

miRNAs: Small RNAs, Big Impact

microRNAs (miRNA) are naturally occurring, small non-protein coding sequences that are involved in post-translational gene regulation and have been implicated in a variety of biological processes and diseases. These small RNAs (~22 nt) also have a big impact on many complex pathophysiological responses, making them a key part of life science research on mammalian and plant systems.

miRNA profiling allows for the detection and quantification of miRNAs with high sensitivity and specificity, and provides researchers with both raw and processed data for quick interpretation and comparison of multiple samples.

Lentiviral vectors and ready-to-use lentiviruses and adenoviruses allow researchers to over-express or inhibit individual miRNAs to study their functional roles in both *in vitro* and *in vivo* systems. Target validation for miRNAs can be performed with 3'UTR reporter vectors, lentiviruses, or stable cell lines utilizing a reporter gene such as luciferase or GFP.

Finding the best tools for miRNA research is a challenging task and will depend on sample type, experimental scope and functional analysis. GentaUR offers a comprehensive selection of products and services for miRNA profiling, isolation, detection, expression, inhibition, and target validation to meet your research needs.

miRNA Profiling

- **Human, Mouse, Single Profiling Service**

Cat. No.: C201, C202, C205

- **RNA Isolation, cDNA Synthesis**

Cat. No.: C203, C204



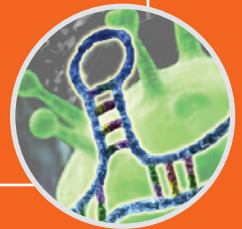
Lentivirus miRNA Systems

- **miRNA Lentivirus Expression**

Human, Mouse, Rat

- **Lentivirus Inhibition Vectors**

Human, Mouse, Rat



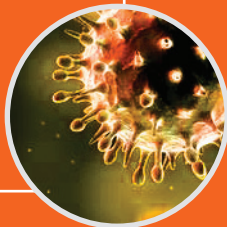
Adenovirus miRNA Systems

- **miRNA Adenovirus Expression**

Human, Mouse, Rat

- **Adenovirus Inhibition Vectors**

Human, Mouse, Rat



3'UTR Reporter Vector and Stable Cell Lines

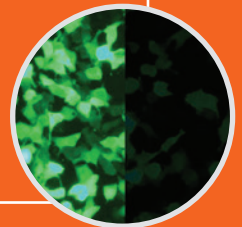
- **3' UTR Luciferase Reporter**

Vectors, Viruses

- **3' UTR GFP Reporter**

Vectors, Viruses

- **3' UTR Stable Cell Lines**



miRNA Profiling

abm's miRNA Profiling Service provides extensive Sanger miRBase registry coverage (Human and Mouse) and offers fast turn-around time with high sensitivity and specificity. Our profiling platform utilizes quantitative reverse transcription PCR (qRT-PCR) to achieve highly parallel and high-throughput results.

Accurate result from minimal starting material

Unlike other miRNA quantification approaches, **abm's** miRNA profiling service requires significantly less purified total RNA (1-10 ng) than hybridization-based methods (>100 ng required).

Distinguish between highly homologous mature miRNAs

The existence of multiple miRNA isoforms presents a significant challenge in miRNA quantification. All the primers in our assay are experimentally validated and are able to achieve single-base discrimination with minimal cross-reactivity.

Synthetic miRNA Template	Assay Primers	Relative Detection (% Perfect Match)	miRNA Template Sequence
miR-19a	miR-19a	100	UGUGCAAUUCUUGCAAAACUGA
	miR-19b	3.17	UGUGCAAUUCUUGCAAAACUGA
	miR-19b	100	UGUGCAAUUCUUGCAAAACUGA
	miR-19a	0.68	UGUGCAAUUCUUGCAAAACUGA
miR-23a	miR-23a	100	AUCACAUUGCCAGGGAUUC
	miR-23b	0.89	AUCACAUUGCCAGGGAUUC
	miR-23b	100	AUCACAUUGCCAGGGAUUC
	miR-23a	0.78	AUCACAUUGCCAGGGAUUC
miR-10a	miR-10a	100	UACCCUGUAGAACCGAAUUGUG
	miR-10b	7.80	UACCCUGUAGAACCGAAUUGUG
	miR-10b	100	UACCCUGUAGAACCGAAUUGUG
	miR-10a	0.07	UACCCUGUAGAACCGAAUUGUG

Figure 1: Single Nucleotide discrimination data. Relative detection, displayed as a percent of the perfect match, was calculated using the Ct values of target and off-target assays.

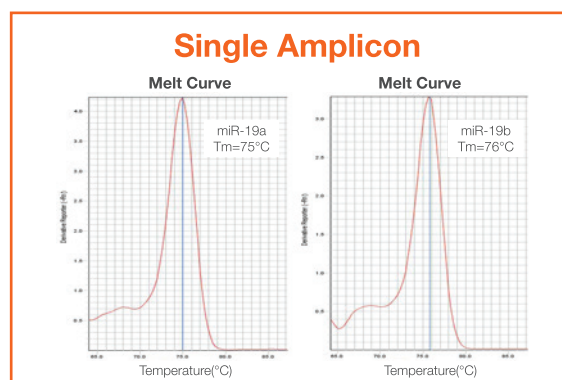


Figure 2: Melt Curve analysis of miR-19a and miR-19b amplification. The discrete peaks correspond to single amplicon species and demonstrates no non-specific binding of the primers.

miRNA profiling data analysis service

Our miRNA profiling service offers data processing, data normalization and calculation of differential miRNA expression between samples.

