

Research article

## Viral micro RNA analysis via the bioinformatics approaches basis on their Statistics values

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### Abstract

Viral micro RNA is a family of small non-coding RNAs that regulate gene expression in a sequence-specific manner. miRNAs are a class of post-transcriptional regulators. miRNAs are a family of 19 to 25 small nucleotide RNAs. . These important regulatory mechanisms mediate much biological process such as development, cell proliferation and differentiations .this work mainly focused on analysis of miRBase viral miRNAs via the bioinformatics approaches on their Statistics values. In this object explains various type of table for time saving statistical analysis. **Copyright © AJBCPS, all rights reserved.**

**Keywords:** miRNA ,miRBase , statistics, noncoding, gene expression

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### Introduction

Since miRNAs have been discovered and their role in gene regulation established, it has been theorized that viruses could generate miRNAs as well and that these viral encoded miRNAs could regulate cellular mechanisms and viral replication there are several lines of evidence to support this theory (Vijay Laxmi Saxena and Alka Dwivedi,2013). Micro RNA are the noncoding class of RNA which plays major role post transcriptional regulation of genes and 19-22 nt in length and endogenous in nature (Alka Dubey et.al .,2013) MicroRNAs (miRNAs) are processed from

RNA polymerase II (RNAPII)-specific transcripts of independent genes or from introns of protein-coding genes (kim V N *et al.*, 2009).

In the canonical pathway, primary precursor (pri-miRNA) processing occurs in two steps, catalyzed by two members of the RNase III family of enzymes, Drosha and Dicer, operating in complexes with dsRNA binding proteins (dsRBPs), for example DGCR8 and transactivation-responsive (TAR) RNA-binding protein (TRBP) in mammals. In the first nuclear step, the Drosha–DGCR8 complex processes pri-miRNA into an ~70-nucleotide precursor hairpin (pre-miRNA), which is exported to the cytoplasm. Some pre-miRNAs are produced from very short introns (mirtrons) as a result of splicing and debranching, thereby bypassing the Drosha– DGCR8 step. In either case, cleavage by Dicer, assisted by TRBP, in the cytoplasm yields an ~20-bp miRNA/miRNA\* duplex. In mammals, argonaute 2 (AGO2), which has robust RNaseH-like endonuclease activity, can support Dicer processing by cleaving the 3' arm of some pre-miRNAs, thus forming an additional processing intermediate called AGO2-cleaved precursor miRNA (ac-pre-miRNA) (Fabian M. R *et al.*, 2010).

Processing of pre-miRNA also requires cleavage by AGO2, but is independent of Dicer and the 3' end is generated by exonucleolytic trimming (Han J, 2009).

Following processing, one strand of the miRNA/miRNA\* duplex (the guide strand) is preferentially incorporated into a miRNA-induced silencing complex (miRISC), whereas the other strand (passenger or miRNA\*) is released and degraded (not shown). Generally, the retained strand is the one that has the less stably base-paired 5' end in the miRNA/miRNA\* duplex. MiRNA\* strands are not always by-products of miRNA biogenesis and can also be loaded into miRISC to function as miRNAs (Okamura K *et al.*, 2009).

## Materials and Method

The precursors (pre-miRNA) sequences of viruses were retrieved from miRBase (mirbase@manchester.ac.uk) (Ambros V *et al.*, 2003) and then go for secondary structure with optimal minimum free energy was found out with the help of RNA fold web servers such as (<http://rna.tbi.univie.ac.at>) then retrieve the sequence of miRNA from miRBase and calculate the Oligonucleotide values for researchers time saving analysis (Warren A Kibbe, 2007).

## Results and Discussion

(A) **Analyzed optimal minimal free energy (MFE) of miRBase precursors** : miRNA was the first to be discovered, a class of noncoding RNAs involved in gene regulation, transcribed as ~70 nucleotide precursors and subsequently processed by the dicer enzyme to give a 21 nucleotide product. The extents of the hairpin precursors are not generally known and are estimated based on hairpin prediction. In this study is exclusively based on in silico firstly for retrieves precursor sequences from miRBase and then this sequence is submitted in RNA fold web server for minimum free energy values.

**Table 1:** Minimum free energy of miRBASE (database) virus precursor sequence.

S.no	Virus name	Unique identifier ID	M.F.E(kcal/mol)
1.	Bovine herpes virus 1	>bhv1-mir-B1 MI0013173	-40.00
		>bhv1-mir-B10 MI0014712	-31.60
		>bhv1-mir-B2 MI0013174	-50.70
		>bhv1-mir-B3 MI0013175	-29.60
		>bhv1-mir-B4 MI0013176	-37.40
		>bhv1-mir-B5 MI0013177	-40.00
		>bhv1-mir-B6 MI0013178	-62.60
		>bhv1-mir-B7 MI0013179	-61.60
		>bhv1-mir-B8 MI0013180	-32.70
		>bhv1-mir-B9 MI0013181	-25.30
2.	BK polyomavirus	>bkv-mir-B1 MI0009981	-43.40
3.	Bovine leukemia virus	>blv-mir-B1 MI0022561	-36.60
		>blv-mir-B2 MI0022562	-30.80
		>blv-mir-B3 MI0022563	-29.60

		>blv-mir-B4 MI0022564	-31.60		
		>blv-mir-B5 MI0022565	-28.80		
4.	Bandicoot papillomatosis carcinomatosis virus type 1	>bpcv1-mir-B1 MI0018178	-23.50		
5.	Bandicoot papillomatosis carcinomatosis virus type 2	>bpcv2-mir-B1 MI0018179	-26.50		
6.	Epstein Barr virus	>ebv-mir-BART1 MI0001067	-28.60		
		>ebv-mir-BART2 MI0001068	-25.70		
		>ebv-mir-BART3 MI0003725	-40.20		
		>ebv-mir-BART4 MI0003726	-38.80		
		>ebv-mir-BART5 MI0003727	-38.40		
		>ebv-mir-BART6 MI0003728	-43.10		
		>ebv-mir-BART7 MI0003729	-38.40		
		>ebv-mir-BART8 MI0003730	-30.00		
		>ebv-mir-BART9 MI0003731	-32.40		
		>ebv-mir-BART10 MI0003732	-49.50		
		>ebv-mir-BART11 MI0003733	-42.70		
		>ebv-mir-BART12 MI0003734	-38.10		
		>ebv-mir-BART13 MI0003735	-29.50		
		>ebv-mir-BART14 MI0003736	-34.20		
		>ebv-mir-BART15 MI0004988	-29.00		
		>ebv-mir-BART16 MI0004989	-34.20		
		>ebv-mir-BART17 MI0004990	-48.60		
		>ebv-mir-BART18 MI0004991	-41.20		
		>ebv-mir-BART19 MI0004992	-40.90		
		>ebv-mir-BART20 MI0004993	-40.10		
				>ebv-mir-BART21 MI0010627	-40.60
				>ebv-mir-BART22 MI0010628	-34.20
		>ebv-mir-BHRF1-1 MI0001064	-26.70		
		>ebv-mir-BHRF1-2 MI0001065	-26.80		
		>ebv-mir-BHRF1-3 MI0001066	-22.50		
7.	Herpes B virus	>hbv-mir-B2RC MI0011555	-43.40		
		>hbv-mir-B4 MI0011556	-56.80		
		>hbv-mir-B20 MI0011557	-66.40		
8.	Human cytomegalovirus	>hcmv-mir-UL22A MI0001678	-20.80		
		>hcmv-mir-UL36 MI0001679	-48.30		
		>hcmv-mir-UL70 MI0003688	-37.00		
		>hcmv-mir-UL112 MI0001680	-33.30		
		>hcmv-mir-UL148D MI0001681	-40.60		
		>hcmv-mir-US4 MI0003687	-44.30		
		>hcmv-mir-US5-1 MI0001682	-30.20		
		>hcmv-mir-US5-2 MI0001683	-25.60		
		>hcmv-mir-US25-1 MI0001684	-33.00		
		>hcmv-mir-US25-2 MI0001685	-47.70		
		>hcmv-mir-US33 MI0001686	-34.40		
9.	Human herpes virus 6B	>hhv6b-mir-Ro6-1 MI0020179	-29.90		
		>hhv6b-mir-Ro6-2 MI0020180	-31.20		
		>hhv6b-mir-Ro6-3 MI0020181	-59.10		
		>hhv6b-mir-Ro6-4 MI0020182	-54.10		
10.	Human immunodeficiency virus 1	>hiv1-mir-H1 MI0006106	-34.40		
		>hiv1-mir-N367 MI0006104	-20.90		

