

Supplementary Materials

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Supplementary Table 1 | Baseline data of the included and excluded participants (N = 9756).

| Variables | Overall |
|---|---------------------------|
| Participants | N=9756 |
| Continuous variables, Median (Q1-Q3) | |
| AAMA(ng/mL) | 46.500 (24.500-86.675) |
| AMCC(ng/mL) | 116.000 (59.975-239.750) |
| ATCA(ng/mL) | 138.000 (64.675-273.000) |
| BPMA(ng/mL) | 4.070 (1.290-11.325) |
| CEMA(ng/mL) | 96.800 (49.200-184.000) |
| CYMA(ng/mL) | 1.825 (0.979-4.757) |
| DHBMA(ng/mL) | 297.000 (167.000-476.000) |
| 2HPMA(ng/mL) | 31.050 (16.200-56.900) |
| 3HPMA(ng/mL) | 235.000 (120.000-457.000) |
| MHBMA3(ng/mL) | 5.640 (2.810-10.875) |
| Low-frequency PTA(db) | 8.750 (4.583-14.583) |
| Speech-frequency PTA(db) | 10.312 (5.625-17.188) |
| High-frequency PTA(db) | 18.333 (10.833-31.667) |
| BMI (kg/m ²) | 24.500 (19.300-29.800) |
| Age(year) | 26.000 (9.000-52.000) |
| Creatinine (mg/dL) | 0.820 (0.690-0.980) |
| Categorical variables, % | |
| Gender | |
| Male | 4856 (49.774%) |
| Female | 4900 (50.226%) |
| Race/Ethnicity | |
| Mexican American | 1355 (13.889%) |
| Non-Hispanic White | 1076 (11.029%) |
| Non-Hispanic Black | 2973 (30.474%) |
| Other races | 4352 (44.608%) |
| Education level | |
| Below high school | 1332 (23.978%) |
| High school | 1169 (21.044%) |
| Above high school | 3054 (54.977%) |
| Hypertension | 2031 (32.944%) |
| Diabetes | 708 (7.567%) |
| Cigarette smoking | 2369 (42.662%) |
| Alcohol drinking | 3577 (71.871%) |
| Noise Exposure | 540 (13.818%) |

SD, Standard Deviation; BMI, Body Mass Index. VOCs, Volatile Organic Compounds: AAMA, Urinary N-Acetyl-S-(2-carbamoyl-ethyl)-L-cysteine; AMCC, Urinary N-Acetyl-S-(N-methylcarbamoyl)-L-cysteine; ATCA, Urinary 2-Aminothiazoline-4-carboxylic acid; BPMA, Urinary N-Acetyl-S-(n-propyl)-L-cysteine; CEMA, Urinary N-Acetyl-S-(2-carboxyethyl)-L-cysteine; CYMA, Urinary N-Acetyl-S-(2-cyanoethyl)-L-cysteine; DHBMA, Urinary N-Acetyl-S-(3,4-dihydroxybutyl)-L-cysteine; 2HPMA, Urinary N-Acetyl-S-(2-hydroxypropyl)-L-cysteine; 3HPMA, Urinary N-Acetyl-S-(3-hydroxypropyl)-L-cysteine; MA, Urinary Mandelic acid; MHBMA3, Urinary N-Acetyl-S-(4-hydroxy-2-butenyl)-L-cysteine.

Supplementary Table 2 | Distribution of the urinary VOCs metabolites levels in NHANES 2011-2012 (n = 9756).