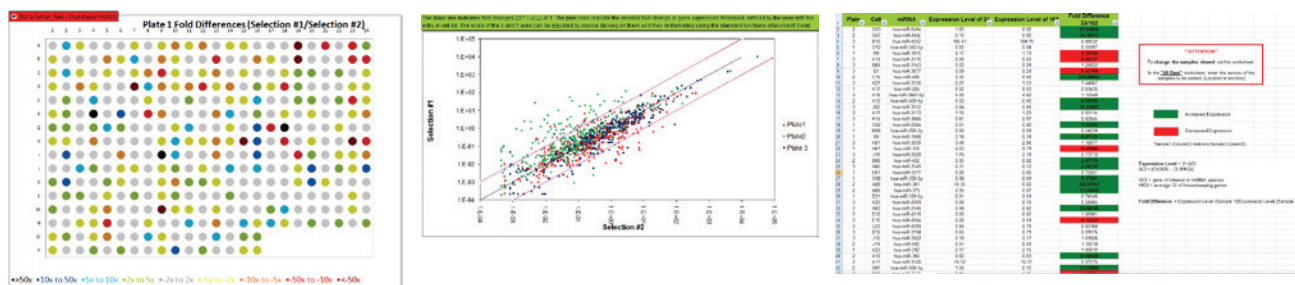


Figure 3: Our results are presented in a variety of visual formats, allowing rapid interpretation of data sets.

Explore individual miRNA roles in functional studies

We offer individual miRNA primers for targeted quantification workflows following the miRNA profiling service. Customizable profiling service is also available upon request.

Lentivirus miRNA Systems (LentimiRa)

Recombinant lentiviral expression vectors are the most widely used delivery vehicle for miRNA delivery due to their high efficiency transduction and stable integration. As a world leader in both lentiviruses and miRNA, Gentaur provides the most comprehensive selection of miRNA lentivirus expression and inhibition vectors for human, mouse, and rat.

Efficient over-expression of individual miRNAs

Each lentiviral miRNA vector has the option of including a GFP reporter and uses the constitutive CMV promoter in both plasmid vector and ready-to-use viral particle formats. The design of native pri-miRNA (~400-500 bp) for each miRNA offers higher levels of target gene suppression than those based on a single common miRNA backbone as seen with competitors.

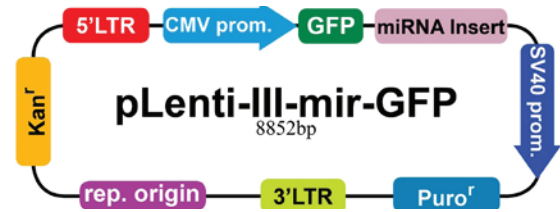


Figure 4: Vector maps for LentimiRa over-expression system. LentimiRa constructs have puromycin resistance for stable cell selection and an optional GFP reporter for monitoring transfection, transduction and expression.

Specific inhibitors for 5p or 3p arm of miRNA stem-loops

miRNA inhibitors are provided in lentiviral plasmid vector and ready-to-use viral particle format for the knock-down of specific miRNA expression. They are designed to suppress the expression of only one of the 5p or 3p arms of the miRNA stem-loop, allowing for a more targeted approach to miRNA functional studies.

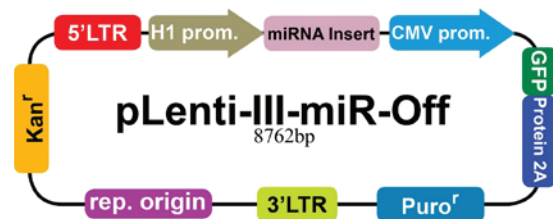


Figure 5: Vector maps for LentimiRa-Off inhibitor system. LentimiRa-Off constructs have puromycin resistance for stable cell selection and an optional GFP reporter for monitoring transfection, transduction.

