

| Supplementary Table S3: Characteristics of significant SNPs with genome-wide associations (P<5×10 <sup>-5</sup> ) for MMP-1 on LSL |           |           |           |           |         |          |        |          |       |       |       |        |          |           |           |      |          |          |         |          |       |          |         |          |           |           |    |        |       |      |           |          |         |   |           |    |        |           |        |           |         |            |         |
|------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|---------|----------|--------|----------|-------|-------|-------|--------|----------|-----------|-----------|------|----------|----------|---------|----------|-------|----------|---------|----------|-----------|-----------|----|--------|-------|------|-----------|----------|---------|---|-----------|----|--------|-----------|--------|-----------|---------|------------|---------|
| SNP                                                                                                                                | effect_al | other_all | effect_al | other_all | beta    | expo     | beta   | outc     | eaf   | expos | eaf   | outco  | remove   | palindrom | ambiguous | id   | outcom   | se       | outcomp | pval     | outc  | outcome  | mr_keep | o        | pval_orig | data_sour | se | exposu | pval  | expo | samplesiz | exposure | mr_keep | e | pval_orig | id | exposu | data_sour | action | SNP_index | mr_keep | samplesize | outcome |
| rs1073282 A                                                                                                                        | G         | A         | G         |           | 0.0558  | -0.00534 | 0.3498 | 0.367796 | FALSE | FALSE | FALSE | t3hc6V | 0.01634  | 0.743976  | outcome   | TRUE | reported | textfile | 0.0124  | 6.80E-06 | 14742 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1097864 A                                                                                                                        | T         | A         | T         |           | 0.0649  | 0.029164 | 0.7462 | 0.748458 | FALSE | TRUE  | FALSE | t3hc6V | 0.018855 | 0.121925  | outcome   | TRUE | reported | textfile | 0.014   | 3.56E-06 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1099053 T                                                                                                                        | C         | T         | C         |           | 0.0703  | 0.016048 | 0.253  | 0.234649 | FALSE | FALSE | FALSE | t3hc6V | 0.01817  | 0.377118  | outcome   | TRUE | reported | textfile | 0.0135  | 1.91E-07 | 14734 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1163502 A                                                                                                                        | T         | A         | T         |           | 0.0639  | 0.003141 | 0.3845 | 0.377199 | FALSE | TRUE  | FALSE | t3hc6V | 0.016111 | 0.845408  | outcome   | TRUE | reported | textfile | 0.0142  | 6.80E-06 | 10717 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1167312 T                                                                                                                        | C         | T         | C         |           | -0.0585 | -0.00199 | 0.296  | 0.303928 | FALSE | FALSE | FALSE | t3hc6V | 0.016939 | 0.906266  | outcome   | TRUE | reported | textfile | 0.0127  | 4.10E-06 | 14741 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1168898 A                                                                                                                        | G         | A         | G         |           | -0.176  | 0.017119 | 0.0455 | 0.047631 | FALSE | FALSE | FALSE | t3hc6V | 0.036384 | 0.637999  | outcome   | TRUE | reported | textfile | 0.03    | 4.45E-09 | 14744 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1212203 A                                                                                                                        | T         | A         | T         |           | -0.1077 | 0.011264 | 0.0741 | 0.06836  | FALSE | TRUE  | FALSE | t3hc6V | 0.031376 | 0.71959   | outcome   | TRUE | reported | textfile | 0.024   | 7.21E-06 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1214179 A                                                                                                                        | G         | A         | G         |           | 0.0859  | 0.000344 | 0.6981 | 0.695291 | FALSE | FALSE | FALSE | t3hc6V | 0.017676 | 0.984475  | outcome   | TRUE | reported | textfile | 0.013   | 3.90E-11 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1236736 T                                                                                                                        | G         | T         | G         |           | 0.0861  | 0.008281 | 0.1146 | 0.112742 | FALSE | FALSE | FALSE | t3hc6V | 0.02499  | 0.740373  | outcome   | TRUE | reported | textfile | 0.0186  | 3.67E-06 | 14744 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1238045 T                                                                                                                        | C         | T         | C         |           | -0.0593 | -0.02989 | 0.7098 | 0.698983 | FALSE | FALSE | FALSE | t3hc6V | 0.017083 | 0.080148  | outcome   | TRUE | reported | textfile | 0.0133  | 8.25E-06 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1417822 A                                                                                                                        | G         | A         | G         |           | 0.3767  | -0.03086 | 0.9777 | 0.984415 | FALSE | FALSE | FALSE | t3hc6V | 0.062952 | 0.624025  | outcome   | TRUE | reported | textfile | 0.0445  | 2.56E-17 | 14731 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1489088 A                                                                                                                        | G         | A         | G         |           | -0.2306 | -0.01537 | 0.0214 | 0.018597 | FALSE | FALSE | FALSE | t3hc6V | 0.057454 | 0.789076  | outcome   | TRUE | reported | textfile | 0.0517  | 8.18E-06 | 12935 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1498192 A                                                                                                                        | G         | A         | G         |           | -0.1601 | -0.13153 | 0.0417 | 0.02164  | FALSE | FALSE | FALSE | t3hc6V | 0.054022 | 0.014904  | outcome   | TRUE | reported | textfile | 0.0351  | 5.08E-06 | 14744 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1886263 T                                                                                                                        | C         | T         | C         |           | -0.2509 | -0.05166 | 0.0177 | 0.015988 | FALSE | FALSE | FALSE | t3hc6V | 0.062367 | 0.407518  | outcome   | TRUE | reported | textfile | 0.053   | 2.20E-06 | 12935 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs1891733 T                                                                                                                        | C         | T         | C         |           | 0.3179  | 0.104591 | 0.0131 | 0.012908 | FALSE | FALSE | FALSE | t3hc6V | 0.069989 | 0.135073  | outcome   | TRUE | reported | textfile | 0.0714  | 8.49E-06 | 11925 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs2155053 T                                                                                                                        | C         | T         | C         |           | -0.3212 | -0.07619 | 0.9461 | 0.93883  | FALSE | FALSE | FALSE | t3hc6V | 0.032678 | 0.019728  | outcome   | TRUE | reported | textfile | 0.0264  | 4.68E-34 | 14741 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs2229629 A                                                                                                                        | G         | A         | G         |           | -0.3153 | -0.02336 | 0.0135 | 0.012473 | FALSE | FALSE | FALSE | t3hc6V | 0.070308 | 0.739717  | outcome   | TRUE | reported | textfile | 0.0673  | 2.80E-06 | 10887 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs2926741 T                                                                                                                        | C         | T         | C         |           | -0.0704 | 0.016193 | 0.3436 | 0.367544 | FALSE | FALSE | FALSE | t3hc6V | 0.016235 | 0.318576  | outcome   | TRUE | reported | textfile | 0.0126  | 2.31E-08 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs3595909 T                                                                                                                        | TA        | T         | TA        |           | 0.0698  | -0.00558 | 0.7439 | 0.735171 | FALSE | FALSE | FALSE | t3hc6V | 0.017808 | 0.754213  | outcome   | TRUE | reported | textfile | 0.0154  | 5.83E-06 | 11339 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs4734879 A                                                                                                                        | G         | A         | G         |           | 0.1136  | -0.00865 | 0.7422 | 0.72481  | FALSE | FALSE | FALSE | t3hc6V | 0.01773  | 0.625649  | outcome   | TRUE | reported | textfile | 0.0137  | 1.11E-16 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs484915 A                                                                                                                         | T         | A         | T         |           | -0.3517 | -0.01703 | 0.5613 | 0.554868 | FALSE | TRUE  | TRUE  | t3hc6V | 0.016285 | 0.295694  | outcome   | TRUE | reported | textfile | 0.0119  | #####    | 14295 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | FALSE | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs5881124 T                                                                                                                        | C         | T         | C         |           | -0.1051 | 0.036528 | 0.9266 | 0.936579 | FALSE | FALSE | FALSE | t3hc6V | 0.03251  | 0.261177  | outcome   | TRUE | reported | textfile | 0.0234  | 7.07E-06 | 14723 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs6717478 A                                                                                                                        | T         | A         | T         |           | 0.1548  | 0.062886 | 0.966  | 0.963714 | FALSE | TRUE  | FALSE | t3hc6V | 0.041811 | 0.132566  | outcome   | TRUE | reported | textfile | 0.0338  | 4.65E-06 | 14742 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs7219205 A                                                                                                                        | G         | A         | G         |           | 0.0569  | -0.01179 | 0.5023 | 0.477264 | FALSE | FALSE | FALSE | t3hc6V | 0.016021 | 0.461782  | outcome   | TRUE | reported | textfile | 0.0121  | 2.57E-06 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs7277739 A                                                                                                                        | G         | A         | G         |           | 0.1657  | 0.096621 | 0.9671 | 0.96917  | FALSE | FALSE | FALSE | t3hc6V | 0.044999 | 0.031778  | outcome   | TRUE | reported | textfile | 0.0364  | 5.31E-06 | 14744 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs7709531 T                                                                                                                        | G         | T         | G         |           | -0.1416 | -0.04033 | 0.0705 | 0.074131 | FALSE | FALSE | FALSE | t3hc6V | 0.029952 | 0.178159  | outcome   | TRUE | reported | textfile | 0.0238  | 2.69E-09 | 14744 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs873675 T                                                                                                                         | C         | T         | C         |           | 0.1234  | -0.00068 | 0.0684 | 0.057335 | FALSE | FALSE | FALSE | t3hc6V | 0.033833 | 0.983888  | outcome   | TRUE | reported | textfile | 0.0234  | 1.34E-07 | 14742 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |
| rs9524612 T                                                                                                                        | C         | T         | C         |           | -0.072  | -0.00399 | 0.177  | 0.179154 | FALSE | FALSE | FALSE | t3hc6V | 0.020597 | 0.846553  | outcome   | TRUE | reported | textfile | 0.0162  | 8.81E-06 | 14296 | exposure | TRUE    | reported | heG1I2    | textfile  | 2  | 1      | TRUE  | NA   |           |          |         |   |           |    |        |           |        |           |         |            |         |