| Variable | LLOD | 10 th percentile | 25 th percentile | 50 th percentile | 75 th percentile | 90 th percentile |
|----------|--------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| URXAAM | 2.200 | 13.150 | 24.500 | 46.500 | 86.675 | 167.000 |
| URXAMC | 6.260 | 30.100 | 59.975 | 116.000 | 239.750 | 481.000 |
| URXATC | 15.00 | 31.850 | 64.675 | 138.000 | 273.000 | 486.500 |
| URXBPM | 1.200 | 0.850 | 1.290 | 4.070 | 11.325 | 28.700 |
| URXCEM | 6.960 | 24.600 | 49.200 | 96.800 | 184.000 | 325.500 |
| URXCYM | 0.500 | 0.550 | 0.979 | 1.825 | 4.757 | 106.000 |
| URXDHB | 5.250 | 89.550 | 167.000 | 297.000 | 476.000 | 683.000 |
| URXGAM | 9.400 | 6.650 | 6.650 | 6.650 | 14.000 | 24.800 |
| URXHEM | 0.791 | 0.559 | 0.559 | 0.970 | 1.850 | 3.735 |
| URXHP2 | 5.300 | 8.645 | 16.200 | 31.050 | 56.900 | 113.500 |
| URXHPM | 13.000 | 61.050 | 120.000 | 235.000 | 457.000 | 920.000 |
| URXMB1 | 0.700 | 0.495 | 0.495 | 0.495 | 0.495 | 0.495 |
| URXMB2 | 0.700 | 0.495 | 0.495 | 0.495 | 0.495 | 0.732 |
| URXMB3 | 0.700 | 1.370 | 2.810 | 5.640 | 10.875 | 25.850 |

VOCs, Volatile Organic Compounds. The variable names are detailed in the attached table

Supplementary Table 3 | Sensitive analysis for the association between urinary ATCA concentrations and hearing threshold shift (N = 9756).

β (95% CI), P value of urinary ATCA concentrations, (ng/mL)

| ATCA | Crude Model | | Model I | | Model II | |
|----------------------|--------------------------|---------|------------------------|---------|-----------------------------|--------------|
| Low-frequency PTA | | | | | | |
| Q1 | Reference | P Value | Reference | P Value | Reference | P Value |
| Q2 | 1.056 (-1.020, 3.132) | 0.319 | 0.495 (-1.584, 2.575) | 0.641 | 0.394 (-1.679, 2.468) | 0.709 |
| Q3 | 4.632 (2.558, 6.706) | <0.001 | 3.434 (1.326, 5.541) | 0.001 | 3.102 (0.992, 5.211) | 0.004 |
| Q4 | 5.452 (3.377, 7.527) | <0.001 | 3.636 (1.481, 5.791) | <0.001 | 3.241 (1.074, 5.408) | 0.003 |
| Speech-frequency PTA | | | | | | |
| Q1 | Reference | P Value | Reference | P Value | Reference | P Value |
| Q2 | -0.015 (-2.051, 2.021) | 0.988 | 0.213 (-1.833, 2.258) | 0.839 | 0.103 (-1.941, 2.146) | 0.922 |
| Q3 | 2.429 (0.395, 4.462) | 0.019 | 2.834 (0.761, 4.908) | 0.007 | 2.504 (0.426, 4.583) | 0.018 |
| Q4 | 2.759 (0.724, 4.793) | 0.008 | 3.321 (1.201, 5.441) | 0.002 | 2.859 (0.725, 4.994) | 0.009 |
| High-frequency PTA | | | | | | |
| Q1 | Reference | P Value | Reference | P Value | Reference | P Value |
| Q2 | -4.461 (-7.106, -1.817) | <0.001 | -1.599 (-4.174, 0.976) | 0.224 | -1.414 (-3.986, 1.158) | 0.281 |
| Q3 | -6.115 (-8.757, -3.474) | <0.001 | -0.265 (-2.875, 2.345) | 0.842 | 0.075 (-2.541, 2.691) | 0.955 |
| Q4 | -9.141 (-11.784, -6.498) | <0.001 | -0.445 (-3.114, 2.224) | 0.744 | -0.094 (-2.781, 2.593) | 0.945 |

Crude Model = unadjusted. Model I = Crude Model + Gender, Age. Model II = Model I + Race/Ethnicity, BMI, Education level, Hypertension, Diabetes, Cigarette smoking, Alcohol drinking, Creatinine and Noise Exposure. CI, Confidence Interval; BMI, Body Mass Index.

