SUPPLEMENTARY:

SFSSClass: An integrated approach for miRNA based tumor classification

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We have considered microRNA expression profiling data from [1] and [2]. For the different experimental purposes mentioned in the original article the following files are used (All the data sets are available at the following address http://www.isical.ac.in/~rmitra_t/):

1 Data set extracted from Lu et al., 2005

1.1 Original Dataset

We have considered two data sets namely miGCM_218.gct and PDT_miRNA.gct from the original dataset of [1].

1.1.1 miGCM_218.txt

This dataset consists of 218 samples and 217 miRNAs. For Experiment 1 we have considered 66 Tumor samples from 9 tissue types viz. Colon, Pancreas, Kidney, Bladder, Prostate, Ovary, Uterus, Lung and Breast and for classifying poorly differentiated tumor (PDT) samples we have considered 77 Tumor samples from 11 tissue types viz. Colon, Pancreas, Kidney, Bladder, Prostate, Ovary, Uterus, Lung, Mesothelioma, Melanoma and Breast.

1.1.2 PDT_miRNA.txt

This dataset consists of 19 PDT samples and 217 miRNAs. For classifying PDT samples we have considered 17 samples as a test set from 4 tissue types viz. Colon, Ovary, Lung and Breast as mentioned in [1].

1.2 Preprocessed Dataset

The data is preprocessed as suggested in [1] by filtering out those miRNAs whose expression value never exceeds a minimal cut off (>7.25 on log\(_2\) scale) for all the samples.

1.2.1 Exp1: A set of More Differentiated Tumor (MDT) samples from 9 tissue types have been classified based on the following data sets and parameter.

(1) Without SFSS obtained dataset:
   - Without SFSS MDT train.txt
   - Without SFSS MDT test.txt
   - Without SFSS Sample label MDT train.txt
   - Without SFSS Sample label MDT test.txt

(2) After SFSS obtained dataset:
   - After SFSS MDT train.txt
(3) Optimal parameter \((\Delta, \rho)\) determination for the classifier USC is based on 10 random 4 fold cross validation:

(3a) Without SFSS:
Based on Figure S1 the chosen optimal parameter is \(\Delta = 0.1\) and \(\rho = 0.8\).

Fig S1. Selection of optimal parameter based on 10 random 4 fold cross validation.
(3b) After SFSS:
Based on Figure S2 the chosen optimal parameter is $\Delta = 0.4$ and $\rho = 0.9$

Fig S2. Selection of optimal parameter based on 10 random 4 fold cross validation.

1.2.3 Classifying PDT Samples: A set of Poorly Differentiated Tumor samples have been classified based on the following data sets and parameter.

(1) Without SFSS obtained dataset:
   - Without SFSS PDT train.txt
   - Without SFSS PDT test.txt
   - Without SFSS Sample label PDT train.txt
   - Without SFSS Sample label PDT test.txt

(2) After SFSS obtained dataset:
   - After SFSS PDT train.txt
   - After SFSS PDT test.txt
   - After SFSS Sample label PDT train.txt
Optimal parameter \((\Delta, \rho)\) determination for the classifier USC is based on 10 random 4 fold cross validation:

(3a) Without \textit{SFSS}:

Based on Figure S3 the chosen optimal parameter is \(\Delta = 0.3\) and \(\rho = 0.9\)

Fig S3. Selection of optimal parameter based on 10 random 4 fold cross validation.

2 Data set extracted from Blower et al., 2007

1.2.3 Exp2: A set of 12 cancer cell lines from 6 tumor types have been classified based on the following data sets and parameter.

(1) Preprocessed dataset (without \textit{SFSS}):
   Without \textit{SFSS NCI\_60 train.txt}
   Without \textit{SFSS NCI\_60 test.txt}
   Without \textit{SFSS Sample label NCI\_60 train.txt}
   Without \textit{SFSS Sample label NCI\_60 test.txt}

(2) After \textit{SFSS} obtained dataset:
   After \textit{SFSS NCI\_60 train.txt}
   After \textit{SFSS NCI\_60 test.txt}
   After \textit{SFSS Sample label NCI\_60 train.txt}
(3) Optimal parameter \((\Delta, \rho)\) determination for the classifier USC is based on 10 random 4 fold cross validation:

(3a) Without SFSS:
Based on Figure S4 the chosen optimal parameter is \(\Delta = 0.3\) and \(\rho = 0.9\)

(3b) After SFSS:
Based on Figure S5 the chosen optimal parameter is \(\Delta = 0.1\) and \(\rho = 0.9\)
3 Selection of optimal parameter

Performance of the classifier Uncorrelated Shrunken Centroid (USC) [3] is dependent on the two threshold values - Shrinkage threshold (\(\Delta\)) and Correlation threshold (\(\rho\)). It is a prerequisite for classification to select a smaller number of relevant features as the cost for classifying the patients' sample is directly proportional to the number of features that should be tested to make the diagnosis. But only reduced number of features may not provide good prediction accuracy. Thus it is needed to determine the optimal parameter (\(\Delta\) and \(\rho\)) in such a way that the classification accuracy is increased. To determine the optimal parameters, ten random fourfold cross validation has been performed on training set and observed for which parameter the average classification error rate is minimum. As can be seen from the figures mentioned above the optimal parameter (\(\Delta\) and \(\rho\)) is chosen based on the cross validation result. But only average classification error rate is not sufficient for SFSSClass algorithm to determine the optimal parameter. As in the proposed method a set of relevant features are already selected through Simultaneous Feature and Sample selection (SFSS) using Biclustering and cancer-miRNA network and it is assumed that these miRNAs have significant class information, thus further reduction of the number of the potential miRNAs is not desirable. As can be seen from figure S5 that during cross validation minimum average classification error rate is obtained by a range of \(\Delta\) values (0.2-0.6) and \(\rho = 0.7\). But these values also reduced a significant number of miRNAs that are already selected by SFSS and assumed to have relevant class information. For classifying an independent test set based on the training samples it is not desirable to further reduce such relevant features. For example, though the above mentioned \(\Delta\) and \(\rho\) values provide minimum average classification error rate during cross validation but provide a poor classification accuracy (75%) when classifying an independent test set compared to the other relevant parameters. Thus selection of the relevant number of features is also an important issue in SFSSClass algorithm. Selection of the number of miRNAs based on different values of (\(\Delta\) and \(\rho\)) is shown in Figure S6(a) and S6(b).

