

Supplementary Material

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Tables S1-S3; Figures S1-S3

Table S1 Number of common SNP-pairs shared by *score*; and *total score* for top 1000 SNP-pairs obtained

	<i>score</i> ₁	<i>score</i> ₂	<i>score</i> ₃	<i>score</i> ₄	<i>score</i> ₅	<i>score</i> ₆	<i>score</i> ₇	<i>total score</i>
<i>score</i> ₁	1000	321	83	402	64	345	267	318
<i>score</i> ₂	321	1000	80	915	91	356	293	934
<i>score</i> ₃	83	80	1000	81	982	90	61	262
<i>score</i> ₄	402	915	81	1000	63	368	289	879
<i>score</i> ₅	64	91	982	63	1000	71	65	215
<i>score</i> ₆	345	356	90	368	71	1000	398	592
<i>score</i> ₇	267	293	61	289	65	398	1000	206
<i>total score</i>	318	934	262	879	215	592	206	1000

Table S2 The top 100 SNP-pairs based on the interaction intensity

Rank	SNP-pair	<i>total score</i>	<i>P</i>	Rank	SNP-pair	<i>total score</i>	<i>P</i>
1	rs395601*rs2077889	3.5094	0.00001	51	rs2825276*rs3750203	1.7354	0.0317
2	rs1424903*rs663550	3.4649	0.00011	52	rs1686430*rs938326	1.7282	0.0319
3	rs744877*rs1033109	3.4124	0.00022	53	rs1734449*rs938326	1.7151	0.0323
4	rs1424903*rs673834	3.3531	0.00067	54	rs1969530*rs954986	1.6909	0.0329
5	rs164466*rs1047950	3.2849	0.00089	55	rs1424903*rs2035415	1.6764	0.0332
6	rs744877*rs1358716	3.2699	0.0022	56	rs1941487*rs140643	1.6624	0.0335
7	rs955783*rs1860302	3.2046	0.0026	57	rs1424903*rs1318725	1.6439	0.0343
8	rs1424903*rs1341518	3.1820	0.0039	58	rs1424903*rs12898	1.6347	0.0345
9	rs2077889*rs1157675	3.1067	0.0042	59	rs1424903*rs879253	1.6007	0.0350
10	rs1424903*rs1389622	3.1016	0.0063	60	rs1004531*rs7799	1.5908	0.0355
11	rs1031804*rs2060596	2.9785	0.0069	61	rs744877*rs737645	1.5828	0.0358
12	rs2077889*rs1424903	2.9736	0.0106	62	rs1941487*rs1318725	1.5801	0.0360
13	rs1424903*rs1157675	2.9534	0.0126	63	rs1424903*rs742920	1.5729	0.0362
14	rs2151913*rs1941487	2.8054	0.0127	64	rs1945645*rs1887984	1.5621	0.0367
15	rs2837710*rs1890007	2.7751	0.0128	65	rs1864003*rs521861	1.5578	0.0371
16	rs1424903*rs225160	2.7699	0.0133	66	rs1850407*rs761319	1.5474	0.0372
17	rs10117*rs674630	2.7622	0.0152	67	rs2077889*rs1050181	1.5220	0.0377
18	rs954986*rs1887984	2.7595	0.0161	68	rs814397*rs1057613	1.5106	0.0382
19	rs1372887*rs214527	2.7569	0.0181	69	rs783779*rs1488403	1.5091	0.0384
20	rs700273*rs411103	2.7541	0.0198	70	rs759382*rs736379	1.5009	0.0387
21	rs1057613*rs705670	2.75403	0.0209	71	rs1566485*rs744148	1.4986	0.0388
22	rs479062*rs2837710	2.75400	0.0213	72	rs970595*rs511145	1.4861	0.0391
23	rs2060596*rs1003979	2.7516	0.0216	73	rs1004531*rs2227551	1.4823	0.0393
24	rs164466*rs1568261	2.7515	0.0226	74	rs744877*rs37358	1.4781	0.0395
25	rs164466*rs1004531	2.5089	0.0231	75	rs759939*rs1050181	1.4677	0.0398
26	rs164466*rs736379	2.5017	0.0232	76	rs1424903*rs1953088	1.4652	0.0399
27	rs10117*rs16946	2.4529	0.0234	77	rs744877*rs1157308	1.4527	0.0403
28	rs395601*rs910516	2.3799	0.0239	78	rs673834*rs699778	1.4434	0.0407
29	rs1004531*rs1969530	2.2805	0.0242	79	rs1953088*rs1450782	1.4361	0.0413
30	rs744877*rs1548506	2.2133	0.0246	80	rs673834*rs910516	1.4252	0.0415
31	rs759382*rs954986	2.1748	0.0250	81	rs1430934*rs816943	1.4171	0.0417
32	rs759382*rs983530	2.1669	0.0253	82	rs1864003*rs247892	1.4099	0.0419
33	rs1568261*rs1953088	2.1419	0.0255	83	rs1424903*rs342817	1.3970	0.0423
34	rs1004531*rs1409104	2.1183	0.0256	84	rs2282*rs1395610	1.3961	0.0424
35	rs744877*rs783779	2.0883	0.0258	85	rs1424903*rs933224	1.3882	0.0428
36	rs2060596*rs1890007	2.0746	0.0260	86	rs744877*rs1001065	1.3865	0.0429
37	rs1389622*rs2016985	2.0370	0.0265	87	rs744877*rs968057	1.3825	0.0430
38	rs634742*rs905164	2.0082	0.0266	88	rs1969530*rs194391	1.3761	0.0431
39	rs1372887*rs3794968	1.9955	0.0269	89	rs1953088*rs2063099	1.3743	0.0432
40	rs970595*rs17229	1.9522	0.0272	90	rs164466*rs1920586	1.3735	0.0433
41	rs1850407*rs761319	1.9340	0.0273	91	rs970595*rs1318725	1.3726	0.0434
42	rs1491233*rs705670	1.9323	0.0277	92	rs759382*rs663550	1.3694	0.0435
43	rs1572456*rs814397	1.9216	0.0280	93	rs1568261*rs1057613	1.3617	0.0436
44	rs970595*rs8027424	1.8419	0.0291	94	rs1424903*rs2051179	1.3554	0.0438
45	rs26956*rs761319	1.8329	0.0294	95	rs26959*rs955783	1.3520	0.0440
46	rs1850264*rs846319	1.8251	0.0297	96	rs1424903*rs1391766	1.3506	0.0441
47	rs1566485*rs550238	1.7973	0.0302	97	rs2535694*rs753012	1.3484	0.0443
48	rs759382*rs1424903	1.7776	0.0307	98	rs1132975*rs245906	1.3422	0.0447
49	rs2060596*rs1889188	1.7559	0.0311	99	rs814397*rs1491233	1.3402	0.0450
50	rs2282*rs795734	1.7525	0.0313	100	rs1858941*rs1889188	1.3394	0.0452

