

1 **Supplement Table S1.** Locations of significant differences of the voxel-based comparisons of MTR_{asym} values
2 among the three fitting methods at the 3.00 ppm and 3.43 ppm offset frequencies for the 3D segmented EPI
3 sequence

ppm (Group analysis)	Cluster size	Cluster location	BA	Talairach coordinates			Z score
3.00 (Poly10<Poly14)	184.00	Lt. precuneus, WM		-5.56	-50.00	55.30	4.13
	184.00	Lt. superior parietal lobule, GM	7	-7.48	-65.07	55.64	4.08
	65.00	Lt. superior parietal lobule, GM	7	-20.40	-61.10	54.00	4.13
	65.00	Lt. precuneus, WM		-25.91	-53.45	52.83	3.84
	63.00	Rt. inferior frontal gyrus, WM		39.78	31.56	7.94	4.10
3.00 (Poly10<Spline)	92.00	Lt. insula, GM	13	-45.42	5.92	4.07	4.98
	166.00	Rt. culmen, GM		25.04	-59.26	-24.34	4.86
	166.00	Rt. declive, GM		15.68	-65.50	-17.88	3.84
	642.00	Lt. middle occipital gyrus, WM		-38.48	-74.29	16.41	4.74
	642.00	Lt. cuneus, GM	23	-10.64	-72.05	11.68	4.57
	642.00	Lt. middle temporal gyrus, WM		-42.11	-64.61	13.66	4.54
	35.00	Rt. cuneus, WM		20.67	-78.85	22.38	4.54
	40.00	Lt. cingulate gyrus, GM	31	-5.27	-44.18	34.23	4.08
40.00	Lt. cingulate gyrus, WM		-12.60	-41.76	28.94	3.83	
3.00 (Poly14<Spline)	393.00	Lt. middle temporal gyrus, WM		-40.32	-68.69	16.91	4.84
	393.00	Lt. angular gyrus, WM		-40.50	-60.95	33.85	4.76
	393.00	Lt. occipital lobe, WM		-36.59	-75.82	12.69	4.65
	46.00	Lt. insula, GM	13	-45.42	5.92	4.07	4.78
	81.00	Rt. culmen, GM		28.75	-55.55	-23.92	4.26
	61.00	Lt. precuneus, GM	7	-7.27	-74.51	36.73	4.19
	61.00	Rt. precuneus		1.94	-73.04	40.63	3.82
3.43 (Poly10<Poly14)	69.00	Rt. frontal lobe, WM		37.94	35.30	8.26	4.73
3.43 (Poly10<Spline)	874.00	Lt. middle temporal gyrus, GM	37	-42.07	-66.12	9.91	5.05
	874.00	Lt. lingual gyrus, WM		-10.50	-72.87	0.80	4.68
	874.00	Lt. middle occipital gyrus, WM		-32.81	-75.31	7.40	4.66
	143.00	Rt. insula, WM		39.62	4.78	12.61	4.82
	143.00	Rt. frontal lobe, WM		46.99	0.84	14.16	4.82
	64.00	Rt. inferior frontal gyrus, GM	47	32.57	16.57	-11.62	4.77
	147.00	Rt. cuneus, WM		18.77	-79.19	25.92	4.65
	147.00	Rt. cuneus, GM	18	5.86	-78.77	22.14	4.41
	153.00	Rt. culmen, GM		21.33	-62.97	-24.75	4.42
	30.00	Lt. precuneus, WM		-11.01	-72.97	40.42	4.15
	113.00	Rt. temporal lobe, WM		31.84	-52.82	25.04	4.15
113.00	Rt. parietal lobe, WM		28.16	-43.49	25.86	3.91	
3.43 (Poly14<Spline)	530.00	Lt. middle occipital gyrus, WM		-32.81	-75.31	7.40	4.60
	530.00	Lt. middle temporal gyrus, WM		-38.46	-66.84	17.11	4.50
	61.00	Rt. cuneus, WM		5.79	-79.29	27.49	4.43
	61.00	Rt. cuneus, GM	18	18.75	-77.50	27.88	4.00
	75.00	Rt. parietal lobe, WM		29.99	-50.95	25.18	4.29

