
metaRNA Documentation

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metaRNA finds potential target sites for the microRNAs in genomic sequences.

- Written in Python
- Built on [miRanda](#).

It is built on miRanda, an algorithm for detection and ranking of the targets of microRNA.

CHAPTER 1

Quickstart

```
from metarna.target_scan import scan, free_energy

gene_sequence = (
    "ACAAGATGCCATTGTCCCCGGCCTCCTGCTGCTGCTGCTCTCCGGGGCCACGGCCACCGCTGCCCTGCC"
    "CCTGGAGGGTGGCCCCACCGGCCGAGACAGCGAGCATATGCAGGAAGCGGCAGGAATAAGGAAAAGCAGC"
    "CTCCTGACTTTCCTCGCTTGGTGGTTTGAGTGGACCTCCCAGGCCAGTGCCGGGCCCCCTCATAGGAGAGG"
)

mirna_sequence = "UGGCGAUUUUGGAACUCAAUGGCA"

# Get free Energy value:
delta_g = free_energy(gene_sequence, mirna_sequence)

# Get full targets information:
targets = scan(gene_sequence, mirna_sequence)

# Specifying Calculation Parameters
targets = scan(gene_sequence, mirna_sequence, scale=5.0)
```

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Installing

Using PyPi

metaRNA can be installed very easily using `pip`.

```
pip install metarna
```

Using git

If you want to run the very latest, feel free to pull down the repo from github and install by hand.

```
git clone https://github.com/prashnts/metaRNA.git
cd metaRNA
python setup.py install
```

You can run the tests using the test-runner:

```
python setup.py test
```

Browse the source code online at <https://github.com/prashnts/metaRNA>

Pre-requisite

ViennaRNA is required to compile metaRNA C extensions. It is recommended to install ViennaRNA from source. On Unix-like systems, it usually involves:

```
wget 'http://www.tbi.univie.ac.at/RNA/download/sourcecode/2_2_x/ViennaRNA-2.2.10.tar.
↪gz' -O viennarna.tar.gz
mkdir viennarna
tar -zxvf viennarna.tar.gz -C viennarna --strip-components=1
cd viennarna
./configure
make
sudo make install
```

Usual build essentials (automake, autoconf, gcc) are required.

You can download the above package from [this link](#) if the above link isn't accessible. To download and verify the SHA checksum:

```
wget "https://noop.pw/etc/vienna224.tar.gz" -O vienna224.tar.gz
echo "71a4c4704228fd01eb6e39415400a904d5240cef  vienna224.tar.gz" | shasum -c
```

Windows System

metaRNA hasn't been tested or built on Windows systems yet. Contributions are welcome.

Calculation Parameters

miRanda algorithm used by metaRNA accepts the following optional parameters.

Parameter	Type	Default	Description
scale	float	4.0	The 5' miRNA scaling parameter.
strict	int	0	Perform a Strict Seed search when set to 1.
gap_open	float	-9.0	Gap-open Penalty
gap_extend	float	-4.0	Gap-extend Penalty
score_threshold	float	50.0	Score Threshold for reporting hits
energy_threshold	float	1.0	Energy Threshold for reporting hits
length_5p_for_weighting	int	8	The 5' sequence length to be weighed except for the last residue.
temperature	int	30	Used while calculating Free Energy
alignment_len_threshold	int	8	Minimum alignment.

Passing Parameters

The parameters are passed as keyword arguments.

```
targets = scan(gene_sequence, mirna_sequence, scale=5.0, strict=1)
```


CHAPTER 2

Indices and tables

- `genindex`
- `modindex`
- `search`