Table S3 Feature SNPs filtered from the most frequently observed top 100 scoring SNP-pairs with seven scores

Feature SNP	Frequency of SNP observed in each scoring measure and <i>total score</i>							<i>total score</i>
	<i>score</i> ₁	<i>score</i> ₂	<i>score</i> ₃	<i>score</i> ₄	<i>score</i> ₅	<i>score</i> ₆	<i>score</i> ₇	
rs164466*	1	5	0	6	0	28	34	74
rs1424903*	12	18	0	19	0	13	9	71
rs744877*	9	10	0	8	0	8	5	40
rs2535694 ^a	0	1	10	1	10	0	0	22
rs395601 ^{a*}	3	2	1	2	1	8	4	21
rs2060596 ^a	3	5	0	4	0	3	4	19
rs2077889	1	4	1	4	1	3	4	18
rs1969530 ^a	2	3	0	4	0	3	6	18
rs1941487*	2	4	0	5	0	4	3	18
rs1004531 ^{a*}	1	5	0	5	0	4	3	18
rs26959 ^a	2	2	0	2	0	3	7	16
rs759382 ^{a*}	0	3	3	3	3	0	3	15
rs970595*	2	5	0	4	0	2	1	14
rs1870424 ^a	0	0	7	0	7	0	0	14
rs1318725 ^a	0	3	2	4	2	1	1	13

^aMultiple SNPs in LD, where rs2535694, rs1969530, rs1004531, rs26959, rs759382, rs1870424 and rs1318725 were found in LD with one SNP. rs206596 was found in LD with two SNPs. rs395601 was found in LD with five SNPs.

*SNPs were confirmed to be associated with RA by previous studies (4, 14).