![Fig. S6(a)](image)

Fig. S6(a). For classifying PDT samples using MDT training set, during cross validation a number of miRNAs are selected based on different values of \(\Delta\) and \(\rho\).

![Fig. S6(b)](image)

Fig. S6(b). In Exp.3, during cross validation a number of miRNAs are selected based on different values of \(\Delta\) and \(\rho\).

Figure S6(a) and S6(b) clearly shows for which parameter a significant number of miRNAs are reduced. For both the cases \(\rho = 0.6\) and 0.7 and \(\Delta > 0.4\) always select a relatively reduced number of miRNAs. Beside this for all the experiments \(\rho = 1\) is not considered as it provides a classification accuracy equivalent to Shrunken Centroid (SC) [4] algorithm.

4 Biclustering algorithm SAMBA: A short note

Groups of genes showing similar activity patterns under a specific subset of the experimental conditions, can be identified by a biclustering algorithm [5]. The concept of biclustering was first introduced by Hartigan in 1972 [6] and this technique was first implemented to gene expression data by Cheng and Church in the year 2000 [7]. Microarray data is stored in an \(n \times p\) matrix \(M\), which is defined by a set of rows (genes) \(R = R_1, R_2, ..., R_n\) and a set of columns \(C = C_1, C_2, ..., C_p\). An entry \(m_{gs}\) of \(M\) is a real value representing the expression level of gene \(g\) for sample \(s\). A bicluster is a submatrix \(M_{GS}\) of \(M\), where \(G \subseteq R\) and \(S \subseteq C\), having similar activity pattern. A bicluster consists of a subset of genes expected to be co-expressed within a subset of the conditions (belonging to that bicluster). In the proposed article we have considered a graph theoretic approach to biclustering combined with a statistical data model called SAMBA [8]. In this algorithm the gene expression matrix is considered as a bipartite graph \(G = (U, V, E)\) where \(U\) is the set of conditions, \(V\) is the set of genes and \((u, v) \in E\) if \(v\) responds in condition \(u\). Biclusters produced by SAMBA is considered as a subgraph \(H = (U', V', E')\) of \(G\) where \(V'\) is represented as sub-
set of genes that are coexpressed with a subset of conditions \( U \). A likelihood score assesses the significance of an observed subgraph. In SAMBA it has been shown how to assign weights to the vertex pairs of the bipartite graph. Quality of a computed bicluster in SAMBA is defined by the weight of the subgraph. The objective of SAMBA is to identify maximum weight subgraph assuming that the weight of the subgraph will correspond to its statistical significance. The most significant biclusters under the weighting scheme is equivalent to the selection of the heaviest subgraphs in the model bipartite graph. (In SAMBA, the genes with degree exceeding a threshold \( d \) are ignored.) This is biologically relevant since the genes that show high expression in many conditions contribute little to the bicluster. Moreover such genes are typically involved in several biological processes, and hence do not exhibit a specific effect as desirable in a bicluster.

In [8] two statistical models have been considered for the resulting bicluster. In the simpler model, it is assumed that all the values of all the genes in a given bicluster have changed relative to their normal level in the subset of the conditions that form the bicluster, without considering any kind of coherence of the values \( m_g \). Each value \( m_g \), can be represented either by the symbol \( A_1 \) (change) or \( A_0 \) (no change) instead of its true values. An edge has been established between a gene and a condition if that gene has a changed expression level in that specific condition. No edge means no change. In the refined model, for each bicluster every two conditions must have the same or opposite effect for each of the genes. In this model the sign of the change is taken into account and is achieved by assigning a signal \( C_{ij} \in \{-1,1\} \) to each edge of the graph and then looking for a bicluster \((I,J)\) and an assignment \( \tau: I \cup J \rightarrow \{-1,1\} \) such that \( C_{ij} = \tau(i) \tau(j) \).

The algorithm finds \( K \) number of heaviest bicliques in the graph. In a post processing phase in order to perform a local improvement of the biclusters, SAMBA performs greedy addition or removal of vertices of the selected subgraph.

5 CANCER-MIRNA NETWORK

A complete list of all the miRNAs involved in different cancer types is provided in Table S1. The differential expression pattern of miRNAs in different tumor tissues along with a list of references (PubMed-indexed for MEDLINE or PMID) is also present in this table. The information is obtained from extensive literature search [9]. Other relevant parameters that have been considered are location of the miRNAs at fragile sites and cancer associated genomic regions, epigenetic alteration of miRNA expression and abnormalities in miRNA processing target genes and proteins.

Table S1: Tabular representation of Cancer-miRNA network (Last update - 13th August, 2009).

