

Supplementary Table 1A: UCSF and Mayo Clinic Cases and Controls used in the Study Stages.

		UCSF	Mayo
Stage 1A: Imputation*	Oligodendroglioma/MOA** Cases	191	199
	Controls	192	532
Stage 1B: Long Range PCR / Pooled Next Generation Sequencing	Oligodendroglioma/MOA Cases	177	220
	Controls	547	274
Stage 2: Custom validation genotyping for 8q24.21 (CCDC26) Region****	Oligodendroglioma Cases	168	98
	MOA Cases	59	166
	Astrocytoma (A2) Cases	84	65
	Anaplastic Astrocytoma (A3) Cases	104	188
	Glioblastoma (A4) Cases	390	330
	All Gliomas	805	852***
	Controls	512	789

* Imputation was performed using the data published in Jenkins et al. Cancer Genetics 1:13;2011

** MOA = mixed oligoastrocytoma

*** Five Mayo astrocytomas were of indeterminant grade

**** For UCSF, 182 of the cases and none of the controls in Stage 2 were also used for Stages 1A and 1B. For Mayo, 693 of the cases and 578 controls were also used in stages 1A and 1B.

Supplementary Table 1B: Age and Gender of UCSF and Mayo Clinic Cases and Controls used in Validation Genotyping (Stage 2).

	Mayo Control (N=789)	UCSF Control (N=512)	Mayo A2 (N=65)	UCSF A2 (N=84)	Mayo A3 (N=188)	UCSF A3 (N=104)	Mayo GBM (N=330)	UCSF GBM (N=390)	Mayo Oligo (N=98)	UCSF Oligo (N=168)	Mayo MOA (N=166)	UCSF MOA (N=59)
Age												
Mean (SD)	49.8 (14.1)	57.9 (15.3)	42.2 (13.6)	42.0 (13.6)	48.4 (14.8)	44.3 (13.9)	55.7 (12.4)	56.5 (12.9)	41.6 (10.7)	45.3 (12.1)	39.0 (11.5)	39.3 (11.6)
Median	49	58	41	40	48	44	56	57	41	44	38	37
Gender												
Male	450 (57.0%)	289 (56.4%)	38 (58.5%)	58 (69.0%)	103 (54.8%)	55 (52.9%)	207 (62.7%)	252 (64.6%)	50 (51.0%)	94 (56.0%)	91 (54.8%)	37 (62.7%)
Female	339 (43.0%)	223 (43.6%)	27 (41.5%)	26 (31.0%)	85 (45.2%)	49 (47.1%)	123 (37.3%)	138 (35.4%)	48 (49.0%)	74 (44.0%)	75 (45.2%)	22 (37.3%)

See Supplementary Table 1A for abbreviations used; Oligo is oligodendroglioma.

Supplementary Table 3: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology type

Mayo Clinic			All Gliomas (N=852)						Oligodendrogliomas (N=98)					
SNP	BP	Control MAF (N=789)	Case MAF	OR	95% CI	p	-log ₁₀ (p)	Case MAF	OR	95% CI	p	-log ₁₀ (p)		
rs72714236	130468065	0.051	0.120	2.47	1.89 3.25	6.41E-11	10.19	0.189	4.09	2.59 6.46	1.51E-09	8.82		
rs72714295	130569398	0.066	0.142	2.30	1.80 2.93	3.17E-11	10.50	0.219	3.58	2.36 5.44	2.14E-09	8.67		
rs72714302	130588045	0.049	0.124	2.64	2.01 3.47	3.43E-12	11.46	0.214	4.74	3.04 7.38	5.83E-12	11.23		
rs72716319	130599332	0.050	0.125	2.64	2.01 3.46	3.11E-12	11.51	0.209	4.65	2.98 7.26	1.32E-11	10.88		
rs72716328	130606932	0.046	0.117	2.74	2.06 3.65	3.79E-12	11.42	0.184	4.25	2.28 6.73	7.63E-10	9.12		
rs147958197	130631395	0.041	0.112	2.90	2.16 3.90	2.01E-12	11.70	0.194	5.82	3.59 9.43	9.49E-13	12.02		
rs55705857	130645692	0.052	0.145	3.03	2.32 3.95	4.05E-16	15.39	0.242	5.92	3.79 9.25	6.21E-15	14.21		

UCSF			All Gliomas (N=810)						Oligodendrogliomas (N=168)					
SNP	BP	Control MAF (N= 512)	Case MAF	OR	95% CI	p	-log ₁₀ (p)	Case MAF	OR	95% CI	p	-log ₁₀ (p)		
rs72714236	130468065	0.046	0.102	2.05	1.45 2.90	5.46E-05	4.26	0.164	3.74	2.34 5.98	3.42E-08	7.47		
rs72714295	130569398	0.054	0.124	2.30	1.66 3.18	5.00E-07	6.30	0.194	4.29	2.75 6.68	1.34E-10	9.87		
rs72714302	130588045	0.033	0.109	3.02	2.04 4.47	3.12E-08	7.51	0.180	6.15	3.71 10.20	2.08E-12	11.68		
rs72716319	130599332	0.033	0.108	3.00	2.03 4.44	4.07E-08	7.39	0.176	5.91	3.56 9.82	6.79E-12	11.17		
rs72716328	130606932	0.029	0.107	3.28	2.17 4.94	1.46E-08	7.84	0.170	6.33	3.74 10.73	6.63E-12	11.18		
rs147958197	130631395	0.030	0.104	2.98	2.00 4.46	1.03E-07	6.99	0.182	6.32	3.78 10.57	1.96E-12	11.71		
rs55705857	130645692	0.036	0.132	3.33	2.29 4.83	2.38E-10	9.62	0.214	6.79	4.19 11.01	8.63E-15	14.06		

Mayo and UCSF			All Gliomas (N=1662)						Oligodendrogliomas (N=266)					
SNP	BP	Control MAF (N=1301)	Case MAF	OR	95% CI	p	-log ₁₀ (p)	Case MAF	OR	95% CI	p	-log ₁₀ (p)		
rs72714236	130468065	0.049	0.112	2.29	1.85 2.84	2.45E-14	13.61	0.173	3.93	2.83 5.46	2.89E-16	15.54		
rs72714295	130569398	0.061	0.134	2.27	1.87 2.75	1.77E-16	15.75	0.203	3.88	2.87 5.26	1.77E-18	17.75		
rs72714302	130588045	0.043	0.117	2.76	2.21 3.45	4.19E-19	18.38	0.193	5.34	3.83 7.44	4.97E-23	22.30		
rs72716319	130599332	0.043	0.117	2.75	2.20 3.43	5.64E-19	18.25	0.188	5.18	3.71 7.22	3.72E-22	21.43		
rs72716328	130606932	0.039	0.112	2.90	2.30 3.66	2.45E-19	18.61	0.175	5.07	3.59 7.14	1.83E-20	19.74		
rs147958197	130631395	0.037	0.109	2.93	2.31 3.71	7.25E-19	18.14	0.186	6.09	4.28 8.64	6.57E-24	23.18		
rs55705857	130645692	0.046	0.139	3.11	2.51 3.85	5.00E-25	24.30	0.225	6.32	4.56 8.77	2.15E-28	27.67		