4 (Lt : Left, Rt : Right, GM : Gray Matter, WM : White Matter, BA : Brodmann Area)

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7 **Supplement Table S2.** Locations of significant differences of the voxel-based comparisons of MTR_{asym} values
 8 among the three fitting methods at the 3.00 ppm and 3.50 ppm offset frequencies for the 3D GRASE sequence

ppm (Group analysis)	Cluster size	Cluster location	BA	Talairach coordinates			Z score
3.00 (Poly10<Poly14)	32.00	Lt. brainstem, pons	-8.19	-27.41	-21.88	4.48	
	34.00	Lt. parahippocampal gyrus, WM	-32.30	-9.35	-13.37	4.35	
	34.00	Lt. superior temporal gyrus, WM	-37.75	0.52	-17.93	3.86	
3.00 (Poly<Spline)	119.00	Lt. frontal lobe, paracentral Lobule	0.23	-26.28	43.23	5.13	
	119.00	Lt. cingulate gyrus, WM	-7.18	-31.83	42.58	3.91	
3.00 (Poly14<Spline)	135.00	Lt. cingulate gyrus, WM	-9.01	-31.65	40.76	4.15	
	94.00	Lt. caudate body	-10.42	-2.76	14.65	4.82	
3.50 (Poly10<Poly14)	32.00	Lt. brainstem, pons	-10.06	-27.58	-20.13	4.19	
	32.00	Lt. culmen, GM	-13.88	-35.71	-13.75	3.99	

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10 (Lt : Left, Rt : Right, GM : Gray Matter, WM : White Matter, BA : Brodmann Area)

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12 **Supplement Table S3.** Locations of significant differences of the voxel-based comparisons of MTR_{asym} values
 13 among the three fitting methods at the 2.14 ppm offset frequency for the 3D segmented EPI data.

ppm (Group analysis)	Cluster size	Cluster location	BA	Talairach coordinates			Z score
2.14 (Poly10<Poly14)	170	Rt. inferior frontal gyrus, WM		39.82	35.46	6.51	4.70
	170	Rt. middle frontal gyrus, WM		34.25	48.18	11.22	4.12
	170	Rt. frontal lobe, WM		30.54	37.20	8.32	3.80
	477	Lt. precuneus		-1.84	-49.85	53.57	4.52
	477	Rt. precuneus, GM	7	3.61	-61.58	57.96	4.12
	257	Lt. middle frontal gyrus, WM		-28.64	54.27	8.93	4.47
	257	Lt. frontal lobe, WM		-34.28	37.18	10.82	4.10
	2.14 (Poly10<Spline)	86	Rt. inferior frontal gyrus, WM		32.60	18.61	-13.23
304		Rt. middle frontal gyrus, GM	10	35.97	41.71	19.65	4.84
304		Rt. inferior frontal gyrus, WM		36.23	27.21	-5.14	4.47
304		Rt. superior frontal gyrus, WM		26.78	47.70	16.46	4.32
65		Rt. cuneus, WM		20.62	-79.20	25.95	4.82
1094		Lt. occipital lobe, WM		-21.93	-62.38	28.63	4.82
1094		Lt. temporal lobe, WM		-34.71	-73.79	11.11	4.77
1094		Lt. middle occipital gyrus, WM		-25.40	-69.76	8.05	4.63
134		Lt. parietal lobe, WM		-34.88	-34.89	36.42	4.72
134		Lt. frontal lobe, WM		-31.03	-30.14	26.12	4.16
51		Lt. insula, GM	13	-43.60	3.87	5.71	4.72
157		Rt. declive, GM		19.46	-61.27	-22.82	4.58
157		Rt. culmen, GM		28.73	-55.73	-22.14	4.20
157		Rt. cerebellar tonsil, GM		32.54	-60.46	-31.53	4.07
197		Lt. cingulate gyrus, GM	31	-5.30	-44.36	36.02	4.50
197		Lt. cingulate gyrus, WM		-12.59	-38.03	29.29	4.38
227		Rt. frontal lobe, WM		33.71	-34.37	28.62	4.39
227		Rt. temporal lobe, WM		30.16	-40.59	15.36	4.37
82		Lt. precuneus, WM		-31.36	-78.28	37.77	4.25
82		Lt. cuneus, WM		-23.83	-81.00	26.83	3.83
43	Lt. middle temporal gyrus, GM	39	-47.76	-58.00	23.20	4.15	
43	Lt. angular gyrus, WM		-40.48	-58.91	32.24	4.13	
94	Rt. cingulate gyrus, WM		15.16	1.94	42.55	4.14	
2.14 (Poly14<Spline)	569	Lt. temporal lobe, WM		-34.71	-73.79	11.11	5.33
	569	Lt. middle occipital gyrus, WM		-25.45	-82.98	8.60	4.04
	135	Rt. posterior lobe, GM		32.49	-60.81	-27.96	4.86
	135	Rt. culmen, GM		21.32	-59.41	-22.61	3.94
	39	Lt. insula, GM	13	-43.59	5.73	5.88	4.62
	84	Rt. superior frontal gyrus, WM		26.72	43.62	19.67	4.46
	84	Rt. middle frontal gyrus, WM		34.09	39.69	21.23	4.10
	84	Rt. superior frontal gyrus, WM		26.87	46.53	9.14	4.04
	87	Lt. precuneus, WM		-35.03	-72.50	36.45	4.07
	87	Lt. precuneus, GM	19	-29.50	-81.85	35.66	4.01
	87	Lt. cuneus		-16.54	-81.91	35.87	3.98
	55	Lt. cuneus, WM		-10.62	-71.88	9.90	4.04