| Cancer Type                  | miRNA    | Expression                      | References (PMID)          |
|------------------------------|----------|--------------------------------|----------------------------|
| Follicular_lymphoma          | hsa-mir-19a | Up regulated/ Amplified        | 16885332, 14973191         |
| Melanoma                     | hsa-let-7 family | Down regulated               | 18379589                   |
| CNS                          | hsa-let-7a  | Down regulated                 | 17363563                   |
| Hematologic                  | hsa-let-7a  | Down regulated                 | 14973191                   |
| Melanoma                     | hsa-let-7a  | Deleted                        | 18679415                   |
| Bladder (Urothelial)         | hsa-let-7a-1 | Deleted                       | 14973191                   |
| Colon                        | hsa-let-7a-1 | Down regulated                | 17965831                   |
| Lung                         | hsa-let-7a-1 | Down regulated                | 17940623, 16712479         |
| Uterus/Endometrial_cancer    | hsa-let-7a-1 | Up regulated                  | 17243163                   |
| Breast                       | hsa-let-7a-2 | Down regulated/ Deleted       | 17028596, 14973191         |
| Cervical                     | hsa-let-7a-2 | Deleted                       | 14973191                   |
| Colon                        | hsa-let-7a-2 | Down regulated                | 17965831                   |
| Lung                         | hsa-let-7a-2 | Down regulated/ Deleted       | 17940623, 17096367,         |
| Ovary                        | hsa-let-7a-2 | Deleted                       | 14973191                   |
| Uterus/Endometrial_cancer    | hsa-let-7a-2 | Up regulated                  | 17243163                   |
| Colon                        | hsa-let-7a-3 | Down regulated                | 17965831                   |
| Lung                         | hsa-let-7a-3 | Down regulated                | 17028596                   |
| Uterus/Endometrial_cancer    | hsa-let-7a-3 | Up regulated                  | 17243163                   |
| Colon                        | hsa-let-7b   | Down regulated                | 17965831                   |
| Lung                         | hsa-let-7b   | Down regulated                | 17940623, 17965831         |
| Melanoma                     | hsa-let-7b   | Up regulated                  | 18379589                   |
| Uterus/Endometrial_cancer    | hsa-let-7b   | Up regulated                  | 17243163                   |
| Tissue Type                      | miRNA   | Regulation          | Gene ID          |
|---------------------------------|---------|---------------------|------------------|
| CNS                             | hsa-let-7c | Down regulated     | 17363563         |
| Colon                           | hsa-let-7c | Down regulated     | 17965831, 17363563 |
| Lung                            | hsa-let-7c | Down regulated/ Deleted | 14973191       |
| Uterus/Endometrial_cancer       | hsa-let-7c | Up regulated        | 17243163         |
| Bladder (Urothelial)            | hsa-let-7d | Deleted             | 14973191         |
| Colon                           | hsa-let-7d | Down regulated      | 17965831         |
| Lung                            | hsa-let-7d | Down regulated      | 17965831         |
| Uterus/Endometrial_cancer       | hsa-let-7d | Down regulated      | 17965831         |
| CNS                             | hsa-let-7e | Down regulated      | 17363563         |
| Colon                           | hsa-let-7e | Down regulated      | 17965831         |
| Hematologic                     | hsa-let-7e | Down regulated      | 17363563         |
| Lung                            | hsa-let-7e | Down regulated      | 17965831         |
| Uterus/Endometrial_cancer       | hsa-let-7e | Up regulated        | 17243163         |
| CNS                             | hsa-let-7e | Down regulated      | 17363563         |
| Colon                           | hsa-let-7e | Down regulated      | 17363563         |
| Bladder (Urothelial)            | hsa-let-7f-1 | Deleted            | 14973191         |
| Lung                            | hsa-let-7f-1 | Down regulated     | 15172979, 16712479 |
| Uterus/Endometrial_cancer       | hsa-let-7f-1 | Up regulated       | 17243163         |
| Colon                           | hsa-let-7f-2 | Down regulated     | 17965831         |
| Kidney                          | hsa-let-7f-2 | Up regulated       | 17826655         |
| Lung                            | hsa-let-7f-2 | Down regulated     | 17940623, 17965831 |
| Uterus/Endometrial_cancer       | hsa-let-7f-2 | Up regulated       | 17243163         |
| Breast                          | hsa-let-7g | Deleted             | 14973191         |
| CNS                             | hsa-let-7g | Down regulated      | 17363563         |
| Colon                           | hsa-let-7g | Up regulated        | 16651716         |
| Lung                            | hsa-let-7g | Down regulated      | 15172979         |
| Uterus/Endometrial_cancer       | hsa-let-7g | Down regulated      | 17965831         |
| Colon                           | hsa-let-7i | Down regulated      | 16712479         |
| Lung                            | hsa-let-7i | Down regulated      | 17243163         |
| Uterus/Endometrial_cancer       | hsa-let-7i | Up regulated        | 17363563         |
| CNS                             | hsa-miR-1  | Down regulated      | 17363563         |
| Hematologic                     | hsa-miR-1  | Down regulated      | 14973191         |
| Breast                          | hsa-miR-100 | Deleted            | 14973191         |
| Cervical                        | hsa-miR-100 | Deleted            | 14973191         |
| HCC/Liver                       | hsa-miR-100 | Up regulated       | 18307259         |
| Lung                            | hsa-miR-100 | Deleted            | 14973191         |
| Ovary                           | hsa-mir-100 | Deleted            | 14973191         |
| Pancreas                        | hsa-miR-100 | Up regulated       | 17473300         |
| Pancreas                        | hsa-miR-100-1/2 | Up regulated     | 17473300         |
| Breast                          | hsa-miR-101-1 | Deleted            | 16530703         |
| Lung                            | hsa-miR-101-1 | Down regulated     | 16530703         |
| Ovary                           | hsa-miR-101-1 | Deleted            | 16530703         |
| CNS                             | hsa-miR-103 | Down regulated      | 17363563         |
| Bladder (Urothelial)            | hsa-miR-103-1 | Up regulated     | 17826655         |