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

Supplementary Table 3: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology type

Mayo Clinic			Mixed Oligoastrocytomas (N=166)						Oligodendrogliomas and Mixed Oligoastrocytomas (N=264)					
SNP	BP	Control MAF (N=789)	Case MAF	OR	95% CI	p	-log10(p)	Case MAF	OR	95% CI	p	-log10(p)		
rs72714236	130468065	0.051	0.163	3.36	2.24 5.05	5.50E-09	8.26	0.172	3.6	2.54 5.11	7.60E-13	12.12		
rs72714295	130569398	0.066	0.181	2.88	1.97 4.21	5.13E-08	7.29	0.195	3.12	2.26 4.30	4.49E-12	11.35		
rs72714302	130588045	0.049	0.166	3.57	2.38 5.35	7.26E-10	9.14	0.184	3.96	2.80 5.60	7.76E-15	14.11		
rs72716319	130599332	0.050	0.166	3.47	2.32 5.20	1.48E-09	8.83	0.182	3.88	2.74 5.49	1.77E-14	13.75		
rs72716328	130606932	0.046	0.157	3.64	2.40 5.52	1.20E-09	8.92	0.167	3.87	2.70 5.54	1.70E-13	12.77		
rs147958197	130631395	0.041	0.136	3.39	2.20 5.23	3.58E-08	7.45	0.157	4.15	2.85 6.04	1.08E-13	12.97		
rs55705857	130645692	0.052	0.204	3.97	2.71 5.81	1.47E-12	11.83	0.218	4.72	3.37 6.62	2.14E-19	18.67		

UCSF			Mixed Oligoastrocytomas (N=59)						Oligodendrogliomas and Mixed Oligoastrocytomas (N=227)					
SNP	BP	Control MAF (N= 512)	Case MAF	OR	95% CI	p	-log10(p)	Case MAF	OR	95% CI	p	-log10(p)		
rs72714236	130468065	0.046	0.102	2.05	0.96 4.35	0.062	1.21	0.148	3.24	2.06 5.09	3.51E-07	6.45		
rs72714295	130569398	0.054	0.119	2.12	1.05 4.30	0.036	1.44	0.174	3.70	2.41 5.68	2.08E-09	8.68		
rs72714302	130588045	0.033	0.110	3.32	1.48 7.43	0.0036	2.44	0.162	5.24	3.21 8.58	4.21E-11	10.38		
rs72716319	130599332	0.033	0.095	3.03	1.28 7.17	0.012	1.94	0.155	5.05	3.08 8.29	1.48E-10	9.83		
rs72716328	130606932	0.029	0.110	3.80	1.66 8.71	0.0016	2.80	0.154	5.49	3.29 9.17	7.87E-11	10.10		
rs147958197	130631395	0.030	0.136	4.46	2.02 9.83	0.0002162	3.67	0.170	5.51	3.35 9.07	1.82E-11	10.74		
rs55705857	130645692	0.036	0.153	4.49	2.11 9.55	9.79E-05	4.01	0.198	5.86	3.67 9.35	1.26E-13	12.90		

Mayo and UCSF			Mixed Oligoastrocytomas (N=225)						Oligodendrogliomas and Mixed Oligoastrocytomas (N=491)					
SNP	BP	Control MAF (N=1301)	Case MAF	OR	95% CI	p	-log10(p)	Case MAF	OR	95% CI	p	-log10(p)		
rs72714236	130468065	0.049	0.147	3.02	2.11 4.32	1.68E-09	8.78	0.161	3.47	2.63 4.58	1.53E-18	17.81		
rs72714295	130569398	0.061	0.164	2.68	1.92 3.74	7.79E-09	8.11	0.185	3.31	2.56 4.28	6.44E-20	19.19		
rs72714302	130588045	0.043	0.151	3.55	2.47 5.11	7.06E-12	11.15	0.174	4.37	3.29 5.80	1.67E-24	23.78		
rs72716319	130599332	0.043	0.147	3.41	2.36 4.91	5.33E-11	10.27	0.169	4.25	3.20 5.64	1.44E-23	22.84		
rs72716328	130606932	0.039	0.144	3.70	2.55 5.38	5.78E-12	11.24	0.161	4.36	3.25 5.85	6.47E-23	22.19		
rs147958197	130631395	0.037	0.136	3.67	2.51 5.36	1.84E-11	10.73	0.163	4.64	3.44 6.25	6.24E-24	23.20		
rs55705857	130645692	0.046	0.191	4.09	2.91 5.75	4.82E-16	15.32	0.209	5.12	3.89 6.72	1.13E-31	30.95		

* Gold highlighted cells are significant after Bonferroni correction (p<0.00030); Yellow highlighted cells are nominally significant (p<0.05)

Supplementary Table 3: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology type

Mayo Clinic			Astrocytomas (N=65)						Anaplastic Astrocytomas (N=188)					
SNP	BP	Control MAF (N=789)	Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.051	0.115	2.19	1.22	3.94	0.00848	2.07	0.104	2.14	1.42	3.20	0.00025	3.61
rs72714295	130569398	0.066	0.169	2.61	1.56	4.37	0.00027	3.57	0.112	1.78	1.21	2.61	0.0033	2.48
rs72714302	130588045	0.049	0.131	2.58	1.47	4.52	0.00094	3.02	0.104	2.20	1.46	3.30	0.00015	3.83
rs72716319	130599332	0.050	0.131	2.52	1.44	4.42	0.0013	2.90	0.109	2.31	1.54	3.45	4.61E-05	4.34
rs72716328	130606932	0.046	0.131	2.69	1.53	4.72	0.00059	3.23	0.104	2.37	1.57	3.58	4.07E-05	4.39
rs147958197	130631395	0.041	0.123	2.94	1.62	5.32	0.00037	3.43	0.113	2.94	1.94	4.45	3.848E-07	6.41
rs55705857	130645692	0.052	0.131	2.35	1.34	4.12	0.0029	2.53	0.138	2.88	1.97	4.20	4.485E-08	7.35

UCSF			Astrocytomas (N=84)						Anaplastic Astrocytomas (N=104)					
SNP	BP	Control MAF (N= 512)	Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.046	0.137	2.98	1.61	5.52	0.00052	3.29	0.106	2.39	1.31	4.37	0.0046	2.34
rs72714295	130569398	0.054	0.151	3.19	1.75	5.81	0.0001567	3.80	0.135	2.54	1.47	4.39	0.000835	3.08
rs72714302	130588045	0.033	0.149	5.06	2.58	9.93	2.50E-06	5.60	0.121	3.74	2.00	6.97	3.48E-05	4.46
rs72716319	130599332	0.033	0.149	5.06	2.58	9.93	2.50E-06	5.60	0.125	3.92	2.11	7.27	1.50E-05	4.82
rs72716328	130606932	0.029	0.149	5.74	2.87	11.50	8.02E-07	6.10	0.125	4.33	2.30	8.15	5.524E-06	5.26
rs147958197	130631395	0.030	0.137	5.05	2.54	10.06	4.12E-06	5.38	0.096	2.99	1.55	5.76	0.0011	2.97
rs55705857	130645692	0.036	0.179	5.93	3.12	11.28	5.74E-08	7.24	0.149	4.41	2.45	7.95	7.372E-07	6.13