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15 (Lt : Left, Rt : Right, GM : Gray Matter, WM : White Matter, BA : Brodmann Area)

16 At 0.86 ppm, MTR_{asym} values had no difference among the three fitting methods.

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18 **Supplement Table S4.** Locations of significant differences of the voxel-based comparisons of MTR_{asym} values
 19 among the three fitting methods at the 1.00 ppm and 2.00 ppm offset frequencies for the 3D GRASE data.

ppm (Group analysis)	Cluster Size	Cluster location	BA	Talairach coordinates			Z score
1.00 (Poly10<Poly14)	109	Lt. superior temporal gyrus, WM		-37.83	-1.87	-12.76	4.42
	109	Lt. temporal lobe, WM		-37.81	-10.84	-17.21	3.81
	41	Lt. superior temporal gyrus		-52.66	14.45	-6.05	4.32
1.00 (Poly10<Spline)	851.00	Lt. corpus callosum		-12.40	-45.78	12.34	5.05
	851.00	Lt. frontal lobe, paracentral lobule		0.23	-26.28	43.23	4.76
	705.00	Lt. caudate head		-8.33	8.11	-0.50	4.93
	207.00	Rt. parietal lobe, WM		37.24	-32.06	43.31	4.78
	207.00	Rt. frontal lobe, WM		27.96	-23.04	47.61	4.33
	207.00	Rt. postcentral gyrus, WM		37.09	-33.10	54.02	4.27
	42.00	Lt. superior parietal lobule, GM	7	-18.57	-50.28	58.66	4.72
	42.00	Lt. precuneus, WM		-11.14	-50.15	56.99	4.20
	132.00	Lt. postcentral gyrus, WM		-38.77	-34.40	50.81	4.65
	38.00	Lt. cingulate gyrus, GM	24	-10.85	-7.76	46.60	4.28
1.00 (Poly10>Spline)	38.00	Lt. culmen, GM		-13.91	-48.75	-14.99	4.85
1.00 (Poly14<Spline)	525.00	Lt. thalamus, GM, medial dorsal nucleus		-8.59	-21.23	11.13	4.53
	525.00	Lt. cingulate gyrus, WM		-14.39	-26.67	28.53	4.46
	193.00	Rt. precuneus, GM	7	5.72	-34.11	46.19	4.13
	599.00	Lt. caudate Body		-12.27	-2.75	14.62	4.77
	599.00	Lt. caudate Head		-8.33	8.11	-0.50	4.67
1.00 (Poly14>Spline)	73.00	Lt. culmen, GM		-13.91	-48.75	-14.99	4.87
	103.00	Lt. temporal lobe, WM		-28.85	-34.99	-1.33	4.63
	103.00	Lt. temporal lobe, WM		-25.16	-42.46	-1.97	4.40
	145.00	Lt. culmen GM		-26.77	-36.98	-19.50	4.40
	145.00	Lt. parahippocampal gyrus, GM	35	-24.92	-27.85	-16.80	4.39
2.00 (Poly10<Spline)	137.00	Lt. caudate body		-10.42	-2.76	14.65	4.91
	137.00	Lt. thalamus, GM, ventral anterior nucleus		-10.33	-3.93	7.33	4.47
	32.00	Rt. inferior parietal lobule, GM	40	37.26	-31.89	41.52	4.60
2.00 (Poly10<Spline)	52.00	Lt. culmen, GM		-26.74	-36.81	-21.28	4.76
	52.00	Lt. parahippocampal Gyrus, WM		-32.30	-27.64	-18.71	4.23
	32.00	Lt. culmen, GM		-15.76	-46.88	-14.84	4.62
2.00 (Poly14<Spline)	184.00	Lt. caudate, Body		-12.27	-2.75	14.62	5.05
	44.00	Lt. corpus callosum		-14.34	-35.46	22.30	4.30
	60.00	Rt. caudate body		6.33	5.13	10.27	4.32
2.00 (Poly14>Spline)	188.00	Lt. declive, GM		-17.68	-54.67	-12.01	4.84
	188.00	Lt. culmen, GM		-26.74	-36.81	-21.28	4.68