| Colon                           | hsa-miR-106a | Up regulated       | 16461460         |
| Lung                            | hsa-miR-106a | Up regulated       | 16461460         |
| Ovary                           | hsa-miR-106a | Down regulated     | 18499237         |
| Pancreas                        | hsa-mir-106a | Up regulated       | 16461460, 17442096 |
| Prostate                        | hsa-miR-106a | Up regulated       | 16461460         |
| Location          | miRNA Symbol(s) | Regulation Status | Gene Expression ID(s) |
|-------------------|-----------------|-------------------|----------------------|
| CNS               | hsa-miR-107     | Down regulated    | 17363563             |
| Colon             | hsa-miR-107     | Up regulated      | 16461460             |
| Pancreas          | hsa-miR-107     | Up regulated      | 16461460             |
| Stomach           | hsa-miR-107     | Up regulated      | 16461460             |
| CNS               | hsa-miR-10a     | Up regulated      | 17363563             |
| HCC/Liver         | hsa-miR-10a     | Down regulated    | 17363563             |
| Hematologic       | hsa-miR-10a     | Down regulated    | 17363563             |
| Breast            | hsa-miR-10b     | Down regulated    | 17363563             |
| HCC/Liver         | hsa-miR-122     | Down regulated    | 17363563             |
| Lung              | hsa-miR-123     | Deleted           | 19296470             |
| CNS               | hsa-miR-124a    | Down regulated    | 17363563             |
| Lung              | hsa-miR-124a-1  | Down regulated    | 16461460             |
| Lung              | hsa-miR-124a-3  | Down regulated    | 17028596             |
| CNS               | hsa-miR-125a    | Down regulated    | 17363563             |
| HCC/Liver         | hsa-miR-125a    | Down regulated    | 16331254, 17188425   |
| Hematologic       | hsa-miR-125a    | Down regulated    | 17363563             |
| Lung              | hsa-miR-125a    | Down regulated    | 16530703             |
| Pancreas          | hsa-miR-125a    | Up regulated      | 17473300             |
| Lung              | hsa-miR-125a-prec | Down regulated  | 17363563             |
| CNS               | hsa-miR-125b    | Down regulated    | 17363563             |
| Colon             | hsa-miR-125b    | Down regulated    | 17363563             |
| HCC/Liver         | hsa-miR-125b    | Up regulated      | 18307259             |
| Hematologic       | hsa-miR-125b    | Down regulated    | 17363563             |
| Lung              | hsa-miR-125b    | Down regulated    | 14973191             |
| Breast            | hsa-miR-125b-1  | Down regulated    | 17028596, 16466964   |
| Cervical          | hsa-miR-125b-1  | Deleted           | 14973191             |
| Lung              | hsa-miR-125b-1  | Down regulated    | 17473300             |
| Pancreas          | hsa-miR-125b-1  | Up regulated      | 14973191             |
| Ovary             | hsa-miR-125b-1  | deletion          | 14973191, 17875710   |
| CNS               | hsa-miR-126     | Down regulated    | 17363563             |
| Colon             | hsa-miR-126     | Down regulated    | 17363563             |
| HCC/Liver         | hsa-miR-126     | Down regulated    | 16530703             |
| Hematologic       | hsa-miR-126     | Down regulated    | 17363563             |
| Lung              | hsa-miR-126     | Down regulated    | 16530703             |
| CNS               | hsa-miR-126*    | Down regulated    | 17363563             |
| Colon             | hsa-miR-126*    | Down regulated    | 17363563             |
| HCC/Liver         | hsa-miR-126*    | Down regulated    | 16530703             |
| Lung              | hsa-miR-126*    | Down regulated    | 16530703             |
| Glioblastoma      | hsa-miR-128     | Down regulated    | 16039986             |
| CNS               | hsa-miR-128a    | Down regulated    | 17363563             |
| ALL               | hsa-miR-128b    | Up regulated      | 17891271             |
| CNS               | hsa-miR-128b    | Down regulated    | 17363563             |
| Colon             | hsa-miR-128b    | Up regulated      | 16461460             |
| Lung              | hsa-miR-128b    | Up regulated      | 16461460             |
| Pancreas          | hsa-mir-128b    | Up regulated      | 16461460             |
| Colon             | hsa-miR-130a    | Down regulated    | 17363563             |
| CNS               | hsa-miR-132     | Down regulated    | 17363563             |
| Colon             | hsa-miR-132     | Down regulated    | 17363563             |
| HCC/Liver         | hsa-miR-132     | Deleted           | 14973191             |
| Tissue                  | miRNA   | Change          | Reference       |
|------------------------|---------|-----------------|-----------------|
| Hematologic            | hsa-miR-132 | Down regulated | 17363563        |
| CNS                    | hsa-miR-133b | Down regulated | 17363563        |
| Colon                  | hsa-miR-133b | Down regulated | 17363563, 16854228 |
| CNS                    | hsa-miR-133b | Down regulated | 17363563        |
| Breast                 | hsa-miR-134 | Down regulated | 17363563        |
| Lung                   | hsa-miR-135-1 | Deleted        | 14973191        |
| CNS                    | hsa-miR-135a | Down regulated | 17363563        |
| Colon                  | hsa-miR-135b | Up regulated   | 16854228        |
| CNS                    | hsa-miR-137 | Down regulated | 17363563        |
| Melanoma               | hsa-miR-137 | Down regulated | 18316599        |
| CNS                    | hsa-miR-138 | Down regulated | 17363563        |
| Nasopharyngeal/Nasal   | hsa-miR-138-1 | Deleted        | 14973191        |
| CNS                    | hsa-miR-139 | Down regulated | 17363563        |
| Colon                  | hsa-miR-139 | Down regulated | 17363563        |
| CNS                    | hsa-miR-140 | Down regulated | 17363563        |
| Colon                  | hsa-miR-140 | Down regulated | 17363563        |
| CNS                    | hsa-miR-140 | Down regulated | 17363563        |
| Hematologic            | hsa-miR-140 | Down regulated | 16530703        |
| Lung                   | hsa-miR-140 | Down regulated | 17875710        |
| Ovary                  | hsa-miR-141 | Up regulated   | 17875710        |
| Stomach                | hsa-miR-141 | Down regulated | 19363643        |
| CNS                    | hsa-miR-142-3p | Down regulated | 17363563        |
| CNS                    | hsa-miR-142-5p | Down regulated | 17363563        |
| Cervical               | hsa-miR-143 | Down regulated | 17616659        |
| CNS                    | hsa-miR-143 | Down regulated | 17363563        |