Mayo and UCSF			Astrocytomas (N=149)						Anaplastic Astrocytomas (N=292)					
SNP	BP	Control MAF (N=1301)	Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.049	0.128	2.54	1.68	3.85	1.14E-05	4.95	0.105	2.19	1.57	3.05	3.942E-06	5.40
rs72714295	130569398	0.061	0.159	2.76	1.88	4.05	2.44E-07	6.61	0.120	2.00	1.47	2.72	1.04E-05	4.98
rs72714302	130588045	0.043	0.141	3.36	2.22	5.10	1.15E-08	7.94	0.110	2.60	1.86	3.64	2.133E-08	7.67
rs72716319	130599332	0.043	0.141	3.30	2.17	5.00	1.91E-08	7.72	0.115	2.71	1.95	3.77	3.568E-09	8.45
rs72716328	130606932	0.039	0.141	3.58	2.35	5.45	2.78E-09	8.56	0.111	2.82	2.01	3.94	1.70E-09	8.77
rs147958197	130631395	0.037	0.131	3.64	2.35	5.62	6.75E-09	8.17	0.107	2.88	2.04	4.06	1.919E-09	8.72
rs55705857	130645692	0.046	0.158	3.43	2.29	5.12	2.02E-09	8.69	0.142	3.18	2.33	4.34	3.141E-13	12.50

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

Supplementary Table 3: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology type

Mayo Clinic			Glioblastomas (N=330)					
SNP	BP	Control MAF (N=789)	Case MAF	OR	95% CI	p	-log10(p)	
rs72714236	130468065	0.051	0.089	1.94	1.35 2.78	0.00032	3.49	
rs72714295	130569398	0.066	0.111	1.85	1.33 2.56	0.00023	3.63	
rs72714302	130588045	0.049	0.088	1.92	1.33 2.75	0.00045	3.34	
rs72716319	130599332	0.050	0.088	1.91	1.33 2.74	0.00050	3.30	
rs72716328	130606932	0.046	0.084	2.03	1.39 2.96	0.00025	3.61	
rs147958197	130631395	0.041	0.076	2.14	1.43 3.20	0.00022	3.67	
rs55705857	130645692	0.052	0.094	2.06	1.44 2.96	8.39E-05	4.08	

UCSF			Glioblastomas N=390)					
SNP	BP	Control MAF (N= 512)	Case MAF	OR	95% CI	p	-log10(p)	
rs72714236	130468065	0.046	0.069	1.55	1.03 2.34	0.03647	1.44	
rs72714295	130569398	0.054	0.090	1.80	1.24 2.62	0.0022	2.66	
rs72714302	130588045	0.033	0.069	2.21	1.41 3.47	0.00059	3.23	
rs72716319	130599332	0.033	0.069	2.21	1.41 3.47	0.00059	3.23	
rs72716328	130606932	0.029	0.067	2.39	1.49 3.83	0.00028	3.55	
rs147958197	130631395	0.030	0.064	2.13	1.34 3.39	0.0014	2.85	
rs55705857	130645692	0.036	0.081	2.33	1.52 3.56	9.84E-05	4.01	

Mayo and UCSF			Glioblastomas (N=720)					
SNP	BP	Control MAF (N=1301)	Case MAF	OR	95% CI	p	-log10(p)	
rs72714236	130468065	0.049	0.078	1.74	1.33 2.27	4.91E-05	4.31	
rs72714295	130569398	0.061	0.099	1.79	1.40 2.28	2.694E-06	5.57	
rs72714302	130588045	0.043	0.078	2.01	1.52 2.65	8.023E-07	6.10	
rs72716319	130599332	0.043	0.078	2.00	1.52 2.64	9.563E-07	6.02	
rs72716328	130606932	0.039	0.074	2.13	1.60 2.84	2.512E-07	6.60	
rs147958197	130631395	0.037	0.070	2.09	1.55 2.82	1.29E-06	5.89	
rs55705857	130645692	0.046	0.087	2.12	1.62 2.77	4.462E-08	7.35	

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

Supplementary Table 4: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology and IDH1/2 status

Mayo Clinic

SNP	BP	Control MAF (N=789)	IDH1/2 Positive Gliomas (N=132)					IDH1/2 Negative Gliomas (N=98)						
			Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.051	0.155	3.50	2.26	5.43	2.10E-08	7.68	0.031	0.62	0.27	1.43	0.27	0.58
rs72714295	130569398	0.066	0.174	2.81	1.87	4.23	7.58E-07	6.12	0.062	0.95	0.52	1.77	0.88	0.05
rs72714302	130588045	0.049	0.155	3.34	2.16	5.16	5.94E-08	7.23	0.036	0.73	0.33	1.60	0.44	0.36
rs72716319	130599332	0.050	0.155	3.25	2.10	5.01	1.10E-07	6.96	0.036	0.73	0.33	1.60	0.43	0.37
rs72716328	130606932	0.046	0.148	3.32	2.13	5.18	1.14E-07	6.94	0.031	0.71	0.31	1.65	0.43	0.37
rs147958197	130631395	0.041	0.159	4.23	2.70	6.63	2.89E-10	9.54	0.041	1.09	0.51	2.33	0.83	0.08
rs55705857	130645692	0.052	0.205	4.25	2.83	6.38	3.49E-12	11.46	0.046	0.97	0.48	1.96	0.94	0.03

UCSF

SNP	BP	Control MAF (N= 512)	IDH1/2 Positive Gliomas (N=201)					IDH1/2 Negative Gliomas (N=163)						
			Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.046	0.124	2.86	1.71	4.79	6.32E-05	4.20	0.071	1.60	0.95	2.68	0.078	1.11
rs72714295	130569398	0.054	0.154	3.29	2.05	5.28	8.13E-07	6.09	0.092	1.84	1.15	2.94	0.011	1.95
rs72714302	130588045	0.033	0.145	4.91	2.84	8.49	1.29E-08	7.89	0.067	2.22	1.25	3.93	0.0065	2.18
rs72716319	130599332	0.033	0.147	5.01	2.90	8.65	7.31E-09	8.14	0.064	2.11	1.18	3.77	0.012	1.92
rs72716328	130606932	0.029	0.147	5.72	3.25	10.07	1.44E-09	8.84	0.061	2.27	1.24	4.13	0.0077	2.11
rs147958197	130631395	0.030	0.152	4.87	2.81	8.44	1.70E-08	7.77	0.058	2.04	1.11	3.72	0.021	1.67
rs55705857	130645692	0.036	0.182	5.62	3.35	9.42	6.00E-11	10.22	0.077	2.35	1.36	4.05	0.0022	2.65