Supplementary Table 4 | Smoking-related stratified analysis for the association between ATCA concentrations and hearing threshold shift (N = 1048).

| ATCA | N | Low-frequency PTA | Speech-frequency PTA | | High-frequency PTA | | |
|-------------|-----|---|----------------------|-----------------------------|--------------------|-----------------------|---------|
| Non-smoking | | β (95% CI), P value of urinary ATCA concentrations, (ng/mL) | | | | | |
| Q1 | 146 | Reference | P Value | Reference | P Value | Reference | P Value |
| Q2 | 169 | 0.911 (-0.911, 2.733) | 0.328 | 0.950 (-0.874, 2.773) | 0.308 | 0.346 (-2.351, 3.043) | 0.802 |
| Q3 | 167 | 1.320 (-0.544, 3.184) | 0.166 | 1.339 (-0.527, 3.205) | 0.160 | 0.753 (-2.006, 3.513) | 0.593 |
| Q4 | 153 | 1.683 (-0.266, 3.632) | 0.091 | 1.970 (0.019, 3.921) | 0.048 | 1.992 (-0.893, 4.877) | 0.176 |
| Smoking | | β (95% CI), P value of ATCA concentrations, (ng/mL) | | | | | |
| Q1 | 114 | Reference | P Value | Reference | P Value | Reference | P Value |
| Q2 | 95 | 1.775 (-0.452, 4.002) | 0.119 | 2.014 (-0.311, 4.338) | 0.090 | 2.153 (-1.605, 5.912) | 0.262 |
| Q3 | 95 | 0.787 (-1.449, 3.023) | 0.491 | 1.015 (-1.320, 3.349) | 0.395 | 1.710 (-2.064, 5.484) | 0.375 |
| Q4 | 109 | 1.084 (-1.130, 3.297) | 0.338 | 1.518 (-0.793, 3.829) | 0.199 | 2.590 (-1.147, 6.326) | 0.175 |

Adjusted for gender, Race/Ethnicity, BMI, Education level, Hypertension, Diabetes, Alcohol drinking, Creatinine, and Noise exposure.

CI, Confidence Interval; PTA, Pure tone audiometry. ATCA, Urinary 2-Aminothiazoline-4-carboxylic acid

Supplementary Table 5| Transcription factor prediction of hepatocyte growth factor (HGF) gene.

