

Supplementary Table 1 – GWAS-implicated aBMD variants discovered in adults that were used to calculate genetic scores

| Estrada <i>et al.</i> : Femoral Neck (FNBMD) & Lumbar Spine (LSBMD) GWAS Implicated Bone Density Variants |                     |            |        |      |                               |                   |
|---|---------------------|------------|--------|------|-------------------------------|-------------------|
| Region  | Nearest Gene(s)     | SNP        | Allele | Freq | P-value (Skeletal Site)       | Beta              |
| 7q36.1  | <i>ABCF2</i>        | rs7812088  | A      | 0.13 | 7 x 10 <sup>-9</sup> (FNBMD)  | .05 unit increase |
| 13q14.11  | <i>AKAP11</i>       | rs9533090  | T      | 0.49 | 5 x 10 <sup>-68</sup> (LSBMD) | .1 unit decrease  |
| 2q13  | <i>ANAPC1</i>       | rs17040773 | A      | 0.76 | 2 x 10 <sup>-9</sup> (FNBMD)  | .04 unit increase |
| 11p11.2   | <i>ARHGAP1/LRP4</i> | rs7932354  | T      | 0.31 | 5 x 10 <sup>-18</sup> (FNBMD) | .05 unit increase |
| 16p13.3   | <i>AXIN1</i>        | rs9921222  | T      | 0.48 | 1 x 10 <sup>-16</sup> (LSBMD) | .04 unit decrease |
| 12q23.3   | <i>C12orf23</i>     | rs1053051  | T      | 0.52 | 1 x 10 <sup>-9</sup> (FNBMD)  | .03 unit decrease |
| 16p13.3   | <i>C16orf38</i>     | rs13336428 | A      | 0.43 | 1 x 10 <sup>-16</sup> (FNBMD) | .04 unit decrease |
| 17q21.31  | <i>C17orf53</i>     | rs227584   | A      | 0.7  | 3 x 10 <sup>-24</sup> (FNBMD) | .06 unit decrease |
| 18p11.21  | <i>C18orf19</i>     | rs4796995  | A      | 0.63 | 5 x 10 <sup>-8</sup> (FNBMD)  | .03 unit increase |
| 6q25.1  | <i>C6orf97</i>      | rs4869742  | T      | 0.31 | 4 x 10 <sup>-35</sup> (LSBMD) | .08 unit decrease |
| 6q25.1  | <i>C6orf97/ESR1</i> | rs7751941  | A      | 0.21 | 2 x 10 <sup>-24</sup> (LSBMD) | .08 unit decrease |
| 7q31.31   | <i>C7orf58</i>      | rs13245690 | A      | 0.65 | 2 x 10 <sup>-11</sup> (LSBMD) | .05 unit increase |
| 6p22.3  | <i>CDKAL1</i>       | rs9466056  | A      | 0.38 | 3 x 10 <sup>-13</sup> (FNBMD) | .04 unit decrease |
| 10q24.2   | <i>CPN1</i>         | rs7084921  | T      | 0.39 | 9 x 10 <sup>-10</sup> (FNBMD) | .03 unit increase |
| 3p22.1  | <i>CTNNB1</i>       | rs430727   | T      | 0.48 | 4 x 10 <sup>-25</sup> (FNBMD) | .06 unit decrease |
| 16q12.1   | <i>CYLD</i>         | rs1564981  | A      | 0.5  | 2 x 10 <sup>-10</sup> (LSBMD) | .04 unit decrease |
| 11p14.1   | <i>DCDC5</i>        | rs163879   | T      | 0.68 | 2 x 10 <sup>-11</sup> (LSBMD) | .04 unit decrease |
| 12q13.12  | <i>DHH</i>          | rs12821008 | T      | 0.39 | 1 x 10 <sup>-15</sup> (LSBMD) | .05 unit increase |
| 1q24.3  | <i>DNM3</i>         | rs479336   | T      | 0.74 | 9 x 10 <sup>-15</sup> (FNBMD) | .04 unit decrease |
| 12p13.33  | <i>ERC1/WNT5B</i>   | rs2887571  | A      | 0.76 | 6 x 10 <sup>-12</sup> (LSBMD) | .04 unit decrease |
| 16q24.1   | <i>FOXL1</i>        | rs10048146 | A      | 0.8  | 1 x 10 <sup>-14</sup> (FNBMD) | .05 unit increase |
| 9q34.11   | <i>FUBP3</i>        | rs7851693  | C      | 0.64 | 3 x 10 <sup>-22</sup> (FNBMD) | .05 unit increase |
| 2q24.3  | <i>GALNT3</i>       | rs1346004  | A      | 0.5  | 4 x 10 <sup>-30</sup> (LSBMD) | .06 unit decrease |
| 19q13.11  | <i>GPATCH1</i>      | rs10416218 | T      | 0.73 | 7 x 10 <sup>-11</sup> (LSBMD) | .04 unit decrease |
| 12q13.13  | <i>HOXC6</i>        | rs736825   | C      | 0.56 | 8 x 10 <sup>-16</sup> (LSBMD) | .05 unit increase |
| 4p16.3  | <i>IDUA</i>         | rs3755955  | A      | 0.16 | 5 x 10 <sup>-15</sup> (LSBMD) | .06 unit decrease |
| 2q14.2  | <i>INSIG2</i>       | rs1878526  | A      | 0.22 | 1 x 10 <sup>-10</sup> (LSBMD) | .04 unit increase |
| 20p12.2   | <i>JAG1</i>         | rs3790160  | T      | 0.5  | 3 x 10 <sup>-19</sup> (LSBMD) | .05 unit increase |