Mayo and UCSF

SNP	BP	Control MAF (N=1301)	IDH1/2 Positive Gliomas (N=333)					IDH1/2 Negative Gliomas (N=261)						
			Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.049	0.137	3.25	2.32	4.54	6.54E-12	11.18	0.056	1.15	0.76	1.76	0.50	0.30
rs72714295	130569398	0.061	0.162	2.98	2.19	4.05	3.43E-12	11.46	0.081	1.39	0.97	1.99	0.071	1.15
rs72714302	130588045	0.043	0.149	3.92	2.80	5.50	2.32E-15	14.63	0.056	1.40	0.91	2.15	0.13	0.89
rs72716319	130599332	0.043	0.150	3.88	2.77	5.43	2.87E-15	14.54	0.054	1.34	0.87	2.07	0.19	0.73
rs72716328	130606932	0.039	0.147	4.13	2.93	5.82	5.03E-16	15.30	0.050	1.38	0.88	2.17	0.16	0.79
rs147958197	130631395	0.037	0.155	4.56	3.23	6.45	7.91E-18	17.10	0.052	1.53	0.97	2.41	0.067	1.17
rs55705857	130645692	0.046	0.191	4.77	3.47	6.57	6.56E-22	21.18	0.065	1.57	1.04	2.36	0.030	1.52

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

** INF=infinity

Supplementary Table 4: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology and IDH1/2 status

Mayo Clinic			IDH1/2 Positive Astrocytomas and Anaplastic Astrocytomas (N=38)						IDH1/2 Negative Astrocytomas and Anaplastic Astrocytomas (N=18)					
SNP	BP	Control MAF (N=789)	Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.051	0.145	3.31	1.58	6.95	0.0015	2.81	0.028	0.55	0.08	3.95	0.55	0.26
rs72714295	130569398	0.066	0.145	2.21	1.09	4.49	0.028	1.55	0.056	0.82	0.19	3.45	0.78	0.11
rs72714302	130588045	0.049	0.118	2.57	1.19	5.56	0.017	1.77	0.028	0.54	0.07	3.93	0.54	0.27
rs72716319	130599332	0.050	0.118	2.43	1.12	5.27	0.025	1.60	0.028	0.54	0.07	3.90	0.54	0.27
rs72716328	130606932	0.046	0.118	2.63	1.21	5.70	0.014	1.85	0.000	INF**	INF	INF	1.00	0.00
rs147958197	130631395	0.041	0.171	5.02	2.45	10.26	1.02E-05	4.99	0.028	0.68	0.09	5.04	0.70	0.15
rs55705857	130645692	0.052	0.197	4.10	2.12	7.95	2.81E-05	4.55	0.028	0.54	0.07	3.93	0.54	0.27

UCSF			IDH1/2 Positive Astrocytomas and Anaplastic Astrocytomas (N=83)						IDH1/2 Negative Astrocytomas and Anaplastic Astrocytomas (N=15)					
SNP	BP	Control MAF (N= 512)	Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.046	0.121	2.58	1.31	5.07	0.0060	2.22	0.067	1.41	0.33	5.97	0.64	0.19
rs72714295	130569398	0.054	0.169	3.46	1.86	6.41	8.20E-05	4.09	0.100	1.88	0.55	6.37	0.31	0.51
rs72714302	130588045	0.033	0.159	5.23	2.56	10.69	5.63E-06	5.25	0.067	2.11	0.45	9.92	0.34	0.46
rs72716319	130599332	0.033	0.163	5.54	2.73	11.24	2.22E-06	5.65	0.067	2.11	0.45	9.92	0.34	0.46
rs72716328	130606932	0.029	0.163	6.38	3.07	13.28	7.20E-07	6.14	0.067	2.46	0.52	11.59	0.26	0.59
rs147958197	130631395	0.030	0.157	4.73	2.31	9.68	2.12E-05	4.67	0.067	2.46	0.52	11.59	0.25	0.60
rs55705857	130645692	0.036	0.199	6.47	3.29	12.73	6.45E-08	7.19	0.133	4.79	1.43	16.08	0.011	1.95

Mayo and UCSF			IDH1/2 Positive Astrocytomas and Anaplastic Astrocytomas (N=121)						IDH1/2 Negative Astrocytomas and Anaplastic Astrocytomas (N=33)					
SNP	BP	Control MAF (N=1301)	Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.049	0.128	2.92	1.76	4.83	3.09E-05	4.51	0.045	0.93	0.29	2.98	0.90	0.04
rs72714295	130569398	0.061	0.161	2.84	1.81	4.47	6.04E-06	5.22	0.076	1.27	0.51	3.19	0.61	0.21
rs72714302	130588045	0.043	0.146	3.78	2.29	6.23	1.91E-07	6.72	0.045	1.07	0.33	3.47	0.91	0.04
rs72716319	130599332	0.043	0.149	3.78	2.30	6.20	1.41E-07	6.85	0.045	1.06	0.33	3.44	0.92	0.04
rs72716328	130606932	0.039	0.149	4.19	2.54	6.92	2.27E-08	7.64	0.030	0.77	0.19	3.19	0.72	0.14
rs147958197	130631395	0.037	0.161	4.95	2.98	8.21	6.20E-10	9.21	0.045	1.26	0.38	4.14	0.71	0.15
rs55705857	130645692	0.046	0.198	5.16	3.24	8.21	4.69E-12	11.33	0.076	1.72	0.67	4.38	0.26	0.59

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

** INF=infinity

Supplementary Table 4: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology and IDH1/2 status

Mayo Clinic			IDH1/2 Negative GBMs (N=79)											
SNP	BP	Control MAF (N=789)	IDH1/2 Positive GBMs (N=8)						IDH1/2 Negative GBMs (N=79)					
			Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.051	0.250	6.00	1.84	19.56	0.0029	2.53	0.032	0.66	0.27	1.62	0.36	0.44
rs72714295	130569398	0.066	0.250	4.60	1.42	14.84	0.011	1.97	0.064	1.01	0.52	1.98	0.97	0.01
rs72714302	130588045	0.049	0.250	6.12	1.88	19.92	0.0026	2.58	0.038	0.79	0.34	1.84	0.59	0.23
rs72716319	130599332	0.050	0.250	6.05	1.85	19.72	0.0029	2.54	0.038	0.79	0.34	1.83	0.58	0.24
rs72716328	130606932	0.046	0.250	6.37	1.98	20.56	0.0019	2.71	0.038	0.90	0.39	2.08	0.81	0.09
rs147958197	130631395	0.041	0.125	3.35	0.71	15.91	0.1276	0.89	0.044	1.22	0.54	2.75	0.63	0.20
rs55705857	130645692	0.052	0.250	5.81	1.77	19.05	0.0037	2.43	0.051	1.11	0.53	2.32	0.79	0.10