| Matrix ID | Name | Score | Relative score | Sequence ID | Start | End | Strand | Predicted sequence |
|-----------|-----------------|-----------|----------------|---------------------------------|-------|------|--------|--------------------|
| MA0465.3 | MA0465.3.CDX2 | 14.592027 | 1.000000006 | NC_000007.14:c81774047-81772047 | 751 | 758 | + | GCAATAAA |
| MA1473.2 | MA1473.2.CDX4 | 15.482717 | 1.000000003 | NC_000007.14:c81774047-81772047 | 751 | 759 | + | GCAATAAAA |
| MA0913.3 | MA0913.3.HOXD9 | 15.327005 | 1.000000001 | NC_000007.14:c81774047-81772047 | 751 | 759 | + | GCAATAAAA |
| MA0442.3 | MA0442.3.SOX10 | 11.610084 | 1 | NC_000007.14:c81774047-81772047 | 636 | 641 | + | ACAAAG |
| MA0442.3 | MA0442.3.SOX10 | 11.610084 | 1 | NC_000007.14:c81774047-81772047 | 825 | 830 | + | ACAAAG |
| MA0442.3 | MA0442.3.SOX10 | 11.610084 | 1 | NC_000007.14:c81774047-81772047 | 1721 | 1726 | + | ACAAAG |
| MA0442.3 | MA0442.3.SOX10 | 11.610084 | 1 | NC_000007.14:c81774047-81772047 | 1772 | 1777 | + | ACAAAG |
| MA1125.2 | MA1125.2.ZNF384 | 14.630931 | 0.999999998 | NC_000007.14:c81774047-81772047 | 1469 | 1476 | - | AAAAAAAA |
| MA1125.2 | MA1125.2.ZNF384 | 14.630931 | 0.999999998 | NC_000007.14:c81774047-81772047 | 1470 | 1477 | - | AAAAAAAA |
| MA1125.2 | MA1125.2.ZNF384 | 14.630931 | 0.999999998 | NC_000007.14:c81774047-81772047 | 1628 | 1635 | + | AAAAAAAA |
| MA1125.2 | MA1125.2.ZNF384 | 14.630931 | 0.999999998 | NC_000007.14:c81774047-81772047 | 1629 | 1636 | + | AAAAAAAA |
| MA1125.2 | MA1125.2.ZNF384 | 14.630931 | 0.999999998 | NC_000007.14:c81774047-81772047 | 1630 | 1637 | + | AAAAAAAA |
| MA0878.3 | MA0878.3.CDX1 | 16.87225 | 0.999999991 | NC_000007.14:c81774047-81772047 | 750 | 759 | + | GGCAATAAAA |
| MA0899.2 | MA0899.2.HOXA10 | 13.389124 | 0.995139121 | NC_000007.14:c81774047-81772047 | 751 | 759 | + | GCAATAAAA |
| MA1125.2 | MA1125.2.ZNF384 | 12.618615 | 0.9665189 | NC_000007.14:c81774047-81772047 | 1022 | 1029 | + | AAAAAAT |
| MA1125.2 | MA1125.2.ZNF384 | 12.618615 | 0.9665189 | NC_000007.14:c81774047-81772047 | 1485 | 1492 | + | AAAAAAT |
| MA1125.2 | MA1125.2.ZNF384 | 12.618615 | 0.9665189 | NC_000007.14:c81774047-81772047 | 1631 | 1638 | + | AAAAAAT |
| MA1125.2 | MA1125.2.ZNF384 | 12.446241 | 0.963650929 | NC_000007.14:c81774047-81772047 | 1486 | 1493 | + | AAAAATA |