		>hiv1-mir-TAR MI0007073	-34.00
11.	Herpes Simplex Virus 1	>hsv1-mir-H1 MI0004730	-42.60
		>hsv1-mir-H11 MI0013885	-116.80
		>hsv1-mir-H12 MI0013886	-39.60
		>hsv1-mir-H13 MI0013887	-34.00
		>hsv1-mir-H14 MI0013888	-55.80
		>hsv1-mir-H15 MI0013889	-76.60
		>hsv1-mir-H16 MI0013890	-42.00
		>hsv1-mir-H17 MI0013891	-63.40
		>hsv1-mir-H18 MI0013892	-78.90
		>hsv1-mir-H2 MI0008937	-37.50
		>hsv1-mir-H26 MI0021816	-25.00
		>hsv1-mir-H3 MI0008938	-52.30
		>hsv1-mir-H4 MI0008939	-50.00
		>hsv1-mir-H5 MI0008940	-43.30
		>hsv1-mir-H6 MI0008941	-50.30
		>hsv1-mir-H7 MI0012167	-46.20
>hsv1-mir-H8 MI0012168	-34.70		
12.	Herpes Simplex Virus 2	>hsv2-miR-H10 MI0013560	-23.60
		>hsv2-mir-H11 MI0013898	-129.30
		>hsv2-mir-H12 MI0013899	-33.80
		>hsv2-mir-H13 MI0013900	-35.60
		>hsv2-mir-H19 MI0013901	-42.30
		>hsv2-mir-H2 MI0010694	-39.90
		>hsv2-mir-H20 MI0013902	-52.60
		>hsv2-mir-H21 MI0013903	-13.90
		>hsv2-mir-H22 MI0013904	-53.30
		>hsv2-mir-H23 MI0013905	-41.10
		>hsv2-mir-H24 MI0013906	-54.90
		>hsv2-mir-H25 MI0013907	-47.70
		>hsv2-mir-H3 MI0010692	-70.20
		>hsv2-mir-H4 MI0010693	-43.40
		>hsv2-mir-H5 MI0014713	-62.70
		>hsv2-mir-H6 MI0014714	-60.10
>hsv2-mir-H7 MI0013558	-36.40		
>hsv2-mir-H9 MI0013559	-36.00		
13.	Herpes virus saimiri strain A11	>hvsa-miR-HSUR2 MI0019127	-34.10
		>hvsa-miR-HSUR4 MI0019126	-22.90
		>hvsa-miR-HSUR5 MI0019125	-30.40
14.	Herpes virus of turkeys	>hvt-mir-H1 MI0012473	-34.00
		>hvt-mir-H2 MI0012474	-27.60
		>hvt-mir-H3 MI0012475	-31.50
		>hvt-mir-H4 MI0012476	-26.80
		>hvt-mir-H5 MI0012477	-32.10
		>hvt-mir-H7 MI0012478	-24.60
		>hvt-mir-H8 MI0012479	-27.50
		>hvt-mir-H9 MI0012480	-27.60
		>hvt-mir-H10 MI0012624	-23.80
		>hvt-mir-H11 MI0012632	-22.90
		>hvt-mir-H12 MI0012625	-25.20
		>hvt-mir-H13 MI0012626	-31.20
>hvt-mir-H14 MI0012627	-38.70		

		>hvt-mir-H15 MI0012628	-26.00
		>hvt-mir-H16 MI0012629	-31.40
		>hvt-mir-H17 MI0012630	-32.90
		>hvt-mir-H18 MI0012631	-22.30
15.	Infectious laryngotracheitis virus	>iltv-mir-I1 MI0012481	-28.60
		>iltv-mir-I2 MI0012482	-36.40
		>iltv-mir-I3 MI0012483	-29.40
		>iltv-mir-I4 MI0012484	-34.30
		>iltv-mir-I5 MI0012485	-39.90
		>iltv-mir-I6 MI0012486	-29.90
		>iltv-mir-I7 MI0012623	-52.20
16.	JC polyomavirus	>jcv-mir-J1 MI0009980	-34.90
17.	Kaposi sarcoma-associated herpesvirus	>kshv-miR-K12-2 MI0002476	-32.40
		>kshv-mir-K12-1 MI0002475	-23.50
		>kshv-mir-K12-10a MI0002472	-31.90
		>kshv-mir-K12-10b MI0002473	-38.10
		>kshv-mir-K12-11 MI0002474	-23.50
		>kshv-mir-K12-12 MI0004987	-59.60
		>kshv-mir-K12-3 MI0002483	-28.70
		>kshv-mir-K12-4 MI0002482	-21.30
		>kshv-mir-K12-5 MI0002481	-25.50
		>kshv-mir-K12-6 MI0002480	-32.40
		>kshv-mir-K12-7 MI0002479	-30.90
		>kshv-mir-K12-8 MI0002478	-23.70
		>kshv-mir-K12-9 MI0002477	-40.60
18.	Mouse cytomegalovirus	>mcmv-mir-M23-1 MI0006252	-36.60
		>mcmv-mir-M23-2 MI0006253	-37.20
		>mcmv-mir-M44-1 MI0006254	-40.60
		>mcmv-mir-M55-1 MI0006255	-28.20
		>mcmv-mir-M87-1 MI0006258	-37.50
		>mcmv-mir-M95-1 MI0006260	-22.90
		>mcmv-mir-m01-1 MI0006246	-24.30
		>mcmv-mir-m01-2 MI0006247	-25.60
		>mcmv-mir-m01-3 MI0006248	-32.20
		>mcmv-mir-m01-4 MI0006249	-28.90
		>mcmv-mir-m21-1 MI0006250	-30.70
		>mcmv-mir-m22-1 MI0006251	-36.90
		>mcmv-mir-m59-1 MI0006256	-36.60
		>mcmv-mir-m59-2 MI0006257	-19.50
		>mcmv-mir-m88-1 MI0006259	-40.20
		>mcmv-mir-m107-1 MI0006261	-35.30
		>mcmv-mir-m108-1 MI0006262	-43.50
		>mcmv-mir-m108-2 MI0006263	-47.20
19.	Merkel cell polyomavirus	>mcv-mir-M1 MI0010647	-31.40
20.	Mareks disease virus	>mdv1-mir-M1 MI0005093	-31.60
		>mdv1-mir-M10 MI0006988	-26.30
		>mdv1-mir-M11 MI0006989	-23.60
		>mdv1-mir-M12 MI0006990	-34.10
		>mdv1-mir-M13 MI0006991	-28.80

		>mdv1-mir-M2 MI0005094	-36.90
		>mdv1-mir-M3 MI0005095	-29.10
		>mdv1-mir-M31 MI0008337	-29.70
		>mdv1-mir-M4 MI0005096	-24.90
		>mdv1-mir-M5 MI0005097	-26.40
		>mdv1-mir-M6 MI0005098	-36.40
		>mdv1-mir-M7 MI0005099	-39.80
		>mdv1-mir-M8 MI0005100	-47.40
		>mdv1-mir-M9 MI0006987	-24.80
21.	Mareks disease virus type 2	>mdv2-mir-M14 MI0005882	-28.70
		>mdv2-mir-M15 MI0005883	-40.00
		>mdv2-mir-M16 MI0005884	-37.30
		>mdv2-mir-M17 MI0005885	-38.30
		>mdv2-mir-M18 MI0005886	-32.70
		>mdv2-mir-M19 MI0005887	-31.00
		>mdv2-mir-M20 MI0005888	-29.60
		>mdv2-mir-M21 MI0005889	-36.50
		>mdv2-mir-M22 MI0005890	-24.20
		>mdv2-mir-M23 MI0005891	-30.70
		>mdv2-mir-M24 MI0005892	-28.00
		>mdv2-mir-M25 MI0005893	-41.00
		>mdv2-mir-M26 MI0005894	-34.00
		>mdv2-mir-M27 MI0005895	-38.50
		>mdv2-mir-M28 MI0005896	-52.90
		>mdv2-mir-M29 MI0005897	-32.50
		>mdv2-mir-M30 MI0005898	-41.70
		>mdv2-mir-M32 MI0012487	-22.60
22.	Mouse gammaherpesvirus 68	>mghv-mir-M1-1 MI0001669	-20.50
		>mghv-mir-M1-10 MI0016250	-22.50
		>mghv-mir-M1-11 MI0016251	-44.80
		>mghv-mir-M1-12 MI0016252	-22.30
		>mghv-mir-M1-13 MI0016253	-19.60
		>mghv-mir-M1-14 MI0016254	-29.40
		>mghv-mir-M1-15 MI0016255	-14.80
		>mghv-mir-M1-2 MI0001670	-38.30
		>mghv-mir-M1-3 MI0001671	-35.80
		>mghv-mir-M1-4 MI0001672	-28.60
		>mghv-mir-M1-5 MI0001673	-25.70
		>mghv-mir-M1-6 MI0001674	-29.90
		>mghv-mir-M1-7 MI0001675	-27.30
		>mghv-mir-M1-8 MI0001676	-29.50
		>mghv-mir-M1-9 MI0001677	-23.80
23	Pseudorabies virus	>prv-mir-LLT1 MI0022072	-43.30
		>prv-mir-LLT2 MI0022073	-43.60
		>prv-mir-LLT3 MI0022074	-32.10
		>prv-mir-LLT4 MI0022075	-38.90
		>prv-mir-LLT5 MI0022076	-44.80
		>prv-mir-LLT6 MI0022077	-44.10
		>prv-mir-LLT7 MI0022078	-50.20
		>prv-mir-LLT8 MI0022079	-42.50
		>prv-mir-LLT9 MI0022080	-39.50
		>prv-mir-LLT10a MI0022081	-58.90

