

# Thermo Scientific Dharmacon<sup>®</sup> miRIDIAN<sup>™</sup> microRNA Mimics, Inhibitors and Negative Controls

## miRNA Overview

MicroRNAs (miRNAs) are small endogenous RNA molecules (~21-25 nt) that regulate gene expression by targeting one or more mRNAs for translational repression or cleavage. Several thousand miRNAs have been identified in organisms as diverse as viruses, worms, and primates through cloning or computational prediction. Information on miRNAs is currently available in the miRBase Sequence Database hosted by the Sanger Institute (<http://microrna.sanger.ac.uk/>).

To promote research on the biochemistry and biological function of miRNAs, Dharmacon offers the miRIDIAN<sup>™</sup> microRNA product line. Dharmacon miRIDIAN microRNA Mimics and Inhibitors are designed based on known or predicted miRNA sequences in miRBase for human, mouse and rat. miRNA mimics facilitate gain-of-function studies, while miRNA inhibitors facilitate loss-of-function studies.

In experiments using miRIDIAN microRNA Mimics and Inhibitors, we recommend including a sample treated with an equal concentration of a negative control to confirm that the effects observed with the mimic or inhibitor is specific. Dharmacon offers two universal negative controls for both mimics and inhibitors based on two *C. elegans* miRNA sequences. These miRNAs have been confirmed to have minimal sequence identity with miRNAs in human, mouse and rat. Table 1 provides the identity, accession numbers and sequences of the two miRNAs that the controls are based upon. We recommend using the mature miRNA sequences to determine which control would be most appropriate for the miRNA being studied.

Table 1. miRIDIAN microRNA Negative Controls

	Mature miRNA	Mimic Negative Controls*	Inhibitor Negative Controls*
ID	cel-miR-67	Cat. # CN-001000-01 Mol. Wt. 14074g/mol	Cat. # IN-001000-01 Mol. Wt. 18550g/mol
Accession No.	MIMAT0000039		
Sequence	UCACAACCUCCUAGAAAGAGUAGA		
ID	cel-miR-239b	Cat. # CN-002000-01 Mol. Wt. 14124g/mol	Cat. # IN-002000-01 Mol. Wt. 18507g/mol
Accession No.	MIMAT0000295		
Sequence	UUGUACUACACAAAAGUACUG		

\*Cat. = catalog; Mol. Wt. = molecular weight

## Product Description

### miRIDIAN microRNA Mimics

- Double-stranded oligonucleotides designed to mimic the function of endogenous mature miRNA
- Chemically enhanced to preferentially program RISC with active miRNA strand

### miRIDIAN microRNA Mimic Negative Controls

Chemically modified double-stranded oligonucleotides designed to serve as negative controls for miRIDIAN microRNA Mimics

### miRIDIAN microRNA Inhibitors

- Single-stranded RNA oligonucleotides designed to inhibit the function of endogenous miRNA
- Chemically enhanced to improve efficiency and biological stability

### miRIDIAN microRNA Inhibitor Negative Controls

Chemically modified single-stranded oligonucleotides designed to serve as negative controls for miRIDIAN microRNA Inhibitors

## Quality Control

- Mass of each oligonucleotide strand is confirmed by MALDI-TOF mass spectrometry
- Duplex integrity is confirmed by non-denaturing polyacrylamide gel electrophoresis

## Disclaimer

Dharmacon designed the miRIDIAN reagents based on publicly available information and applied proprietary algorithms to improve rationality of the basic design. We presently do not offer functional guarantees for these products. For some suggested experimental parameters on the use of mimics and inhibitors, please review the publications listed in Table 3.

### Shipping and Storage

- miRIDIAN microRNA reagents are shipped as dried pellets at room temperature (23°C). Under these conditions, they are stable for at least four weeks.
- Upon receipt, miRIDIAN microRNA reagents should be stored at -20°C to -80°C. Under these conditions, they are stable for at least one year.

### Resuspension

- Resuspend miRIDIAN microRNA reagents in an appropriately buffered, RNase-free solution to give a stock concentration of 20 µM (Table 2).
- Upon resuspension, aliquot the miRIDIAN microRNA reagents into small volumes and store at -20°C to -80°C. For best results, limit freeze-thawing of each tube to five events. Under these conditions, the reagents are stable for at least six months.

Table 2. Recommended Volumes for Preparing 20µM miRIDIAN microRNA Reagents

Amount per Tube (nmol)	Amount of Buffer to be Added (mL)
5	0.25
10	0.5
20	1.0

### Handling Precautions

Oligonucleotides are susceptible to enzymatic degradation by nucleases and to chemical degradation by extreme pH and temperatures. We recommend wearing gloves and maintaining nuclease-free conditions when handling the oligonucleotides.

### Publication Reference Guide

When referencing the use of miRIDIAN microRNA reagents, please include the following information: catalog number, ThermoFisher Scientific, Lafayette, CO.

Table 3. Applications of Synthetic miRNA Mimics and Inhibitors

The concentration of miRNA mimics and inhibitors used in these publications range from 5 pM to 20 µM. Although the mimics and inhibitors reported here are not miRIDIAN microRNA reagents, the concentrations used serve as good starting points for experimental optimizations. Detection of miRNA mimic or inhibitor function was conducted by reporter assays, unless indicated by an asterisk (\*).

Reference	miRNA	Cells	[Mimic]	[Inhibitor]
Meister, G., M. Landthaler, et al. RNA, 2004. 10: 544-550.	miR-21	HeLa S3	40 nM	120 nM
Poy, M., L. Eliasson, et al. Nature, 2004. 432: 226-30.	miR-375	MIN6	200 nM	200 nM
Yekta, S., I.H. Shih, et al. Science, 2004. 304: 594-596.	miR-196a	HeLa	5 or 20 pM	N/A
Esau, C., X. Kang, et al. J. Biol. Chem., 2004. 279: 52361-52365.	miR-143	HeLa	N/A	20 nM
		Primary pre-adipocytes	N/A	250 nM*
Yu, Z., T. Raabe, et al. Biol. Reprod., 2005. 73: 427-433.	miR-122a	NIH 3T3	15-20 nM	N/A
Lee, Y.S., H.K. Kim, et al. J. Biol. Chem., 2005. 280: 16635-16641.	miR-125b	PC3, HeLa	N/A	160 nM*
Lim, L., N. Lau, et al. Nature, 2005. 433: 769-73.	miR-1, miR-124	HeLa	100 nM	N/A
Chen, J-F, E. Mandel, et al. Nat. Gen., 2006. 38: 228-33.	miR-1, miR-133	C2C12	200 nM	200 nM*
Schratt, G., F. Tuebing, et al. Nature, 2006. 439: 283-89.	miR-134	Primary neurons	10 µM	20 µM

### Contact Information

For technical questions regarding the use of siRNA reagents, please contact Dharmacon Products Technical Support at:

In America/Asia

800-235-9880

303-604-9499

dharmacon.lab@thermofisher.com

In Europe/Israel

00800 73724648

32-53-85-71-84

perbio.eurotech@thermofisher.com

In Other Countries

Please contact your appropriate

distributor as listed on

www.thermo.com/dharmacondistributors

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