|          |                       |            |   |      |                               |                   |
|----------|-----------------------|------------|---|------|-------------------------------|-------------------|
| 10q22.3  | <i>KCNMA1</i>         | rs7071206  | T | 0.78 | 5 x 10 <sup>-19</sup> (LSBMD) | .06 unit decrease |
| 3q13.2   | <i>KIAA2018</i>       | rs1026364  | T | 0.37 | 4 x 10 <sup>-10</sup> (FNBMD) | .03 unit increase |
| 12p11.22 | <i>KLHDC5</i>         | rs7953528  | A | 0.18 | 2 x 10 <sup>-12</sup> (FNBMD) | .05 unit increase |
| 3q25.31  | <i>LEKR1</i>          | rs344081   | T | 0.87 | 4 x 10 <sup>-12</sup> (LSBMD) | .06 unit increase |
| 11p14.1  | <i>LIN7C</i>          | rs10835187 | T | 0.55 | 5 x 10 <sup>-8</sup> (LSBMD)  | .03 unit decrease |
| 11q13.2  | <i>LRP5</i>           | rs3736228  | T | 0.16 | 2 x 10 <sup>-26</sup> (LSBMD) | .08 unit decrease |
| 17q21.31 | <i>MAPT/WNT3</i>      | rs1864325  | T | 0.22 | 5 x 10 <sup>-11</sup> (LSBMD) | .04 unit decrease |
| 14q32.32 | <i>MARK3</i>          | rs11623869 | T | 0.35 | 5 x 10 <sup>-16</sup> (FNBMD) | .04 unit decrease |
| 10q21.1  | <i>MBL2/DKK1</i>      | rs1373004  | T | 0.13 | 2 x 10 <sup>-12</sup> (LSBMD) | .06 unit decrease |
| 5q14.3   | <i>MEF2C</i>          | rs1366594  | A | 0.54 | 4 x 10 <sup>-61</sup> (FNBMD) | .08 unit increase |
| 4q22.1   | <i>MEPE</i>           | rs6532023  | T | 0.34 | 1 x 10 <sup>-27</sup> (LSBMD) | .06 unit increase |
| 10p12.1  | <i>MPP7</i>           | rs3905706  | T | 0.22 | 2 x 10 <sup>-16</sup> (LSBMD) | .05 unit increase |
| 16p13.11 | <i>NTANI</i>          | rs4985155  | A | 0.67 | 2 x 10 <sup>-10</sup> (FNBMD) | .03 unit decrease |
| 2p21     | <i>PKDCC</i>          | rs7584262  | T | 0.23 | 1 x 10 <sup>-9</sup> (FNBMD)  | .04 unit increase |
| 14q32.11 | <i>RPS6KA5</i>        | rs1286083  | T | 0.81 | 2 x 10 <sup>-15</sup> (FNBMD) | .05 unit decrease |
| 6q22.33  | <i>RSPO3</i>          | rs13204965 | A | 0.76 | 8 x 10 <sup>-12</sup> (FNBMD) | .04 unit increase |
| 16q12.1  | <i>SALL1</i>          | rs1566045  | T | 0.8  | 2 x 10 <sup>-22</sup> (FNBMD) | .06 unit decrease |
| 7q21.3   | <i>SLC25A13</i>       | rs4727338  | C | 0.67 | 8 x 10 <sup>-48</sup> (FNBMD) | .08 unit increase |
| 17p13.3  | <i>SMG6</i>           | rs4790881  | A | 0.69 | 1 x 10 <sup>-18</sup> (FNBMD) | .05 unit increase |
| 17q21.31 | <i>SOST</i>           | rs4792909  | T | 0.37 | 2 x 10 <sup>-11</sup> (FNBMD) | .04 unit increase |
| 11p15.2  | <i>SOX6</i>           | rs7108738  | T | 0.83 | 1 x 10 <sup>-32</sup> (FNBMD) | .08 unit decrease |
| 17q24.3  | <i>SOX9</i>           | rs7217932  | A | 0.46 | 2 x 10 <sup>-11</sup> (FNBMD) | .03 unit increase |
| 12q13.13 | <i>SP7</i>            | rs2016266  | A | 0.68 | 3 x 10 <sup>-20</sup> (LSBMD) | .05 unit decrease |
| 2p16.2   | <i>SPTBN1</i>         | rs4233949  | C | 0.38 | 2 x 10 <sup>-18</sup> (LSBMD) | .05 unit increase |
| 7p14.1   | <i>STARD3NL/SFRP4</i> | rs6959212  | T | 0.32 | 4 x 10 <sup>-38</sup> (LSBMD) | .07 unit decrease |
| 6p21.1   | <i>SUPT3H</i>         | rs11755164 | T | 0.4  | 6 x 10 <sup>-11</sup> (LSBMD) | .04 unit decrease |
| 18q21.33 | <i>TNFRSF11A</i>      | rs884205   | A | 0.27 | 2 x 10 <sup>-17</sup> (LSBMD) | .05 unit decrease |
| 8q24.12  | <i>TNFRSF11B</i>      | rs2062377  | A | 0.57 | 3 x 10 <sup>-39</sup> (LSBMD) | .08 unit decrease |
| 7p14.1   | <i>TXNDC3/SFRP4</i>   | rs10226308 | A | 0.84 | 6 x 10 <sup>-13</sup> (LSBMD) | .06 unit decrease |
| 1p31.3   | <i>WLS</i>            | rs12407028 | T | 0.6  | 3 x 10 <sup>-45</sup> (LSBMD) | .08 unit increase |
| 1p31.3   | <i>WLS</i>            | rs17482952 | A | 0.93 | 1 x 10 <sup>-11</sup> (FNBMD) | .08 unit increase |
| 7q31.31  | <i>WNT16</i>          | rs3801387  | A | 0.74 | 3 x 10 <sup>-51</sup> (LSBMD) | .09 unit decrease |

|         |                    |           |   |      |                               |                   |
|---------|--------------------|-----------|---|------|-------------------------------|-------------------|
| 1p36.12 | <i>WNT4</i>        | rs7521902 | A | 0.31 | 1 x 10 <sup>-10</sup> (LSBMD) | .05 unit decrease |
| 8q13.3  | <i>XKR9/LACTB2</i> | rs7017914 | A | 0.49 | 3 x 10 <sup>-7</sup> (FNBMD)  | .03 unit increase |
| 1p36.12 | <i>ZBTB40/WNT4</i> | rs6426749 | C | 0.17 | 7 x 10 <sup>-57</sup> (FNBMD) | .11 unit increase |

Supplementary Table 2 – Characteristics of the trans-ethnic and European ancestry specific samples used in the GWAS analyses

|                          | Trans-Ethnic<br>(N=1,885) | European Ancestry<br>(N=1,419) |
|--------------------------|---------------------------|--------------------------------|
| Discovery Cohort, N      | 1399                      | 933                            |
| Replication Cohort, N    | 486                       | 486                            |
|                          |                           |                                |
| Age, mean (SD), years    | 11.5 (4.3)                | 11.4 (4.3)                     |
| Female, N (%)            | 51.2                      | 51.6                           |
| European Ancestry, N (%) | 75.3                      |                                |
| African Ancestry, N (%)  | 18.0                      |                                |
| Asian Ancestry, N (%)    | 0.05                      |                                |