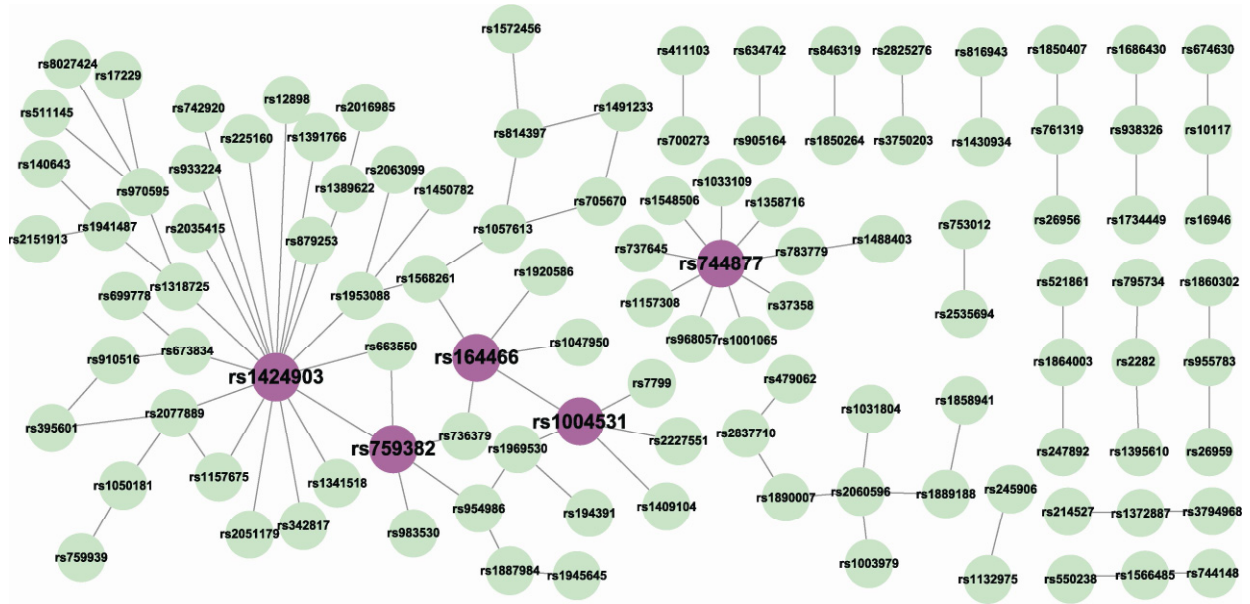


Figure S1 A SNP-SNP network specific for RA. The network includes 110 SNPs. Each of 100 edges indicates a SNP-pair. The hub SNPs were indicated by pink filled circles.

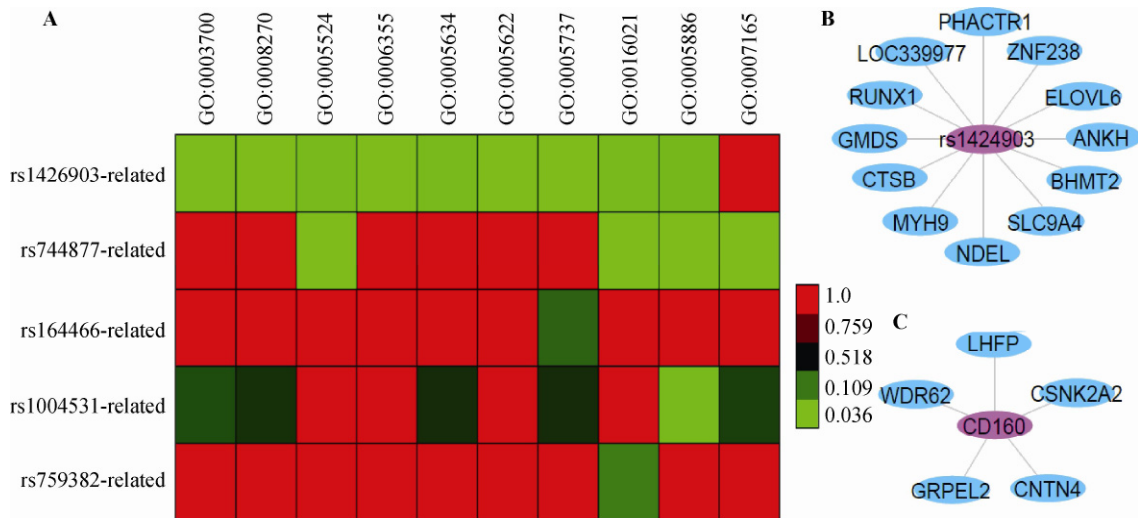


Figure S2 GO enrichment results for five gene modules. **A.** The enrichment results for five gene modules. The *P*-values are depicted by different colors, where the green colors indicate the greater enrichment effect in GO terms. **B.** Functional gene module with hub SNP rs1424903. **C.** Functional gene module with hub SNP rs744877 (CD160).