UCSF			IDH1/2 Negative GBMs (N=119)											
SNP	BP	Control MAF (N= 512)	IDH1/2 Positive GBMs (N=35)						IDH1/2 Negative GBMs (N=119)					
			Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.046	0.143	3.12	1.36	7.15	0.0071	2.15	0.046	1.05	0.53	2.08	0.90	0.05
rs72714295	130569398	0.054	0.171	3.75	1.72	8.18	0.00087	3.06	0.059	1.16	0.63	2.15	0.63	0.20
rs72714302	130588045	0.033	0.171	6.68	2.85	15.65	1.24E-05	4.91	0.042	1.36	0.65	2.85	0.42	0.38
rs72716319	130599332	0.033	0.171	6.68	2.85	15.65	1.24E-05	4.91	0.042	1.36	0.65	2.85	0.42	0.38
rs72716328	130606932	0.029	0.171	7.62	3.21	18.11	4.24E-06	5.37	0.038	1.37	0.63	2.99	0.43	0.37
rs147958197	130631395	0.030	0.157	6.84	2.84	16.46	1.79E-05	4.75	0.038	1.24	0.57	2.70	0.58	0.23
rs55705857	130645692	0.036	0.200	7.33	3.27	16.45	1.36E-06	5.87	0.046	1.33	0.66	2.72	0.43	0.37

Mayo and UCSF			IDH1/2 Negative GBMs (N=198)											
SNP	BP	Control MAF (N=1301)	IDH1/2 Positive GBMs (N=43)						IDH1/2 Negative GBMs (N=198)					
			Case MAF	OR	95% CI		p	-log10(p)	Case MAF	OR	95% CI		p	-log10(p)
rs72714236	130468065	0.049	0.163	3.81	1.92	7.56	0.00013	3.89	0.040	0.84	0.49	1.45	0.53	0.27
rs72714295	130569398	0.061	0.186	3.9	2.05	7.41	3.32E-05	4.48	0.061	1.04	0.66	1.63	0.86	0.06
rs72714302	130588045	0.043	0.186	6.52	3.28	12.97	9.19E-08	7.04	0.040	1.01	0.59	1.74	0.97	0.02
rs72716319	130599332	0.043	0.186	6.44	3.23	12.81	1.15E-07	6.94	0.040	1.01	0.59	1.74	0.98	0.01
rs72716328	130606932	0.039	0.186	7.17	3.58	14.34	2.67E-08	7.57	0.038	1.06	0.61	1.86	0.84	0.08
rs147958197	130631395	0.037	0.151	5.63	2.68	11.81	5.03E-06	5.30	0.040	1.18	0.67	2.05	0.57	0.24
rs55705857	130645692	0.046	0.209	6.66	3.43	12.94	2.17E-08	7.66	0.048	1.15	0.69	1.92	0.58	0.24

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

** INF=infinity

Supplementary Table 4: Association from Stage 2 genotyping of seven SNPs in chromosome 8q24.21 (CCDC26) region with glioma, stratified by morphology and IDH1/2 status

Mayo Clinic			IDH1/2 Positive Oligodendrogliomas and MOAs (N=86)						IDH1/2 Negative Oligodendrogliomas and MOAs (N=1)				
SNP	BP	Control MAF (N=789)	Case MAF	OR	95% CI	p	-log10(p)	Case MAF	OR	95% CI	p	-log10(p)	
rs72714236	130468065	0.051	0.151	3.29	1.98 5.45	4.09E-06	5.39	-	-	-	-	-	
rs72714295	130569398	0.066	0.180	2.9	1.82 4.61	7.62E-06	5.12	-	-	-	-	-	
rs72714302	130588045	0.049	0.163	3.46	2.11 5.65	7.932E-07	6.10	-	-	-	-	-	
rs72716319	130599332	0.050	0.163	3.36	2.06 5.50	1.29E-06	5.89	-	-	-	-	-	
rs72716328	130606932	0.046	0.151	3.38	2.04 5.60	2.35E-06	5.63	-	-	-	-	-	
rs147958197	130631395	0.041	0.157	4.09	2.45 6.83	7.046E-08	7.15	-	-	-	-	-	
rs55705857	130645692	0.052	0.204	4.08	2.57 6.49	2.483E-09	8.61	-	-	-	-	-	

UCSF			IDH1/2 Positive Oligodendrogliomas and MOAs (N=83)						IDH1/2 Negative Oligodendrogliomas and MOAs (N=29)				
SNP	BP	Control MAF (N= 512)	Case MAF	OR	95% CI	p	-log10(p)	Case MAF	OR	95% CI	p	-log10(p)	
rs72714236	130468065	0.046	0.121	3.03	1.58 5.80	0.0008278	3.08	0.172	3.85	1.733 8.56	0.0009372	3.03	
rs72714295	130569398	0.054	0.133	2.95	1.62 5.39	0.0004238	3.37	0.224	4.78	2.266 10.09	4.01E-05	4.40	
rs72714302	130588045	0.033	0.121	4.48	2.25 8.93	2.03E-05	4.69	0.172	6.84	2.855 16.38	1.60E-05	4.80	
rs72716319	130599332	0.033	0.121	4.48	2.25 8.93	2.03E-05	4.69	0.155	5.76	2.355 14.06	0.0001238	3.91	
rs72716328	130606932	0.029	0.121	5.18	2.56 10.48	4.90E-06	5.31	0.155	6.73	2.724 16.63	3.61E-05	4.44	
rs147958197	130631395	0.030	0.145	5.45	2.78 10.68	7.75E-07	6.11	0.138	5.50	2.177 13.89	0.0003122	3.51	
rs55705857	130645692	0.036	0.157	5.48	2.87 10.46	2.616E-07	6.58	0.172	6.52	2.739 15.54	2.27E-05	4.64	

Mayo and UCSF			IDH1/2 Positive Oligodendrogliomas and MOAs (N=169)						IDH1/2 Negative Oligodendrogliomas and MOAs (N=30)				
SNP	BP	Control MAF (N=1301)	Case MAF	OR	95% CI	p	-log10(p)	Case MAF	OR	95% CI	p	-log10(p)	
rs72714236	130468065	0.049	0.136	3.18	2.13 4.74	1.42E-08	7.85	0.167	3.62	1.64 7.96	0.00141	2.85	
rs72714295	130569398	0.061	0.157	2.87	1.99 4.15	1.97E-08	7.71	0.217	4.42	2.13 9.18	6.87E-05	4.16	
rs72714302	130588045	0.043	0.142	3.78	2.53 5.64	8.65E-11	10.06	0.167	6.21	2.63 14.63	3.01E-05	4.52	
rs72716319	130599332	0.043	0.142	3.69	2.47 5.51	1.64E-10	9.78	0.150	5.23	2.17 12.61	0.00022	3.66	
rs72716328	130606932	0.039	0.136	3.89	2.58 5.86	7.63E-11	10.12	0.150	6.09	2.51 14.81	6.62E-05	4.18	
rs147958197	130631395	0.037	0.151	4.58	3.05 6.86	1.86E-13	12.73	0.133	5.11	2.04 12.81	0.0004941	3.31	
rs55705857	130645692	0.046	0.181	4.48	3.08 6.52	5.27E-15	14.28	0.167	5.95	2.53 13.95	4.22E-05	4.37	