Supplementary Table 3 – European ancestry GWAS signals observed for the principal component loading scores

| Phenotype | Sex | Chr. | SNP        | Position <sup>b</sup> | Allele | EAF  | Discovery (N=470) <sup>a</sup> |       |          | Replication (N=238) <sup>a</sup> |       |          | Combined (N=708) <sup>a</sup> |      |          | Nearest Gene     |
|-----------|-----|------|------------|-----------------------|--------|------|--------------------------------|-------|----------|----------------------------------|-------|----------|-------------------------------|------|----------|------------------|
|           |     |      |            |                       |        |      | Beta                           | SE    | P-value  | Beta                             | SE    | P-value  | Beta                          | SE   | P-value  |                  |
| PC1       | F   | 8    | rs75321045 | 40483038              | G      | 0.95 | 0.58                           | 0.13  | 1.93E-05 | 0.57                             | 0.12  | 1.97E-06 | 0.61                          | 0.11 | 2.50E-08 | <i>ZMAT4</i>     |
| PC2       | MF  | 7    | rs9640799  | 120830215             | A      | 0.40 | -0.29                          | 0.050 | 8.66E-09 | -0.25                            | 0.064 | 1.37E-04 | -0.27                         | 0.04 | 4.92E-12 | <i>CPED1</i>     |
| PC2       | F   | 7    | rs34249834 | 120774116             | C      | 0.65 | 0.37                           | 0.066 | 2.54E-08 | 0.35                             | 0.081 | 5.00E-11 | 0.32                          | 0.05 | 3.66E-12 | <i>CPED1</i>     |
| PC3       | F   | 2    | rs58649746 | 73351806              | G      | 0.87 | -0.41                          | 0.093 | 1.44E-05 | -0.40                            | 0.081 | 1.16E-06 | -0.42                         | 0.07 | 4.76E-09 | <i>RAB11FIP5</i> |

<sup>a</sup>The sample sizes given in parentheses are specific to Females. Abbreviations: EAF, effect allele frequency; F, female; M, male; SE, standard error, SNP, single nucleotide polymorphism. PC1, principal component 1 (concordant phenotypic model); PC2, principal component 2 (discordant phenotypic model for distal radius versus the hip and spine aBMD); PC3, principal component 3 (discordant phenotypic model for spine versus the hip and distal radius aBMD). <sup>b</sup>Reference genome: GRCh37 (hg19)

Supplementary Table 4 – All *CPEDI* GWAS signals by position and TAD boundaries for females

| Sex | Cohort | Ancestry | SNP        | Position  | Allele | EAF   | Beta | SE   | P-Value  | Topological Associated Domains (TADs) |                                   |
|-----|--------|----------|------------|-----------|--------|-------|------|------|----------|---------------------------------------|-----------------------------------|
|     |        |          |            |           |        |       |      |      |          | Start-End Positions                   | Other Genes in TAD                |
| F   | DR     | European | rs1861000  | 120725354 | T      | 0.591 | 0.26 | 0.05 | 2.77E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs1861001  | 120725502 | A      | 0.591 | 0.26 | 0.05 | 2.58E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs2968349  | 120726926 | A      | 0.58  | 0.25 | 0.04 | 2.40E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs2110283  | 120727858 | C      | 0.672 | 0.27 | 0.05 | 1.89E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs2968345  | 120728872 | A      | 0.667 | 0.27 | 0.05 | 1.55E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs6956201  | 120730822 | G      | 0.689 | 0.28 | 0.05 | 4.40E-09 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs6466767  | 120731577 | C      | 0.681 | 0.28 | 0.05 | 3.37E-09 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs6961525  | 120731870 | G      | 0.681 | 0.28 | 0.05 | 3.36E-09 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs1917113  | 120735062 | G      | 0.688 | 0.27 | 0.05 | 1.86E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs798934   | 120736671 | A      | 0.666 | 0.26 | 0.05 | 3.47E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs12673968 | 120737058 | G      | 0.679 | 0.28 | 0.05 | 7.73E-09 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs1554635  | 120739237 | A      | 0.688 | 0.28 | 0.05 | 1.47E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs6466769  | 120742103 | A      | 0.688 | 0.27 | 0.05 | 2.20E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs6954757  | 120743182 | G      | 0.689 | 0.28 | 0.05 | 1.59E-08 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs13223036 | 120747308 | T      | 0.692 | 0.30 | 0.05 | 1.39E-09 | 120425000 - 120750000                 | <i>ING3 &amp; TSPAN12</i>         |
| F   | DR     | European | rs798943   | 120758899 | G      | 0.646 | 0.31 | 0.05 | 2.96E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs2968338  | 120759424 | T      | 0.643 | 0.31 | 0.05 | 4.31E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs1296405  | 120759606 | G      | 0.648 | 0.31 | 0.05 | 5.35E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs13245677 | 120761932 | G      | 0.663 | 0.32 | 0.05 | 1.16E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs798946   | 120762842 | T      | 0.647 | 0.32 | 0.05 | 1.71E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs12673770 | 120766322 | C      | 0.648 | 0.30 | 0.05 | 9.72E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs12706313 | 120767660 | A      | 0.653 | 0.31 | 0.05 | 5.75E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs34320754 | 120770437 | G      | 0.652 | 0.32 | 0.05 | 1.60E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs34249834 | 120774116 | C      | 0.654 | 0.33 | 0.05 | 3.66E-12 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs7801723  | 120774160 | C      | 0.665 | 0.33 | 0.05 | 9.92E-12 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F   | DR     | European | rs12706318 | 120774941 | A      | 0.654 | 0.32 | 0.05 | 1.88E-11 | 120750000 - 121670000                 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |

