

Supplementary Tables

Table S1: Instrumental variables of Omega-3 fatty acids for knee osteoarthritis and hip osteoarthritis.

| SNP | effect_allele | other_allele | beta | eaf | se | F |
|-------------|---------------|--------------|--------|-------|-------|----------|
| rs10096633 | T | C | -0.039 | 0.124 | 0.006 | 99.027 |
| rs10162642 | A | G | -0.049 | 0.210 | 0.005 | 237.809 |
| rs10184054 | G | C | -0.036 | 0.224 | 0.005 | 138.023 |
| rs11242109 | T | G | 0.024 | 0.479 | 0.004 | 87.590 |
| rs112875651 | A | G | -0.087 | 0.392 | 0.004 | 1071.996 |
| rs11563251 | T | C | 0.035 | 0.111 | 0.006 | 72.960 |
| rs11681659 | T | C | -0.025 | 0.716 | 0.004 | 78.449 |
| rs117143374 | C | T | -0.037 | 0.142 | 0.006 | 100.665 |
| rs1260326 | C | T | -0.082 | 0.604 | 0.004 | 976.166 |
| rs12914626 | T | C | -0.059 | 0.702 | 0.004 | 440.894 |
| rs12976395 | C | G | 0.029 | 0.505 | 0.004 | 108.121 |
| rs13424225 | T | G | 0.022 | 0.450 | 0.004 | 73.339 |
| rs139974673 | C | T | 0.118 | 0.026 | 0.013 | 212.235 |
| rs144018203 | C | G | 0.107 | 0.011 | 0.020 | 68.367 |
| rs157592 | C | A | 0.028 | 0.185 | 0.005 | 70.257 |
| rs1672811 | C | T | 0.025 | 0.748 | 0.005 | 71.907 |
| rs16940904 | T | C | -0.036 | 0.227 | 0.005 | 132.706 |
| rs1800978 | G | C | -0.037 | 0.124 | 0.006 | 90.880 |
| rs182611493 | G | A | -0.210 | 0.013 | 0.020 | 286.560 |
| rs2072114 | G | A | -0.320 | 0.123 | 0.006 | 6746.634 |
| rs2131925 | T | G | 0.071 | 0.646 | 0.004 | 704.494 |
| rs2269928 | G | T | -0.154 | 0.226 | 0.005 | 2439.528 |
| rs2278426 | T | C | -0.073 | 0.035 | 0.011 | 108.292 |
| rs2394976 | T | G | -0.046 | 0.162 | 0.006 | 175.485 |
| rs261291 | C | T | 0.113 | 0.356 | 0.004 | 1783.202 |
| rs34707604 | C | T | 0.046 | 0.259 | 0.005 | 221.129 |
| rs35135293 | T | C | -0.021 | 0.517 | 0.004 | 65.427 |
| rs4000713 | A | G | -0.029 | 0.295 | 0.004 | 104.402 |
| rs4367411 | T | C | 0.031 | 0.207 | 0.005 | 83.753 |
| rs4704834 | G | A | 0.029 | 0.644 | 0.004 | 116.729 |
| rs5112 | G | C | 0.048 | 0.534 | 0.004 | 297.528 |
| rs55891451 | C | A | 0.034 | 0.202 | 0.005 | 113.214 |
| rs58542926 | T | C | -0.172 | 0.074 | 0.008 | 1226.261 |
| rs58983615 | T | A | -0.099 | 0.020 | 0.015 | 111.534 |
| rs6129624 | A | G | -0.026 | 0.335 | 0.004 | 86.527 |