* Gold highlighted cells are significant after Bonferroni correction ($p < 0.00030$); Yellow highlighted cells are nominally significant ($p < 0.05$)

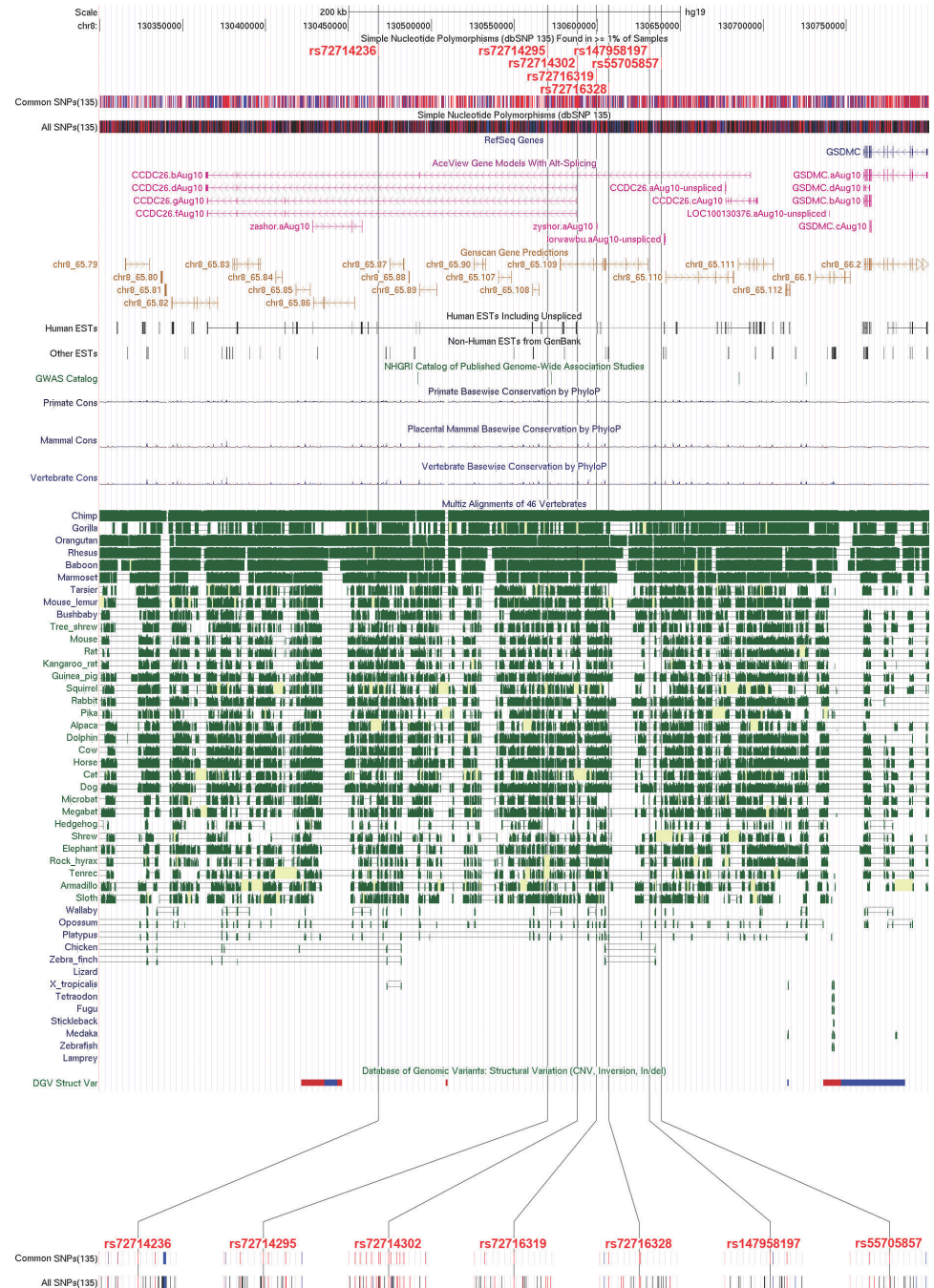
** INF=infinity

Supplementary Table 5: Association of rs55705857 with the development of all gliomas and gliomas of oligodendroglial lineage when adjusted for six other low frequency SNPs and the two previously reported tag SNPs.

SNP	Indicated SNP adjusted for rs55705857			rs55705857 adjusted for indicated SNP		
	OR	95% CI	P-value*	OR	95% CI	P-value*
All Gliomas						
rs72714236	1	0.73-1.35	0.97	3.11	2.31-4.2	1.00E-13
rs72714295	1.06	0.79-1.41	0.71	2.98	2.19-4.05	3.20E-12
rs72714302	0.97	0.63-1.49	0.89	3.17	2.11-4.77	2.90E-08
rs72716319	0.92	0.59-1.43	0.71	3.32	2.19-5.04	1.70E-08
rs72716328	0.97	0.61-1.53	0.88	3.20	2.09-4.89	8.20E-08
rs14795819	0.92	0.56-1.49	0.72	3.34	2.15-5.18	8.60E-08
rs4295627	0.98	0.83-1.15	0.76	3.17	2.47-4.08	2.40E-19
rs891835	1.07	0.94-1.23	0.31	2.96	2.35-3.73	5.50E-20
Oligodendrogliomas and MOAs						
rs72714236	0.95	0.63-1.45	0.81	5.29	3.55-7.90	3.70E-16
rs72714295	0.89	0.58-1.37	0.59	5.62	3.62-8.73	1.50E-14
rs72714302	0.89	0.50-1.58	0.69	5.61	3.27-9.63	4.10E-10
rs72716319	0.74	0.41-1.34	0.33	6.50	3.72-11.36	4.70E-11
rs72716328	0.67	0.36-1.23	0.19	7.03	4.03-12.28	7.00E-12
rs14795819	0.9	0.50-1.63	0.73	5.55	3.24-9.51	4.60E-10
rs4295627	1.08	0.84-1.39	0.55	4.81	3.43-6.76	1.20E-19
rs891835	1.03	0.83-1.27	0.81	5.01	3.7-6.8	3.80E-25

