

Table S3. Epistasis data for top SNPs. For each of the top epistasis results in Table 1, we show the epistasis data here. The SNP rsIDs are shown with the Ras/MAPK (RMK) SNP first and epistatic (EPI) SNP second. Genotype abbreviations are: HOM – homozygous for major allele; hom – homozygous for minor allele; Het – heterozygous. The observed counts for each genotype-combination are shown in the same order as SNPs (e.g. HOM-Het represents RMK SNP homozygous for the major allele and EPI SNP heterozygous), with expected counts and pseudo-control counts (respectively) displayed in brackets. Cells with count of more than 5 observed or expected are **bolded** if at least 2X excess is observed in cases compared with expectation and are shown in *italics* if at least 0.5X decrease is observed in cases compared with expectation. Asterisks are used to show pseudo-control counts deviating 2-fold from expectation in either direction.

RMK-EPI SNPs	HOM-HOM	HOM-Het	Het-HOM	Het-Het	HOM-hom	hom-HOM	Het-hom	hom-Het	hom-hom
rs713365- rs57173428	3830 [3815/3820]	93 [105/118]	126 [141/124]	14 [4/3]	1 [1/1]	2 [1/1]	1 [0/0]	0 [0/0]	0 [0/0]
rs7133635- rs17110869	3817 [3805/3807]	92 [104/120]	128 [140/123]	14 [4/3]	1 [1/1]	2 [1/1]	1 [0/0]	0 [0/0]	0 [0/0]
rs11913063- rs28459694	3377 [3361/3352]	78 [97/107]	307 [315/314]	23 [9/9]	4 [1/1]	0 [7/7]	1 [0/0]	1 [0/1]	0 [0/0]
rs62487902- rs72690923	3042 [3004/2965]	185 [212/216]	453 [490/536]	61 [34/28]	19 [4/3]	1 [20/15]	1 [1/2]	4 [1/1]	0 [0/0]
rs1733826- rs12239450	2792 [2756/2762]	354 [387/359]	263 [295/313]	72 [41/47]	11 [14/14]	7 [8/9]	3 [1/0]	2 [1/0]	0 [0/0]
rs73398437- rs62168052	3292 [3269/3251]	154 [179/178]	170 [189/206]	30 [10/13]	5 [2/1]	2 [3/4]	0 [0/0]	0 [0/0]	0 [0/0]
chr7:14062570 7:l-rs1318299	3248 [3237/3230]	65 [79/78]	381 [392/405]	26 [10/7]	0 [0/0]	10 [12/10]	0 [0/0]	1 [0/1]	0 [0/0]
rs74644204- rs149565205	3448 [3438/3462]	83 [93/66]	160 [173/168]	17 [5/6]	0 [1/2]	2 [2/7*]	0 [0/0]	1 [0/0]	0 [0/0]
rs7714386- rs56667163	3509 [3490/3507]	413 [423/417]	103 [130/124]	37 [16/11]	6 [13/13]	3 [1/0]	2 [0/1]	0 [0/0]	0 [0/0]
rs17879775- rs11925140	3524 [3607/3514]	115 [129/142]	183 [95/75]	14 [3/3]	0 [1/2]	0 [1/0]	0 [0/0]	0 [0/0]	0 [0/0]
chr2:39208512 :l-rs304654	3326 [3302/3317]	73 [92/90]	448 [474/465]	31 [13/10]	0 [1/18*]	19 [17/1*]	1 [0/0]	2 [0/0]	0 [0/0]
chr15:3859189 3:D- rs73760016	3432 [3407/3422]	200 [225/222]	189 [206/191]	33 [14/15]	2 [4/3]	2 [3/4]	1 [0/1]	0 [0/1]	0 [0/0]
rs117147554- rs80214471	3289 [3277/3263]	129 [143/164]	152 [163/158]	20 [7/6]	3 [2/0]	0 [2/4]	1 [0/0]	1 [0/0]	0 [0/0]
rs75961317- rs143823697	3291 [3271/3293]	185 [203/207]	219 [241/220]	34 [15/14]	4 [3/2]	3 [4/2]	0 [0/0]	2 [0/0]	0 [0/0]
rs75087565- rs254700	3412 [3399/3399]	73 [84/75]	172 [189/200]	17 [5/3]	1 [1/0]	5 [3/3]	0 [0/0]	0 [0/0]	0 [0/0]
rs58347743- rs80179511	2426 [2382/2414]	310 [345/352]	660 [694/658]	135 [101/103]	5 [12/9]	36 [51/46]	7 [4/5]	15 [7/9]	2 [0/0]
rs41280637- rs114617777	3248 [3227/3247]	369 [389/384]	148 [171/150]	43 [21/23]	8 [12/15]	3 [2/3]	2 [1/0]	1 [0/0]	0 [0/0]
rs11818771- chr6:80625529 :D	2679 [2638/2615]	668 [699/716]	214 [257/263]	95 [68/69]	42 [46/48]	6 [6/5]	12 [5/4]	5 [2/1]	0 [0/0]
rs9672789- rs113552799	2709 [2678/2667]	219 [255/239]	453 [477/498]	69 [45/44]	5 [6/5]	19 [21/29]	4 [1/1]	7 [2/2]	0 [0/0]
rs12309312- rs118078508	3508 [3498/3477]	164 [176/176]	77 [86/109]	16 [4/2]	2 [2/2]	0 [1/0]	0 [0/1]	0 [0/0]	0 [0/0]
rs3093853- rs114490548	3530 [3505/3466]	142 [168/177]	169 [190/218]	26 [9/11]	4 [2/1]	4 [3/3]	0 [0/0]	1 [0/0]	0 [0/0]
rs114670618- rs2043732	3184 [3162/3179]	279 [305/273]	165 [184/195]	38 [18/20]	10 [7/5]	1 [3/6*]	2 [0/0]	1 [0/1]	0 [0/0]
rs117672593- rs73688732	3347 [3333/3340]	128 [142/133]	213 [229/235]	26 [10/9]	0 [2/1]	4 [4/1]	1 [0/0]	0 [0/0]	0 [0/0]
rs6948377- rs1826547	3158 [3137/3138]	334 [120/136]	99 [352/335]	29 [13/13]	1 [1/2]	9 [10/9]	2 [0/0]	2 [0/1]	0 [0/0]
rs116702532- rs41274082	3548 [3534/3521]	180 [194/186]	119 [135/155]	24 [7/6]	2 [3/4]	2 [1/3]	0 [0/0]	0 [0/0]	0 [0/0]
rs61761074- rs140695911	3256 [3243/3245]	170 [183/82]	156 [170/170]	25 [10/10]	1 [3/3]	1 [2/1]	2 [0/0]	0 [0/0]	0 [0/0]

