

Supplementary Tables

In the following supplementary tables we provide, for each comparison: (a) the distribution of the selected voxels in the brain according to the anatomical atlas described in (Hammers et al., 2003; Gousias et al., 2008); (b) the complete lists of SNPs with selection probability ≥ 0.5 for the sRRR rank 1, rank 2 and rank 3 analyses.

AD versus CN

# voxels	Region
3138	Lateral ventricle, frontal horn, central part and occipital horn left
2986	Lateral ventricle, frontal horn, central part and occipital horn right
937	Hippocampus left
907	Hippocampus right
580	Posterior temporal lobe right
402	Posterior temporal lobe left
289	Lateral ventricle, temporal horn right
267	Gyri parahippocampalis et ambiens left
211	Amygdala left
206	Lateral ventricle, temporal horn left
169	Gyri parahippocampalis et ambiens right
156	Caudate nucleus right
133	Amygdala right
101	Lateral occipitotemporal gyrus, gyrus fusiformis right
94	Medial and inferior temporal gyri right
88	Medial and inferior temporal gyri left
84	Caudate nucleus left
71	Third ventricle
64	Superior temporal gyrus, posterior part right
48	Insula right
44	Anterior temporal lobe, medial part left
35	Superior temporal gyrus, posterior part left
32	Precentral gyrus right
27	Corpus callosum
20	Cingulate gyrus, posterior part right
18	Inferior frontal gyrus right
16	Frontal lobe right, becomes middle frontal gyrus after subdivision of frontal lobe
11	Lateral orbital gyrus left
9	Lateral occipitotemporal gyrus, gyrus fusiformis left
9	Insula left

9	Parietal lobe left
9	Anterior temporal lobe, medial part right
9	Superior parietal gyrus left
6	Occipital lobe right
5	Cingulate gyrus, anterior part left
5	Superior frontal gyrus left
5	Postcentral gyrus right
3	Superior temporal gyrus, anterior part right
2	Thalamus left
1	Cingulate gyrus, posterior part left
1	Thalamus right
1	Posterior orbital gyrus left

Table 1: The distribution of the selected voxels in the brain, from the AD versus CN comparison. Among the 11394 selected voxels, 186 were labelled as background in the atlas used.

	SNP	Gene	Chr	MAF	HWE	\hat{P}_{x_j}
Rank 1	APOE- ϵ 4	APOE	19	0.276	0.083	0.996
	rs2075650	TOMM40	19	0.252	0.868	0.944
	rs3815501	BZW1	2	0.154	0.470	0.758
	rs11132507		4	0.284	0.643	0.705
	rs11132508		4	0.284	0.643	0.705
	rs1681052	LOC647946	18	0.077	0.647	0.681
	rs7761213		6	0.303	0.458	0.675
	rs17345545		1	0.266	0.422	0.647
	rs13340334	PDZD2	5	0.112	0.336	0.611
	rs17103124		14	0.152	0.623	0.605
	rs8025706		15	0.309	0.040	0.597
	rs12185469	YES1	18	0.118	1.000	0.572
	rs12185470	YES1	18	0.118	1.000	0.572
	rs10766003	TEAD1	11	0.130	1.000	0.559
	rs1503659		4	0.158	0.055	0.556
	rs913587	KDM4C	9	0.439	0.524	0.550
	rs17380902		2	0.136	0.429	0.546
	rs17686103		5	0.303	0.181	0.546
	rs785232		2	0.301	0.456	0.538
	rs4771473		13	0.221	0.027	0.530
	rs11740943		5	0.173	1.000	0.524