|   |    |          |                  |           |   |       |       |      |          |                       |                                   |
|---|----|----------|------------------|-----------|---|-------|-------|------|----------|-----------------------|-----------------------------------|
| F | DR | European | rs10953928       | 120775815 | G | 0.65  | 0.32  | 0.05 | 1.62E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs13232048       | 120776281 | G | 0.653 | 0.32  | 0.05 | 6.73E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs35758028       | 120776860 | G | 0.651 | 0.31  | 0.05 | 2.58E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6947453        | 120777183 | G | 0.651 | 0.31  | 0.05 | 2.57E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6952113        | 120777619 | G | 0.651 | 0.31  | 0.05 | 2.57E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6951990        | 120777717 | C | 0.664 | 0.32  | 0.05 | 1.83E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs34770628       | 120779576 | C | 0.665 | 0.33  | 0.05 | 5.56E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs872007         | 120779949 | C | 0.652 | 0.32  | 0.05 | 1.29E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs872008         | 120779990 | G | 0.652 | 0.32  | 0.05 | 1.29E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs868053         | 120780285 | G | 0.652 | 0.32  | 0.05 | 1.26E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs884373         | 120780483 | G | 0.652 | 0.32  | 0.05 | 1.24E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10234955       | 120782962 | A | 0.358 | -0.32 | 0.05 | 1.13E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10235232       | 120783206 | A | 0.358 | -0.32 | 0.05 | 1.13E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10275439       | 120783425 | A | 0.358 | -0.32 | 0.05 | 1.12E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10261671       | 120783551 | T | 0.357 | -0.31 | 0.05 | 2.41E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10280039       | 120784867 | A | 0.361 | -0.30 | 0.05 | 8.10E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs13245690       | 120785064 | A | 0.665 | 0.33  | 0.05 | 7.78E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120785124:I | 120785124 | C | 0.375 | -0.29 | 0.05 | 5.06E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10258619       | 120786416 | G | 0.362 | -0.30 | 0.05 | 1.54E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120788345:I | 120788345 | A | 0.408 | -0.28 | 0.05 | 3.62E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs74525916       | 120788346 | C | 0.397 | -0.29 | 0.05 | 2.92E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1404264        | 120788347 | A | 0.397 | -0.28 | 0.05 | 2.96E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120789334:D | 120789334 | A | 0.652 | 0.33  | 0.05 | 3.62E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6950680        | 120790287 | A | 0.665 | 0.33  | 0.05 | 7.90E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs66871562       | 120795371 | A | 0.666 | 0.33  | 0.05 | 8.27E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs35789132       | 120803286 | A | 0.692 | 0.28  | 0.05 | 1.72E-08 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1112810        | 120812574 | T | 0.656 | 0.32  | 0.05 | 2.94E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs67991850       | 120813920 | C | 0.647 | 0.33  | 0.05 | 8.44E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs34275932       | 120816329 | C | 0.626 | 0.30  | 0.05 | 8.78E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs7798060        | 120822386 | C | 0.641 | 0.31  | 0.05 | 7.35E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |

|   |    |          |                  |           |   |       |       |      |          |                       |                                   |
|---|----|----------|------------------|-----------|---|-------|-------|------|----------|-----------------------|-----------------------------------|
| F | DR | European | rs7805735        | 120823964 | T | 0.384 | -0.30 | 0.05 | 3.35E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs7787044        | 120824247 | A | 0.381 | -0.30 | 0.05 | 4.74E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6963115        | 120825318 | C | 0.383 | -0.31 | 0.05 | 2.51E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1554634        | 120826238 | C | 0.387 | -0.31 | 0.05 | 2.30E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs28588484       | 120826569 | A | 0.384 | -0.30 | 0.05 | 3.37E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs9641660        | 120829653 | C | 0.392 | -0.29 | 0.05 | 2.07E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120829847:D | 120829847 | T | 0.348 | -0.32 | 0.05 | 6.90E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120829849:D | 120829849 | T | 0.367 | -0.28 | 0.05 | 4.31E-08 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120829851:D | 120829851 | T | 0.346 | -0.30 | 0.05 | 2.28E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs9640799        | 120830215 | A | 0.383 | -0.31 | 0.05 | 2.39E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10085590       | 120832023 | G | 0.392 | -0.29 | 0.05 | 3.63E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs7785211        | 120836056 | G | 0.392 | -0.28 | 0.05 | 8.82E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1917117        | 120839460 | G | 0.623 | 0.28  | 0.05 | 1.16E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs2402562        | 120839854 | G | 0.392 | -0.28 | 0.05 | 6.49E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs4730999        | 120841241 | G | 0.392 | -0.28 | 0.05 | 6.56E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120841523:I | 120841523 | A | 0.423 | -0.27 | 0.05 | 1.39E-08 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs7797976        | 120843516 | C | 0.641 | 0.31  | 0.05 | 8.27E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6947494        | 120843708 | T | 0.392 | -0.29 | 0.05 | 6.47E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs62469350       | 120843946 | G | 0.392 | -0.28 | 0.05 | 6.82E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1917118        | 120844324 | C | 0.622 | 0.29  | 0.05 | 8.85E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120846503:D | 120846503 | G | 0.62  | 0.28  | 0.05 | 1.46E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120846506:D | 120846506 | A | 0.623 | 0.28  | 0.05 | 2.15E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1524501        | 120846569 | A | 0.622 | 0.29  | 0.05 | 9.17E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1524502        | 120846665 | T | 0.622 | 0.29  | 0.05 | 9.18E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6954210        | 120848385 | G | 0.622 | 0.29  | 0.05 | 9.47E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6970762        | 120852034 | A | 0.633 | 0.30  | 0.05 | 1.95E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1357756        | 120852193 | T | 0.393 | -0.28 | 0.05 | 7.94E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1534015        | 120853065 | A | 0.392 | -0.28 | 0.05 | 8.92E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs7786203        | 120853607 | G | 0.63  | 0.30  | 0.05 | 8.55E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120856324:D | 120856324 | T | 0.647 | 0.32  | 0.05 | 5.19E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |



|   |    |          |                  |           |   |       |       |      |          |                       |                                   |
|---|----|----------|------------------|-----------|---|-------|-------|------|----------|-----------------------|-----------------------------------|
| F | DR | European | chr7:120856326:D | 120856326 | C | 0.622 | 0.30  | 0.05 | 1.25E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1404268        | 120857747 | A | 0.4   | -0.29 | 0.05 | 6.17E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs115203811      | 120862734 | T | 0.613 | 0.30  | 0.05 | 1.58E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs6963730        | 120863109 | C | 0.43  | -0.26 | 0.05 | 4.45E-08 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs148819132      | 120865038 | A | 0.4   | -0.30 | 0.05 | 5.57E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs9770763        | 120865482 | A | 0.615 | 0.29  | 0.05 | 8.07E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs11764551       | 120865603 | C | 0.645 | 0.30  | 0.05 | 7.33E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10242653       | 120865801 | C | 0.4   | -0.30 | 0.05 | 5.98E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs55694614       | 120866038 | C | 0.609 | 0.30  | 0.05 | 3.03E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs34088248       | 120866167 | G | 0.609 | 0.30  | 0.05 | 3.09E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs10953931       | 120867272 | T | 0.645 | 0.30  | 0.05 | 7.04E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | rs1524503        | 120868003 | A | 0.645 | 0.29  | 0.05 | 1.64E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| F | DR | European | chr7:120868495:I | 120868495 | T | 0.626 | 0.27  | 0.05 | 2.88E-08 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |

Abbreviation: DR, Discovery and replication cohorts

Supplementary Table 5 – All *CPEDI* GWAS signals by position and TAD boundaries for males and females