| Colon                  | hsa-miR-143 | Down regulated | 16195701        |
| Colon                  | hsa-miR-143 | Down regulated | 17363563        |
| Colon                  | hsa-miR-143 | Down regulated | 17363563        |
| Hematologic            | hsa-miR-143 | Down regulated | 17363563        |
| Lung                   | hsa-miR-143 | Down regulated | 16530703        |
| Prostate               | hsa-miR-143 | Down regulated | 17616659        |
| Breast                 | hsa-miR-145 | Down regulated | 16885332        |
| Colon                  | hsa-miR-145 | Down regulated | 16195701, 16847880 |
| Colon                  | hsa-miR-145 | Down regulated | 17363563, 16854228 |
| HCC/Liver              | hsa-miR-145 | Down regulated | 18307259        |
| Hematologic            | hsa-miR-145 | Down regulated | 17363563        |
| Lung                   | hsa-miR-145 | Down regulated | 17028596        |
| Ovary                  | hsa-miR-145 | Down regulated | 17875710        |
| Prostate               | hsa-miR-145 | Down regulated | 17028596        |
| Breast                 | hsa-miR-146 | Up regulated   | 16461460        |
| Colon                  | hsa-miR-146 | Down regulated | 17363563        |
| Hematologic            | hsa-miR-146 | Down regulated | 17363563        |
| Lung                   | hsa-miR-146 | Up regulated   | 16530703        |
| Pancreas               | hsa-miR-146 | Up regulated   | 16461460        |
| Prostate               | hsa-miR-146 | Up regulated   | 16461460        |
| Thyroid                | hsa-miR-146b | Up regulated   | 17965831, 16885332 |
| CNS                    | hsa-miR-150 | Down regulated | 17363563        |
| Colon                  | hsa-miR-150 | Down regulated | 17363563        |
| Hematologic            | hsa-miR-150 | Down regulated | 17363563        |
| Lung                   | hsa-miR-150 | Up regulated   | 16530703        |
| Tissue                  | miRNA     | Regulation | Exp. Value     |
|------------------------|-----------|------------|----------------|
| Colon                  | hsa-miR-152 | Down regulated | 17363563      |
| Hematologic            | hsa-miR-152 | Down regulated | 17363563      |
| CNS                    | hsa-miR-154* | Down regulated | 17363563      |
| ALL                    | hsa-miR-155 | Up regulated | 16641092      |
| Breast                 | hsa-miR-155 | Up regulated | 16461460, 16103050 |
| Burkitts_lymphoma      | hsa-mir-155 | Up regulated | 16466964, 18354490 |
| Colon                  | hsa-miR-155 | Up regulated | 16441460, 16530703 |
| Hematologic            | hsa-miR-155 | Down regulated | 17363563      |
| High-grade-lymphoma    | hsa-mir-155 | Up regulated | 17487835      |
| Lung                   | hsa-miR-155 | Up regulated | 17028596, 16530703 |
| Pancreas               | hsa-miR-155 | Up regulated | 17931294      |
| Thyroid                | hsa-miR-155 | Up regulated | 18270258      |
| B-Cell-CLL             | hsa-miR-15a | Down regulated | 14973191      |
| CLL                    | hsa-miR-15a | Down regulated | 17363563      |
| Colon                  | hsa-miR-15a | Deleted/Down regulated | 14973191      |
| Prostate               | hsa-miR-15a | Down regulated | 18931683      |
| B-Cell-CLL             | hsa-miR-15b | Down regulated | 17234972      |
| B-Cell-CLL             | hsa-miR-16-1 | Down regulated | 17965831, 17531469 |
| CLL                    | hsa-miR-16-1 | Deleted/Down regulated | 14973191      |
| Prostate               | hsa-miR-16-1 | Down regulated | 18931683      |
| B-Cell-CLL             | hsa-miR-16-2 | Down regulated | 12434020      |
| Prostate               | hsa-miR-16-2 | Down regulated | 18931683      |
| B-Cell-CLL             | hsa-miR-16a | Down regulated | 14973191      |
| Follicular_lymphoma    | hsa-mir-17 | Amplified | 14973191      |
| Lung                   | hsa-mir-17 | Up regulated | 16266980      |
| Pancreas               | hsa-mir-17* | Up regulated | 16461460      |
| CNS                    | hsa-mir-17-3p | Down regulated | 17363563      |
| Lung                   | hsa-mir-17-3p | Up regulated | 16530703      |
| Bladder (Urothelial)   | hsa-mir-17-5p | Up regulated | 17826565      |
| Breast                 | hsa-mir-17-5p | Up regulated | 16461460      |
| Colon                  | hsa-mir-17-5p | Up regulated | 16461460      |
| Lung                   | hsa-mir-17-5p | Up regulated | 16461460      |
| Pancreas               | hsa-mir-17-5p | Up regulated | 16461460      |
| Prostate               | hsa-mir-17-5p | Up regulated | 16461460      |
| Follicular_lymphoma    | hsa-mir-18 | Amplified | 14973191      |
| HCC/Liver              | hsa-miR-18 | Up regulated | 16331254      |
| CNS                    | hsa-miR-181a | Down regulated | 17363563      |
| Glioblastoma           | hsa-miR-181a | Down regulated | 16039986, 18710654 |
| AML                    | hsa-miR-181a-1 | Deregulated | 18450603      |
| AML                    | hsa-miR-181a-2 | Deregulated | 18450603      |
| CNS                    | hsa-miR-181b | Down regulated | 17363563      |
| Glioblastoma           | hsa-mir-181b | Down regulated | 16039986      |
| ALL                    | hsa-mir-181b-1 | Up regulated | 17891271      |
| Breast                 | hsa-mir-181b-1 | Up regulated | 16461460      |
| Glioblastoma           | hsa-mir-181b-1 | Down regulated | 18710654      |
| Pancreas               | hsa-mir-181b-1 | Up regulated | 16461460      |
| Prostate               | hsa-mir-181b-1 | Up regulated | 16461460      |
| CNS                    | hsa-miR-181c | Down regulated | 17363563      |
| Glioblastoma           | hsa-miR-181C | Down regulated | 16039986      |
| Lung                   | hsa-miR-181C-prec | Down regulated | 17028596, 16530703 |
| Tissue/Location               | miRNA Name | Regulation | Gene ID(s)          |
|------------------------------|------------|------------|---------------------|
| Colon                        | hsa-miR-183| Up regulated | 16854228            |
| Bladder (Urothelial)         | hsa-miR-185| Up regulated | 17826655            |
| Kidney                       | hsa-miR-185| Up regulated | 17826655            |
| Thyroid                      | hsa-miR-187| Up regulated | 18270258            |
| HCC/Liver                    | hsa-miR-18-prec| Up regulated | 16331254            |
| CNS                          | hsa-miR-190| Down regulated | 17363563            |
| Colon                        | hsa-miR-190| Down regulated | 17363563            |
| CNS                          | hsa-miR-191| Down regulated | 17363563            |
| Colon                        | hsa-miR-191| Down regulated | 17363563            |
