting - Sample quality control - Sample labeling - Microarray hybridization and read out - Comprehensive data analysis and easy-to-understand bio-informatics report 	<ul style="list-style-type: none"> - Customized design and data analysis - Detailed data interpretation and an easy-to-understand analysis report - Personal support by febit's experienced in-house experts - Validation and development of biomarkers

Catalog Order Numbers

GENIOM® RT ANALYZER - Instrument, software package, PC, screen, installation, training, service package	P001
STANDARD miRNA SCREENING	S001
CUSTOM miRNA SCREENING	S004
CUSTOM GENIOM® BIOCHIP DESIGN SERVICE - Design Service (From RNA sequences to Geniom® Biochip design; up to 5 MBases) - Please inquire for genomes or target sequences exceeding 5 MBases	S005
CUSTOM GENIOM® BIOCHIP SYNTHESIS SERVICE - Synthesis Service 30nt (30nt-Probe design and Geniom® Biochip-Synthesis) - Synthesis Service 60nt (Probe synthesis 30-60 nt according to your specifications)	S006 S0061
GENIOM® DATA BIOINFORMATICS SERVICE - Bioinformatics Service Geniom® Data (From raw data to analysis and bioinformatics report within 2-4 weeks)	S0070

Please refer to febit's Product Catalog to see the complete list of catalog Biochips.

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*Note: This number is only toll-free for callers inside of the US and Canada.