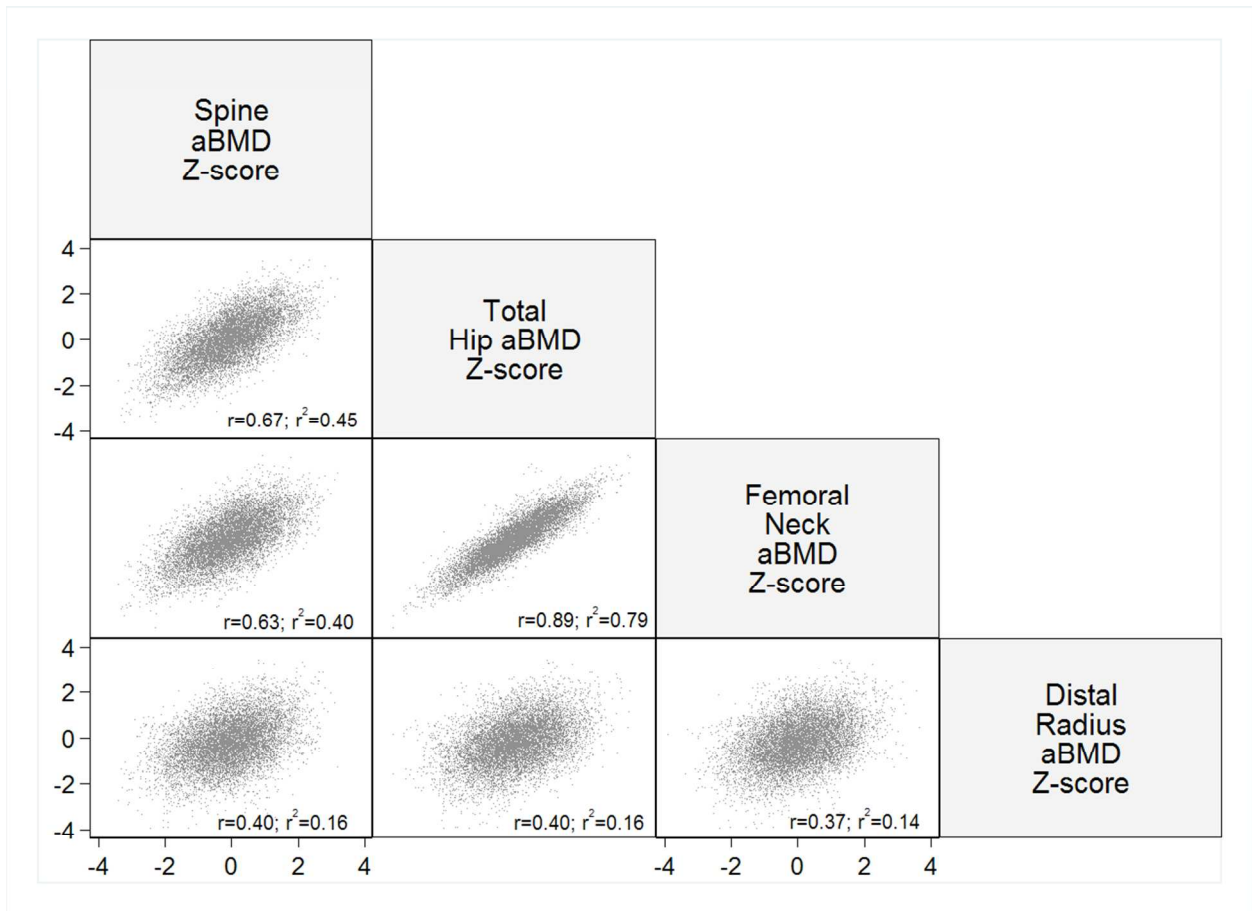
| Sex | Cohort | Chr. | SNP        | Position  | allele1 | EAF   | Beta   | SE    | P-value  | Start-End Positions   | Other Genes in TAD                            |
|-----|--------|------|------------|-----------|---------|-------|--------|-------|----------|-----------------------|---|
| M+F | DR     | 7    | rs1554635  | 120739237 | A       | 0.665 | 0.227  | 0.040 | 2.27E-08 | 120425000 - 120750000 | <i>ING3</i> & <i>TSPAN12</i>                  |
| M+F | DR     | 7    | rs6466769  | 120742103 | A       | 0.666 | 0.226  | 0.040 | 2.72E-08 | 120425000 - 120750000 | <i>ING3</i> & <i>TSPAN12</i>                  |
| M+F | DR     | 7    | rs6954757  | 120743182 | G       | 0.666 | 0.228  | 0.040 | 2.02E-08 | 120425000 - 120750000 | <i>ING3</i> & <i>TSPAN12</i>                  |
| M+F | DR     | 7    | rs13223036 | 120747308 | T       | 0.667 | 0.246  | 0.041 | 2.75E-09 | 120425000 - 120750000 | <i>ING3</i> & <i>TSPAN12</i>                  |
| M+F | DR     | 7    | rs798943   | 120758899 | G       | 0.624 | 0.267  | 0.040 | 3.13E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs2968338  | 120759424 | T       | 0.616 | 0.258  | 0.040 | 1.50E-10 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs1296405  | 120759606 | G       | 0.626 | 0.267  | 0.040 | 3.67E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs13245677 | 120761932 | G       | 0.627 | 0.261  | 0.040 | 8.48E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs798946   | 120762842 | T       | 0.625 | 0.267  | 0.040 | 2.84E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs12673770 | 120766322 | C       | 0.626 | 0.263  | 0.040 | 6.16E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs12706313 | 120767660 | A       | 0.631 | 0.265  | 0.040 | 6.84E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs34320754 | 120770437 | G       | 0.626 | 0.262  | 0.040 | 7.01E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs34249834 | 120774116 | C       | 0.627 | 0.267  | 0.040 | 3.36E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs7801723  | 120774160 | C       | 0.628 | 0.265  | 0.040 | 4.56E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs12706318 | 120774941 | A       | 0.627 | 0.262  | 0.040 | 7.44E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs10953928 | 120775815 | G       | 0.626 | 0.263  | 0.040 | 6.51E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs13232048 | 120776281 | G       | 0.626 | 0.267  | 0.040 | 3.39E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs35758028 | 120776860 | G       | 0.626 | 0.263  | 0.040 | 6.44E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs6947453  | 120777183 | G       | 0.626 | 0.263  | 0.040 | 6.43E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs6952113  | 120777619 | G       | 0.626 | 0.263  | 0.040 | 6.43E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs6951990  | 120777717 | C       | 0.628 | 0.265  | 0.040 | 4.59E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs34770628 | 120779576 | C       | 0.631 | 0.274  | 0.040 | 1.19E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs872007   | 120779949 | C       | 0.626 | 0.264  | 0.040 | 5.84E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs872008   | 120779990 | G       | 0.626 | 0.264  | 0.040 | 5.83E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs868053   | 120780285 | G       | 0.626 | 0.264  | 0.040 | 5.72E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs884373   | 120780483 | G       | 0.626 | 0.264  | 0.040 | 5.64E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |
| M+F | DR     | 7    | rs10234955 | 120782962 | A       | 0.376 | -0.268 | 0.040 | 2.53E-11 | 120750000 - 121670000 | <i>WNT16</i> , <i>FAM3C</i> , & <i>PTPRZ1</i> |

