Supplementary Table 1. Patient characteristics for samples used in the pyrosequencing studies.

| Age | Gender | Patient Set | Patient Diagnosis | Treatment Status |
|---|---|---|---|---|
| 76 | F | N.C | joint replacement | |
| 60 | M | N.C | joint replacement | |
| 51 | F | N.C | joint replacement | |
| 63 | F | N.C | joint replacement | |
| 80 | M | N.C | h/o new dx FL | |
| 59 | F | N.C | PRIOR FL | |
| 12 | M | N.C | NEW DX B CELL LYMPHOMA | |
| 65 | F | N.C | RELAPSED CUT DLBCL | |
| 64 | F | N.C | DLBCL IN 1998 | |
| 14 | F | N.C | RHABDOMYOSARCOMA | |
| 49 | F | N.C | RELAPSED FL | |
| 64 | M | N.C | PRIOR FL | |
| 57 | F | N.C | NEW DX BCL | |
| 62 | M | N.C | DLBCL | |
| 38 | F | N.C | NEW DX DLBCL | |
| 38 | M | N.C | relapsed cHL | |
| 21 | M | N.C | NEW LARGE BCL OF MEDIASTINUM | |
| 33 | F | N.C | new NSHL | |
| 60 | M | N.C | new dx CNS DLBCL | |
| 72 | M | N.C | new dx intraventricular mass | |
| 39 | F | N.C | staging for follicular lymphoma | |
| 72 | M | N.C | s/p SCT, now relapsed mantle cell lymphoma | |
| 52.23 | average | | | |
| 19.49 | stdev | | | |
| | 45% M | | | |
| 63 | F | MDS | RCMD | growth factors |
| 72 | M | MDS | RCMD | untreated |
| 74 | F | MDS | RCMD | untreated |
| 69 | M | MDS | RCMD | untreated |
| 78 | F | MDS | RCMD | untreated |
| 66 | F | MDS | RA | untreated |
| 78 | F | MDS | RA | growth factors |
| 73 | M | MDS | RA | immunosuppressives |
| 76 | M | MDS | RAEB-2 | chemotherapy |
| 59 | M | MDS | RCMD | azacytidine 9 months prior |
| 69 | M | MDS | RAEB-2 | thalidomide |
| 47 | M | MDS | RCMD | chemotherapy |
| 50 | F | MDS | RCMD | chemotherapy |
| 69 | M | MDS | RCMD | azacytidine 12 months prior |
| 56 | F | MDS | RA | growth factors |
| 58 | M | MDS | RCMD | azacytidine 24 months prior, followed by chemotherapy and cord blood SCT |
| 73 | M | MDS | RA | untreated |
| 51 | M | MDS | RARS | immunosuppressives |
| 87 | M | MDS | RCMD | growth factors |
| 60 | M | MDS | RCMD | thalidomide18 months ago x 1y, decitabine 6 months prior, then panobinostat x 3 months |
| 66.4 | average | | 60% RCMD (12) | |
| 10.64 | stdev | | also includes 5 RA, 1 RARS, 2 RAEB2 | |
| | 65% M | | | |
| 66 | M | MDS | RA | started on decitabine x 4 cycles, now vidaza x 1 cycle |
| 58 | M | MDS | RCMD | on azacytidine for 2 years, stable |
| 57 | M | MDS | RAEB-2 | s/p 4c azacytidine no response |
| 79 | M | MDS | RAEB-2 | on decitabine x 3 cycles with no response |
| 56 | M | MDS | RAEB-1 | azacytidine x 5 cycles, then enocitabine x 2months |
| 78 | M | MDS | RCMD | s/p azacytidine x 8 cycles with initial response, now worsening anemia due to renal failure (polyclonal plasmacytosis) |
| 65.67 | average | | 1 RA, 2 RCMD, 1 RAEB1, 2 RAEB2 | |
| 10.56 | stdev | | | |
| | 100% M | | | |

Supplementary Table 2. Primers used in pyrosequencing (all sequences listed from 5′ to 3′).