| Lung                         | hsa-miR-191| Up regulated | 16461460            |
| Pancreas                     | hsa-miR-191| Up regulated | 16461460            |
| Prostate                     | hsa-miR-191| Up regulated | 16461460            |
| Stomach                      | hsa-miR-191| Up regulated | 16461460            |
| Lung                         | hsa-miR-192| Down regulated | 16530703            |
| Thyroid                      | hsa-miR-192| Deleted     | 16530703            |
| Lung                         | hsa-miR-192-prec| Down regulated | 16530703           |
| Thyroid                      | hsa-miR-192-prec| Deleted     | 16530703            |
| CLL                          | hsa-miR-195| Up regulated | 17891271            |
| CNS                          | hsa-miR-195| Down regulated | 17363563            |
| HCC/Liver                    | hsa-miR-195| Down regulated | 17188425, 16331254  |
| Hematologic                  | hsa-miR-195| Down regulated | 17363563            |
| Lung                         | hsa-miR-195| Down regulated | 14973191            |
| Pancreas                     | hsa-miR-196a-2| Up regulated | 17473000            |
| CNS                          | hsa-miR-196b| Up regulated | 17363563            |
| Hematologic                  | hsa-miR-196b| Down regulated | 17363563            |
| CNS                          | hsa-miR-197| Down regulated | 17363563            |
| Thyroid                      | hsa-miR-197| Up regulated | 18270258            |
| Uterus/Endometrial_cancer    | hsa-miR-197| Down regulated | 17243163            |
| HCC/Liver                    | hsa-miR-198| Down regulated | 18307259            |
| Lung                         | hsa-miR-198| Down regulated | 16530703            |
| Colon                        | hsa-miR-199a| Down regulated | 17363563            |
| HCC/Liver                    | hsa-miR-199a| Down regulated | 16331254            |
| Hematologic                  | hsa-miR-199a| Down regulated | 17363563            |
| Ovary                        | hsa-miR-199a| Downregulated | 17875710            |
| Colon                        | hsa-miR-199a*| Down regulated | 17363563            |
| HCC/Liver                    | hsa-miR-199a*| Down regulated | 16331254            |
| Hematologic                  | hsa-miR-199a*| Down regulated | 17363563            |
| Pancreas                     | hsa-miR-199a-1| Up regulated | 16461460            |
| Prostate                     | hsa-miR-199a-1| Up regulated | 16461460            |
| Pancreas                     | hsa-miR-199a-2| Up regulated | 17473000            |
| Colon                        | hsa-miR-199b| Down regulated | 17363563            |
| Bladder (Urothelial)         | hsa-miR-199b-prec| Down regulated | 17470785           |
| Lung                         | hsa-miR-199b-prec| Down regulated | 16530703           |
| Colon                        | hsa-miR-199-s| Down regulated | 17363563            |
| Hematologic                  | hsa-miR-199-s| Down regulated | 17363563            |
| Lung                         | hsa-miR-199a| Up regulated | 16885332            |
| Follicular_lymphoma          | hsa-miR-19b-1| Amplified | 14973191            |
| HCC/Liver                    | hsa-miR-200a| Downregulated | 16331254            |
| Ovary                        | hsa-miR-200a| Up regulated | 17875710            |
| Ovary                        | hsa-miR-200b| Up regulated | 17875710            |
| Tissue                  | miRNA   | Regulation | Expression |
|------------------------|---------|------------|------------|
| Colon                  | hsa-miR-200c | Up regulated | 18079988   |
| Ovary                  | hsa-miR-200c | Up regulated | 17875710   |
| Esophageal             | hsa-miR-203 | Down regulated | 18242245   |
| Lung                   | hsa-miR-203 | Up regulated | 16530703   |
| Ovary                  | hsa-miR-203 | Up regulated | 17875710   |
| ALL                    | hsa-miR-204 | Up regulated | 17891271   |
| CNS                    | hsa-miR-204 | Down regulated | 17363563   |
| Colon                  | hsa-miR-204 | Down regulated | 17363563   |
| Hematologic            | hsa-miR-204 | Down regulated | 17363563   |
| Esophageal             | hsa-miR-205 | Down regulated | 18242245   |
| Head & Neck            | hsa-miR-205 | Up regulated | 17475218   |
| Lung                   | hsa-miR-205 | Up regulated | 16530703   |
| Ovary                  | hsa-miR-205 | Up regulated | 17875710   |
| Breast                 | hsa-miR-205 | Down regulated | 19276373   |
| Breast                 | hsa-miR-20a | Down regulated | 16461460   |
| Colon                  | hsa-miR-20a | Up regulated | 16461460   |
| Follicular lymphoma    | hsa-mir-20a | Amplified | 14973191   |
| Lung                   | hsa-mir-20a | Up regulated | 16885332, 16266980 |
| Pancreas               | hsa-miR-20a | Up regulated | 16461460   |
| Prostate               | hsa-miR-20a | Up regulated | 16461460   |
| Breast                 | hsa-miR-21  | Up regulated | 16103053, 16461460 |
| Cervical               | hsa-miR-21  | Up regulated | 17616659   |
| Cholangiocarcinoma     | hsa-mir-21  | Up regulated | 16762633, 19296468 |
| CNS                    | hsa-miR-21  | Up regulated | 17363563   |
| Colon                  | hsa-miR-21  | Up regulated | 16461460   |
| Diffuse large B cell lymphoma | hsa-miR-21 | Up regulated | 17487835   |
| Esophageal             | hsa-miR-21 | Up regulated | 18242245   |
| Glioblastoma           | hsa-mir-21  | Up regulated | 16024602   |
| HCC/Liver              | hsa-miR-21  | increased   | 18223217   |
| Head & Neck            | hsa-miR-21  | Up regulated | 17475218   |
| Hematologic            | hsa-miR-21  | Down regulated | 17363563   |
| Lung                   | hsa-miR-21  | Up regulated | 16461460   |
| Ovary                  | hsa-miR-21  | Up regulated | 17875710   |
| Pancreas               | hsa-mir-21  | Up regulated | 16461460   |
| Prostate               | hsa-mir-21  | Up regulated | 16461460, 19302977 |
| Stomach                | hsa-mir-21  | Up regulated | 16461460   |
| Thyroid                | hsa-mir-21  | Up regulated | 16365291   |
| Uterus/Endometrial cancer | hsa-miR-21 | Up regulated | 17243163   |
| Breast                 | hsa-miR-210 | induced     | 18316553   |
| Lung                   | hsa-miR-210 | Up regulated | 16530703   |
| Ovary                  | hsa-mir-210 | Deleted     | 16530703   |
| CNS                    | hsa-miR-212 | Down regulated | 17363563   |
| HCC/Liver              | hsa-mir-212 | Deleted     | 14973191   |
| Lung                   | hsa-mir-212 | Up regulated | 16530703   |
| Uterus/Endometrial cancer | hsa-mir-212 | Down regulated | 17243163   |