|     |    |   |                  |           |   |       |        |       |          |                       |                                   |
|-----|----|---|------------------|-----------|---|-------|--------|-------|----------|-----------------------|-----------------------------------|
| M+F | DR | 7 | rs10235232       | 120783206 | A | 0.376 | -0.268 | 0.040 | 2.50E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10275439       | 120783425 | A | 0.376 | -0.269 | 0.040 | 2.48E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10261671       | 120783551 | T | 0.376 | -0.269 | 0.040 | 2.45E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10280039       | 120784867 | A | 0.376 | -0.269 | 0.040 | 2.46E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs13245690       | 120785064 | A | 0.628 | 0.266  | 0.040 | 3.49E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120785124:I | 120785124 | C | 0.389 | -0.266 | 0.040 | 5.57E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10258619       | 120786416 | G | 0.377 | -0.268 | 0.040 | 2.63E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120788345:I | 120788345 | A | 0.423 | -0.254 | 0.041 | 7.90E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs74525916       | 120788346 | C | 0.412 | -0.262 | 0.041 | 2.48E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1404264        | 120788347 | A | 0.411 | -0.262 | 0.041 | 2.33E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120789334:D | 120789334 | A | 0.627 | 0.269  | 0.040 | 2.43E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs6950680        | 120790287 | A | 0.628 | 0.267  | 0.040 | 3.31E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs66871562       | 120795371 | A | 0.628 | 0.267  | 0.040 | 2.96E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs35789132       | 120803286 | A | 0.671 | 0.241  | 0.041 | 7.39E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1112810        | 120812574 | T | 0.626 | 0.270  | 0.040 | 2.87E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs67991850       | 120813920 | C | 0.628 | 0.275  | 0.040 | 1.58E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs34275932       | 120816329 | C | 0.602 | 0.269  | 0.039 | 1.44E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs7798060        | 120822386 | C | 0.604 | 0.271  | 0.040 | 1.05E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs7805735        | 120823964 | T | 0.399 | -0.273 | 0.039 | 5.77E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs7787044        | 120824247 | A | 0.398 | -0.271 | 0.039 | 8.62E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs6963115        | 120825318 | C | 0.398 | -0.274 | 0.039 | 5.05E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1554634        | 120826238 | C | 0.4   | -0.273 | 0.039 | 7.33E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs28588484       | 120826569 | A | 0.399 | -0.273 | 0.039 | 5.86E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs9641660        | 120829653 | C | 0.4   | -0.273 | 0.039 | 6.71E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120829847:D | 120829847 | T | 0.363 | -0.261 | 0.044 | 3.13E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120829849:D | 120829849 | T | 0.364 | -0.257 | 0.043 | 2.92E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120829851:D | 120829851 | T | 0.355 | -0.249 | 0.043 | 6.49E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs9640799        | 120830215 | A | 0.399 | -0.275 | 0.039 | 4.92E-12 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10085590       | 120832023 | G | 0.4   | -0.270 | 0.039 | 1.13E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs7785211        | 120836056 | G | 0.401 | -0.265 | 0.039 | 2.86E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |

