Supplementary materials

Table S1. Correlations of summary statistics (z-scores) between AD and each cancer type, with a block Jackknife p-value[a]

Trait 1	Trait 2: Cancer	Corr1 (of z-scores)	bjk p-value1
	All Colon	0.002	0.583
	Breast ER-negative	0.008	0.069
	All Breast	0.009	0.089
	Prostate aggressive	-0.005	0.223
Alzheimer's disease	All Prostate	-0.006	0.236
	Ovarian	-0.003	0.581
	Lung adenocarcinoma	0.009	0.025
	Lung squamous	0.012	0.003
	All Lung	0.015	0.001

[a]Adjacent SNPs on the same chromosome were divided into blocks; overall there were around 200 blocks across the genome with each block size of 25K-28K SNPs. Block jackknife (bjk) estimates were obtained via a leave-one-block-out estimation procedure

Table S2. Genetic correlation between AD and each significant cancer type in the eight functional categories

Annotation	Cancer type	Num_SNPs[a]	r_g	SE	P-value
Repressed	Any cancer	2,200,465	-0.127	0.310	0.681
	Breast	2,172,902	-0.132	0.348	0.705
	Lung	2,610,980	-0.052	0.259	0.841
H3K4me1	Any cancer	2,089,387	0.087	0.061	0.155
	Breast	2,062,737	0.087	0.064	0.173
	Lung	2,492,345	0.073	0.080	0.359
H3K27ac	Any cancer	1,879,775	0.095	0.058	0.100
	Breast	1,860,057	0.103	0.066	0.119
	Lung	2,232,313	0.074	0.082	0.369
Intron	Any cancer	1,907,385	0.050	0.100	0.616
	Breast	1,883,447	0.101	0.106	0.340
	Lung	2,254,094	0.038	0.129	0.768
Transcribed	Any cancer	1,698,138	0.035	0.070	0.619
	Breast	1,677,283	0.038	0.073	0.604
	Lung	2,003,018	0.009	0.080	0.910
Super enhancer	Any cancer	803,218	0.157	0.079	0.046
	Breast	794,399	0.069	0.087	0.427
	Lung	952,330	0.094	0.093	0.313
DHS	Any cancer	830,077	0.058	0.077	0.448
	Breast	818,119	0.069	0.075	0.356
	Lung	994,325	0.083	0.094	0.378
H3K4me3	Any cancer	631,807	-0.002	0.065	0.974
	Breast	625,431	0.005	0.068	0.936

Lung	750,740	-0.022	0.074	0.762

[a]overlapping SNPs