		>prv-mir-LLT10b MI0022082	-58.90
		>prv-mir-LLT11a MI0022083	-40.20
		>prv-mir-LLT11b MI0022084	-40.20
24	Rhesus lymphocryptovirus	>rlcv-mir-rL1-1 MI0003737	-37.70
		>rlcv-mir-rL1-10 MI0003746	-33.50
		>rlcv-mir-rL1-11 MI0003747	-53.30
		>rlcv-mir-rL1-12 MI0003748	-45.00
		>rlcv-mir-rL1-13 MI0003749	-43.70
		>rlcv-mir-rL1-14-1 MI0003750	-48.10
		>rlcv-mir-rL1-14-2 MI0013275	-49.10
		>rlcv-mir-rL1-15 MI0003751	-43.70
		>rlcv-mir-rL1-16 MI0003752	-31.70
		>rlcv-mir-rL1-17 MI0013276	-38.20
		>rlcv-mir-rL1-18 MI0013277	-39.20
		>rlcv-mir-rL1-19 MI0013278	-38.10
		>rlcv-mir-rL1-2 MI0003738	-33.60
		>rlcv-mir-rL1-20 MI0013279	-42.70
		>rlcv-mir-rL1-21 MI0013280	-48.30
		>rlcv-mir-rL1-22 MI0013281	-42.60
		>rlcv-mir-rL1-23 MI0013282	-39.70
		>rlcv-mir-rL1-24 MI0013283	-35.60
		>rlcv-mir-rL1-25 MI0013284	-37.40
		>rlcv-mir-rL1-26 MI0013285	-33.40
		>rlcv-mir-rL1-27 MI0013286	-38.80
		>rlcv-mir-rL1-28 MI0013287	-37.10
		>rlcv-mir-rL1-29 MI0013288	-50.90
		>rlcv-mir-rL1-3 MI0003739	-52.00
		>rlcv-mir-rL1-30 MI0013289	-43.40
		>rlcv-mir-rL1-31 MI0013290	-58.80
		>rlcv-mir-rL1-32 MI0013291	-37.60
		>rlcv-mir-rL1-33 MI0013292	-31.60
		>rlcv-mir-rL1-34 MI0015355	-32.10
		>rlcv-mir-rL1-35 MI0015356	-26.50
		>rlcv-mir-rL1-4 MI0003740	-40.00
		>rlcv-mir-rL1-5 MI0003741	-38.50
		>rlcv-mir-rL1-6 MI0003742	-41.10
		>rlcv-mir-rL1-7 MI0003743	-33.50
		>rlcv-mir-rL1-8 MI0003744	-43.00
		>rlcv-mir-rL1-9 MI0003745	-49.80
25.	Rhesus monkey rhadinovirus	>rrv-miR-rR1-1 MI0005718	-47.30
		>rrv-miR-rR1-2 MI0005719	-44.30
		>rrv-miR-rR1-3 MI0005720	-44.80
		>rrv-miR-rR1-4 MI0005721	-55.40
		>rrv-miR-rR1-5 MI0005722	-42.90
		>rrv-miR-rR1-6 MI0005723	-35.80
		>rrv-miR-rR1-7 MI0005724	-39.40
26.	Simian virus 40	>sv40-mir-S1 MI0003689	-33.80

**Table 1: Explanations** information about the precursor RNA obtained from the MIRBASE (database of miRNA) of 26 viruses with their minimal free energy. This energy values analyzed via the online RNA fold web server

(B) **Analyzed the statical Oligonucleotide values:** Even prior to PCR, DNA oligonucleotides were used extensively in molecular biology as primers and as probes. With the availability of completely sequenced genomes, various genomic and array technologies including DNA microarrays and bead arrays have made oligonucleotides even more important reagents. OligoCalc provides a convenient web interface for calculating the physical properties of DNA and RNA oligonucleotides including melting temperature, molecular weight, %GC content and absorbance coefficient for a given oligonucleotide sequence. The recent interest and availability of biological applications for siRNAs has resulted in the addition of RNA oligonucleotides as common laboratory reagents, and OligoCalc can be used to calculate the properties of single-stranded and double-stranded RNA as well as DNA. for this analysis miRNA retrieves from miRBase and submit the sequence in analysis tool in Oligo Calc: Oligonucleotide Properties Calculator

**Table 2:** Statical values of MIRBASE miRNA from Oligonucleotides properties calculator

S.NO	Virus Name	Identifier ID	Physical Constants			Thermodynamic constants conditions		
			Length	% GC	M.W.	delt aG	delta H	delta S
1	Bandicoot papillomatosis carcinomatosis virus type 1 (1mature)	>bpcv1-miR-B1MIMAT0020276	22	50	7279.3	29.2	228.71	592.1
2	Bandicoot papillomatosis carcinomatosis virus type 2 (1mature)	>bpcv2-miR-B1MIMAT0020277	22	50	7279.3	29.2	228.71	592.1
3	BK polyomavirus(2 mature)	>bkv-miR-B1-3p MIMAT0009150	22	50	7176.2	28	235.86	612
		>bkv-miR-B1-5p MIMAT0009149	22	45	7326.3	27.3	231.34	601.9
4	Bovine herpesvirus 1 (12 mature)	>bhv1-miR-B7 MIMAT0013969	23	70	7471.3	37.6	254.71	646
		>bhv1-miR-B1 MIMAT0013962	21	57	7018.2	29.3	227.25	587.6
		>bhv1-miR-B8-3p MIMAT0013971	23	48	7539.3	31.5	227.43	588.9
		>bhv1-miR-B9 MIMAT0013972	21	71	6940	33.3	238.71	603.1
		>bhv1-miR-B4 MIMAT0013965	21	62	7068.2	30.3	225.85	580
		>bhv1-miR-B8-5p MIMAT0013970	22	55	7307.4	31.5	222.8	575.5
		>bhv1-miR-B6-5p MIMAT0013967	23	70	7700.6	37.6	254.71	646
		>bhv1-miR-B5 MIMAT0013966	24	71	7179.7	37.2	276.03	702.5
		>bhv1-miR-B6-3p MIMAT0013968	23	83	7542.5	40	272.45	684
		>bhv1-miR-B10 MIMAT0015649	22	68	7372.3	33.9	250.09	635.1
		>bhv1-miR-B2 MIMAT0013963	20	70	6697.9	31.3	222.39	566.4
>bhv1-miR-B3 MIMAT0013964	20	65	6658.9	29.3	220.33	564.3		
5	Bovine leukemia virus (8 mature)	>blv-miR-B2-3p MIMAT0025861	21	48	4824.9	28.5	215.06	558.7
		>blv-miR-B5-5p MIMAT0025865	22	55	7398.	29.7	237.2	607.9



				4		8		
		>blv-miR-B1-3p MIMAT0025859	23	48	7448.3	29.5	242.57	626.9
		>blv-miR-B3-3p MIMAT0025863	23	57	7600.4	34	244.23	626.5
		>blv-miR-B5-3p MIMAT0025866	23	61	7376.3	33.9	249	636.9
		>blv-miR-B2-5p MIMAT0025860	22	50	7365.4	29	235.59	609.3
		>blv-miR-B3-5p MIMAT0025862	21	68	6820.9	31.2	236.88	601.3
		>blv-miR-B4-3p MIMAT0025864	24	54	7746.5	34	256.59	657.9
6	Epstein Barr virus (44 mature)	>ebv-miR-BART4-3p MIMAT0009204	23	57	7566.5	31.9	247.2	634
		>ebv-miR-BART20-3p MIMAT0003720	22	55	7221.2	29.1	230.88	593.9
		>ebv-miR-BHRF1-2-5p MIMAT0000996	22	41	7247.3	26.7	218.25	571.1
		>ebv-miR-BART22 MIMAT0010132	23	35	7554.4	25.9	221.36	579.5
		>ebv-miR-BART14-3p MIMAT0003426	22	41	7327.3	26.3	220.45	572.7
		>ebv-miR-BART10-3p MIMAT0003420	23	43	7569.4	28.6	233.9	606.6
		>ebv-miR-BART7-3p MIMAT0003416	22	55	7238.2	28.1	235.17	606.5
		>ebv-miR-BART16 MIMAT0003714	24	46	7948.6	30.2	250.3	647.6
		>ebv-miR-BART15 MIMAT0003713	22	41	7172.1	26.7	213.22	556.7
		>ebv-miR-BART9-3p MIMAT0003419	23	48	7505.4	29.9	236.72	610.6
		>ebv-miR-BART21-5p MIMAT0010130	21	43	6924.1	24.9	207.77	539.7
		>ebv-miR-BART3-3p MIMAT0003411	22	59	7197.2	30.8	237.86	607.5
		>ebv-miR-BART7-5p MIMAT0004815	22	45	7206.2	27	222.36	577.2
		>ebv-miR-BART1-3p MIMAT0003390	22	50	7119.1	28.2	230.85	596.3
		>ebv-miR-BART11-5p MIMAT0003421	24	50	7907.6	32.5	246.48	636.6
		>ebv-miR-BART6-3p MIMAT0003415	22	59	7317.3	30.8	237.75	608.4
		>ebv-miR-BART13-5p MIMAT0004818	22	64	7253.2	33.3	239.14	609.6
		>ebv-miR-BART1-5p MIMAT0000999	24	50	7947.6	32	248.64	642.7
		>ebv-miR-BART2-5p MIMAT0001000	22	45	7051	28.7	219.67	571.6
		>ebv-miR-BART2-3p MIMAT0004744	24	33	8055.8	28.8	224.79	593.1