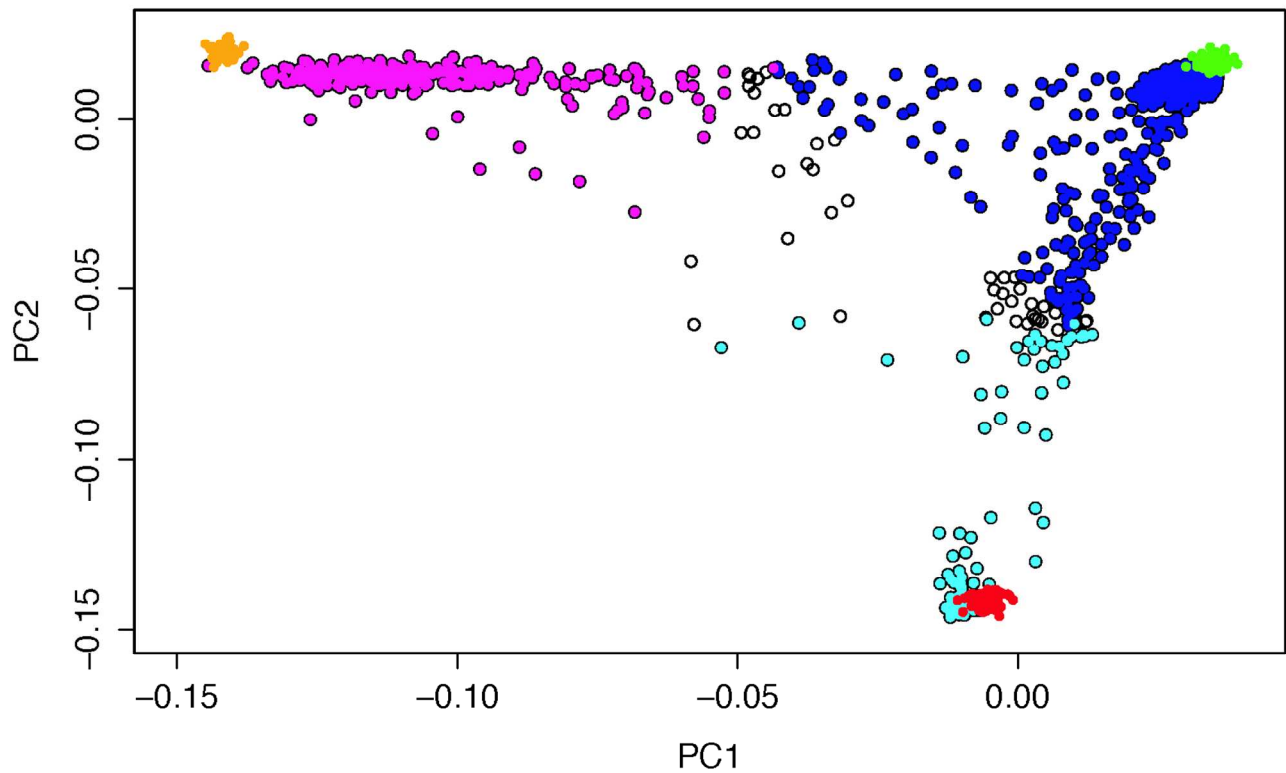
|     |    |   |                  |           |   |       |        |       |          |                       |                                   |
|-----|----|---|------------------|-----------|---|-------|--------|-------|----------|-----------------------|-----------------------------------|
| M+F | DR | 7 | rs1917117        | 120839460 | G | 0.602 | 0.264  | 0.040 | 3.33E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs2402562        | 120839854 | G | 0.4   | -0.264 | 0.039 | 2.96E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs4730999        | 120841241 | G | 0.4   | -0.264 | 0.039 | 3.01E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120841523:I | 120841523 | A | 0.436 | -0.253 | 0.041 | 6.21E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs7797976        | 120843516 | C | 0.606 | 0.265  | 0.040 | 2.76E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs6947494        | 120843708 | T | 0.399 | -0.265 | 0.040 | 2.90E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs62469350       | 120843946 | G | 0.4   | -0.264 | 0.039 | 3.13E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1917118        | 120844324 | C | 0.602 | 0.264  | 0.040 | 3.51E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120846503:D | 120846503 | G | 0.599 | 0.261  | 0.039 | 5.13E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120846506:D | 120846506 | A | 0.603 | 0.257  | 0.040 | 1.25E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1524501        | 120846569 | A | 0.602 | 0.264  | 0.040 | 3.65E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1524502        | 120846665 | T | 0.602 | 0.264  | 0.040 | 3.66E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs6954210        | 120848385 | G | 0.602 | 0.263  | 0.040 | 3.78E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs6970762        | 120852034 | A | 0.603 | 0.259  | 0.040 | 7.77E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1357756        | 120852193 | T | 0.401 | -0.263 | 0.039 | 3.82E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1534015        | 120853065 | A | 0.4   | -0.262 | 0.040 | 5.06E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs7786203        | 120853607 | G | 0.603 | 0.259  | 0.040 | 9.72E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120856324:D | 120856324 | T | 0.628 | 0.269  | 0.041 | 5.50E-11 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | chr7:120856326:D | 120856326 | C | 0.607 | 0.259  | 0.040 | 1.11E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1404268        | 120857747 | A | 0.393 | -0.257 | 0.040 | 1.18E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs115203811      | 120862734 | T | 0.61  | 0.259  | 0.040 | 2.17E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs6963730        | 120863109 | C | 0.424 | -0.245 | 0.041 | 3.17E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs148819132      | 120865038 | A | 0.394 | -0.261 | 0.040 | 1.58E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs9770763        | 120865482 | A | 0.612 | 0.251  | 0.041 | 8.96E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs11764551       | 120865603 | C | 0.611 | 0.260  | 0.041 | 1.96E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10242653       | 120865801 | C | 0.393 | -0.261 | 0.040 | 1.47E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs55694614       | 120866038 | C | 0.609 | 0.256  | 0.041 | 3.70E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs34088248       | 120866167 | G | 0.609 | 0.256  | 0.041 | 3.74E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs10953931       | 120867272 | T | 0.611 | 0.259  | 0.041 | 2.35E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |
| M+F | DR | 7 | rs1524503        | 120868003 | A | 0.612 | 0.257  | 0.041 | 3.49E-10 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZ1</i> |

|     |    |   |                  |           |   |       |        |       |          |                       |                                   |
|-----|----|---|------------------|-----------|---|-------|--------|-------|----------|-----------------------|-----------------------------------|
| M+F | DR | 7 | chr7:120868495:1 | 120868495 | T | 0.618 | 0.241  | 0.041 | 5.88E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZI</i> |
| M+F | DR | 7 | rs1581525        | 120868519 | A | 0.38  | -0.243 | 0.041 | 4.52E-09 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZI</i> |
| M+F | DR | 7 | rs7799790        | 120868631 | G | 0.621 | 0.238  | 0.041 | 1.04E-08 | 120750000 - 121670000 | <i>WNT16, FAM3C, &amp; PTPRZI</i> |

Abbreviation: DR, Discovery and replication cohorts

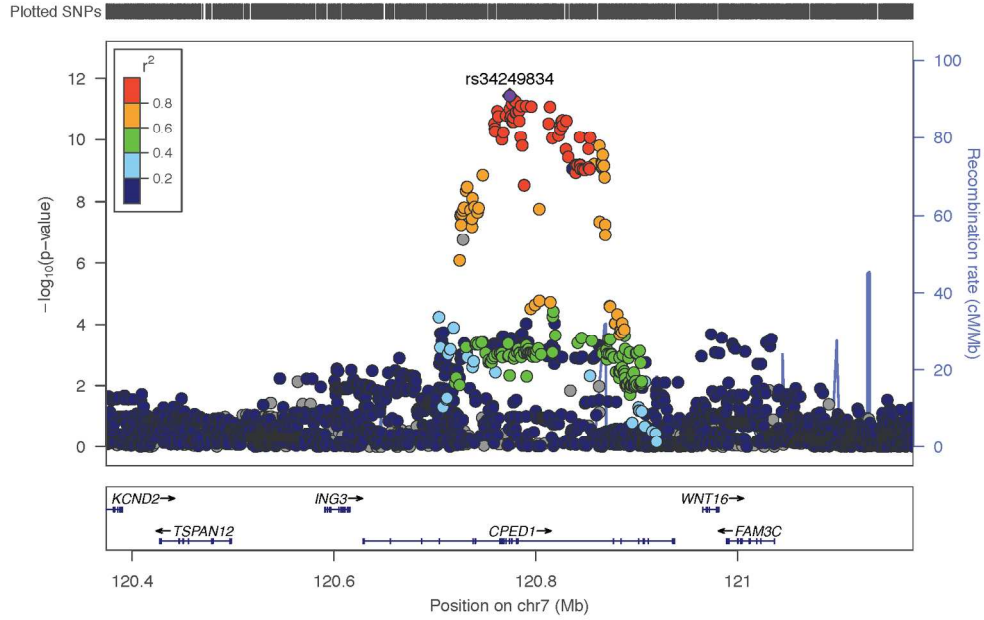


Supplementary Figure 1 – Correlations between aBMD Z-scores across 4 skeletal sites