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|------------|---|---|--------|-------|-------|---------|
| rs62466318 | T | C | -0.072 | 0.204 | 0.005 | 507.465 |
| rs629301 | T | G | 0.038 | 0.778 | 0.005 | 153.707 |
| rs6601924 | C | T | 0.035 | 0.846 | 0.006 | 96.682 |
| rs6693447 | G | T | 0.023 | 0.462 | 0.004 | 79.207 |
| rs673335 | C | T | -0.067 | 0.160 | 0.006 | 365.572 |
| rs72789541 | A | T | -0.081 | 0.296 | 0.004 | 826.638 |
| rs73109460 | A | G | -0.035 | 0.124 | 0.006 | 79.047 |
| rs74945822 | A | G | -0.048 | 0.143 | 0.006 | 166.085 |
| rs76376981 | C | G | -0.149 | 0.046 | 0.010 | 558.638 |
| rs7924036 | T | G | 0.023 | 0.504 | 0.004 | 82.553 |
| rs7970695 | A | G | -0.025 | 0.621 | 0.004 | 90.944 |
| rs9295128 | T | G | -0.130 | 0.017 | 0.016 | 164.385 |
| rs964184 | C | G | -0.117 | 0.867 | 0.006 | 956.146 |
| rs9947684 | G | A | 0.042 | 0.654 | 0.004 | 245.697 |
| rs9963974 | A | T | 0.031 | 0.319 | 0.004 | 124.368 |
| rs9987289 | G | A | 0.057 | 0.909 | 0.007 | 160.754 |

Table S2: Instrumental variables of Omega-6 fatty acids for knee osteoarthritis.

| SNP | effect_allele | other_allele | beta | eaf | se | F |
|-------------|---------------|--------------|--------|-------|-------|----------|
| rs1002687 | A | G | 0.091 | 0.645 | 0.004 | 1166.075 |
| rs1065853 | T | G | -0.199 | 0.081 | 0.007 | 1783.454 |
| rs1081105 | C | A | 0.119 | 0.028 | 0.012 | 231.989 |
| rs11239588 | G | A | 0.029 | 0.268 | 0.005 | 97.879 |
| rs112875651 | A | G | -0.064 | 0.392 | 0.004 | 578.357 |
| rs114863007 | A | G | -0.046 | 0.095 | 0.007 | 108.884 |
| rs115478735 | T | A | 0.042 | 0.183 | 0.005 | 164.256 |
| rs11789603 | T | C | 0.048 | 0.109 | 0.006 | 136.084 |
| rs11854242 | T | C | -0.038 | 0.275 | 0.005 | 178.650 |
| rs1260326 | C | T | -0.064 | 0.604 | 0.004 | 607.683 |
| rs12740374 | T | G | -0.057 | 0.221 | 0.005 | 348.097 |
| rs13108218 | G | A | -0.035 | 0.615 | 0.004 | 177.350 |
| rs141469619 | G | A | 0.111 | 0.010 | 0.021 | 67.295 |
| rs142158911 | A | G | -0.094 | 0.117 | 0.006 | 558.348 |
| rs1461729 | G | A | 0.084 | 0.899 | 0.007 | 388.137 |
| rs1800961 | T | C | -0.074 | 0.030 | 0.012 | 99.886 |
| rs183130 | T | C | 0.062 | 0.324 | 0.004 | 509.111 |
| rs1883711 | C | G | 0.092 | 0.031 | 0.012 | 151.489 |
| rs200730299 | C | A | -0.037 | 0.194 | 0.005 | 113.569 |
| rs2378390 | A | G | -0.033 | 0.141 | 0.006 | 82.036 |
| rs261290 | C | T | -0.097 | 0.655 | 0.004 | 1290.077 |

