Supplemental Table 1. AD GWAS information: cases and controls, ADGC cohort

	Cases (n = 1443)	Controls (n = 99)
Gender, n (%)		
Male	680 (47.1)	57 (57.6)
Female	763 (52.9)	42 (42.4)
Age, mean (SD)	80.9 (6.8)	85.2 (7.4)
Braak stage, n (%)		
No degeneration	0 (0)	14 (13.7)
Stage I	0 (0)	29 (29.4)
Stage II	0 (0)	30 (30.4)
Stage III	0 (0)	26 (26.5)
Stage IV	0 (0)	0 (0)
Stage V	639 (44.2)	0 (0)
Stage VI	804 (55.8)	0 (0)
CERAD NP plaque density, n (%)		
High NP plaques	1385 (96.0)	0(0)
Moderate NP plaques	57(4.0)	0(0)
Low/No NP plaques/Not done	0(0)	99 (100)
Documented clinical dementia, n (%)		
Yes	1368 (94.8)	19 (19.2)
No or missing	75 (5.2)	80 (80.8)

Supplemental Table 1 Legend. Information about cases and controls from the AD GWAS. All these cases were included from the ADGC cohort. For exclusion and inclusion criteria, see Supplemental methods.

Supplemental Table 2 AD pathology GWAS data: Top 10 AD GWAS hits using AD pathology criteria applied to ADGC dataset

SNP	Chr	Position (NCBI 37)	Region	P-value
rs2075650	19	45395619	TOMM40	4.23E-13
rs11556505	19	45396144	TOMM40	1.53E-12
rs34404554	19	45395909	TOMM40	1.82E-12
rs17169634	7	34093997	BMPER	1.15E-07
rs75353220	7	34094036	BMPER	1.82E-07
rs74651988	7	34065142	BMPER	6.31E-07
rs75847378	2	40181517	SLC8A1-AS1	6.70E-07
rs75733828	7	34057913	BMPER	7.14E-07
rs79312206	7	34068665	BMPER	7.14E-07
rs74495807	7	34088535	BMPER	7.94E-07

Supplemental Table 2 Legend. Results of GWAS using AD pathology as case-control criteria for GWAS. Note that TOMM40 is probably a proxy allele for APOE genotype.

Supplemental Table 3 HS-Aging GWAS information: cases and controls, ADGC cohort

	Cases (n = 186)	Controls (n = 1450)
Gender, n (%)		
Male	84 (45.2)	743 (51.2)
Female	102 (54.8)	707 (48.8)
Age, mean (SD)	84.1 (8.2)	81.5 (8.7)
NPBRAAK, n (%)		
Stage I	4 (2.2)	37 (2.6)
Stage II	4 (2.2)	56 (3.9)
Stage III	6 (3.2)	120 (8.3)
Stage IV	26 (14)	196 (13.5)
Stage V	65 (34.9)	395 (27.3)
Stage VI	80 (43)	627 (43.3)
No degeneration	1 (0.5)	18 (1.2)
NPCERAD, n (%)		
Definite/probable/possible AD	165 (95.9)	1159 (92.7)
Disease criteria not met	7 (4.1)	91 (7.3)
Years of education, n (%)		
12 years or less	62 (33.9)	451 (32)
More than 12 years	121 (66.1)	960 (68)
CLINICAL DEMENTIA, n (%)		
Yes	153 (90)	1032 (82.6)
No	17 (10)	218 (17.4)

Supplemental Table 3 Legend. Information about cases and controls from the HS-Aging GWAS. All these cases were included from the ADGC cohort and had replete neuropathologic information. For exclusion and inclusion criteria, see Supplemental methods.