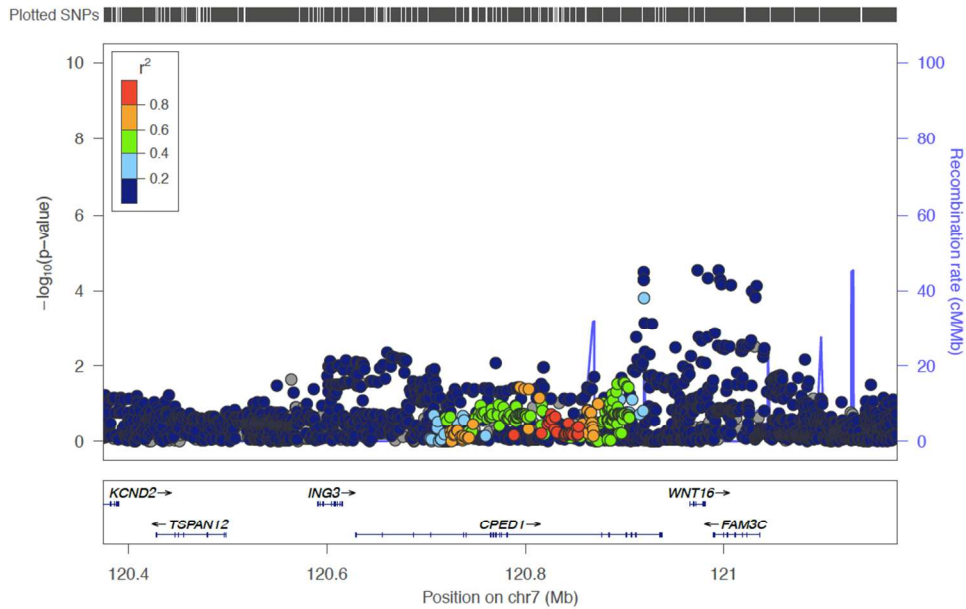


Supplementary Figure 2. Genetic substructure of the BMDCS. Two-dimensional plots from multidimensional scaling analyses of the BMDCS based on the first two genomic components. Clustering rule based on ancestral proportions (ADMIXTURE, model-based maximum likelihood estimates). Children were assigned to one of the three main genetic ancestry groups, based on their highest fraction of estimated ancestry (i.e.  $>0.50$ ) proportion. Hapmap Phase II populations (Sub-Saharan African in orange, European in green and East Asian in red) shown for reference.

### Fdr Chr7 Pheno 2

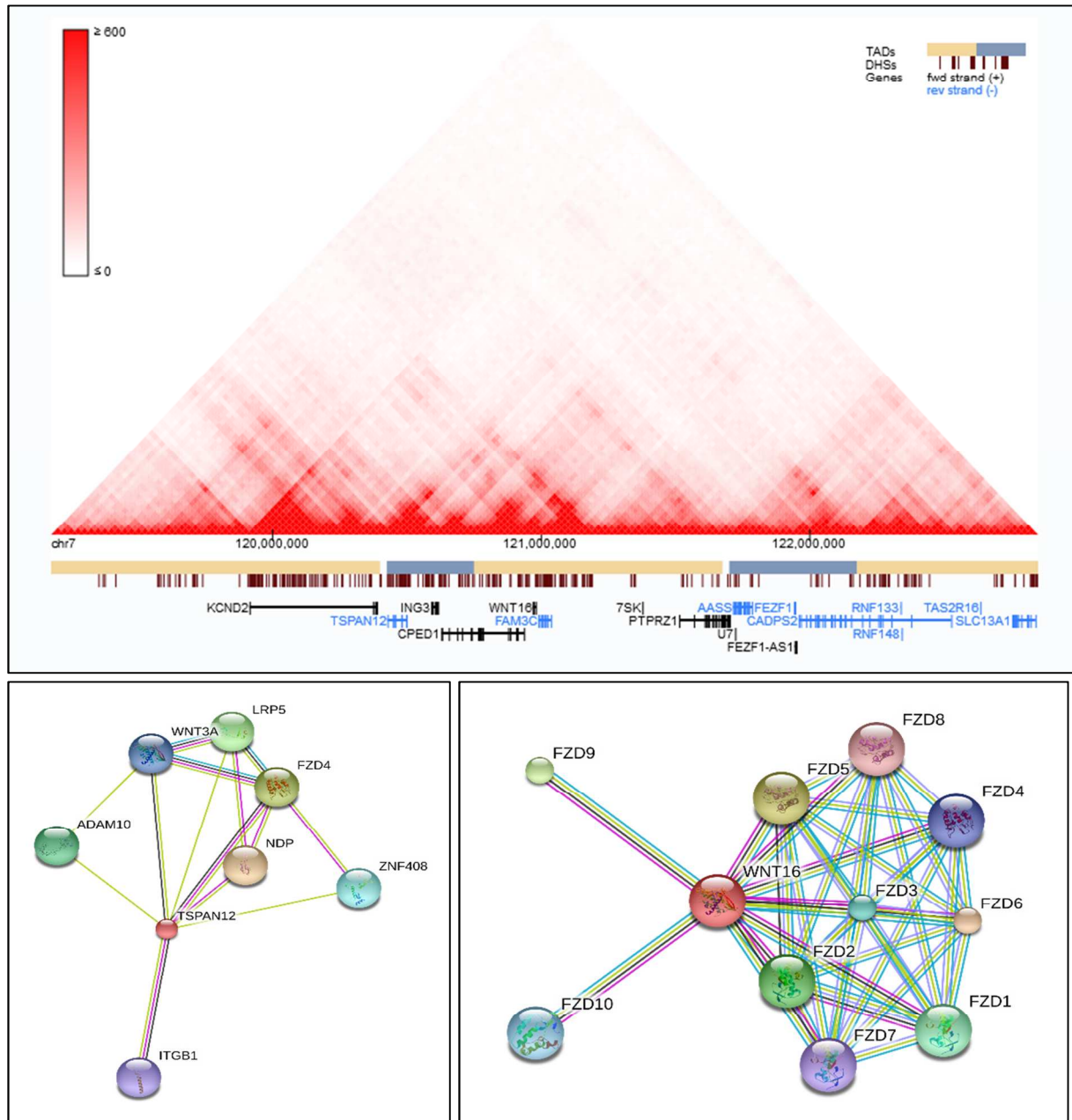


### Fdr chr7 Pheno 2 Conditioned on rs34249834



Supplementary Figure 3. Conditional analysis testing if the weak signal above *WNT16* (top panel) for PC2 changed after conditioning on the lead signal nearest to *CPED1*, using data from females in the discovery and replication cohorts.





Supplementary Figure 4 – Topological associated domains (TADS) at the 7q31.31 locus (top panel) and protein networks for the genes *TSPAN12* and *WNT16* (bottom panels). The TAD panle was generated using the online 3D Genome Browser at Penn State University (<http://promoter.bx.psu.edu/hi-c/>). The protein networks were generated using STRING version 10.5 (<https://string-db.org>).