| | | | | | | |
|------------|---|---|--------|-------|-------|----------|
| rs2737245 | T | G | -0.027 | 0.279 | 0.005 | 92.905 |
| rs2740488 | C | A | -0.050 | 0.265 | 0.005 | 299.750 |
| rs28383314 | C | T | 0.039 | 0.623 | 0.004 | 218.170 |
| rs2986164 | A | G | -0.025 | 0.536 | 0.004 | 80.426 |
| rs34121855 | G | T | -0.050 | 0.204 | 0.005 | 243.995 |
| rs35603463 | C | T | 0.034 | 0.567 | 0.005 | 120.765 |
| rs3734854 | A | G | 0.048 | 0.065 | 0.008 | 84.390 |
| rs3770586 | T | C | -0.023 | 0.484 | 0.004 | 80.363 |
| rs3817335 | A | T | -0.028 | 0.351 | 0.004 | 108.508 |
| rs4008004 | A | C | 0.033 | 0.222 | 0.005 | 114.291 |
| rs4299376 | T | G | -0.035 | 0.676 | 0.004 | 167.854 |
| rs4439799 | T | C | 0.022 | 0.502 | 0.004 | 76.823 |
| rs4704210 | C | G | 0.047 | 0.374 | 0.004 | 314.350 |
| rs4766578 | A | T | 0.028 | 0.503 | 0.004 | 118.166 |
| rs4860948 | A | T | 0.028 | 0.244 | 0.005 | 87.894 |
| rs486142 | A | G | 0.030 | 0.517 | 0.004 | 141.944 |
| rs534417 | G | A | 0.039 | 0.875 | 0.006 | 103.166 |
| rs56322906 | A | G | -0.100 | 0.035 | 0.011 | 209.766 |
| rs5754102 | A | C | -0.032 | 0.183 | 0.005 | 89.764 |
| rs58542926 | T | C | -0.128 | 0.074 | 0.008 | 693.781 |
| rs633695 | G | A | 0.073 | 0.292 | 0.004 | 663.976 |
| rs6471717 | A | G | -0.029 | 0.663 | 0.004 | 115.170 |
| rs6547409 | T | C | -0.081 | 0.051 | 0.009 | 193.510 |
| rs6602911 | T | C | 0.026 | 0.360 | 0.004 | 93.976 |
| rs672889 | G | T | 0.076 | 0.860 | 0.006 | 433.088 |
| rs6882345 | A | G | 0.045 | 0.633 | 0.004 | 288.401 |
| rs6934962 | T | C | 0.023 | 0.400 | 0.004 | 77.043 |
| rs6938647 | C | A | -0.048 | 0.782 | 0.005 | 236.919 |
| rs7139079 | A | G | -0.030 | 0.593 | 0.004 | 130.578 |
| rs72997616 | A | C | -0.052 | 0.094 | 0.007 | 137.940 |
| rs740516 | G | C | -0.032 | 0.151 | 0.006 | 77.841 |
| rs75406471 | A | G | -0.031 | 0.155 | 0.006 | 78.924 |
| rs7750288 | G | A | 0.025 | 0.285 | 0.004 | 77.995 |
| rs77960347 | G | A | 0.276 | 0.013 | 0.018 | 611.776 |
| rs7831074 | G | C | 0.028 | 0.759 | 0.005 | 76.063 |
| rs79429216 | A | G | 0.151 | 0.013 | 0.018 | 176.327 |
| rs870526 | T | C | -0.032 | 0.521 | 0.004 | 155.868 |
| rs9295128 | T | G | -0.196 | 0.017 | 0.016 | 378.873 |
| rs9304381 | T | C | 0.070 | 0.818 | 0.005 | 449.938 |
| rs9616847 | T | A | 0.024 | 0.388 | 0.004 | 82.058 |
| rs964184 | C | G | -0.139 | 0.867 | 0.006 | 1365.365 |

Table S3: Instrumental variables of Omega-6 fatty acids for hip osteoarthritis.