| Host Gene Name | Forward Primer | Reverse Primer | Sequencing Primer | Amplicon Length [bp] |
|---|---|---|---|---|
| BIRC6 | GTAAGGGAGGGGGTTTTTATT | Bio-CCAACCTCCCAATTTCTTCCTAT | GGTTAATTTTTTTTTTTGTT | 127 |
| TECR | GGATGTTGTTTTGTTTGTTATTTAAT | Bio-CCACCAATCCAAAAAAAATCTCTAC | AATCCAAAAAAAATCTCTAC | 142 |
| IGF2 | Bio-GGGATTTGGTTGAGGTTTTAA | CCATCCCCAATTTCTAAAATACC | TTTTTTTGTTGGGGTAG | 275 |
| IGF2-DMR0 | AGGGGGTTTATTTTTTTAGGAAGTA | Bio-AACAAAAACCACTAAACACACAACTCTA | GGGTTTATTTTTTTAGGAAGTAT | 85 |
| PANK3 | GTTAGGTTTGAGGGGAGGAAT | Bio-CAACCCCCCTCTTACAAAATTTCT | GGTTTGAGGGGAGGA | 164 |
| WWP2 | Bio-TGGTTAGTATTTGAGAGTTTG GTTAGTTT | CCCAACTCCTCTCCTACTTCC | TTAGTTTTTTTAGGGTTAGG | 112 |
| EVL1 | Bio-GAGGGAGGTGGGGTGAATAGT | AAACCCCCACCCCTACCATCT | ACCCCTACCATCTTA | 284 |
| RPS11 | Bio-GGGAAGATGGAGGATATTT AGGT | CCCCTCCACTCCAATTAATCTC | ATTAATCTCTAAAAAATAAT | 167 |
| PPARGC1B | QIAGEN Pyromark CpG Assay Hs_hsa-mir-378_01_PM Cat #PM00022519 | | | 176 |
| ZNF207 | QIAGEN Pyromark CpG Assay Hs_ZNF207_01_PM Cat #PM00177688 | | | 212 |
| SRSF2 | QIAGEN Pyromark CpG Assay Hs_MFSD11_02_PM Cat#PM00065359 | | | 180 |
| SFRP2 | QIAGEN Pyromark CpG Assay Hs_SFRP2_01_PM Cat#PM00018802 | | | 110 |

Supplementary Table 3. Expression changes of miRNAs and their host genes during an assay of myeloid maturation (HL60/ATRA).

| miRNAs | Fold increase | Host Genes | Fold increase |
|---|---|---|---|
| miR-103 | 1.22 | PANK3 | 1.50 |
| miR-140 | 1.30 | WWP2 | 1.52 |
| miR-150 | 1.01 | RPS11 | 1.28 |
| miR-342 | 1.13 | EVL | 1.46 |
| miR-378 | $-0.83$ | PPARGC1B | 1.18 |
| miR-483 | 1.20 | IGF2 | not available |
| miR-632 | 1.09 | ZNF207 | 1.25 |
| miR-636 | 1.21 | SFRS2 | 1.30 |

Supplementary Table 4. Compiled methylation results (as percent methylation) for methylation regions examined by pyrosequencing in promoters of WWP2, PPARGC1B, IGF2, ZNF207, and SFRS2. P values obtained from two-tailed t-test analysis of MDS samples (untreated or treated) compared to normal controls (NC).