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21 (Lt : Left, Rt : Right, GM : Gray Matter, WM : White Matter, BA : Brodmann Area)

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23 **Supplement Figure S1.** Result of voxel-based comparisons of MTR_{asym} maps among the three fitting methods at
24 0.86 ppm and 2.14 ppm offset frequencies calculated from the 3D segmented EPI data

25 The red color indicates that MTR_{asym} values are greater than one of the other fitting method.

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Poly10<Spline Poly14<Spline Poly10<Poly14

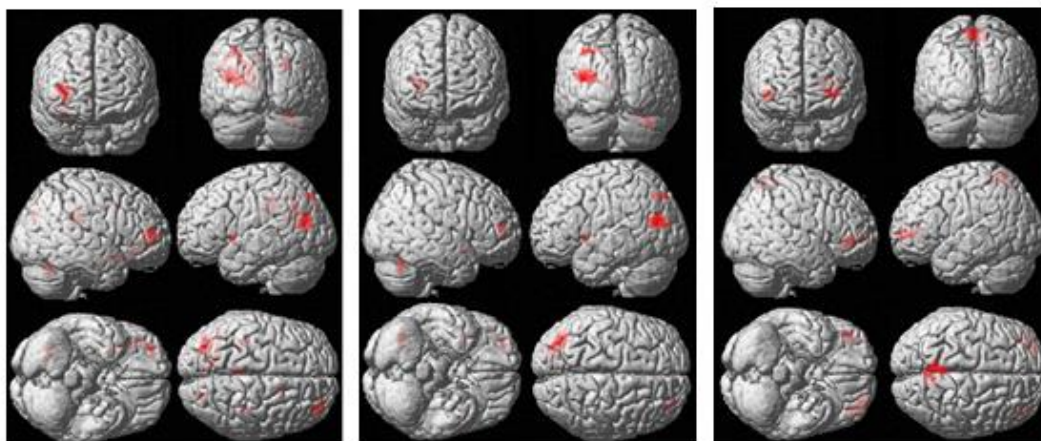