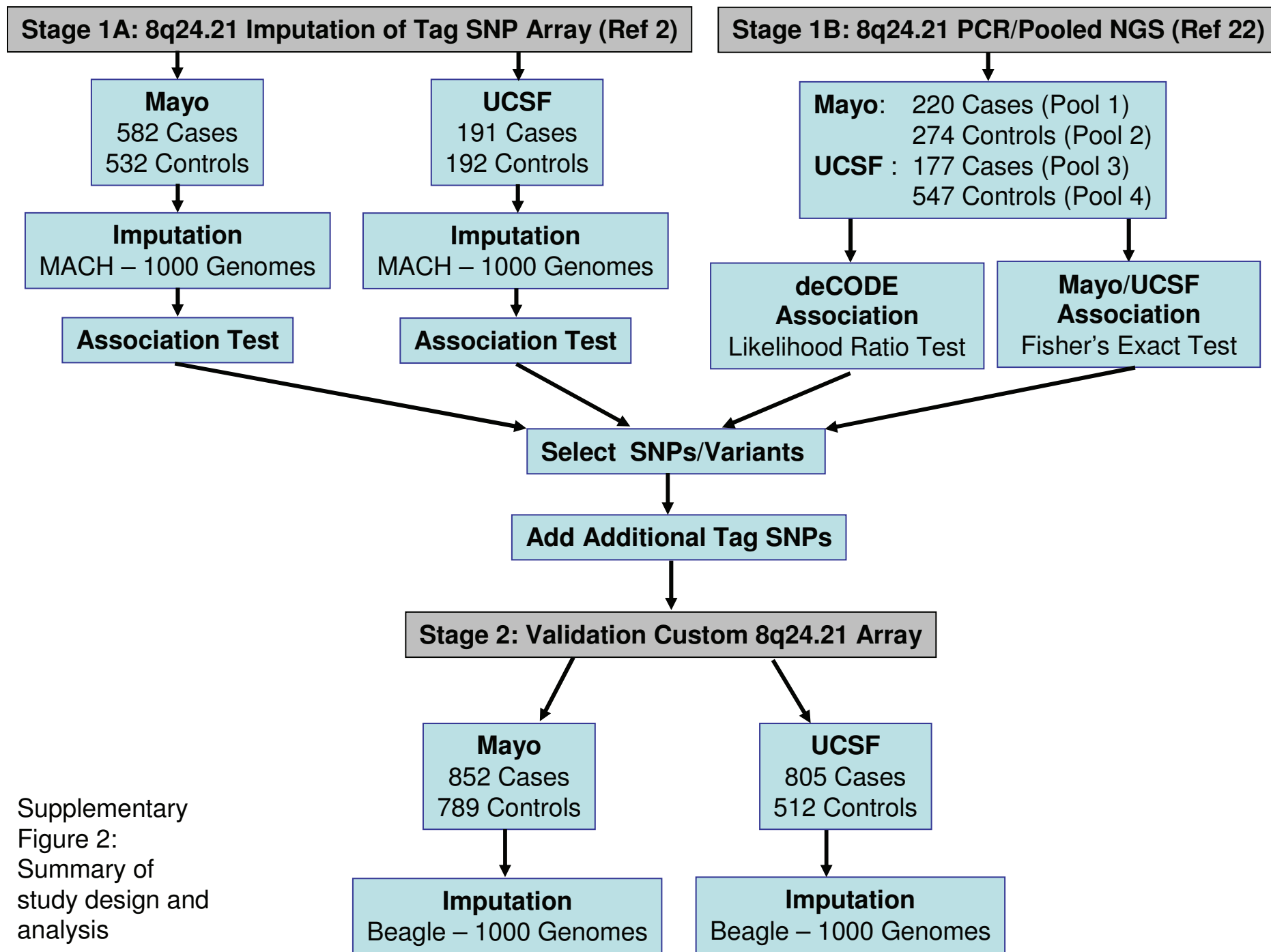
*Logistic regression analysis including rs55705857 and select chromosome 8 SNPs. Age, gender, and study site were included as covariates.

Supplementary Figure 1A: Conservation of the sequenced and imputed 8q24/*CCDC26* region. Various tracks from the UCSC Genome Browser are shown. Each vertical line indicates one of the seven index SNPs reported in the paper.



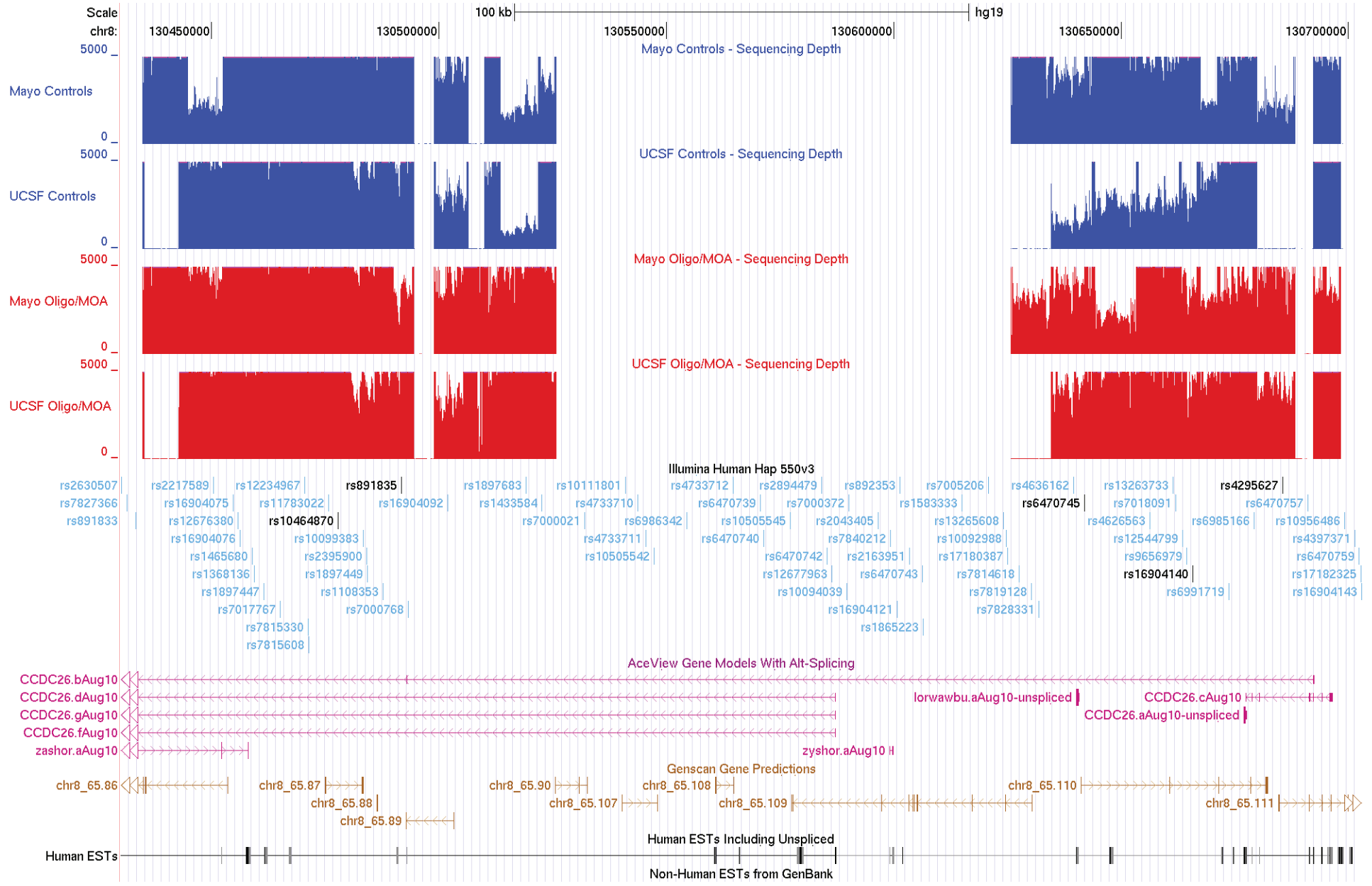
Supplementary Figure 1B: Conservation of the 1001 bp region surrounding each of the seven index SNPs.