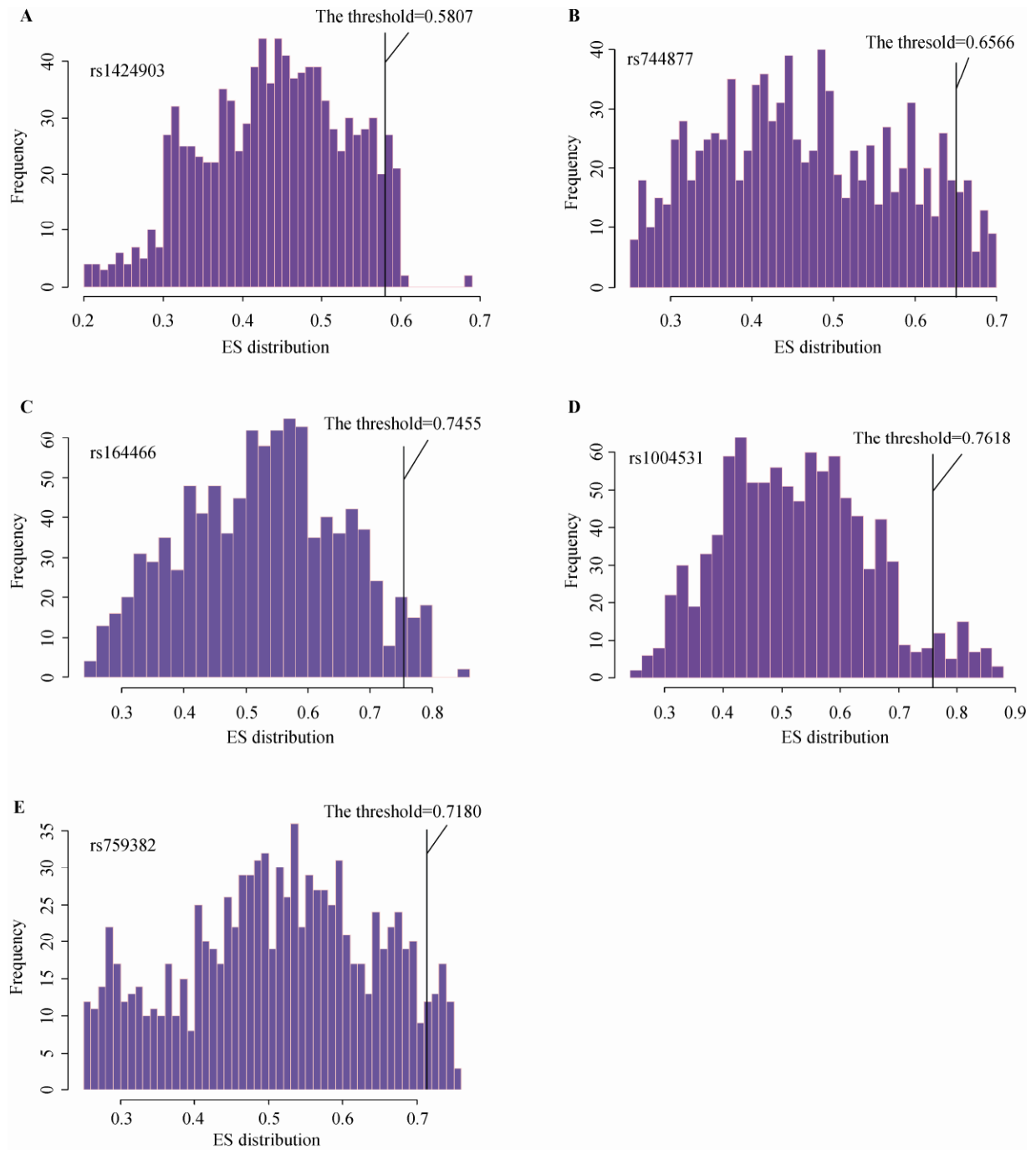


Figure S3 The background distribution of enrichment score (ES) for five sub-networks. The threshold values of ES for five sub-networks with hub SNP rs1424903 (A), rs744877 (B), rs164466 (C), rs1004531(D) and rs759382 (E) were 0.5807, 0.6566, 0.7455, 0.7618 and 0.7180, respectively as shown in different panels.