| MA1125.2 | MA1125.2.ZNF384 | 12.388456 | 0.962689497 | NC_000007.14:c81774047-81772047 | 798 | 805 | + | AAAAAAC |
| MA1125.2 | MA1125.2.ZNF384 | 12.388456 | 0.962689497 | NC_000007.14:c81774047-81772047 | 1468 | 1475 | - | AAAAAAC |
| MA1125.2 | MA1125.2.ZNF384 | 11.94268 | 0.955272634 | NC_000007.14:c81774047-81772047 | 1348 | 1355 | + | AAAAAAG |
| MA1125.2 | MA1125.2.ZNF384 | 11.844371 | 0.953636951 | NC_000007.14:c81774047-81772047 | 799 | 806 | + | AAAAACA |

| | | | | | | | | |
|----------|-----------------|-----------|-------------|---------------------------------|------|------|---|------------|
| MA1125.2 | MA1125.2.ZNF384 | 11.844371 | 0.953636951 | NC_000007.14:c81774047-81772047 | 820 | 827 | + | AAAAACA |
| MA1473.2 | MA1473.2.CDX4 | 11.901981 | 0.951378084 | NC_000007.14:c81774047-81772047 | 1974 | 1982 | - | GCCATAAAG |
| MA0878.3 | MA0878.3.CDX1 | 13.313726 | 0.948176068 | NC_000007.14:c81774047-81772047 | 1974 | 1983 | - | GGCCATAAAG |
| MA0465.3 | MA0465.3.CDX2 | 11.670449 | 0.935950885 | NC_000007.14:c81774047-81772047 | 736 | 743 | + | ACAATAAA |
| MA0465.3 | MA0465.3.CDX2 | 11.596826 | 0.934336849 | NC_000007.14:c81774047-81772047 | 1975 | 1982 | - | GCCATAAA |
| MA1125.2 | MA1125.2.ZNF384 | 10.433926 | 0.930169832 | NC_000007.14:c81774047-81772047 | 1023 | 1030 | + | AAAAAATT |
| MA1125.2 | MA1125.2.ZNF384 | 10.433926 | 0.930169832 | NC_000007.14:c81774047-81772047 | 1632 | 1639 | + | AAAAAATT |
| MA0913.3 | MA0913.3.HOXD9 | 10.696103 | 0.929022654 | NC_000007.14:c81774047-81772047 | 1974 | 1982 | - | GCCATAAAG |
| MA0899.2 | MA0899.2.HOXA10 | 10.09461 | 0.923045298 | NC_000007.14:c81774047-81772047 | 1974 | 1982 | - | GCCATAAAG |
| MA1125.2 | MA1125.2.ZNF384 | 9.832055 | 0.920155853 | NC_000007.14:c81774047-81772047 | 1467 | 1474 | - | AAAAAACT |
| MA1125.2 | MA1125.2.ZNF384 | 9.761436 | 0.918980894 | NC_000007.14:c81774047-81772047 | 1349 | 1356 | + | AAAAAAGT |
| MA1473.2 | MA1473.2.CDX4 | 8.8909025 | 0.910491388 | NC_000007.14:c81774047-81772047 | 736 | 744 | + | ACAATAAAG |
| MA0465.3 | MA0465.3.CDX2 | 10.20262 | 0.903771967 | NC_000007.14:c81774047-81772047 | 301 | 308 | - | GAAATAAA |
| MA0899.2 | MA0899.2.HOXA10 | 9.204637 | 0.90357001 | NC_000007.14:c81774047-81772047 | 736 | 744 | + | ACAATAAAG |
| MA0899.2 | MA0899.2.HOXA10 | 9.192059 | 0.903294766 | NC_000007.14:c81774047-81772047 | 1346 | 1354 | + | GTAAAAAAA |