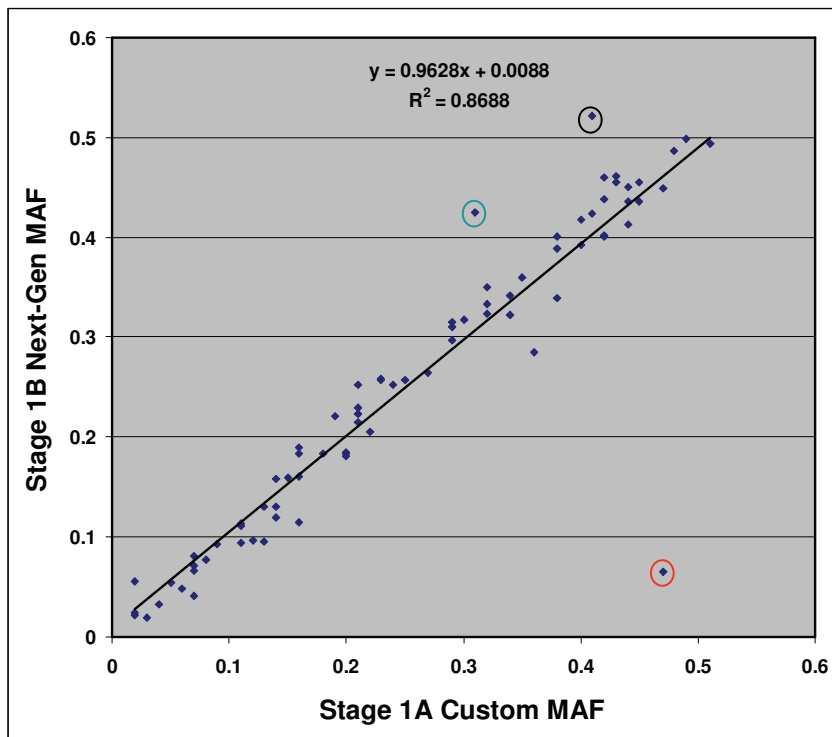
Supplementary
Figure 2:
Summary of
study design and
analysis

Supplementary Figure 3: Long-range PCR/pooled next-generation sequence coverage of the 8q24/*CCDC26* region (Stage 1B). Four coverage tracks are illustrated; one each for the 274 Mayo controls, the 547 UCSF controls, the 220 Mayo Clinic oligodendrogliomas and mixed oligoastrocytomas and the 177 UCSF oligodendrogliomas and mixed oligoastrocytomas. The Illumina Hap 550v3 track summarizes many of the variants in the region; the SNPs reported in previous publications are highlighted in black. AceView Gene Models and Genscan Gene predictions are also shown.

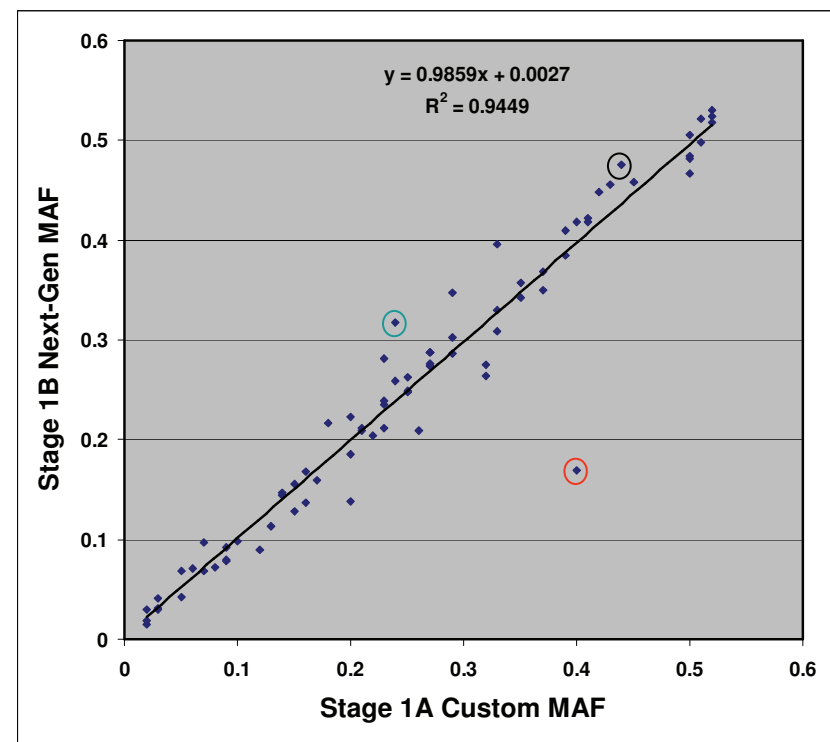


Supplementary Figure 4: Quality control of the pooled next-generation sequencing data from Stage 1B of the study design. The minor allele frequencies (MAFs) of known common variants for which there was prior tag genotyping data from similar groups of Mayo Clinic and UCSF cases and controls (Stage 1A)(reference 2) and the MAFs for the same SNPs as estimated by the pooled sequencing approach. The pooled next-generation sequencing approach accurately estimated the MAF for most common variants.

Control MAF Comparison



Case MAF Comparison



Supplementary Figure 5: 8q24/*CCDC26* SNPs identified by pooled NGS (Stage 1B) and by imputation (Stage 1A). The results of two independent bioinformatic analyses of the pooled sequencing data are shown. Imputation of the UCSF and the Mayo association data from the prior 8q24 tag custom array (reference 2) is also illustrated. ORs greater than 1.0 and the reciprocal of ORs less than 1.0 are plotted (the Effect Size). Results for the same variant are connected by dotted or dashed lines. The 7 SNPs reported in this paper are indicated by the numbered symbols. Only SNPs with case-control $p < 0.01$ are illustrated. The bottom track summarizes the coverage of the long-range PCR/pooled sequencing.