| SNP | effect_allele | other_allele | beta | eaf | se | F |
|-------------|---------------|--------------|--------|-------|-------|----------|
| rs1002687 | A | G | 0.091 | 0.645 | 0.004 | 1166.075 |
| rs1065853 | T | G | -0.199 | 0.081 | 0.007 | 1783.454 |
| rs1081105 | C | A | 0.119 | 0.028 | 0.012 | 231.989 |
| rs11239588 | G | A | 0.029 | 0.268 | 0.005 | 97.879 |
| rs112875651 | A | G | -0.064 | 0.392 | 0.004 | 578.357 |
| rs115478735 | T | A | 0.042 | 0.183 | 0.005 | 164.256 |
| rs11789603 | T | C | 0.048 | 0.109 | 0.006 | 136.084 |
| rs11854242 | T | C | -0.038 | 0.275 | 0.005 | 178.650 |
| rs1260326 | C | T | -0.064 | 0.604 | 0.004 | 607.683 |
| rs12740374 | T | G | -0.057 | 0.221 | 0.005 | 348.097 |
| rs13108218 | G | A | -0.035 | 0.615 | 0.004 | 177.350 |
| rs141469619 | G | A | 0.111 | 0.010 | 0.021 | 67.295 |
| rs142158911 | A | G | -0.094 | 0.117 | 0.006 | 558.348 |
| rs1461729 | G | A | 0.084 | 0.899 | 0.007 | 388.137 |
| rs1800961 | T | C | -0.074 | 0.030 | 0.012 | 99.886 |
| rs183130 | T | C | 0.062 | 0.324 | 0.004 | 509.111 |
| rs1883711 | C | G | 0.092 | 0.031 | 0.012 | 151.489 |
| rs200730299 | C | A | -0.037 | 0.194 | 0.005 | 113.569 |
| rs2378390 | A | G | -0.033 | 0.141 | 0.006 | 82.036 |
| rs261290 | C | T | -0.097 | 0.655 | 0.004 | 1290.077 |
| rs2737245 | T | G | -0.027 | 0.279 | 0.005 | 92.905 |
| rs2740488 | C | A | -0.050 | 0.265 | 0.005 | 299.750 |
| rs28383314 | C | T | 0.039 | 0.623 | 0.004 | 218.170 |
| rs2986164 | A | G | -0.025 | 0.536 | 0.004 | 80.426 |
| rs34121855 | G | T | -0.050 | 0.204 | 0.005 | 243.995 |
| rs35603463 | C | T | 0.034 | 0.567 | 0.005 | 120.765 |
| rs3734854 | A | G | 0.048 | 0.065 | 0.008 | 84.390 |
| rs3770586 | T | C | -0.023 | 0.484 | 0.004 | 80.363 |
| rs3817335 | A | T | -0.028 | 0.351 | 0.004 | 108.508 |
| rs4008004 | A | C | 0.033 | 0.222 | 0.005 | 114.291 |
| rs4299376 | T | G | -0.035 | 0.676 | 0.004 | 167.854 |
| rs4439799 | T | C | 0.022 | 0.502 | 0.004 | 76.823 |
| rs4704210 | C | G | 0.047 | 0.374 | 0.004 | 314.350 |
| rs4766578 | A | T | 0.028 | 0.503 | 0.004 | 118.166 |
| rs4860948 | A | T | 0.028 | 0.244 | 0.005 | 87.894 |
| rs486142 | A | G | 0.030 | 0.517 | 0.004 | 141.944 |
| rs534417 | G | A | 0.039 | 0.875 | 0.006 | 103.166 |
| rs56322906 | A | G | -0.100 | 0.035 | 0.011 | 209.766 |
| rs5754102 | A | C | -0.032 | 0.183 | 0.005 | 89.764 |
| rs58542926 | T | C | -0.128 | 0.074 | 0.008 | 693.781 |
| rs633695 | G | A | 0.073 | 0.292 | 0.004 | 663.976 |

| | | | | | | |
|------------|---|---|--------|-------|-------|----------|
| rs6471717 | A | G | -0.029 | 0.663 | 0.004 | 115.170 |
| rs6547409 | T | C | -0.081 | 0.051 | 0.009 | 193.510 |
| rs6602911 | T | C | 0.026 | 0.360 | 0.004 | 93.976 |
| rs672889 | G | T | 0.076 | 0.860 | 0.006 | 433.088 |
| rs6882345 | A | G | 0.045 | 0.633 | 0.004 | 288.401 |
| rs6938647 | C | A | -0.048 | 0.782 | 0.005 | 236.919 |
| rs7139079 | A | G | -0.030 | 0.593 | 0.004 | 130.578 |
| rs72997616 | A | C | -0.052 | 0.094 | 0.007 | 137.940 |
| rs740516 | G | C | -0.032 | 0.151 | 0.006 | 77.841 |
| rs75406471 | A | G | -0.031 | 0.155 | 0.006 | 78.924 |
| rs7750288 | G | A | 0.025 | 0.285 | 0.004 | 77.995 |
| rs77960347 | G | A | 0.276 | 0.013 | 0.018 | 611.776 |
| rs7831074 | G | C | 0.028 | 0.759 | 0.005 | 76.063 |
| rs79429216 | A | G | 0.151 | 0.013 | 0.018 | 176.327 |
| rs870526 | T | C | -0.032 | 0.521 | 0.004 | 155.868 |
| rs9295128 | T | G | -0.196 | 0.017 | 0.016 | 378.873 |
| rs9304381 | T | C | 0.070 | 0.818 | 0.005 | 449.938 |
| rs9616847 | T | A | 0.024 | 0.388 | 0.004 | 82.058 |
| rs964184 | C | G | -0.139 | 0.867 | 0.006 | 1365.365 |