rs75217189-	3372	262	150	33	4	1	1	1	0
rs192196641	[3358/3332]	[281/317]	[163/144]	[14/18]	[6/10]	[2/2]	[0/1]	[0/0]	[0/0]
rs75756950-	2824	451	285	91	15	14	5	5	0
rs2765709	[2779/2786]	[483/456]	[335/340]	[58/66]	[21/24]	[10/15]	[3/2]	[2/1]	[0/0]
rs75217189-	3358	231	149	29	2	1	1	1	0
rs11255742	[3345/3319]	[246/281]	[163/145]	[12/17]	[5/8]	[2/2]	[0/0]	[0/0]	[0/0]
rs72417307-	3339	380	223	58	18	4	6	1	0
rs2441690	[3302/3273]	[423/404]	[252/285]	[32/44]	[14/17]	[5/5]	[1/1]	[1/0]	[0/0]
rs2123876-	2961	529	374	123	28	13	6	7	0
chr12:2162469	[2914/2922]	[575/569]	[419/419]	[83/80]	[28/29]	[15/18]	[4/2]	[3/1]	[0/1]
4:D									
rs117834974-	3612	163	119	21	2	2	0	0	0
rs12582581	[3600/3610]	[132/124]	[177/178]	[6/4]	[1/1]	[2/1]	[0/1]	[0/0]	[0/0]
rs17879775-	3385	130	80	14	1	0	1	0	0
rs78762238	[3374/3404]	[142/128]	[89/73]	[4/5]	[1/1]	[1/0]	[0/0]	[0/0]	[0/0]
rs1357384-	3594	94	144	17	1	2	0	0	0
chr13:7870040	[3582/3579]	[106/112]	[156/157]	[5/3]	[1/0]	[2/1]	[0/0]	[0/0]	[0/0]
8:D									
rs75087565-	3050	417	138	49	16	4	2	1	0
rs73475884	[3017/3067]	[447/393]	[168/175]	[25/27]	[17/12]	[2/3]	[1/0]	[0/0]	[0/0]
rs75087565-	3047	419	139	49	16	4	2	1	0
rs55942942	[3015/3065]	[449/393]	[167/176]	[25/27]	[17/12]	[2/3]	[1/0]	[0/0]	[0/0]
rs13083303-	2895	95	842	71	0	63	0	5	0
chr15:7169718	[2866/2862]	[126/104]	[870/875]	[38/37]	[1/1]	[66/88]	[0/1]	[3/3]	[0/0]
2:D									
rs7714386-	3573	113	160	20	2	2	0	1	0
rs60709797	[3555/3538]	[174/200]	[132/118]	[6/10]	[2/4]	[1/0]	[0/1]	[0/0]	[0/0]
rs7714386-	3572	175	113	20	2	2	0	1	0
rs58413939	[3554/3543]	[188/209]	[132/119]	[7/9]	[2/4]	[1/0]	[0/1]	[0/0]	[0/0]
rs297122-	3439	126	275	25	3	3	0	5	0
rs4128728	[3418/3399]	[145/163]	[293/293]	[12/15]	[2/1]	[6/4]	[0/0]	[0/1]	[0/0]