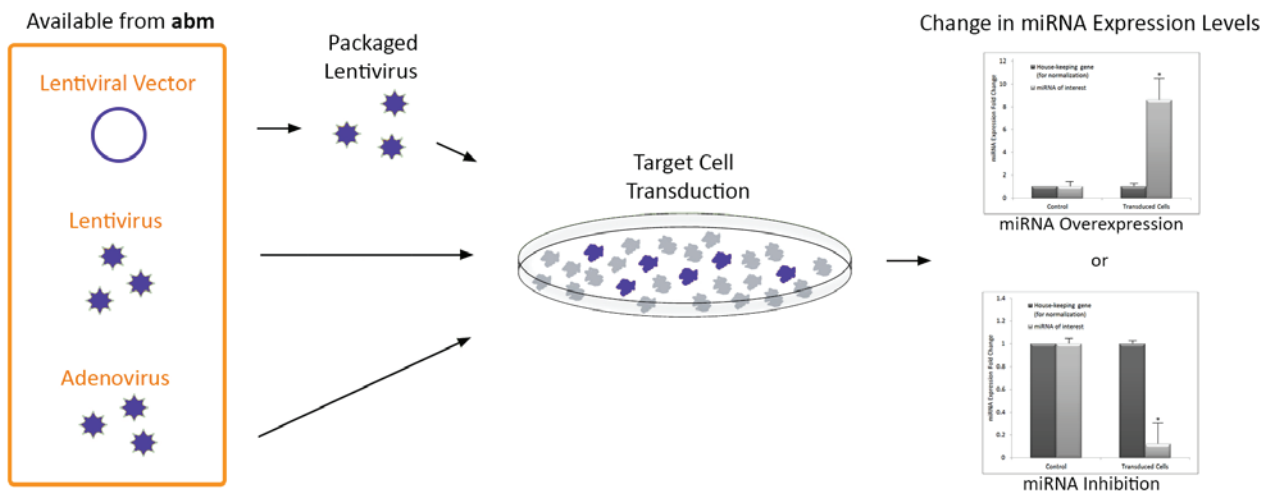


Figure 6: abm miRNA expression and inhibitor products at a glance.

Adenovirus miRNA Systems (AdmiRa)

Adenoviral vectors are the most efficient gene transfer vehicle and offer 100% transient transduction efficiency in most cell lines *in vitro*. The vector will not be integrated into the host cell's genome, minimizing the possibility of host genome mutations associated with vector insertion.

All our AdmiRa and AdmiRa-Off viruses are based on human adenovirus type 5 and are prepared in higher titer format for immediate miRNA expression or inhibition applications.

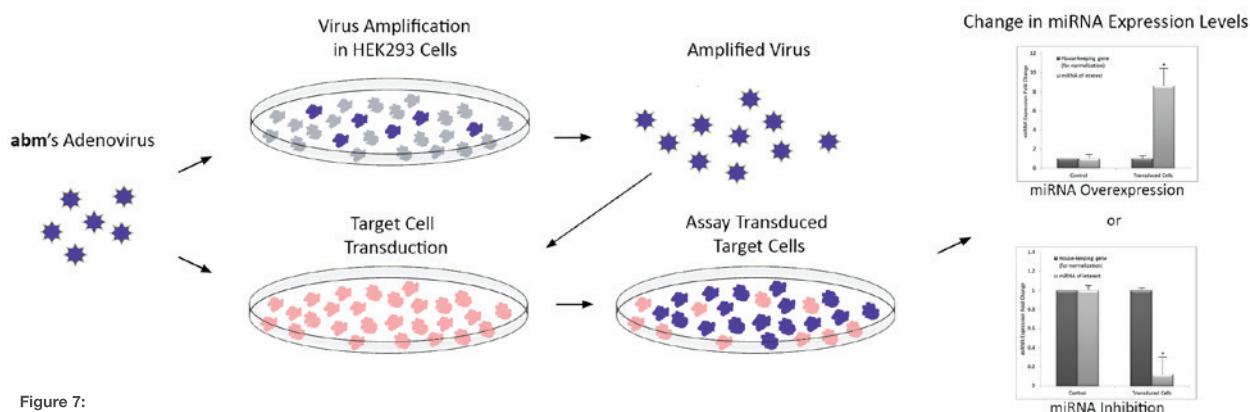


Figure 7:
abm Adenovirus expression system viral partial transduction procedure at a glance.

3'UTR Reporter Vector and Stable Cell Lines

One of the most reliable, quantitative assays for the suppression of target genes by a specific miRNA is the utilization of a reporter gene such as luciferase or GFP. Using this system, any 3'UTR target site can be subcloned downstream of a reporter gene and co-transfected along with a specific miRNA expression vector into cells. Subsequent inhibition of reporter gene expression by the miRNA (when compared to appropriate controls) can serve to validate the regulation of the gene through a target site present on the 3'UTR. A further advantage of using our lentiviral vectors is the flexibility of application for both direct transfection and viral transduction methods.

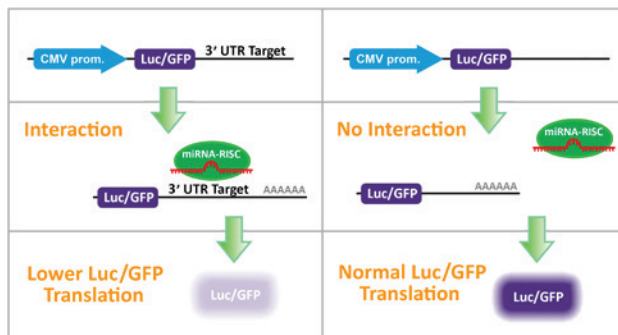


Figure 8:
miRNA target validation. Decreased Luciferase or GFP translation can be detected if the 3'UTR sequence of the gene of interest is targeted by the miRNA in question.

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