| CNS                    | hsa-miR-213 | Down regulated | 17363563   |
| Colon                  | hsa-miR-214 | Down regulated | 17363563   |
| Lung                   | hsa-miR-214 | Up regulated | 16530703   |
| Pancreas               | hsa-miR-214 | Up regulated | 16461460   |
| Tissue          | miRNA   | Regulation | Gene ID  |
|----------------|---------|------------|----------|
| Prostate       | hsa-miR-214 | Up regulated | 16461460 |
| Stomach        | hsa-miR-214 | Up regulated | 16461460 |
| Lung           | hsa-miR-216-prec | Down regulated | 16530703 |
| ALL            | hsa-miR-218 | Up regulated | 17891271 |
| Hematologic    | hsa-miR-218 | Down regulated | 17363563 |
| Breast         | hsa-miR-218-2 | Up regulated | 16461460 |
| Colon          | hsa-miR-218-2 | Down regulated | 16461460 |
| Lung           | hsa-miR-218-2 | Up regulated | 16461460 |
| Pancreas       | hsa-miR-218-2 | Down regulated | 16461460 |
| Prostate       | hsa-miR-218-2 | Down regulated | 16461460 |
| Stomach        | hsa-miR-218-2 | Down regulated | 16461460 |
| CNS            | hsa-miR-219 | Down regulated | 17363563 |
| Lung           | hsa-miR-219-1 | Down regulated | 16530703 |
| Colon          | hsa-miR-22  | Down regulated | 17363563 |
| HCC/Liver      | hsa-miR-22  | Deleted     | 14973191 |
| Hematologic    | hsa-miR-22  | Down regulated | 17363563 |
| Lung           | hsa-miR-220 | Down regulated | 16530703 |
| Bladder (Urothelial) | hsa-miR-221 | Up regulated | 17826655 |
| Colon          | hsa-miR-221 | Up regulated | 16461460 |
| Glioblastoma   | hsa-miR-221 | Up regulated | 16039986 |
| Pancreas       | hsa-miR-221 | Up regulated | 16461460 |
| Pancreas       | hsa-miR-221 | Up regulated | 16461460 |
| Stomach        | hsa-miR-221 | Up regulated | 16461460 |
| Thyroid        | hsa-miR-221 | Up regulated | 17965831, 17468766 |
| Thyroid        | hsa-miR-222 | Up regulated | 16885332, 17468766 |
| Bladder (Urothelial) | hsa-miR-223 | Up regulated | 17826655 |
| CNS            | hsa-miR-223 | Down regulated | 17363563 |
| Colon          | hsa-miR-223 | Up regulated | 16461460 |
| Pancreas       | hsa-miR-223 | Up regulated | 16461460 |
| Prostate       | hsa-miR-223 | Up regulated | 16461460 |
| Stomach        | hsa-miR-223 | Up regulated | 16461460 |
| HCC/Liver      | hsa-miR-224 | Up regulated | 16331254, 16331254 |
| Lung           | hsa-miR-224 | Down regulated | 16530703 |
| Thyroid        | hsa-miR-224 | Up regulated | 18270258 |
| Bladder (Urothelial) | hsa-miR-23a | Up regulated | 17826655 |
| Colon          | hsa-miR-23a | Down regulated | 17363563 |
| Hematologic    | hsa-miR-23b | Down regulated | 17363563 |
| Uterus/Endometrial_cancer | hsa-miR-23b | Up regulated | 17243163 |
| Bladder (Urothelial) | hsa-miR-24-1 | Up regulated | 14973191 |
| Colon          | hsa-miR-24-1 | Up regulated | 16461460 |
| Pancreas       | hsa-miR-24-1 | Up regulated | 16461460 |
| Stomach        | hsa-miR-24-1 | Up regulated | 16461460 |
| Colon          | hsa-miR-24-2 | Up regulated | 16461460 |
| Lung           | hsa-miR-24-2 | Up regulated | 16530703 |
| Pancreas       | hsa-miR-24-2 | Up regulated | 16461460 |
| Stomach        | hsa-miR-24-2 | Up regulated | 16461460 |
| Pancreas       | hsa-miR-25  | Up regulated | 16461460 |
| Prostate       | hsa-miR-25  | Up regulated | 16461460 |
| Stomach        | hsa-miR-25  | Up regulated | 16461460 |
| CNS            | hsa-miR-26a | Down regulated | 17363563 |
| Tissue                        | miRNA               | State         | ID               |
|-------------------------------|---------------------|---------------|------------------|
| Colon                        | hsa-miR-26a         | Down regulated| 17363563         |
| Epithelial                   | hsa-miR-26a         | Deleted       | 14973191         |
| Hematologic                  | hsa-miR-26a         | Down regulated| 17363563         |
| Nasopharyngeal/Nasal Epithelial | hsa-miR-26a       | Deleted       | 14973191         |
| Esophageal Lung              | hsa-miR-26a-1-prec  | Deleted       | 16530703         |
| Bladder (Urothelial)         | hsa-miR-26b         | Up regulated  | 17826655         |
| CNS                          | hsa-miR-26b         | Down regulated| 17363563         |
| Kidney                       | hsa-miR-27          | Up regulated  | 17826655         |
| Uterus/Endometrial_cancer    | hsa-miR-27a         | Up regulated  | 17243163         |
| Stomach                      | hsa-miR-27a         | Up regulated  | 18789835         |
| Bladder (Urothelial)         | hsa-miR-27b         | Deleted       | 14973191         |
| Lung                         | hsa-miR-27b         | Down regulated| 16530703         |
| Hematologic                  | hsa-miR-28          | Down regulated| 17363563         |
| Kidney                       | hsa-miR-28          | Up regulated  | 17826655         |
| Colon                        | hsa-miR-297-3       | Amplified     | 14973191         |
| CNS                          | hsa-miR-299         | Down regulated| 17363563         |
| Colon                        | hsa-miR-299         | Down regulated| 17363563         |
| HCC/Liver                    | hsa-miR-299         | Up regulated  | 18307259         |
| CLL                          | hsa-miR-29a         | Up regulated  | 17891271         |
| Uterus/Endometrial_cancer    | hsa-miR-29b         | Down regulated| 17243163         |
| Breast                       | hsa-miR-29b-2       | Up regulated  | 16461460         |
| Colon                        | hsa-miR-29b-2       | Up regulated  | 16461460         |
| Lung                         | hsa-miR-29b-2       | Down regulated| 17028596         |
| Pancreas                     | hsa-mir-29b-2       | Up regulated  | 16461460         |
| Prostate                     | hsa-mir-29b-2       | Up regulated  | 16461460         |
| CLL                          | hsa-mir-29c         | Up regulated  | 17891271         |
| CNS                          | hsa-mir-29c         | Down regulated| 17363563         |
| Lung                         | hsa-mir-30a         | Down regulated| 17028596         |
| Uterus/Endometrial_cancer    | hsa-mir-30a         | Up regulated  | 17243163         |
| Lung                         | hsa-mir-30a-5p      | Down regulated| 17028596, 16530703|
| CNS                          | hsa-mir-30b         | Down regulated| 17363563         |
| Ovary                        | hsa-mir-30b         | Copy number gain | 16754881    |
| Colon                        | hsa-mir-30c         | Up regulated  | 16461460         |
| Pancreas                     | hsa-mir-30c         | Up regulated  | 16461460         |