Hydroxyl
0.86 ppm

NONE

NONE

NONE

Guanidino
2.14 ppm



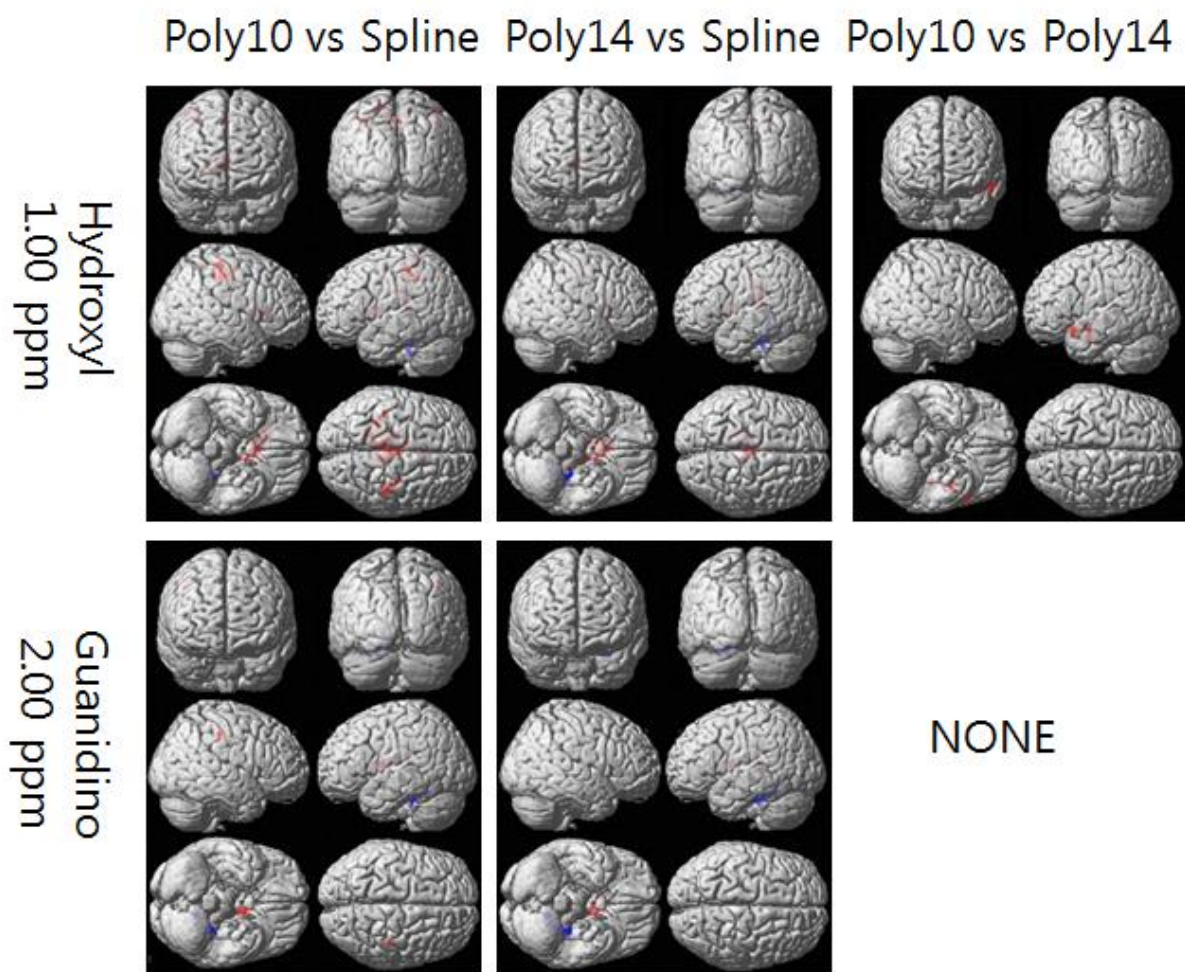
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29 **Supplement Figure S2.** Result of voxel-based comparisons of MTR_{asym} maps among the three fitting methods at
30 1.00 ppm and 2.00 ppm offset frequencies calculated from the 3D GRASE data

31 The red color indicates that MTR_{asym} values with the right fitting method are greater than those with the
32 left fitting method. The blue color indicates the result of the reversed test.

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