		>ebv-miR-BHRF1-3 MIMAT0000998	22	45	7349. 4	28.5	220.2 4	568.8
		>ebv-miR-BART14-5p MIMAT0003425	22	50	7119. 1	29.9	225.7 4	580.5
		>ebv-miR-BART18-5p MIMAT0003717	22	41	7104. 1	27.1	218.3 5	569
		>ebv-miR-BART4-5p MIMAT0003412	22	59	7248. 2	30.7	244.4 4	626.1
		>ebv-miR-BART8-3p MIMAT0003418	23	48	7608. 5	29	239.3 9	621.1
		>ebv-miR-BHRF1-2-3p MIMAT0000997	22	36	7225. 2	27	210.6 4	535.5
		>ebv-miR-BART20-5p MIMAT0003719	21	48	6830. 9	26.2	218.5 1	567
		>ebv-miR-BART13-3p MIMAT0003424	23	57	7623. 5	32.9	247.5 3	632.2
		>ebv-miR-BART19-3p MIMAT0003718	21	38	6866. 9	25.9	200.0 8	522.7
		>ebv-miR-BART8-5p MIMAT0003417	22	41	7201. 2	26.1	213.0 7	555.4
		>ebv-miR-BART5-5p MIMAT0003413	24	50	7896. 7	31.4	247.1 7	641.1
		>ebv-miR-BART17-3p MIMAT0003716	23	52	7475. 3	30.5	244.6 3	626.5
		>ebv-miR-BART17-5p MIMAT0003715	22	50	7371. 4	28.8	226.4 6	584.7
		>ebv-miR-BHRF1-1 MIMAT0000995	22	55	7198. 2	30.2	235.5 8	603.9
		>ebv-miR-BART19-5p MIMAT0004836	23	48	7494. 4	30.4	235.4	613.7
		>ebv-miR-BART18-3p MIMAT0004835	22	50	7233. 2	29.5	224.5 6	581.7
		>ebv-miR-BART6-5p MIMAT0003414	22	45	7263. 3	26.8	221.4 5	573.8
		>ebv-miR-BART12 MIMAT0003423	22	50	7244. 1	29.2	227.9 2	585.8
		>ebv-miR-BART21-3p MIMAT0010131	22	50	7170. 1	28.6	223.7 8	575.8
		>ebv-miR-BART3-5p MIMAT0003410	21	43	6889	25.4	209.3 3	541.6
		>ebv-miR-BART5-3p MIMAT0009205	18	67	5921. 4	26.1	199.6 8	506.2
		>ebv-miR-BART9-5p MIMAT0004816	22	45	7246. 3	27.1	221.6 3	574.9
		>ebv-miR-BART10-5p MIMAT0004817	22	50	7113. 1	28.4	226.8 2	584.4
		>ebv-miR-BART11-3p MIMAT0003422	21	47	6890. 1	31.5	237.3 1	601.8
7	Herpes B virus (3 mature)	>hbv-miR-B2RC MIMAT0012170	21	86	6500. 2	36.5	199.3	508.6
		>hbv-miR-B20 MIMAT0012172	21	71	6566. 2	33.5	190.4	489.6
		>hbv-miR-B4 MIMAT0012171	21	76	6559.	35	202.9	525.5

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8	Herpes Simplex Virus 1 (26 mature)	>hsv1-miR-H8-5p MIMAT0012597	20	50	6689. 9	24	208.0 5	535.2
		>hsv1-miR-H13 MIMAT0014690	23	61	7702. 5	34.2	248.3	633.8
		>hsv1-miR-H1-5p MIMAT0003744	21	57	7178. 3	28.5	227.4 1	584.4
		>hsv1-miR-H6-5p MIMAT0015281	21	67	7187. 3	30.3	235.4 1	593.9
		>hsv1-miR-H11 MIMAT0014688	20	50	6674	26.9	200.2 4	517.9
		>hsv1-miR-H14-3p MIMAT0014692	21	76	6956	35.8	243.1 3	613.8
		>hsv1-miR-H7-5p MIMAT0012595	21	52	7042. 1	27.9	213.8 3	548.9
		>hsv1-miR-H26 MIMAT0025022	20	70	6674. 9	31.2	227.6 5	578.5
		>hsv1-miR-H7-3p MIMAT0012596	21	57	6742. 9	28.6	225.7 6	579.7
		>hsv1-miR-H8-3p MIMAT0012598	20	60	6499. 8	27	217.2 4	552.9
		>hsv1-miR-H6-3p MIMAT0008404	21	62	6661. 8	29.1	228.3 6	584.6
		>hsv1-miR-H1-3p MIMAT0015220	23	65	7295. 2	33.9	259.2 8	653.7
		>hsv1-miR-H2-3p MIMAT0008399	24	67	7966. 7	36.7	272.2 8	692.7
		>hsv1-miR-H3-3p MIMAT0008400	21	67	7021. 1	30.6	232.4 7	590.9
		>hsv1-miR-H4-5p MIMAT0008401	22	50	7365. 4	28.6	227.3 9	586.2
		>hsv1-miR-H17 MIMAT0014695	21	86	7114. 2	38.2	251.5 8	628
		>hsv1-miR-H14-5p MIMAT0014691	24	67	7840. 6	36.7	272.2 8	692.7
		>hsv1-miR-H4-3p MIMAT0008402	22	50	7113. 1	28.6	225.6 1	582.1
		>hsv1-miR-H16 MIMAT0014694	22	68	7395. 4	32.5	249.4 8	634.6
		>hsv1-miR-H5-5p MIMAT0015280	22	68	7326. 3	32.1	248.0 3	629
		>hsv1-miR-H2-5p MIMAT0008398	22	73	7211. 2	37.3	253.6 1	640.9
		>hsv1-miR-H12 MIMAT0014689	22	55	7318. 3	32.4	229.0 2	589.3
		>hsv1-miR-H18 MIMAT0014696	23	91	7546. 4	42.9	279.4 2	695.2
		>hsv1-miR-H15 MIMAT0014693	22	95	7297. 3	41.7	271.2 1	670.5
		>hsv1-miR-H5-3p MIMAT0008403	22	59	7220. 3	30	237.8 9	611.5
		>hsv1-miR-H3-5p MIMAT0015279	22	68	7206. 2	34.1	246.3 9	626.2

9	Herpes Simplex Virus 2 (24 mature)	>hsv2-miR-H11-3p MIMAT0014698	22	45	7286. 3	29.6	217.5 2	564
		>hsv2-miR-H7-5p MIMAT0014351	21	52	7042. 2	28	210.7 1	540.5
		>hsv2-miR-H23-3p MIMAT0014706	21	57	6869	29.6	222.0 9	570.5
		>hsv2-miR-H19 MIMAT0014701	22	59	7277. 3	32.1	234.9 1	601.1
		>hsv2-miR-H4-5p MIMAT0010203	21	62	6908	30.5	229.7 3	590.3
		>hsv2-miR-H3 MIMAT0010202	22	59	7368. 3	31.3	235.7 5	602.6
		>hsv2-miR-H20 MIMAT0014702	21	48	6784. 9	27.4	209.7 6	540.3
		>hsv2-miR-H21 MIMAT0014703	21	48	6894	26.9	213.2 5	554.3
		>hsv2-miR-H9-3p MIMAT0014352	22	64	6984	31.3	247.5 8	631.2
		>hsv2-miR-H6-3p MIMAT0015652	23	57	7274. 1	31.2	250.5 8	643.6
		>hsv2-miR-H23-5p MIMAT0014705	20	70	6657. 9	30.7	227.6	575.2
		>hsv2-miR-H7-3p MIMAT0015375	21	57	6782. 9	29.3	223.9 3	576.1
		>hsv2-miR-H11-5p MIMAT0014697	21	48	6830. 9	28.4	210.7 2	545
		>hsv2-miR-H5 MIMAT0015650	23	83	7668. 5	37.9	277.2 1	692.2
		>hsv2-miR-H4-3p MIMAT0010204	21	62	6845	30.4	224.4 7	574.2
		>hsv2-miR-H10 MIMAT0014353	18	89	6214. 6	30.5	215.2 3	534.3
		>hsv2-miR-H22 MIMAT0014704	22	73	7445. 4	34	255.4	643.1
		>hsv2-miR-H25 MIMAT0014708	21	81	7041. 2	35.8	245.6 7	618.6
		>hsv2-miR-H13 MIMAT0014700	22	55	7341. 3	30.7	229.0 7	587.8
		>hsv2-miR-H2 MIMAT0010205	22	64	7270. 2	33.5	249.8 3	637.3
>hsv2-miR-H9-5p MIMAT0015376	20	70	6714. 9	30.8	226.2	574.5		
>hsv2-miR-H6-5p MIMAT0015651	20	60	6809. 1	28	218.8 7	560.9		
>hsv2-miR-H12 MIMAT0014699	22	50	7302. 3	31	223.3 6	577.3		
>hsv2-miR-H24 MIMAT0014707	23	83	7342. 2	40	273.5 8	683.1		
10	Herpesvirus of turkeys (28 mature)	>hvt-miR-H17-3p MIMAT0012873	23	48	7551. 4	30.7	234.7 1	606
		>hvt-miR-H8 MIMAT0012720	24	67	7337. 6	38.5	271.2 3	689.7
		>hvt-miR-H14-3p MIMAT0012867	23	57	7497.	32.6	244.3	625.9