	rs7536709		1	0.280	0.642	0.524
	rs17516202	YES1	18	0.120	1.000	0.524
	rs157580	TOMM40	19	0.319	1.000	0.514
	rs1750304	MEF2D	1	0.122	0.019	0.506
	rs1171560	MEF2D	1	0.122	0.019	0.506
Rank 2	rs9263844		6	0.161	1.000	0.772
	rs9263846		6	0.161	1.000	0.772
	rs7999394	MTRF1	13	0.408	0.027	0.746
	rs3794328	MTRF1	13	0.408	0.027	0.746
	rs11590365		1	0.114	0.547	0.621
	rs11204949		1	0.114	0.547	0.621
	rs11204971		1	0.114	0.547	0.621
	rs12405278	FLG	1	0.114	0.547	0.621
	rs215340		12	0.248	1.000	0.593
	rs7603289		2	0.345	0.330	0.585
	rs11144246	OSTF1	9	0.118	0.762	0.585
	rs6910087		6	0.132	0.167	0.568
	rs4685279		3	0.291	0.174	0.562
	rs3824139	ARHGEF10	8	0.167	0.001	0.556
	rs6932730		6	0.211	0.344	0.554
	rs1750304	MEF2D	1	0.122	0.019	0.548
	rs1171560	MEF2D	1	0.122	0.019	0.548
	rs9263969		6	0.236	1.000	0.542
	rs6700106		1	0.179	0.283	0.536
	rs795342		12	0.201	0.119	0.536
	rs10026499		4	0.325	0.015	0.534
	rs7979925		12	0.370	0.788	0.530
	rs2325		10	0.152	0.325	0.526
	rs7944761		11	0.490	0.453	0.522
	rs12178606		6	0.106	0.176	0.518
	rs215347		12	0.264	0.873	0.518
	rs2268939	USP13	3	0.301	0.018	0.516
	rs6429696	KAZ	1	0.449	0.703	0.514
	rs11215380		11	0.260	1.000	0.508
Rank 3	rs727432	ADCY2	5	0.282	0.877	0.709
	rs11783329		8	0.398	0.435	0.589
	rs7114756	MAML2	11	0.161	0.059	0.581
	rs17309585		8	0.406	1.000	0.526

	rs10491327		5	0.183	0.143	0.520
	rs12534148	PDE1C	7	0.270	0.153	0.506

Table 2: SNPs with maximum selection probabilities ≥ 0.5 (ranked according to their selection probabilities) for rank 1, 2 and 3 of the AC versus CN sRRR analysis. For each marker also provided are: the corresponding gene annotation, where applicable, the chromosome, the MAF, the HWE p -value and the selection probability.

P-MCI versus CN

# voxels	Region
2201	Lateral ventricle, frontal horn, central part and occipital horn left
1781	Lateral ventricle, frontal horn, central part and occipital horn right
790	Hippocampus left
716	Hippocampus right
686	Posterior temporal lobe left
599	Superior parietal gyrus right
574	Posterior temporal lobe right
416	Amygdala left
412	Gyri parahippocampalis et ambiens left
403	Medial and inferior temporal gyri right
286	Lateral ventricle, temporal horn right
280	Amygdala right
256	Superior parietal gyrus left
249	Medial and inferior temporal gyri left
220	Lateral ventricle, temporal horn left
182	Caudate nucleus right
171	Lateral occipitotemporal gyrus, gyrus fusiformis left
165	Lateral occipitotemporal gyrus, gyrus fusiformis right
160	Caudate nucleus left
157	Superior temporal gyrus, posterior part left
152	Gyri parahippocampalis et ambiens right
148	Insula left
146	Superior temporal gyrus, posterior part right
145	Parietal lobe left
99	Insula right
91	Anterior temporal lobe, medial part left
89	Frontal lobe right, becomes middle frontal gyrus after subdivision of frontal lobe
73	Parietal lobe right