| Prostate                     | hsa-mir-30c         | Up regulated  | 16461460         |
| CNS                          | hsa-mir-30d         | Down regulated| 17363563         |
| Ovary                        | hsa-mir-30d         | Copy number gain | 16754881    |
| CNS                          | hsa-mir-30e         | Down regulated| 17363563         |
| Colon                        | hsa-mir-30e-3p      | Down regulated| 17363563         |
| Colon                        | hsa-mir-30e-3p      | Down regulated| 17363563         |
| Colon                        | hsa-mir-31-31       | Up regulated  | 16854228          |
| Colon                        | hsa-mir-32          | Up regulated  | 16461460         |
| Lung                         | hsa-mir-32          | Down regulated| 17028596         |
| Pancreas                     | hsa-mir-32          | Up regulated  | 16461460         |
| Prostate                     | hsa-mir-32          | Up regulated  | 16461460         |
| Uterus/Endometrial_cancer    | hsa-mir-32          | Down regulated| 17243163         |
| Ovary                        | hsa-mir-320         | Copy number loss | 16754881    |
| Tissue/Condition       | miRNA     | Regulation                      | Gene Count |
|-----------------------|-----------|---------------------------------|------------|
| Breast                | hsa-miR-320 | Copy number loss                | 16754881   |
| Melanoma              | hsa-miR-320 | Copy number loss                | 16754881   |
| CNS                   | hsa-miR-321 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-323 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-324-3p | Down regulated                | 17363563   |
| CNS                   | hsa-miR-324-5p | Down regulated                | 17363563   |
| CNS                   | hsa-miR-328 | Down regulated                  | 17363563   |
| Colon                 | hsa-miR-33  | Deleted                         | 16530703   |
| Lung                  | hsa-miR-33  | Down regulated                  | 16530703   |
| CNS                   | hsa-miR-330 | Down regulated                  | 17363563   |
| ALL                   | hsa-miR-331 | Up regulated                    | 17891271   |
| CLL                   | hsa-miR-331 | Up regulated                    | 17891271   |
| CNS                   | hsa-miR-331 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-338 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-340 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-342 | Down regulated                  | 17363563   |
| Colon                 | hsa-miR-342 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-345 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-346 | Down regulated                  | 17363563   |
| Breast                | hsa-miR-34a | Down regulated                  | 17028596   |
| CLL                   | hsa-miR-34a | Up regulated                    | 17891271   |
| CNS                   | hsa-miR-34a | Down regulated                  | 17363563   |
| Lung                  | hsa-miR-34a | Down regulated                  | 17028596   |
| Breast                | hsa-miR-34a-1 | Deleted                      | 14973191   |
| Lung                  | hsa-miR-34a-1 | Deleted                      | 14973191   |
| Breast                | hsa-miR-34a-2 | Deleted                      | 14973191   |
| Lung                  | hsa-miR-34a-2 | Deleted                      | 14973191   |
| CNS                   | hsa-miR-361 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-370 | Down regulated                  | 17363563   |
| HCC/Liver             | hsa-miR-370 | Up regulated                    | 18307259   |
| Testicular_germ-cell_tumors | hsa-mir-372 | hyper-expressed                  | 17965831, 17189674 |
| Testicular_germ-cell_tumors | hsa-mir-373 | hyper-expressed                  | 17965831, 17189674 |
| Colon                 | hsa-miR-374 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-375 | Down regulated                  | 17363563   |
| Colon                 | hsa-miR-375 | Down regulated                  | 17363563   |
| Pancreas              | hsa-miR-375 | Down regulated                  | 17473390   |
| CNS                   | hsa-miR-376a | Down regulated                 | 17363563   |
| Colon                 | hsa-miR-376a | Down regulated                 | 17363563   |
| Colon                 | hsa-miR-378 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-379 | Down regulated                  | 17363563   |
| Colon                 | hsa-miR-379 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-382 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-383 | Down regulated                  | 17363563   |
| Colon                 | hsa-miR-422a | Down regulated                | 17363563   |
| CNS                   | hsa-miR-422b | Down regulated                | 17363563   |
| Colon                 | hsa-miR-422b | Down regulated                | 17363563   |
| Colon                 | hsa-miR-424 | Down regulated                  | 17363563   |
| CNS                   | hsa-miR-425 | Down regulated                  | 17363563   |
| Lung                  | hsa-mir-9  | Down regulated                  | 16530703   |
| Breast                | hsa-miR-9-1 | Increased, Copy number gain     | 17028596, 16754881 |
| Tissue                  | miRNA       | Expression  | Gene Accession Numbers |
|------------------------|-------------|-------------|------------------------|
| Pancreas               | hsa-miR-92-2 | Up regulated | 16461460               |
| Prostate               | hsa-miR-92-2 | Up regulated | 16461460               |
| Stomach                | hsa-miR-92-2 | Up regulated | 16461460               |
| Follicular lymphoma    | hsa-mir-92a-1 | Up regulated/Amplified | 14973191, 16885332, 17093929, |
| Lung                   | hsa-miR-95   | Down regulated | 16530703               |
| Colon                  | hsa-miR-96   | Up regulated  | 16854228               |
| CNS                    | hsa-miR-98   | Down regulated | 17363563               |
| Pancreas               | hsa-miR-99   | Up regulated  | 17473300               |
| Colon                  | hsa-miR-99a  | Down regulated | 17363563               |
| Hematologic            | hsa-miR-99a  | Down regulated | 17363563               |
| Lung                   | hsa-miR-99a  | Down regulated | 17363563               |
| CNS                    | hsa-miR-99b  | Deleted       | 14973191               |
| Hematologic            | hsa-miR-99b  | Down regulated | 17363563               |
| Breast                 | Hsa-miR-328  | Up regulated  | 19270061               |

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