| | Region 1 | Region 2 | Region 3 | Region 4 | Region 5 | Region 6 | Region 7 |
|---|---|---|---|---|---|---|---|
| **SRSF2** | | | | | | | |
| NC (22) | | | | | | | |
| average | 1.318 | 2.091 | 1.682 | 4.455 | 2.909 | | |
| stdev | 0.568 | 0.921 | 1.729 | 6.486 | 4.363 | | |
| MDS (20) | | | | | | | |
| average | 3.100 | 6.050 | 3.450 | 11.450 | 5.500 | | |
| stdev | 4.447 | 8.599 | 5.000 | 21.010 | 10.605 | | |
| P value vs NC | 0.091 | 0.054 | 0.147 | 0.167 | 0.319 | | |
| MDS post Rx (6) | | | | | | | |
| average | 1.833 | 2.333 | 1.667 | 4.500 | 2.833 | | |
| stdev | 0.753 | 1.033 | 0.816 | 2.074 | 1.722 | | |
| P value vs NC | 0.165 | 0.618 | 0.976 | 0.978 | 0.949 | | |
| **ZNF207** | | | | | | | |
| NC (22) | | | | | | | |
| average | 13.227 | 7.545 | 5.591 | 8.500 | 12.682 | | |
| stdev | 8.772 | 4.964 | 4.067 | 6.292 | 8.632 | | |
| MDS (20) | | | | | | | |
| average | 24.200 | 14.250 | 11.900 | 15.350 | 24.500 | | |
| stdev | 17.356 | 10.290 | 9.239 | 11.926 | 19.720 | | |
| P value | 0.017 | 0.013 | 0.009 | 0.029 | 0.020 | | |
| MDS post Rx (6) | | | | | | | |
| average | 9.667 | 5.667 | 5.167 | 5.833 | 9.833 | | |
| stdev | 2.658 | 1.366 | 2.483 | 1.835 | 1.941 | | |
| P value | 0.112 | 0.128 | 0.755 | 0.095 | 0.167 | | |
| **IGF2** | | | | | | | |
| NC (32) | | | | | | | |
| average | 7.156 | 3.156 | 2.469 | 5.469 | 4.531 | 34.625 | 97.156 |
| stdev | 9.381 | 2.477 | 4.040 | 12.914 | 14.675 | 4.654 | 6.811 |
| MDS (20) | | | | | | | |
| average | 21.471 | 2.706 | 1.000 | 1.824 | 1.706 | 33.000 | 90.950 |
| stdev | 31.814 | 1.359 | 0.612 | 1.286 | 1.263 | 8.681 | 15.856 |
| P value | 0.087 | 0.415 | 0.052 | 0.123 | 0.288 | 0.448 | 0.111 |
| MDS post Rx (6) | | | | | | | |
| average | 16.167 | 13.833 | 11.833 | 14.833 | 26.333 | 30.167 | 96.500 |
| stdev | 28.330 | 28.017 | 26.536 | 28.067 | 38.862 | 5.601 | 4.037 |
| P value | 0.474 | 0.394 | 0.427 | 0.457 | 0.230 | 0.113 | 0.754 |
| **PPARGC1B** | | | | | | | |
| NC (21) | | | | | | | |
| average | 4.333 | 7.000 | 4.714 | 3.158 | | | |
| stdev | 3.152 | 3.987 | 4.540 | 5.284 | | | |
| MDS (20) | | | | | | | |
| average | 6.950 | 10.850 | 9.400 | 12.706 | | | |
| stdev | 4.383 | 7.386 | 9.064 | 14.848 | | | |
| P value | 0.036 | 0.048 | 0.047 | 0.021 | | | |
| MDS post Rx (6) | | | | | | | |
| average | 4.167 | 5.500 | 5.500 | 5.167 | | | |
| stdev | 1.169 | 3.082 | 2.345 | 2.787 | | | |
| P value | 0.844 | 0.349 | 0.576 | 0.244 | | | |
| **WWP2** | | | | | | | |
| NC (19) | | | | | | | |
| average | 4.706 | 1.235 | 1.353 | 1.235 | 3.059 | 4.125 | 2.143 |
| stdev | 1.829 | 0.437 | 0.606 | 0.752 | 1.197 | 1.746 | 1.099 |
| MDS (20) | | | | | | | |
| average | 6.944 | 2.722 | 2.944 | 3.056 | 4.833 | 6.875 | 3.933 |
| stdev | 3.455 | 2.052 | 2.313 | 2.338 | 2.834 | 4.759 | 2.764 |
| P value | 0.023 | 0.007 | 0.011 | 0.005 | 0.023 | 0.043 | 0.032 |
| MDS post Rx (6) | | | | | | | |
| average | 3.667 | 2.000 | 1.667 | 1.667 | 3.000 | 4.667 | 3.333 |
| stdev | 0.577 | 1.000 | 1.155 | 0.577 | 1.000 | 1.528 | 1.155 |
| P value | 0.053 | 0.262 | 0.557 | 0.247 | 0.762 | 0.674 | 0.215 |
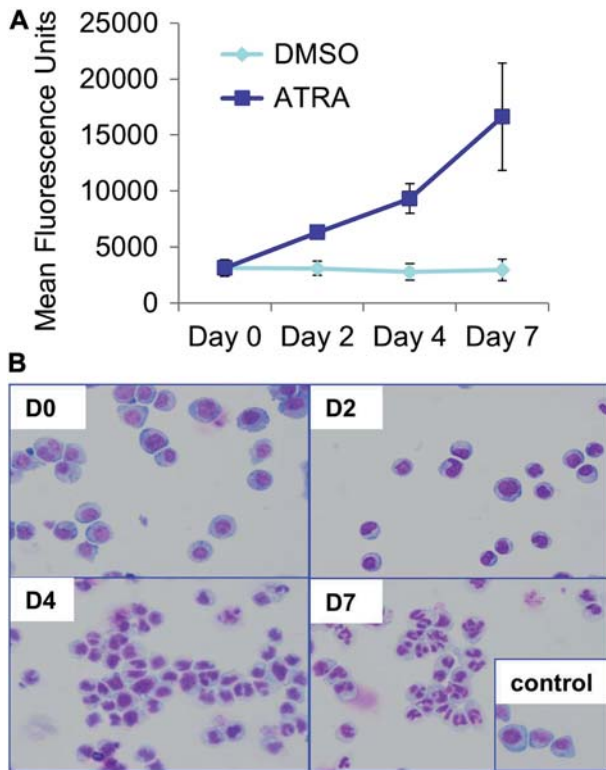
Supplementary Figure 1. (a) Induction of CD11b levels through 7 days of ATRA treatment. Light blue line indicates DMSO treated cells as a vehicle control; dark blue line indicates ATRA treated cells ($P = < 0.0001$ by interactive regression model comparing treatments over time) (b) Wright stained cytospin slides of 1 μM ATRA treated HL60 cells on expermental days 0, 2, 4 and 7 ($40\times$). DMSO treated cells at day 7 are shown in the insert as a vehicle control.