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		>hvt-miR-H14-5p MIMAT0012866	25	48	8219.8	33.7	262.39	679.6
		>hvt-miR-H9-5p MIMAT0012721	25	52	8109.7	34.6	265.45	683.7
		>hvt-miR-H3-3p MIMAT0012713	18	83	6021.5	30.3	208.95	525.3
		>hvt-miR-H2 MIMAT0012711	21	57	6839.9	31.1	213.04	548.1
		>hvt-miR-H15-3p MIMAT0012869	23	57	7709.6	31.7	243.49	626.6
		>hvt-miR-H3-5p MIMAT0012712	22	73	7388.3	35.3	249.98	636.1
		>hvt-miR-H12-5p MIMAT0012863	26	54	8494.9	36.8	274.83	708.2
		>hvt-miR-H13 MIMAT0012865	24	58	7819.5	35.2	257.1	658.4
		>hvt-miR-H4-5p MIMAT0012714	21	57	7086.1	28.5	228.25	586
		>hvt-miR-H16-3p MIMAT0012871	21	43	6901.1	25.7	205.15	534.6
		>hvt-miR-H15-5p MIMAT0012868	22	45	7217.2	29.3	214.73	558.7
		>hvt-miR-H7-5p MIMAT0012718	25	48	8133.7	35.1	247.61	637.3
		>hvt-miR-H11 MIMAT0012876	22	45	7303.3	27.3	222.94	579.3
		>hvt-miR-H17-5p MIMAT0012872	21	57	6960	29.9	218.88	561.3
		>hvt-miR-H18-3p MIMAT0012875	24	50	7896.7	33.1	247.27	642.8
		>hvt-miR-H1 MIMAT0012710	22	82	7363.3	38.5	260.93	656.9
		>hvt-miR-H9-3p MIMAT0012722	25	60	8233.8	36.4	274.12	700.8
		>hvt-miR-H5-3p MIMAT0012717	23	57	7537.4	32.9	244.4	629.4
		>hvt-miR-H5-5p MIMAT0012716	23	74	7653.5	38.4	2167.45	677.6
		>hvt-miR-H4-3p MIMAT0012715	26	77	8649.1	44.7	303.85	763.5
		>hvt-miR-H16-5p MIMAT0012870	21	52	6961	28.2	216.66	558.7
		>hvt-miR-H12-3p MIMAT0012864	25	60	8233.8	36.4	274.12	700.8
		>hvt-miR-H7-3p MIMAT0012719	25	48	8282.9	33.8	254.51	657.2
		>hvt-miR-H18-5p MIMAT0012874	23	52	7647.5	31.5	241.81	622.4
		>hvt-miR-H10 MIMAT0012862	25	52	8172.7	35.2	266.76	689.5
11	Herpesvirus saimiri strain A11 (6 mature)	>hvsa-miR-HSUR5-5p MIMAT0022682	21	52	6783.9	29.2	221.5	571.2

		>hvsa-miR-HSUR4-5p MIMAT0022684	21	43	6878	26.1	208.2	539.4
		>hvsa-miR-HSUR4-3p MIMAT0022685	22	45	7263. 3	28.7	220.6 6	570.4
		>hvsa-miR-HSUR2-5p MIMAT0022686	22	41	7161. 1	27.2	217.2 8	565.2
		>hvsa-miR-HSUR5-3p MIMAT0022683	22	55	7278. 3	30.9	236.9 7	608
		>hvsa-miR-HSUR2-3p MIMAT0022687	21	43	6895	25.8	210.5 2	546.4
12	Human cytomegalovirus (17 mature)	>hcmv-miR-US25-1-3p MIMAT0004755	22	59	6618. 2	31.8	193.2	504
		>hcmv-miR-US25-2-3p MIMAT0001583	23	65	6969. 5	34.7	200.1	517
		>hcmv-miR-UL36-3p MIMAT0004754	22	45	6581. 1	28.8	186.7	493
		>hcmv-miR-US4 MIMAT0003341	22	64	6823. 4	32.5	193.8	504.2
		>hcmv-miR-UL70-3p MIMAT0003343	20	85	6268	34.6	191.1	488.5
		>hcmv-miR-US25-2-5p MIMAT0001582	22	55	6762. 3	30.3	184.6	481.4
		>hcmv-miR-UL70-5p MIMAT0003342	21	67	6304	32.7	188.1	484.7
		>hcmv-miR-UL22A-5p MIMAT0001574	20	50	6006. 9	25.8	164	429.3
		>hcmv-miR-UL36-5p MIMAT0001576	22	45	6736. 4	28.4	182.2	479.6
		>hcmv-miR-US25-1-5p MIMAT0001581	21	67	6350. 1	31.7	187	484.5
		>hcmv-miR-UL112 MIMAT0001577	22	55	6768. 4	30.1	183	476.8
		>hcmv-miR-US33-5p MIMAT0001584	22	73	6752. 3	35.3	205.8	533.8
		>hcmv-miR-UL148D MIMAT0001578	21	62	6121. 8	30.2	184.9	482.5
		>hcmv-miR-US5-2 MIMAT0001580	22	41	6708. 3	25.9	172.9	458.1
		>hcmv-miR-US5-1 MIMAT0001579	21	57	6438. 2	30.1	177.9	460.2
		>hcmv-miR-UL22A-3p MIMAT0001575	22	41	6651. 3	26	169.2	445.6
		>hcmv-miR-US33-3p MIMAT0004756	20	60	6004. 9	28.9	175.2	455.7
13	Human herpesvirus 6B (8 mature)	>hhv6b-miR-Ro6-2-3p MIMAT0026459	22	55	6556. 1	31.8	188.9	490.3
		>hhv6b-miR-Ro6-2-5p MIMAT0026458	22	68	6553. 2	35.4	202	521
		>hhv6b-miR-Ro6-3-5p MIMAT0026460	21	71	6406. 1	33	191.2	493.8
		>hhv6b-miR-Ro6-1-3p MIMAT0023511	24	67	7292. 6	39	214.2	548.7
		>hhv6b-miR-Ro6-4-3p	22	68	6639.	34.5	200.6	519.3

		MIMAT0026463			3			
		>hhv6b-miR-Ro6-1-5p MIMAT0023510	22	55	6648. 3	30.2	182.4	474.3
		>hhv6b-miR-Ro6-4-5p MIMAT0026462	23	74	7001. 5	37.4	209.7	539.2
		>hhv6b-miR-Ro6-3-3p MIMAT0026461	21	71	6389. 1	33.1	189.1	486.7
14	Human immunodeficiency virus 1 (4 mature)	>hiv1-miR-H1 MIMAT0004480	20	80	6172	32	182.2	468.2
		>hiv1-miR-N367 MIMAT0004478	24	46	7246. 6	31.3	196.2	515.6
		>hiv1-miR-TAR-3p MIMAT0006017	23	52	6938. 5	30.4	188.8	494.5
		>hiv1-miR-TAR-5p MIMAT0006016	24	46	7206. 6	29.8	186.6	489.2
15	Infectious laryngotracheitis virus (10 mature)	>iltv-miR-I3 MIMAT0012726	23	57	7571. 3	32.3	198.9	521
		>iltv-miR-I6-3p MIMAT0012731	23	61	7685. 6	33.5	258.5 4	660
		>iltv-miR-I7 MIMAT0012861	22	36	7265. 2	25.9	207.0 1	544.6
		>iltv-miR-I4 MIMAT0012727	24	46	7937. 7	31.8	247.9 5	644.8
		>iltv-miR-I1-3p MIMAT0012724	24	42	7606. 3	29	241.7 7	633.2
		>iltv-miR-I6-5p MIMAT0012730	22	59	7088. 1	30.1	238.6 4	614.3
		>iltv-miR-I5-3p MIMAT0012729	25	52	8391	35.5	267.2 5	692.6
		>iltv-miR-I5-5p MIMAT0012728	24	54	7660. 4	33.2	254.5 7	657.4
		>iltv-miR-I2 MIMAT0012725	24	63	8070. 8	35.8	267.3 1	682.8
		>iltv-miR-I1-5p MIMAT0012723	22	45	7383. 3	27	225.9 8	589.2
16	JC polyomavirus (2 mature)	>jcv-miR-J1-3p MIMAT0009148	22	50	7176. 2	28	235.8 6	612
		>jcv-miR-J1-5p MIMAT0009147	22	45	7286. 3	27.9	226.0 3	586.3
17	Kaposi sarcoma-associated herpesvirus (25 mature)	>kshv-miR-K12-5-3p MIMAT0002190	23	57	7600. 4	32.7	248.4 6	635.2
		>kshv-miR-K12-4-3p MIMAT0002192	22	45	7286. 3	27	228.2 7	589.8
		>kshv-miR-K12-8-5p MIMAT0015216	22	64	7053. 1	33	243.9 2	619
		>kshv-miR-K12-10a-3p MIMAT0002179	22	64	7207. 2	31.9	243.1 1	617.2
		>kshv-miR-K12-5-5p MIMAT0015218	23	61	7599. 4	31.9	250.7 1	636.1
		>kshv-miR-K12-8-3p MIMAT0002186	21	62	7034. 2	30.4	231.9 2	593.2
		>kshv-miR-K12-6-3p MIMAT0002189	22	50	7290. 2	29.4	225.1 1	582.7
		>kshv-miR-K12-6-5p	22	59	7180.	30.5	236.6	607.6