Supplemental Table 4. All SNPs with p<10-5 in the Stage I cohorts GWAS

Locus area	Chr	SNP at Locus with lowest *p* -value	position	Minor Allele	Major Allele	MAF Cases	MAF Controls	*p* -value (Additive MOI)
ABCC9	12	rs7966849	22004199	G	A	0.38	0.51	1.01E-07
ABCC9	12	rs704182	22002569	T	C	0.38	0.51	1.44E-07
ABCC9	12	rs829079	21999109	G	T	0.38	0.51	2.62E-07
ABCC9	12	rs704177	21993273	A	T	0.38	0.51	3.63E-07
ABCC9	12	rs704180	21994112	G	A	0.38	0.51	3.88E-07
ABCC9	12	rs704178	21993479	C	G	0.38	0.51	3.90E-07
ABCC9	12	rs1283822	22001884	A	C	0.39	0.51	4.57E-07
CTAGE5	14	rs8018486	39818617	G	A	0.11	0.21	1.15E-06
intergenic	14	rs4636812	39828196	T	C	0.11	0.20	1.38E-06
intergenic	3	rs114816986	155035752	A	G	0.30	0.08	1.97E-06
CTAGE5	14	rs28718785	39820399	T	C	0.11	0.20	2.07E-06
CTAGE5	14	rs4393482	39818433	G	T	0.17	0.28	2.09E-06
CTAGE5	14	rs2274397	39815476	T	A	0.11	0.20	2.13E-06
intergenic	14	rs10483537	39915084	C	G	0.11	0.20	2.65E-06
intergenic	14	rs11629406	39912005	G	T	0.11	0.20	2.74E-06
FBXO33	14	rs10145518	39896328	A	C	0.11	0.20	2.96E-06
CTAGE5(dist=9215);FBXO33(dist=35965)	14	rs7148572	39829612	A	G	0.11	0.20	2.98E-06
FBXO33(dist=8989);NONE(dist=NONE)	14	rs4902657	39910693	A	G	0.11	0.20	3.04E-06
FBXO33(dist=14363);NONE(dist=NONE)	14	rs4902668	39916067	A	G	0.11	0.20	3.16E-06
CTAGE5(dist=10909);FBXO33(dist=34271)	14	rs62000717	39831306	T	C	0.11	0.20	3.31E-06
CTAGE5(dist=7708);FBXO33(dist=37472)	14	rs4328353	39828105	T	C	0.11	0.20	3.35E-06
FBXO33(dist=15032);NONE(dist=NONE)	14	rs10083310	39916736	C	A	0.11	0.20	3.39E-06
FBXO33(dist=17320);NONE(dist=NONE)	14	rs10139612	39919024	T	C	0.11	0.20	3.39E-06
CTAGE5	14	rs4902542	39821101	T	C	0.12	0.21	3.40E-06
MIR2054(dist=1232924);INTU(dist=892701)	4	rs62324179	127661386	T	C	0.26	0.18	3.65E-06
FBXO33	14	rs10136852	39888440	G	C	0.11	0.20	3.70E-06
CTAGE5(dist=29865);FBXO33(dist=15315)	14	rs10149896	39850262	T	C	0.11	0.20	3.76E-06
FBXO33(dist=73038);NONE(dist=NONE)	14	rs10146966	39974742	T	G	0.11	0.20	3.76E-06
FBXO33	14	rs4902601	39881324	C	T	0.11	0.20	3.82E-06
FBXO33(dist=80724);NONE(dist=NONE)	14	rs2038279	39982428	A	T	0.18	0.28	3.93E-06

FBXO33(dist=24469);NONE(dist=NONE)	14	rs28689476	39926173	G	A	0.11	0.20	4.00E-06
FBXO33(dist=60626);NONE(dist=NONE)	14	rs11157068	39962330	C	T	0.11	0.20	4.21E-06
FBXO33(dist=64977);NONE(dist=NONE)	14	rs140701311	39966681	G	A	0.11	0.20	4.21E-06
FBXO33(dist=27464);NONE(dist=NONE)	14	rs7145382	39929168	G	A	0.11	0.20	4.31E-06
FBXO33(dist=36000);NONE(dist=NONE)	14	rs28839914	39937704	T	C	0.11	0.20	4.31E-06
ABCC9	12	rs1283817	21984971	A	C	0.56	0.45	4.34E-06
FBXO33(dist=78593);NONE(dist=NONE)	14	rs4288915	39980297	G	A	0.18	0.28	4.34E-06
ABCC9	12	rs1283816	21984712	C	T	0.56	0.45	4.34E-06
CTAGE5	14	rs61398943	39811680	A	T	0.11	0.20	4.37E-06
ABCC9	12	rs1299731	21989355	C	A	0.56	0.45	4.74E-06
ABCC9	12	rs829068	21988670	C	G	0.56	0.45	4.94E-06
PCDH17(dist=1542404);DIAPH3(dist=394252)	13	rs80155385	59845469	C	G	0.22	0.05	4.95E-06
PCDH17(dist=1543575);DIAPH3(dist=393081)	13	rs4886143	59846640	T	G	0.22	0.05	4.95E-06
CTAGE5	14	rs28776502	39799698	G	C	0.12	0.21	4.99E-06
CTAGE5	14	rs117255274	39800454	A	G	0.12	0.21	4.99E-06
CTAGE5	14	rs7149197	39801320	C	A	0.12	0.21	4.99E-06
CTAGE5	14	rs7150685	39801323	C	T	0.12	0.21	4.99E-06
CTAGE5	14	rs62000689	39805546	T	C	0.12	0.21	4.99E-06
CTAGE5	14	rs56126634	39794623	A	T	0.12	0.21	5.14E-06
CTAGE5	14	rs4899200	39737912	T	C	0.18	0.28	5.22E-06
CTAGE5	14	rs6571920	39793555	A	G	0.12	0.21	5.72E-06
PCDH17(dist=1564389);DIAPH3(dist=372267)	13	rs7992329	59867454	T	C	0.22	0.05	5.72E-06
ABCC9	12	rs1967534	21987948	C	A	0.56	0.45	5.79E-06
ABCC9	12	rs829069	21988801	C	T	0.56	0.45	5.79E-06
CTAGE5	14	rs10145517	39808312	G	A	0.17	0.27	5.97E-06
ABCC9	12	rs829080	21999864	T	C	0.31	0.43	6.10E-06
FBXO33(dist=82126);NONE(dist=NONE)	14	rs1950339	39983830	G	T	0.18	0.28	6.30E-06
FBXO33(dist=114273);NONE(dist=NONE)	14	rs12437323	40015977	G	A	0.17	0.27	6.47E-06
NONE(dist=NONE);CNTN5(dist=374949)	11	rs3018573	98516757	G	A	0.52	0.41	6.81E-06
CTAGE5	14	rs8019758	39790451	G	C	0.12	0.21	6.84E-06
ABCC9	12	rs704176	21992125	C	G	0.56	0.45	7.45E-06
CTAGE5(dist=40541);FBXO33(dist=4639)	14	rs10142724	39860938	T	A	0.12	0.21	7.51E-06
CTAGE5	14	rs8022515	39794360	A	G	0.12	0.20	7.83E-06
FBXO33(dist=96755);NONE(dist=NONE)	14	rs11624961	39998459	C	T	0.18	0.28	8.04E-06