69	Anterior temporal lobe, medial part right
56	Anterior temporal lobe, lateral part right
47	Occipital lobe right
39	Precentral gyrus right
33	Frontal lobe left, becomes middle frontal gyrus after subdivision of frontal lobe
32	Corpus callosum
31	Cingulate gyrus, posterior part left
30	Cuneus right
26	Third ventricle
23	Superior temporal gyrus, anterior part right
21	Inferior frontal gyrus right
11	Lingual gyrus right
10	Occipital lobe left
10	Lateral orbital gyrus left
9	Superior frontal gyrus right
7	Superior frontal gyrus left
7	Postcentral gyrus right
6	Postcentral gyrus left
6	Lingual gyrus left
5	Cerebellum left
5	Posterior orbital gyrus left
3	Brainstem, spans the midline
3	Thalamus left
3	Inferior frontal gyrus left
3	Subgenual frontal cortex left
2	Cuneus left
2	Superior temporal gyrus, anterior part left
1	Cingulate gyrus, posterior part right
1	Anterior orbital gyrus left
1	Medial orbital gyrus left

Table 3: The distribution of the selected voxels in the brain, from the P-MCI versus CN comparison. Among the 12664 selected voxels, 515 were labelled as background in the atlas used.

	SNP	Gene	Chr	MAF	HWE	\hat{P}_{x_j}
Rank 1	APOE- ϵ 4	APOE	19	0.271	0.083	0.982
	rs2883782	MYO3B	2	0.483	0.387	0.746
	rs2798062		9	0.256	0.105	0.712

	rs10934170		3	0.146	0.619	0.681
	rs17826780		4	0.102	0.318	0.665
	rs7843577		8	0.448	1.000	0.617
	rs2075650	TOMM40	19	0.246	0.180	0.589
	rs1405443		7	0.135	1.000	0.583
	rs758491	RBFOX1	16	0.352	1.000	0.566
	rs914166		21	0.150	0.624	0.548
	rs11150643		16	0.300	0.883	0.542
	rs1981664	COX7A2L	2	0.417	0.446	0.534
	rs10206058	COX7A2L	2	0.356	0.499	0.528
	rs717963	PAPPA	9	0.360	0.894	0.522
	rs10509839		10	0.252	0.412	0.522
	rs763732	RGS6	14	0.208	0.457	0.520
	rs6884345		5	0.229	0.862	0.512
	rs11242336		5	0.229	0.862	0.512
	rs10994250	ANK3	10	0.196	0.556	0.512
	rs10821707	ANK3	10	0.194	0.325	0.512
	rs3912887		4	0.396	0.897	0.510
	rs419867		21	0.333	0.890	0.504
	rs2837900		21	0.139	0.296	0.500
	rs2837902		21	0.139	0.296	0.500
Rank 2	rs13132552	SORBS2	4	0.348	1.000	0.792
	rs12633719		3	0.233	0.490	0.671
	rs11069874		13	0.158	0.242	0.661
	rs885339		13	0.158	0.242	0.661
	rs2381958		5	0.204	0.343	0.655
	rs10041184		5	0.217	0.146	0.639
	rs4265409		1	0.440	0.706	0.627
	rs7584948	ANTXR1	2	0.187	0.105	0.623
	rs501435	ODZ4	11	0.150	0.811	0.599
	rs1001684		5	0.265	0.874	0.595
	rs1257687		14	0.189	0.541	0.575
	rs7336788		13	0.181	0.295	0.571
	rs10065570	RPL37	5	0.283	0.540	0.560
	rs6783007		3	0.400	0.605	0.558
	rs10070362		5	0.108	0.749	0.550
	rs9522086		13	0.140	0.308	0.550
	rs11946115		4	0.200	0.700	0.542
	rs7734346		5	0.112	1.000	0.542