		MIMAT0002188			2		9	
		>kshv-miR-K12-3-5p MIMAT0002193	23	57	7606. 5	33.3	252.2	648.7
		>kshv-miR-K12-2-5p MIMAT0002183	22	55	7255. 2	29.8	233	600.8
		>kshv-miR-K12-12-3p MIMAT0015238	22	68	7406. 3	33.2	252.5 9	636
		>kshv-miR-K12-11-5p MIMAT0015213	24	42	7858. 6	28.8	232.7 4	607.6
		>kshv-miR-K12-1-3p MIMAT0015214	22	59	7134. 1	30.8	235.4 9	602.6
		>kshv-miR-K12-9-3p MIMAT0002185	22	55	7278. 3	30.6	228.9 1	587.2
		>kshv-miR-K12-12-5p MIMAT0003712	23	61	7422. 3	33.1	251.7 2	643
		>kshv-miR-K12-10b MIMAT0002180	22	68	7223. 2	33.3	248.7 7	629.2
		>kshv-miR-K12-3-3p MIMAT0002194	21	52	6956. 1	29.1	223.7 7	578.3
		>kshv-miR-K12-11-3p MIMAT0002181	22	45	7177. 1	28.5	222.7 8	576.6
		>kshv-miR-K12-1-5p MIMAT0002182	23	43	7655. 5	28.2	227.8 1	591.2
		>kshv-miR-K12-9-5p MIMAT0002184	22	64	7156. 2	33.7	240.6 8	609.7
		>kshv-miR-K12-2-3p MIMAT0015215	21	57	6949. 1	27.3	227.3 2	584.5
		>kshv-miR-K12-7-5p MIMAT0015217	24	63	7967. 7	36.6	261.1 1	666.9
		>kshv-miR-K12-10a-5p MIMAT0015212	22	64	7253. 2	32.1	243.5 3	618.8
		>kshv-miR-K12-7-3p MIMAT0002187	20	60	6556. 8	28.5	219.9 7	564
		>kshv-miR-K12-4-5p MIMAT0002191	22	50	7245. 3	28.4	223.8 1	575.9
18	Mouse cytomegalovirus (29 mature)	>mcmv-miR-m01-4-5p MIMAT0005538	23	57	7520. 4	33.6	242.2 7	622.5
		>mcmv-miR-M95-1-3p MIMAT0005554	22	77	7330. 3	38.5	254.4 9	644.1
		>mcmv-miR-M55-1 MIMAT0005547	22	64	7287. 2	34	245.1 6	624.5
		>mcmv-miR-M23-1-5p MIMAT0005542	22	68	7332. 3	34.4	242.1 9	614.6
		>mcmv-miR-M87-1 MIMAT0005550	23	78	7675. 5	39.7	271.8 4	683.4
		>mcmv-miR-M44-1 MIMAT0005546	22	50	7153. 1	30.3	226.0 8	583.7
		>mcmv-miR-M23-1-3p MIMAT0005543	21	81	6875	35.1	247.5	622.2
		>mcmv-miR-M23-2-5p MIMAT0005544	22	59	7231. 2	31.2	236.8 2	606.4
		>mcmv-miR-m01-2-5p MIMAT0005534	23	52	7750. 6	31.4	239.2 2	619



		>mcmv-miR-m108-1-5p MIMAT0005557	22	59	7243. 3	32.9	233.5 5	600
		>mcmv-miR-m22-1 MIMAT0005541	22	68	7149. 2	34.7	247.4 6	625.4
		>mcmv-miR-m01-3-5p MIMAT0005536	23	61	7599. 4	34.7	248.7 8	637.8
		>mcmv-miR-M95-1-5p MIMAT0005553	22	64	7281. 2	32.7	238.0 1	608.1
		>mcmv-miR-m01-2-3p MIMAT0005535	22	55	7152. 1	31.9	225.2 6	582.7
		>mcmv-miR-m01-1 MIMAT0005533	22	50	7411. 4	29.5	224.0 1	582
		>mcmv-miR-m59-2 MIMAT0005549	22	68	7218. 3	32.5	248.5 9	631.8
		>mcmv-miR-m88-1-3p MIMAT0005552	21	57	6989. 1	28.9	226.3 5	583.3
		>mcmv-miR-m108-1-3p MIMAT0005558	22	59	7225. 1	32.4	234.8 2	603.3
		>mcmv-miR-m01-4-3p MIMAT0005539	22	59	7277. 3	32	230.1 8	590.9
		>mcmv-miR-m107-1-3p MIMAT0005556	22	68	7206. 2	35.1	249.3 1	636.3
		>mcmv-miR-m88-1-5p MIMAT0005551	22	64	7196. 2	32.1	246.1 4	629.3
		>mcmv-miR-m21-1 MIMAT0005540	21	57	6995. 1	29.4	221.3 1	567.8
		>mcmv-miR-m108-2-5p.2 MIMAT0005559	21	67	6884	32.8	235.3 5	601.8
		>mcmv-miR-m108-2-3p MIMAT0005561	23	61	7662. 5	33.5	254.0 6	652.6
		>mcmv-miR-m107-1-5p MIMAT0005555	22	64	7150. 1	32	242.6 6	623.1
		>mcmv-miR-M23-2-3p MIMAT0005545	21	71	7043. 1	32.9	239.0 7	604.3
		>mcmv-miR-m59-1 MIMAT0005548	22	59	7214. 2	31.6	237.0 7	607.2
		>mcmv-miR-m01-3-3p MIMAT0005537	22	68	7252. 3	34.9	242.0 2	618.1
		>mcmv-miR-m108-2-5p.1 MIMAT0005560	23	74	7596. 5	38.5	261.8 2	665.6
19	Mouse gammaherpesvirus 68 (28 mature)	>mghv-miR-M1-5-3p MIMAT0017189	22	59	7157. 2	31.7	239.3 1	610.4
		>mghv-miR-M1-10-3p MIMAT0018167	22	36	7202. 2	26.4	208.6 5	547.3
		>mghv-miR-M1-15 MIMAT0018176	25	64	8226. 8	39.5	275.1 6	698.4
		>mghv-miR-M1-11-3p MIMAT0018169	20	55	6523. 8	26	213.2 2	546.4
		>mghv-miR-M1-10-5p MIMAT0018166	21	43	6861	25.2	208.8 1	544
		>mghv-miR-M1-1-5p MIMAT0017185	18	50	6016. 5	22.4	185.3 6	476.4
		>mghv-miR-M1-3-3p	22	59	7374.	31.4	239.5	613.5

		MIMAT0001566			3			
		>mghv-miR-M1-5-5p MIMAT0001568	22	55	7295. 3	29.6	237.8 8	615.8
		>mghv-miR-M1-14-3p MIMAT0018175	22	50	7239. 2	30.8	225.2 5	581
		>mghv-miR-M1-6-3p MIMAT0001569	22	41	7298. 2	27.2	215.8 2	561.6
		>mghv-miR-M1-13-3p MIMAT0018173	22	36	7076	25.2	219.0 5	576
		>mghv-miR-M1-9 MIMAT0001573	22	41	7075	27.5	215.6 3	561.5
		>mghv-miR-M1-8-5p MIMAT0001572	22	59	7271. 2	30.5	239.1 1	610.3
		>mghv-miR-M1-8-3p MIMAT0017191	22	41	7184. 2	26.8	215.1	558.6
		>mghv-miR-M1-7-5p MIMAT0001570	22	55	7381. 4	30.5	230.9 2	590.2
		>mghv-miR-M1-4-3p MIMAT0017188	23	48	7482. 3	30.3	240.5 9	623.4
		>mghv-miR-M1-2-5p MIMAT0017186	23	59	7431. 3	30.3 0	244.9 5	624.5
		>mghv-miR-M1-1-3p MIMAT0001564	22	41	7161. 1	27.3	214.0 1	556
		>mghv-miR-M1-3-5p MIMAT0017187	22	64	7133. 2	32.3	246.0 9	627.2
		>mghv-miR-M1-14-5p MIMAT0018174	22	64	7247. 2	31.5	242.8 9	620.6
		>mghv-miR-M1-11-5p MIMAT0018168	19	53	6338. 7	23.9	198.7 6	511.1
		>mghv-miR-M1-7-3p MIMAT0001571	21	48	6790. 9	27.3	212.3 3	551.9
		>mghv-miR-M1-12-3p MIMAT0018171	25	52	8126. 7	34	261.8 6	670.4
		>mghv-miR-M1-2-3p MIMAT0001565	22	64	6967	30.9	244.7 2	621.5
		>mghv-miR-M1-4-5p MIMAT0001567	22	45	7240. 2	28.5	224.1 9	582.3
		>mghv-miR-M1-13-5p MIMAT0018172	22	55	7375. 3	29.3	236.2 9	607.5
		>mghv-miR-M1-6-5p MIMAT0017190	21	48	6739. 9	26.6	211.9	548.6
		>mghv-miR-M1-12-5p MIMAT0018170	23	43	7512. 4	28.2	236.2 4	614.4
20	Pseudorabies virus (13 mature) (13 mature)	>prv-miR-LLT10b MIMAT0025314	23	74	7430. 3	38	264.7 4	668.1
		>prv-miR-LLT7 MIMAT0025310	19	68	6449. 8	27.6	213.8 7	541.7
		>prv-miR-LLT11b MIMAT0025316	23	65	7844. 7	34.4	261.4 1	662.7
		>prv-miR-LLT10a MIMAT0025313	23	74	7430. 3	38	264.7 4	668.1
		>prv-miR-LLT6 MIMAT0025309	21	71	6866	32.3	231.9 6	585.8

