

**Supplemental Table 4: MiR-seeds found to be the most significantly upregulated in breast cancer**  
 using two-sample t-test p-values\*  
 We find 77 MiRs with P < 3E-04 (Bonferroni FWER < 0.05)

| rank | miR-seed                | p-value  | Bonferroni | rank | miR-seed       | p-value | Bonferroni |
|------|-------------------------|----------|------------|------|----------------|---------|------------|
| 1    | miR-504                 | 8.60E-09 | 1.29E-06   | 78   | miR-145        | 0.00028 | 0.041699   |
| 2    | miR-431                 | 8.57E-08 | 1.28E-05   | 79   | miR-30-3p      | 0.00034 | 0.050946   |
| 3    | miR-28                  | 5.72E-07 | 8.58E-05   | 80   | miR-338        | 0.00037 | 0.055718   |
| 4    | miR-15/16/195/424/497   | 6.36E-07 | 9.54E-05   | 81   | miR-223        | 0.00038 | 0.056899   |
| 5    | miR-31                  | 9.19E-07 | 1.38E-04   | 82   | miR-379        | 0.00044 | 0.065511   |
| 6    | miR-219                 | 1.11E-06 | 1.66E-04   | 83   | miR-320        | 0.00067 | 0.100309   |
| 7    | miR-17-5p/20/93.mr/106/ | 1.13E-06 | 1.70E-04   | 84   | miR-1/206      | 0.00078 | 0.116811   |
| 8    | miR-450                 | 1.52E-06 | 2.28E-04   | 85   | miR-299-3p     | 0.00080 | 0.120671   |
| 9    | miR-129-5p              | 1.56E-06 | 2.34E-04   | 86   | miR-384        | 0.00082 | 0.123366   |
| 10   | miR-9                   | 1.61E-06 | 2.41E-04   | 87   | miR-142-3p     | 0.00086 | 0.129479   |
| 11   | miR-96                  | 1.97E-06 | 2.96E-04   | 88   | miR-323        | 0.00091 | 0.135925   |
| 12   | miR-191                 | 2.88E-06 | 4.32E-04   | 89   | miR-148/152    | 0.00101 | 0.151849   |
| 13   | miR-34/449              | 3.62E-06 | 5.43E-04   | 90   | miR-216        | 0.00104 | 0.156338   |
| 14   | miR-339                 | 4.34E-06 | 6.51E-04   | 91   | miR-362        | 0.00110 | 0.164385   |
| 15   | miR-124.2/506           | 4.67E-06 | 7.00E-04   | 92   | miR-544        | 0.00117 | 0.17479    |
| 16   | miR-455                 | 5.01E-06 | 7.51E-04   | 93   | miR-132/212    | 0.00122 | 0.182873   |
| 17   | miR-204/211             | 5.23E-06 | 7.84E-04   | 94   | miR-125/351    | 0.00124 | 0.186202   |
| 18   | miR-138                 | 5.74E-06 | 8.62E-04   | 95   | miR-218        | 0.00151 | 0.226205   |
| 19   | miR-124.1               | 5.77E-06 | 8.65E-04   | 96   | miR-329        | 0.00158 | 0.237637   |
| 20   | miR-19                  | 6.18E-06 | 9.26E-04   | 97   | miR-143        | 0.00168 | 0.252723   |
| 21   | miR-24                  | 6.97E-06 | 1.05E-03   | 98   | miR-203.1      | 0.00177 | 0.264907   |
| 22   | miR-542-3p              | 7.19E-06 | 1.08E-03   | 99   | miR-493-5p     | 0.00194 | 0.290574   |
| 23   | miR-485-5p              | 7.62E-06 | 1.14E-03   | 100  | let-7/98       | 0.00194 | 0.291542   |
| 24   | miR-140                 | 8.16E-06 | 1.22E-03   | 101  | miR-200b/429   | 0.00220 | 0.329485   |
| 25   | miR-130/301             | 8.79E-06 | 1.32E-03   | 102  | miR-199        | 0.00230 | 0.345711   |
| 26   | miR-365                 | 1.18E-05 | 1.77E-03   | 103  | miR-144        | 0.00243 | 0.363834   |
| 27   | miR-363                 | 1.25E-05 | 1.87E-03   | 104  | miR-7          | 0.00258 | 0.386297   |
| 28   | miR-22                  | 1.31E-05 | 1.96E-03   | 105  | miR-495        | 0.00262 | 0.392676   |
| 29   | miR-146                 | 1.79E-05 | 2.69E-03   | 106  | miR-101        | 0.00281 | 0.421875   |
| 30   | miR-539                 | 2.24E-05 | 3.36E-03   | 107  | miR-205        | 0.00288 | 0.4316     |
| 31   | miR-18                  | 2.28E-05 | 3.41E-03   | 108  | miR-188        | 0.00317 | 0.476078   |
| 32   | miR-183                 | 2.37E-05 | 3.56E-03   | 109  | miR-30-5p      | 0.00330 | 0.49575    |
| 33   | miR-137                 | 2.39E-05 | 3.59E-03   | 110  | miR-375        | 0.00334 | 0.500453   |
| 34   | miR-128                 | 2.41E-05 | 3.61E-03   | 111  | miR-328        | 0.00405 | 0.606965   |
| 35   | miR-410                 | 2.50E-05 | 3.75E-03   | 112  | miR-378*       | 0.00414 | 0.621654   |
| 36   | miR-182                 | 2.54E-05 | 3.81E-03   | 113  | miR-122        | 0.00419 | 0.629056   |
| 37   | miR-503                 | 2.58E-05 | 3.87E-03   | 114  | miR-342        | 0.00475 | 0.712557   |