	rs10155062		4	0.342	0.131	0.540
	rs1289501		11	0.294	0.370	0.534
	rs11949577	PLEKHG4B	5	0.110	0.750	0.528
	rs13436090	PLEKHG4B	5	0.110	0.750	0.528
	rs17370295		3	0.127	0.271	0.520
	rs3760961	TLE2	19	0.298	0.768	0.516
	rs2965069		7	0.379	0.895	0.512
	rs478090	ODZ4	11	0.125	0.777	0.510
	rs2965245	ZNF677	19	0.312	0.885	0.504
	rs962492		5	0.229	0.022	0.504
	rs7963861	C12orf63	12	0.412	0.159	0.500
Rank 3	rs705837	PRSS12	4	0.375	0.895	0.639
	rs11856999	MAP2K5	15	0.148	0.227	0.605
	rs7653663	MGLL	3	0.165	0.111	0.601
	rs12597064		16	0.240	1.000	0.570
	rs633398	NDST3	4	0.373	0.895	0.546
	rs631271	NDST3	4	0.371	1.000	0.544
	rs1529442	AQPEP	5	0.323	0.201	0.542
	rs6864491	AQPEP	5	0.450	0.802	0.534
	rs10445932	NRXN1	2	0.106	0.750	0.518
	rs885120	AQPEP	5	0.489	0.621	0.512
	rs12236788		9	0.187	0.540	0.510

Table 4: SNPs with maximum selection probabilities ≥ 0.5 (ranked according to their selection probabilities) for rank 1, 2 and 3 of the P-MCI versus CN sRRR analysis. For each marker also provided are: the corresponding gene annotation, where applicable, the chromosome, the MAF, the HWE p -value and the selection probability.

P-MCI versus S-MCI

# voxels	Region
1062	Lateral ventricle, frontal horn, central part and occipital horn left
795	Posterior temporal lobe left
742	Lateral ventricle, frontal horn, central part and occipital horn right
695	Superior parietal gyrus right
558	Posterior temporal lobe right
455	Hippocampus left
428	Hippocampus right
339	Frontal lobe right, becomes middle frontal gyrus after subdivision of frontal lobe

299	Medial and inferior temporal gyri right
298	Superior temporal gyrus, posterior part right
288	Frontal lobe left, becomes middle frontal gyrus after subdivision of frontal lobe
231	Lateral ventricle, temporal horn right
228	Parietal lobe left
208	Insula right
208	Superior parietal gyrus left
188	Medial and inferior temporal gyri left
166	Lateral ventricle, temporal horn left
157	Amygdala left
148	Gyri parahippocampalis et ambiens left
143	Occipital lobe right
139	Superior frontal gyrus left
128	Corpus callosum
125	Parietal lobe right
119	Insula left
114	Superior frontal gyrus right
112	Cerebellum left
94	Superior temporal gyrus, posterior part left
92	Amygdala right
84	Gyri parahippocampalis et ambiens right
80	Lingual gyrus right
76	Caudate nucleus left
76	Anterior temporal lobe, medial part left
72	Precentral gyrus left
67	Cerebellum right
57	Lateral occipitotemporal gyrus, gyrus fusiformis right
54	Lateral occipitotemporal gyrus, gyrus fusiformis left
52	Anterior temporal lobe, medial part right
50	Brainstem, spans the midline
49	Caudate nucleus right
45	Putamen right
45	Postcentral gyrus right
42	Lingual gyrus left
39	Cingulate gyrus, posterior part right
38	Precentral gyrus right
36	Postcentral gyrus left
35	Inferior frontal gyrus right
35	Medial orbital gyrus right

33	Anterior temporal lobe, lateral part right
31	Cuneus right
30	Cingulate gyrus, anterior part right
26	Lateral orbital gyrus right
25	Lateral orbital gyrus left
24	Inferior frontal gyrus left
21	Superior temporal gyrus, anterior part right
20	Thalamus right
20	Third ventricle
18	Occipital lobe left
17	Cingulate gyrus, posterior part left
17	Straight gyrus, gyrus rectus left
16	Cingulate gyrus, anterior part left
16	Cuneus left
14	Posterior orbital gyrus right
12	Superior temporal gyrus, anterior part left
11	Thalamus left
10	Straight gyrus, gyrus rectus right
7	Subgenual frontal cortex left
4	Anterior temporal lobe, lateral part left
4	Pre-subgenual frontal cortex left
1	Anterior orbital gyrus left
1	Subcallosal area right
1	Pre-subgenual frontal cortex right

Table 5: The distribution of the selected voxels in the brain, from the P-MCI versus S-MCI comparison. Among the 10593 selected voxels, 623 were labelled as background in the atlas used.