		>prv-miR-LLT1 MIMAT0025304	21	71	6796.9	32.4	242.3	613
		>prv-miR-LLT9 MIMAT0025312	20	60	6826	27	222.27	570.7
		>prv-miR-LLT11a MIMAT0025315	23	65	7844.7	34.4	261.41	662.7
		>prv-miR-LLT3 MIMAT0025306	22	77	7107.1	37.3	253.61	640.9
		>prv-miR-LLT4 MIMAT0025307	22	41	7218.2	27.7	215.34	561.6
		>prv-miR-LLT5 MIMAT0025308	22	59	7477.4	30.6	244.64	628.7
		>prv-miR-LLT8 MIMAT0025311	20	60	6780	28.1	214.68	548.4
		>prv-miR-LLT2 MIMAT0025305	20	65	6498.8	28.7	221.03	566.1
21	Rhesus lymphocryptovirus (68 mature)	>rlcv-miR-rL1-32-5p MIMAT0016957	23	39	7410.3	28.3	220.15	571.4
		>rlcv-miR-rL1-19-3p MIMAT0019187	21	62	6764.9	29	235.93	602
		>rlcv-miR-rL1-10-3p MIMAT0003439	22	59	7294.3	31.3	237.81	608.5
		>rlcv-miR-rL1-13-3p MIMAT0003443	22	55	7301.3	28.7	240.65	619.5
		>rlcv-miR-rL1-32-3p MIMAT0016958	22	50	7365.4	29.5	223.4	576.7
		>rlcv-miR-rL1-21-5p MIMAT0019188	22	59	7368.3	30.9	243.07	619.5
		>rlcv-miR-rL1-34-5p MIMAT0016960	22	45	7286.3	28.5	221.74	573.6
		>rlcv-miR-rL1-28-3p MIMAT0016952	22	45	7286.3	27.1	223.46	581.2
		>rlcv-miR-rL1-31-3p MIMAT0016956	22	59	7294.3	32.3	234.93	601.6
		>rlcv-miR-rL1-16-5p MIMAT0003447	21	48	6854	26.5	217.62	565.5
		>rlcv-miR-rL1-23-3p MIMAT0016946	22	45	7257.2	27.5	226.64	586.7
		>rlcv-miR-rL1-8-5p MIMAT0003437	24	42	7898.6	29.2	238.58	621.4
		>rlcv-miR-rL1-30-5p MIMAT0019195	24	50	7896.7	33.1	245.89	633.7
		>rlcv-miR-rL1-10-5p MIMAT0019088	23	52	7498.3	32.5	240.04	617.9
		>rlcv-miR-rL1-28-5p MIMAT0019193	22	55	7272.2	31	229.22	589.3
		>rlcv-miR-rL1-14-3p MIMAT0003445	21	57	6915.1	29.7	227.29	585.9
		>rlcv-miR-rL1-16-3p MIMAT0003448	22	50	7182.2	28.2	226.41	587.4
		>rlcv-miR-rL1-6-5p MIMAT0003434	23	43	7603.4	29.7	228.88	594.2
		>rlcv-miR-rL1-18-5p	22	55	7375.	30.8	235.9	606.2

	MIMAT0019186			3		5	
	>rlcv-miR-rL1-18-3p MIMAT0016941	22	55	7032	29.1	235.3 5	604.5
	>rlcv-miR-rL1-9 MIMAT0003438	23	57	7457. 3	32.2	251.5 1	644.1
	>rlcv-miR-rL1-20-5p MIMAT0014065	23	48	7648. 5	29.3	233.4 7	601.9
	>rlcv-miR-rL1-4-3p MIMAT0003431	22	55	7141. 2	29.2	235.4	605.9
	>rlcv-miR-rL1-29-5p MIMAT0019194	21	52	6905. 1	27.7	218.1 7	561.3
	>rlcv-miR-rL1-25-5p MIMAT0019190	22	41	7230. 3	26.2	213.8 1	556.8
	>rlcv-miR-rL1-4-5p MIMAT0003430	21	43	6912	26.2	206.7 4	536.1
	>rlcv-miR-rL1-24-3p MIMAT0016948	22	41	7287. 3	25.3	222.3 1	582.4
	>rlcv-miR-rL1-15-3p MIMAT0003446	24	46	7925. 6	30.3	247	637.9
	>rlcv-miR-rL1-35-5p MIMAT0016962	22	64	7236. 3	31.9	237.8 7	605.9
	>rlcv-miR-rL1-26-5p MIMAT0019191	21	62	6931. 1	30	226.7 9	580.8
	>rlcv-miR-rL1-5-5p MIMAT0003432	22	55	7255. 2	30.5	235.6 8	604.2
	>rlcv-miR-rL1-34-3p MIMAT0016961	22	50	7142. 2	29.7	227.7 1	586.5
	>rlcv-miR-rL1-24-5p MIMAT0016947	23	35	7394. 3	26.1	219.6	579.5
	>rlcv-miR-rL1-26-3p MIMAT0016950	22	50	7216. 2	29.2	223.4 9	577.8
	>rlcv-miR-rL1-7-3p MIMAT0019086	21	57	6846	29	227.7 1	580.8
	>rlcv-miR-rL1-6-3p MIMAT0003435	22	50	7119. 1	28.2	230.8 5	596.3
	>rlcv-miR-rL1-25-3p MIMAT0016949	22	32	7249. 2	24.1	207.1 7	544.7
	>rlcv-miR-rL1-35-3p MIMAT0016963	24	54	7946. 6	34.3	254.5 1	653.5
	>rlcv-miR-rL1-23-5p MIMAT0016945	22	50	7222. 2	28.6	231.9 6	595.8
	>rlcv-miR-rL1-2-3p MIMAT0003428	23	43	7523. 3	29.9	228.4	593.4
	>rlcv-miR-rL1-14-5p MIMAT0003444	23	61	7593. 4	35	254.2 7	651.1
	>rlcv-miR-rL1-2-5p MIMAT0019085	22	41	7253. 3	26.3	218.7 6	572.5
	>rlcv-miR-rL1-15-5p MIMAT0019091	22	68	7172. 2	34.2	250.0 5	632.2
	>rlcv-miR-rL1-5-3p MIMAT0003433	22	50	7136. 1	29.1	223.0 3	575.4
	>rlcv-miR-rL1-11-3p MIMAT0003440	22	55	7341. 3	29.5	234.7 8	605.1

		>rlcv-miR-rL1-1-3p MIMAT0019084	22	64	7293. 3	31.4	241.4 3	616.3
		>rlcv-miR-rL1-17-5p MIMAT0019185	24	58	8031. 8	34.9	265.3	678.8
		>rlcv-miR-rL1-33-5p MIMAT0016959	22	45	7051	27.6	218.7 4	570.8
		>rlcv-miR-rL1-33-3p MIMAT0019196	22	45	7475. 5	27.4	219.4 8	569.4
		>rlcv-miR-rL1-31-5p MIMAT0016955	22	64	7173. 2	34.8	234.5 6	598.7
		>rlcv-miR-rL1-12-3p MIMAT0003442	22	55	7341. 3	30.5	236.7 2	607.2
		>rlcv-miR-rL1-30-3p MIMAT0016954	22	50	7210. 1	30.8	218.3 4	566.5
		>rlcv-miR-rL1-29-3p MIMAT0016953	22	45	7211. 1	28.5	216.2 2	560.5
		>rlcv-miR-rL1-27-5p MIMAT0019192	22	64	7104. 1	32.4	243.8 3	620.5
		>rlcv-miR-rL1-13-5p MIMAT0019090	20	55	6666. 9	26.5	211.9 2	543.5
		>rlcv-miR-rL1-7-5p MIMAT0003436	21	48	6917. 1	27.1	209.0 6	542.1
		>rlcv-miR-rL1-20-3p MIMAT0014066	22	41	7138. 1	26	219.6 5	571
		>rlcv-miR-rL1-11-5p MIMAT0019089	22	50	7199. 2	28.2	224.2	582.6
		>rlcv-miR-rL1-17-3p MIMAT0014064	22	50	7056. 1	29.4	233.1 4	602.5
		>rlcv-miR-rL1-21-3p MIMAT0016943	22	41	7104. 1	26.5	220.3 7	574.3
		>rlcv-miR-rL1-12-5p MIMAT0003441	22	59	7323. 4	30.3	242.3 8	620.1
		>rlcv-miR-rL1-8-3p MIMAT0019087	22	64	7253. 2	32.3	242.6	615.8
		>rlcv-miR-rL1-22-3p MIMAT0016944	22	50	7056. 1	30	229.2 8	593.8
		>rlcv-miR-rL1-22-5p MIMAT0019189	19	68	6495. 8	28.6	208.5 7	527.6
		>rlcv-miR-rL1-3 MIMAT0003429	24	63	7698. 4	36.8	268.2 7	684.5
		>rlcv-miR-rL1-19-5p MIMAT0016942	22	45	7360. 3	27.6	227.3 3	588.7
		>rlcv-miR-rL1-1-5p MIMAT0003427	22	59	7214. 2	31.4	239.4 4	609.7
		>rlcv-miR-rL1-27-3p MIMAT0016951	22	50	7302. 3	27.7	224.7 7	581.7
22	Rhesus monkey rhadinovirus (11 mature) (11 mature)	>rrv-miR-rR1-1-5p MIMAT0004406	23	74	7550. 4	38.4	258.1 6	653.8
		>rrv-miR-rR1-4-5p MIMAT0004410	22	82	7443. 4	38.9	260.5 4	653.1
		>rrv-miR-rR1-2 MIMAT0004408	21	62	6988. 1	32.2	229.0 4	583.9
		>rrv-miR-rR1-6-5p MIMAT0004413	23	57	7646.	33.7	241.8	622.2