| 38   | miR-185                 | 2.71E-05 | 4.06E-03   | 115  | miR-505        | 0.00501 | 0.751174   |
| 39   | miR-23                  | 2.75E-05 | 4.12E-03   | 116  | miR-214        | 0.00507 | 0.760314   |
| 40   | miR-193                 | 2.92E-05 | 4.38E-03   | 117  | miR-324-3p     | 0.00602 | 0.903117   |
| 41   | miR-10                  | 3.04E-05 | 4.56E-03   | 118  | miR-496        | 0.00615 | 0.923188   |
| 42   | miR-150                 | 3.32E-05 | 4.98E-03   | 119  | miR-34b        | 0.00618 | 0.926631   |
| 43   | miR-335                 | 3.40E-05 | 5.11E-03   | 120  | miR-376        | 0.00648 | 0.971984   |
| 44   | miR-409-3p              | 3.55E-05 | 5.33E-03   | 121  | miR-33         | 0.00686 | 1.028291   |
| 45   | miR-184                 | 3.63E-05 | 5.45E-03   | 122  | miR-491        | 0.00718 | 1.076628   |
| 46   | miR-376c                | 3.99E-05 | 5.99E-03   | 123  | miR-210        | 0.00769 | 1.154167   |
| 47   | miR-192/215             | 4.05E-05 | 6.07E-03   | 124  | miR-194        | 0.00822 | 1.232256   |
| 48   | miR-326                 | 4.13E-05 | 6.20E-03   | 125  | miR-196        | 0.00887 | 1.330009   |
| 49   | miR-93.hd/291-3p/294/29 | 4.30E-05 | 6.45E-03   | 126  | miR-155        | 0.01008 | 1.512346   |
| 50   | miR-134                 | 4.43E-05 | 6.65E-03   | 127  | miR-485-3p     | 0.01060 | 1.589516   |
| 51   | miR-25/32/92/363/367    | 5.10E-05 | 7.65E-03   | 128  | miR-126/126-3p | 0.01210 | 1.815264   |
| 52   | miR-374                 | 5.24E-05 | 7.86E-03   | 129  | miR-499        | 0.01243 | 1.863857   |
| 53   | miR-141/200a            | 5.26E-05 | 7.89E-03   | 130  | miR-99/100     | 0.01326 | 1.988634   |
| 54   | miR-421                 | 6.95E-05 | 1.04E-02   | 131  | miR-208        | 0.02319 | 3.479152   |
| 55   | miR-380-5p              | 6.97E-05 | 1.04E-02   | 132  | miR-370        | 0.02930 | 4.394275   |
| 56   | miR-299-5p              | 7.09E-05 | 1.06E-02   | 133  | miR-543        | 0.03384 | 5.075361   |
| 57   | miR-224                 | 7.61E-05 | 1.14E-02   | 134  | miR-451        | 0.04349 | 6.523888   |
| 58   | miR-331                 | 7.91E-05 | 1.19E-02   | 135  | miR-186        | 0.04468 | 6.702188   |
| 59   | miR-369-3p              | 8.40E-05 | 1.26E-02   | 136  | miR-361        | 0.04740 | 7.110201   |
| 60   | miR-27                  | 1.04E-04 | 1.56E-02   | 137  | miR-382        | 0.04797 | 7.196214   |
| 61   | miR-133                 | 1.20E-04 | 1.81E-02   | 138  | miR-325        | 0.05878 | 8.816981   |
| 62   | miR-346                 | 1.23E-04 | 1.85E-02   | 139  | miR-26         | 0.06705 | 10.05717   |
| 63   | miR-153                 | 1.25E-04 | 1.87E-02   | 140  | miR-494        | 0.06768 | 10.15218   |
| 64   | miR-500                 | 1.33E-04 | 2.00E-02   | 141  | miR-486        | 0.09159 | 13.73793   |
| 65   | miR-377                 | 1.43E-04 | 2.14E-02   | 142  | miR-151        | 0.10164 | 15.24532   |
| 66   | miR-381                 | 1.43E-04 | 2.15E-02   | 143  | miR-136        | 0.16749 | 25.12317   |
| 67   | miR-21                  | 1.59E-04 | 2.39E-02   | 144  | miR-324-5p     | 0.21946 | 32.91935   |
| 68   | miR-181                 | 1.69E-04 | 2.53E-02   | 145  | miR-139        | 0.25186 | 37.77969   |
| 69   | miR-409-5p              | 1.85E-04 | 2.78E-02   | 146  | miR-378        | 0.25988 | 38.98153   |
| 70   | miR-135                 | 1.98E-04 | 2.96E-02   | 147  | miR-217        | 0.40571 | 60.857     |
| 71   | miR-29                  | 2.14E-04 | 3.21E-02   | 148  | miR-383        | 0.53905 | 80.85796   |
| 72   | miR-330                 | 2.17E-04 | 3.25E-02   | 149  | miR-452        | 0.70222 | 105.3326   |
| 73   | miR-221/222             | 2.41E-04 | 3.62E-02   | 150  | miR-190        | 0.96814 | 145.2209   |
| 74   | miR-448                 | 2.50E-04 | 3.75E-02   |      |                |         |            |
| 75   | miR-103/107             | 2.58E-04 | 3.86E-02   |      |                |         |            |
| 76   | miR-149                 | 2.64E-04 | 3.97E-02   |      |                |         |            |
| 77   | miR-142-5p              | 2.70E-04 | 4.05E-02   |      |                |         |            |

\* The t-test p-values have been used to rank the seeds displaying the most significant deviation of activity in tumors, and are provided here for information.