	SNP	Gene	Chr	MAF	HWE	\hat{P}_{x_j}
Rank 1	APOE- ϵ 4	APOE	19	0.346	0.300	0.903
	rs2038358		14	0.240	0.459	0.774
	rs2615945		11	0.405	0.889	0.685
	rs2602629		2	0.498	0.005	0.683
	rs9633774		10	0.423	0.217	0.653
	rs12356435		10	0.312	0.876	0.641
	rs11256463		10	0.405	0.328	0.623
	rs7068256	MGMT	10	0.240	0.063	0.607
	rs8014021		14	0.158	0.801	0.599

	rs965566		5	0.319	0.644	0.588
	rs10861171	TXNRD1	12	0.122	1.000	0.587
	rs4899126		14	0.156	1.000	0.580
	rs10511576		9	0.206	0.837	0.571
	rs4547037	GRID1	10	0.285	0.188	0.564
	rs8090480	MBD2	18	0.407	0.213	0.556
	rs8094493	MBD2	18	0.410	0.210	0.544
	rs10780472		9	0.337	1.000	0.536
	rs715976		9	0.337	1.000	0.536
	rs2580062		4	0.373	0.668	0.532
	rs6799133	FNDC3B	3	0.421	0.490	0.530
	rs6589963		11	0.378	0.390	0.530
	rs1249794	SLC44A5	1	0.328	0.022	0.528
	rs2972005	SLC44A5	1	0.328	0.022	0.528
	rs1778459	SLC44A5	1	0.328	0.022	0.528
	rs12402118	SLC44A5	1	0.328	0.022	0.528
	rs6795768	FNDC3B	3	0.450	0.277	0.522
	rs4586843	FNDC3B	3	0.450	0.277	0.522
	rs6803988	ALS2CL	3	0.294	0.108	0.522
	rs2195894		7	0.315	0.641	0.518
	rs10261329		7	0.315	0.641	0.518
	rs10905653		10	0.346	0.300	0.518
	rs6463119		7	0.448	0.587	0.516
	rs1991769		7	0.353	1.000	0.516
	rs1423626		5	0.333	0.650	0.512
	rs6687745		1	0.477	0.893	0.506
	rs6363		16	0.231	0.128	0.506
	rs11150643		16	0.292	0.515	0.502
Rank 2	rs12420917		11	0.401	0.576	0.573
Rank 3	rs10751709		12	0.292	0.418	0.754
	rs2703862		8	0.104	0.067	0.617
	rs2507717		8	0.106	0.079	0.597
	rs9295895		6	0.247	0.366	0.581
	rs10082970		12	0.215	0.432	0.548
	rs10503991		8	0.111	0.158	0.512
	rs6468370		8	0.111	0.158	0.512

Table 6: SNPs with maximum selection probabilities ≥ 0.5 (ranked according to their selection probabilities) for rank 1, 2 and 3 of the P-MCI versus S-MCI sRRR analysis. For each marker also provided are: the corresponding gene annotation, where applicable, the chromosome, the MAF, the HWE p -value and the selection probability.

References

- Gousias, I., Rueckert, D., Heckemann, R., Dyet, L., Boardman, J., Edwards, A., and Hammers, A. (2008). Automatic segmentation of brain MRIs of 2-year-olds into 83 regions of interest. *NeuroImage*, 40(2):672–684.
- Hammers, A., Allom, R., Koepp, M., Free, S., Myers, R., Lemieux, L., Mitchell, T., Brooks, D., and Duncan, J. (2003). Three-dimensional maximum probability atlas of the human brain, with particular reference to the temporal lobe. *Human brain mapping*, 19(4):224–247.