Supplementary Table 6 | Transcription factor prediction of cellular-mesenchymal epithelial transition factor (MET) gene.

| Matrix ID | Name | Score | Relative score | Sequence ID | Start | End | Strand | Predicted sequence |
|-----------|---------------|-----------|----------------|----------------------------------|-------|-----|--------|--------------------|
| MA0510.3 | MA0510.3.RFX5 | 14.912289 | 0.893220772 | NC_000007.14:116670196-116672196 | 370 | 383 | + | ATTGCTATGG AAAC |
| MA0510.3 | MA0510.3.RFX5 | 14.73566 | 0.891282239 | NC_000007.14:116670196-116672196 | 370 | 383 | - | GTTCCATAGC AAT |

Supplementary Table 7 | Transcription factor prediction of Superoxide Dismutase 1 (SOD1) gene.

| Matrix ID | Name | Score | Relative score | Sequence ID | Start | End | Strand | Predicted sequence |
|-----------|------------------|-----------|----------------|-------------------------------|-------|------|--------|--------------------|
| MA1564.2 | MA1564.2.SP9 | 15.800247 | 1.000000006 | NC_000021.9:31657693-31659693 | 1750 | 1759 | + | CCACGCCCCC |
| MA1513.2 | MA1513.2.KLF15 | 14.972673 | 1.000000005 | NC_000021.9:31657693-31659693 | 1816 | 1823 | - | CCCCGCCC |
| MA1513.2 | MA1513.2.KLF15 | 14.972673 | 1.000000005 | NC_000021.9:31657693-31659693 | 1852 | 1859 | + | CCCCGCCC |
| MA0741.1 | MA0741.1.KLF16 | 17.682444 | 0.999999994 | NC_000021.9:31657693-31659693 | 1749 | 1759 | + | GCCACGCCCCC |
| MA0746.3 | MA0746.3.SP3 | 18.364372 | 0.998402324 | NC_000021.9:31657693-31659693 | 1749 | 1759 | + | GCCACGCCCCC |
| MA1512.2 | MA1512.2.KLF11 | 16.631697 | 0.997776223 | NC_000021.9:31657693-31659693 | 1750 | 1759 | + | CCACGCCCCC |
| MA1516.2 | MA1516.2.KLF3 | 16.752602 | 0.994217284 | NC_000021.9:31657693-31659693 | 1748 | 1757 | + | GGCCACGCCC |
| MA1517.2 | MA1517.2.KLF6 | 14.075645 | 0.990143904 | NC_000021.9:31657693-31659693 | 1750 | 1758 | + | CCACGCCCC |
| MA0741.1 | MA0741.1.KLF16 | 16.384356 | 0.978779943 | NC_000021.9:31657693-31659693 | 1851 | 1861 | + | GCCCCGCCCCC |
| MA1564.2 | MA1564.2.SP9 | 14.688722 | 0.978726103 | NC_000021.9:31657693-31659693 | 1852 | 1861 | + | CCCCGCCCCC |
| MA1513.2 | MA1513.2.KLF15 | 13.365077 | 0.974446424 | NC_000021.9:31657693-31659693 | 1901 | 1908 | - | GCCCGCCC |
| MA0746.3 | MA0746.3.SP3 | 16.40809 | 0.97180914 | NC_000021.9:31657693-31659693 | 1851 | 1861 | + | GCCCCGCCCCC |
| MA1512.2 | MA1512.2.KLF11 | 13.907747 | 0.957164874 | NC_000021.9:31657693-31659693 | 1852 | 1861 | + | CCCCGCCCCC |
| MA1517.2 | MA1517.2.KLF6 | 11.182343 | 0.934651331 | NC_000021.9:31657693-31659693 | 1815 | 1823 | - | CCCCGCCCC |
| MA1517.2 | MA1517.2.KLF6 | 11.182343 | 0.934651331 | NC_000021.9:31657693-31659693 | 1852 | 1860 | + | CCCCGCCCC |
| MA1516.2 | MA1516.2.KLF3 | 11.612109 | 0.923598609 | NC_000021.9:31657693-31659693 | 1850 | 1859 | + | GGCCCCGCCC |
| MA1564.2 | MA1564.2.SP9 | 11.755391 | 0.922583993 | NC_000021.9:31657693-31659693 | 1899 | 1908 | - | GCCCGCCCC |
| MA1564.2 | MA1564.2.SP9 | 11.49181 | 0.917539212 | NC_000021.9:31657693-31659693 | 1814 | 1823 | - | CCCCGCCCCG |
| MA1564.2 | MA1564.2.SP9 | 11.231851 | 0.912563755 | NC_000021.9:31657693-31659693 | 1943 | 1952 | - | CCTCGCCAC |
| MA0757.2 | MA0757.2.ONECUT3 | 14.176346 | 0.910616216 | NC_000021.9:31657693-31659693 | 769 | 780 | + | ATAAATCGATAG |
| MA1517.2 | MA1517.2.KLF6 | 9.667968 | 0.905606135 | NC_000021.9:31657693-31659693 | 1944 | 1952 | - | CCTCGCCA |
| MA1512.2 | MA1512.2.KLF11 | 10.197224 | 0.901844696 | NC_000021.9:31657693-31659693 | 1899 | 1908 | - | GCCCGCCCC |

Supplementary Table 8 | Transcription factor prediction of Toll-like receptor 4 (TLR4) gene.