				5		5		
		>rrv-miR-rR1-5 MIMAT0004412	24	67	7892.7	37.5	259.82	661
		>rrv-miR-rR1-7-5p MIMAT0004415	23	52	7624.5	31.9	238.2	614.9
		>rrv-miR-rR1-6-3p MIMAT0004414	21	57	6846	30.3	220.05	566
		>rrv-miR-rR1-1-3p MIMAT0004407	19	74	6351.7	29	218.85	554.8
		>rrv-miR-rR1-3 MIMAT0004409	19	58	6257.6	24.8	202	519.5
		>rrv-miR-rR1-7-3p MIMAT0004416	21	57	6846	29.4	220.91	571.3
		>rrv-miR-rR1-4-3p MIMAT0004411	22	64	7133.2	33	239.04	609.3
23	Simian virus 40 (2 mature)	>sv40-miR-S1-3p MIMAT0003345	20	55	6517.7	26.5	213.79	549.5
		>sv40-miR-S1-5p MIMAT0003344	22	55	7318.3	30.2	237.05	607.6
24	Mareks disease virus (26 mature)	>mdv1-miR-M11-3p MIMAT0005983	22	45	7320.3	27.3	178	470
		>mdv1-miR-M7-3p MIMAT0003928	23	43	7552.4	28.1	234.94	615.7
		>mdv1-miR-M5-3p MIMAT0003926	23	48	7516.3	30.2	239.27	619.6
		>mdv1-miR-M9-3p MIMAT0005980	22	50	7394.5	29.4	220.96	570.7
		>mdv1-miR-M9-5p MIMAT0005979	22	55	7026	30.5	230.97	591.4
		>mdv1-miR-M5-5p MIMAT0005802	22	45	7206.2	28.3	223.66	584.7
		>mdv1-miR-M3-5p MIMAT0003923	24	46	7840.6	31.3	243.29	634
		>mdv1-miR-M3-3p MIMAT0009207	22	41	7258.2	27.1	213.26	535.5
		>mdv1-miR-M8-5p MIMAT0005805	22	41	7189.1	27.1	211.21	552
		>mdv1-miR-M4-3p MIMAT0003925	21	48	6917.1	26.2	218.7	568.4
		>mdv1-miR-M12-5p MIMAT0009209	24	42	7858.6	29.9	239.17	622
		>mdv1-miR-M7-5p MIMAT0005804	23	52	7561.4	31.1	248.3	642.1
		>mdv1-miR-M1-3p MIMAT0005801	20	55	6690	28.9	214.3	552.1
		>mdv1-miR-M1-5p MIMAT0003920	20	55	6557.8	28.4	212.51	544.7
		>mdv1-miR-M2-3p MIMAT0003922	21	57	6932.1	29.8	222.45	571.4
		>mdv1-miR-M13 MIMAT0005985	21	52	7019.2	28.3	217.58	561.4
		>mdv1-miR-M6-5p MIMAT0005803	22	45	7108	27.5	221.64	576.4
		>mdv1-miR-M4-5p MIMAT0003924	23	43	7466.	28.7	228.9	596.6

				3		9		
		>mdv1-miR-M31 MIMAT0007893	23	48	7591.5	30.4	242.35	628.1
		>mdv1-miR-M10-5p MIMAT0007294	22	59	7271.2	30.6	235.59	605.4
		>mdv1-miR-M2-5p MIMAT0003921	23	57	7514.3	31.8	240.4	617.8
		>mdv1-miR-M12-3p MIMAT0005984	20	45	6628.9	24.8	202.95	526.1
		>mdv1-miR-M8-3p MIMAT0003929	22	45	7245.3	27	222.42	577.9
		>mdv1-miR-M10-3p MIMAT0005981	22	36	7214.3	26	215.14	567
		>mdv1-miR-M6-3p MIMAT0003927	22	50	7285.3	28.6	232.42	603.9
		>mdv1-miR-M11-5p MIMAT0005982	23	39	7444.3	28.2	220.81	574.3
25	Mareks disease virus type 2 (36 mature)	>mdv2-miR-M30-3p MIMAT0012546	21	67	7004.1	31	235.02	600.2
		>mdv2-miR-M29-5p MIMAT0004476	22	50	7073.1	28.1	230.62	596.4
		>mdv2-miR-M22-5p MIMAT0004465	23	52	7441.3	31.9	242.96	625.9
		>mdv2-miR-M23-5p MIMAT0004467	22	59	7248.2	31.5	240.38	613.3
		>mdv2-miR-M30-5p MIMAT0004477	22	64	7179.2	33	242.73	619.2
		>mdv2-miR-M19-3p MIMAT0004460	22	73	7188.2	33.4	253.19	638.9
		>mdv2-miR-M29-3p MIMAT0012545	20	50	6707.9	24.2	202.07	522.3
		>mdv2-miR-M25-3p MIMAT0004470	22	64	7293.3	31.4	244.04	618.9
		>mdv2-miR-M24-3p MIMAT0004468	22	45	7326.3	28.1	226.02	587.2
		>mdv2-miR-M24-5p MIMAT0012543	23	52	7435.3	32.1	232.33	598.1
		>mdv2-miR-M26-5p MIMAT0004471	21	48	6905	27	218.87	565.8
		>mdv2-miR-M19-5p MIMAT0012541	20	80	6609.8	33.2	230.46	578.9
		>mdv2-miR-M32-3p MIMAT0012733	22	55	7301.3	30.9	233.93	601.6
		>mdv2-miR-M17-3p MIMAT0004457	22	64	7402.4	32.2	240.87	612.6
		>mdv2-miR-M21-5p MIMAT0004463	22	64	7184.1	33.5	245.07	623.3
		>mdv2-miR-M18-3p MIMAT0004459	21	52	7042.2	28.2	219.96	568.7
		>mdv2-miR-M15-3p MIMAT0004454	21	48	6721.8	27.4	210.99	547.7
		>mdv2-miR-M22-3p MIMAT0004466	21	52	6944	28.2	221.07	566.2

		>mdv2-miR-M21-3p MIMAT0004464	24	67	8012. 8	37.4	273.3	697.3
		>mdv2-miR-M16-5p MIMAT0004455	23	43	7483. 3	28.9	237.0 2	617.5
		>mdv2-miR-M28-5p MIMAT0004474	22	59	7088. 1	32.1	232.4 5	595.6
		>mdv2-miR-M17-5p MIMAT0004456	22	64	7150. 1	31.7	246.7 3	625.2
		>mdv2-miR-M16-3p MIMAT0012540	21	43	7027. 2	25.2	217.9 5	569.2
		>mdv2-miR-M14-3p MIMAT0004452	21	57	6932. 1	30.3	224.5 2	575.1
		>mdv2-miR-M20-3p MIMAT0004462	23	61	7605. 5	34.9	246.4 7	630.2
		>mdv2-miR-M20-5p MIMAT0004461	21	57	6926	29.4	228.4 2	583.7
		>mdv2-miR-M26-3p MIMAT0012544	22	68	7315. 3	34.7	246.7 3	627.4
		>mdv2-miR-M18-5p MIMAT0004458	23	48	7476. 3	30	235.9 6	611.8
		>mdv2-miR-M14-5p MIMAT0004451	22	59	7294. 3	31.4	241.8 1	616.1
		>mdv2-miR-M15-5p MIMAT0004453	21	52	7105. 3	27.1	215.7 7	557.1
		>mdv2-miR-M23-3p MIMAT0012542	22	64	7173. 2	32	240.6 7	616.5
		>mdv2-miR-M28-3p MIMAT0004475	23	61	7748. 6	33	248.7 9	638
		>mdv2-miR-M25-5p MIMAT0004469	23	65	7472. 3	34.4	253.5 6	647.2
		>mdv2-miR-M27-3p MIMAT0004473	23	70	7677. 5	36.7	263.4 5	669.4
		>mdv2-miR-M32-5p MIMAT0012732	23	48	7425. 3	30.4	240.3 5	240.3 5
		>mdv2-miR-M27-5p MIMAT0004472	21	67	6918	32.4	226.5 7	579.4
26	Merkel cell polyomavirus (2 mature)	>mcv-miR-M1-5p MIMAT0010150	22	36	7248. 2	25.1	213.0 6	557.3
		>mcv-miR-M1-3p MIMAT0010151	22	45	7154. 1	27.8	228.7 2	594

**Table 7: Explanations** the contains the statical value of viruses miRNA of MIRBASE from oligonucleotide properties calculator which gives the information about names of viruses in column II annotated name of miRNA in column III, physical constant (length, GC content and molecular weight) in column IV and thermodynamic constants conditions (delta G= gibbs free energy, deltaH= enthalpy, delta S= entropy) in column V.

## Conclusion

In this study entitled: Viral micro RNA analysis via the bioinformatics approaches basis on their Statistics values, analyze the statical values of miRNA and precursors. For computational analysis of miRNA we always predict the MFE values from precursors sequences which is already experimentally indentified and this precursors sequences retrieves from miRBase, for miRNA targeted genes and other analysis also. These tables explains all precursors and miRNAs mainly important values , these values always used in noncoding RNA analysis via the system biology



approaches , we hope these values helpful for those research persons who involved in viral noncoding RNA analysis .

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