**Supplementary Table S1：Characteristics of the SNPs used as instrumental variables in the MR analysis**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SNPs** | **chr** | **Position** | **EA** | **OA** | **Exposure(AS)** | | | **Outcome(IgAN)** | | | **F** |
| **Beta** | **SE** | **P-value** | **Beta** | **SE** | **P-value** |
| rs1041926 | 6 | 28426296 | A | G | -0.075 | 0.012 | 1.55E-10 | 0.220 | 0.201 | 0.27 | 39 |
| rs11065898 | 12 | 111862575 | T | C | 0.026 | 0.005 | 4.71E-08 | 0.010 | 0.077 | 0.90 | 27 |
| rs11190133 | 10 | 101278725 | T | C | -0.034 | 0.004 | 4.84E-14 | 0.019 | 0.063 | 0.76 | 72 |
| rs11209026 | 1 | 67705958 | A | G | -0.104 | 0.010 | 1.94E-27 | -0.173 | 0.149 | 0.24 | 108 |
| rs1128905 | 9 | 139253839 | C | T | -0.024 | 0.004 | 6.95E-09 | 0.058 | 0.061 | 0.35 | 36 |
| rs11624293 | 14 | 88488821 | C | T | 0.043 | 0.007 | 1.49E-10 | -0.004 | 0.111 | 0.97 | 38 |
| rs1250550 | 10 | 81060317 | A | C | -0.026 | 0.004 | 1.46E-09 | -0.058 | 0.062 | 0.35 | 42 |
| rs12615545 | 2 | 182048452 | C | T | 0.025 | 0.004 | 1.03E-09 | 0.030 | 0.061 | 0.62 | 39 |
| rs1801274 | 1 | 161479745 | G | A | 0.025 | 0.004 | 1.35E-09 | 0.038 | 0.061 | 0.53 | 39 |
| rs1860545 | 12 | 6446777 | A | G | -0.027 | 0.004 | 2.78E-10 | -0.033 | 0.062 | 0.60 | 46 |
| rs2517655 | 6 | 30121048 | T | C | 0.088 | 0.005 | 3.47E-80 | -0.042 | 0.068 | 0.53 | 310 |
| rs2531875 | 17 | 26148167 | T | G | -0.027 | 0.004 | 1.22E-10 | 0.069 | 0.063 | 0.28 | 46 |
| rs2596501 | 6 | 31321211 | T | C | -0.152 | 0.004 | 1E-200 | 0.085 | 0.061 | 0.17 | 1444 |
| rs27529 | 5 | 96126308 | G | A | -0.062 | 0.004 | 3.28E-47 | 0.054 | 0.064 | 0.39 | 240 |
| rs2836883 | 21 | 40466744 | A | G | -0.040 | 0.005 | 6.46E-17 | -0.001 | 0.071 | 0.99 | 64 |
| rs35164067 | 19 | 10525181 | A | G | -0.031 | 0.005 | 3.43E-10 | 0.046 | 0.080 | 0.57 | 38 |
| rs4129267 | 1 | 154426264 | T | C | -0.031 | 0.004 | 3.32E-13 | 0.147 | 0.067 | 0.03 | 60 |
| rs41299637 | 1 | 200877850 | G | T | -0.039 | 0.005 | 1.81E-15 | -0.067 | 0.074 | 0.37 | 61 |
| rs4672505 | 2 | 62560332 | G | A | -0.060 | 0.004 | 5.14E-47 | 0.078 | 0.065 | 0.23 | 225 |
| rs4676410 | 2 | 241563739 | A | G | 0.028 | 0.005 | 9.90E-09 | -0.079 | 0.069 | 0.25 | 31 |
| rs6556416 | 5 | 158818745 | C | A | 0.025 | 0.005 | 4.22E-08 | 0.030 | 0.070 | 0.67 | 25 |
| rs6600247 | 1 | 25305114 | C | T | 0.033 | 0.004 | 2.58E-15 | -0.025 | 0.061 | 0.69 | 68 |
| rs7191548 | 16 | 28614734 | C | T | 0.025 | 0.004 | 5.51E-09 | 0.003 | 0.062 | 0.96 | 39 |
| rs9901869 | 17 | 45575206 | A | G | 0.032 | 0.004 | 6.04E-15 | -0.080 | 0.061 | 0.19 | 64 |

SNPs, Single Nucleotide Polymorphisms; Chr, chromosome; EA, Effect Allele; OA, Non‐Effect Allele; Beta, beta coefficient; SE, standard error.

**Supplementary Table S2：Estimated causal effects of IgA nephropathy on ankylosing spondylitis**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Exposure** | **Outcome** | **No. of SNPs** | **Method** | **OR (95% CI)** | **P** |
| IgA nephropathy | ankylosing spondylitis | 1 (rs2412973) | Wald ratio | 0.988 (-0.044, 0.020) | 0.464 |

SNPs, Single Nucleotide Polymorphisms; OR, odds ratio.

**Supplementary Table S3：Horizontal pleiotropy analysis of ankylosing spondylitis for IgA nephropathy**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Exposure** | **Outcome** | **Egger intercept** | **SE** | **P-value** | **MR-PRESSO**  **P-value** |
| ankylosing spondylitis | IgA nephropathy | 0.0134 | 0.0224 | 0.58 | 0.448 |

SE, standard error

**Supplementary Table S4: Heterogeneity analysis of ankylosing spondylitis for IgA nephropathy**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Exposure** | **Outcome** | **Method** | **Q** | **Q\_df** | **P-value for heterogeneity** |
| ankylosing spondylitis | IgA nephropathy | MR Egger | 23.642 | 22 | 0.37 |
| IVW | 24.023 | 23 | 0.40 |

IVW, Inverse variance weighted

**Supplementary Table S5: Detailed information of the datasets**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sequence number** | GSE93798 | GSE73754 | GSE37460 | GSE25101 |
| **Platform** | GPL22945 | GPL10558 | GPL11670、GPL14663 | GPL6947 |
| **Disease** | IgA nephropathy | ankylosing spondylitis | IgA nephropathy | ankylosing spondylitis |
| **Provider** | University of Michigan | University of Toronto | University of Michigan | University of Queensland Diamantina Institute |
| **Research object** | Human | Human | Human | Human |
| **Sample type** | Kidney biopsies | Whole blood RNA | Kidney biopsies | whole blood |
| **Number of samples** | 20/42 | 52/72 | 27/54 | 16/32 |
| **Uploading time** | Public on Jul 03, 2017 | Public on Oct 07, 2015 | Public on Dec 10, 2012 | Public on Nov 04, 2010 |

**Supplementary Figure 1: Funnel plot for ankylosing spondylitis on IgA nephropathy risk.**

MR: Mendelian randomization

**Supplementary Figure 2: leave-one-out test for ankylosing spondylitis on IgA nephropathy risk.**