| Matrix ID | Name | Score | Relative score | Sequence ID | Start | End | Strand | Predicted sequence |
|-----------|-------------------|------------|----------------|----------------------------------|-------|------|--------|--------------------------|
| MA0143.5 | MA0143.5.SOX2 | 12.655396 | 1.000000002 | NC_000009.12:117702403-117704403 | 758 | 764 | + | ACAATGG |
| MA0492.2 | MA0492.2.JUND | 16.849583 | 0.988585599 | NC_000009.12:117702403-117704403 | 1433 | 1443 | + | AATGAGGTCAT |
| MA0497.2 | MA0497.2.MEF2C | 15.5764065 | 0.969150017 | NC_000009.12:117702403-117704403 | 566 | 576 | + | TTAAAAATAGA |
| MA0052.5 | MA0052.5.MEF2A | 14.926926 | 0.957565372 | NC_000009.12:117702403-117704403 | 566 | 575 | + | TTAAAAATAG |
| MA0492.2 | MA0492.2.JUND | 13.339054 | 0.950673139 | NC_000009.12:117702403-117704403 | 1434 | 1444 | - | AATGACCTCAT |
| MA0489.1 | MA0489.1.JUN | 13.702142 | 0.941255552 | NC_000009.12:117702403-117704403 | 1182 | 1195 | - | GCTGGGTGACTCAT |
| MA1126.2 | MA1126.2.FOS::JUN | 13.134733 | 0.938508571 | NC_000009.12:117702403-117704403 | 1434 | 1443 | - | ATGACCTCAT |
| MA0143.5 | MA0143.5.SOX2 | 9.778614 | 0.932261762 | NC_000009.12:117702403-117704403 | 683 | 689 | + | ACAATAG |
| MA0497.2 | MA0497.2.MEF2C | 12.965759 | 0.929464789 | NC_000009.12:117702403-117704403 | 1690 | 1700 | - | ATTTAAATAGC |
| MA0143.5 | MA0143.5.SOX2 | 9.551398 | 0.926911619 | NC_000009.12:117702403-117704403 | 703 | 709 | + | ACAATGC |
| MA0080.5 | MA0080.5.SPI1 | 19.592257 | 0.918632908 | NC_000009.12:117702403-117704403 | 1894 | 1913 | - | GGGTGAGAGGAAG TGAAAGC |
| MA0489.1 | MA0489.1.JUN | 11.89915 | 0.918054449 | NC_000009.12:117702403-117704403 | 1177 | 1190 | + | AAGCCATGAGTCAC |
| MA0489.1 | MA0489.1.JUN | 10.868551 | 0.904792589 | NC_000009.12:117702403-117704403 | 1743 | 1756 | + | GTCAGATGACTAAT |
| MA0497.2 | MA0497.2.MEF2C | 11.289192 | 0.903978792 | NC_000009.12:117702403-117704403 | 1283 | 1293 | - | CTGAAAATAAA |
| MA1126.2 | MA1126.2.FOS::JUN | 11.604256 | 0.902058819 | NC_000009.12:117702403-117704403 | 1434 | 1443 | + | ATGAGGTCAT |
| MA0497.2 | MA0497.2.MEF2C | 11.114759 | 0.901327188 | NC_000009.12:117702403-117704403 | 378 | 388 | - | ATTTAAATAAA |
| MA0492.2 | MA0492.2.JUND | 8.659078 | 0.900131057 | NC_000009.12:117702403-117704403 | 1073 | 1083 | - | CATGACATAAC |

Supplementary Table 9 | Gene associated miRNAs.

| Mirnaid | Refseqid | Genesymbol | Duplex | Start | End | Bindingp | Energy | Seed | Accessibility | Au | Phylostem | Phyloplanck | Me | Number_of_pairings | Bindingregionlength | Longestconsecutivepairings | Position | Validated | Targetscan | Mirdb |
|-----------------|--------------|------------|--|----------|----------|----------|--------|------|---------------|--------|-----------|-------------|-------|--------------------|---------------------|----------------------------|-----------|------------|------------|-------|
| Hsa-mir-148a-3p | Nm_001127500 | Met | Tcagtgcact acagaactttgt #acaggatctc actctgttgcca gggctgtagtg cagtgggt | 51 55 | 51 95 | 1 | -24 | 0 | 4.9e-06 | 0.422 | 0.422 | 0.422 | 0.422 | 15 | 20 | 10 | 3utr | Mirt054388 | 1 | 1 |
| Hsa-mir-216a-3p | Nm_001127500 | Met | Tcacagtgggt ctctgggattat #cccagaaca ggccactc | 50 13 | 50 30 | 1 | -20.3 | 0 | 0.010498 | 0.1718 | 0.1718 | 0.1718 | 13 | 17 | 7 | 3utr | | 1 | 1 | |
| Hsa-mir-130b-3p | Nm_001127500 | Met | Cagtgcaatg atgaaagggc at#tgctcttgcc aaaattgcac ta | 47 08 | 47 30 | 1 | -20.8 | 1 | 0.02524403 | 2.1349 | 2.1349 | 2.1349 | 17 | 22 | 8 | 3utr | | 1 | 1 | |
| Hsa-mir-148a-3p | Nm_000245 | Met | Tcagtgcact acagaactttgt | 51 01 | 51 41 | 1 | -24 | 0 | 4.9e-06 | 0.422 | 0.422 | 0.422 | 15 | 20 | 10 | 3utr | Mirt05438 | 1 | 1 | |