FRMD4A	10	rs72769570	13810428	A	G	0.19	0.05	8.09E-06
CTAGE5(dist=2670);FBXO33(dist=42510)	14	rs8016293	39823067	C	G	0.11	0.20	8.29E-06
NONE(dist=NONE);CNTN5(dist=419207)	11	rs4393281	98472499	T	C	0.51	0.40	8.31E-06
FBXO33(dist=95638);NONE(dist=NONE)	14	rs7153750	39997342	A	G	0.18	0.28	8.85E-06
FBXO33(dist=80083);NONE(dist=NONE)	14	rs11623490	39981787	A	G	0.17	0.27	8.88E-06
CTAGE5	14	rs62000665	39766075	T	C	0.12	0.21	9.07E-06
WWOX	16	rs55751884	78231495	C	T	0.26	0.12	9.19E-06
FBXO33(dist=88661);NONE(dist=NONE)	14	rs7154346	39990365	G	T	0.18	0.28	9.35E-06
CSNK1G3(dist=227012);ZNF608(dist=792860)	5	rs12514988	123179750	T	C	0.16	0.04	9.48E-06
CSNK1G3(dist=227314);ZNF608(dist=792558)	5	rs73800014	123180052	G	C	0.16	0.04	9.48E-06
CSNK1G3(dist=227506);ZNF608(dist=792366)	5	rs76479689	123180244	G	A	0.16	0.04	9.48E-06
CSNK1G3(dist=227844);ZNF608(dist=792028)	5	rs12515740	123180582	T	G	0.16	0.04	9.48E-06
CSNK1G3(dist=228505);ZNF608(dist=791367)	5	rs58563757	123181243	T	C	0.16	0.04	9.48E-06
CSNK1G3(dist=228867);ZNF608(dist=791005)	5	rs60806829	123181605	G	C	0.16	0.04	9.48E-06
CSNK1G3(dist=229023);ZNF608(dist=790849)	5	rs12516490	123181761	A	G	0.16	0.04	9.48E-06
CSNK1G3(dist=229484);ZNF608(dist=790388)	5	rs77869131	123182222	A	G	0.16	0.04	9.48E-06
CSNK1G3(dist=229575);ZNF608(dist=790297)	5	rs78790332	123182313	T	G	0.16	0.04	9.48E-06
CSNK1G3(dist=230388);ZNF608(dist=789484)	5	rs75623302	123183126	G	C	0.16	0.04	9.48E-06
CSNK1G3(dist=235111);ZNF608(dist=784761)	5	rs74440410	123187849	A	G	0.16	0.04	9.48E-06
CSNK1G3(dist=238988);ZNF608(dist=780884)	5	rs72663342	123191726	C	G	0.16	0.04	9.74E-06
CTAGE5	14	rs61998552	39739482	G	C	0.12	0.21	9.89E-06
FBXO33(dist=104271);NONE(dist=NONE)	14	rs11623451	40005975	T	C	0.18	0.27	1.00E-05