Crosstalk between Depression and Dementia with Resting-State fMRI Studies and Its Relationship with Cognitive Functioning

Junhyung Kim and Yong-Ku Kim

(Supplementary Information)

Supplementary Table S1. Characteristics of main rs-fMRI studies associated with the default mode network (DMN) in late-life depression (LLD) patients included in the review.

References	Experimental Details						
	LLD		Healthy Control				
	Sample Size (Male)	Age Mean (SD)	Sample Size (Male)	Study Type	Scanner	Reference Space	Analysis Method
[92]	32(11)	67.2(5.8)	39(19)	CS	3.0T S	MNI	SB
[94]	18(8)	67.2(7.3)	14(7)	CS	1.5T GE	TAL	ReHo
[95]	15(6)	67.5(6.1)	15(6)	CS	1.5T GE	MNI	ReHo
[96]	52(14)	71.4(7.6)	36(9)	CS	3.0T S	MNI	ALFF
[100]	12(5)	70.5(4.9)	8(3)	CS	1.5T GE	MNI	SB
[101]	47(13)	68.7(6.9)	46(13)	Cohort	3.0T S	Colin27	SB

Abbreviations: ALFF, Amplitude of low-frequency fluctuation; CS, cross-sectional study; GE, General Electronics; MNI, Montreal Neurological Institute; ReHo, Regional homogeneity; S, Siemens; SB, seed-based analysis; SD, standard deviation; T, tesla; TAL, Talairach.

Supplementary Table S2. Characteristics of main rs-fMRI studies associated with the default mode network (DMN) in Alzheimer's disease (AD) and mild cognitive impairment (MCI) patients included in the review.

References	Experimental Details								
	AD		MCI		Healthy Control				
	Sample Size (Male)	Age Mean (SD)	Sample Size (Male)	Age Mean (SD)	Sample Size (Male)	Study Type	Scanner	Reference Space	Analysis Method
[112]	13(5)	70.1(6.7)	N/A	N/A	8(3)	CS	1.5T S	TAL	SB
[118]	13(8)	74.5(9.7)	12(6)	69.1(7.4)	13(5)	CS	1.5T S	MNI	ICA
[123]	23(7)	73(9)	19(10)	76(8)	21(12)	CS	3.0T GE	MNI	ReHo
[126]	39(23)	67(8)	23(15)	71(8)	43(22)	CS	1.5T S	MNI	ICA
[128]	21(9)	64.2(8.7)	N/A	N/A	18(12)	Cohort	3.0T GE	MNI	ICA
[131]	11(7)	71.9(7.9)	10(6)	71.2(4.1)	10(7)	CS	3.0T S	MNI	ICA
[134]	24(14)	68.2(8.4)	N/A	N/A	16(7)	CS	3.0T P	MNI	ICA
[135]	28(18)	78(4)	N/A	N/A	56(36)	CS	3.0T GE	MNI	ICA/SB
[141]	18(9)	70.7(7.2)	N/A	N/A	21(8)	CS	1.5T S	MNI	Graph
[142]	N/A	N/A	37(17)	66.8(9.4)	47(20)	CS	3.0T S	MNI	Graph
[143]	33(13)	66.2(9.6)	N/A	N/A	20(10)	CS	1.5T M	MNI	Graph
[158]	16(6)	71.6(5.1)	N/A	N/A	16(7)	CS	1.5T P	MNI	SB
[160]	N/A	N/A	30(15)	72.5(4.4)	26(12)	CS	1.5T GE	MNI	SB

Abbreviations: AD, Alzheimer's disease; CS, cross-sectional study; GE, General Electronics; Graph, Graph analysis; ICA, Independent Component Analysis; M, Marconi; MCI, Mild cognitive impairment; MNI, Montreal Neurological Institute; P, Philips; ReHo, Regional homogeneity; S, Siemens; SB, seed-based analysis; SD, standard deviation; T, tesla; TAL, Talairach.

Supplementary Table S3. Characteristics of main rs-fMRI studies associated with the default mode network (DMN) in Alzheimer's disease (AD) and mild cognitive impairment (MCI) patients included in the review (Continued).

References	Demographic Group: Sample Size, N (Male); Age, Mean (SD)		Study Type	Scanner	Reference Space	Analysis Method
[127]	Sample size: 570(268) CDR 0: 386; CDR 0.5: 91; CDR 1: 33		CS	3.0T S	MNI	SB
[138]	CDR 1: Sample size, 31(13); age, 70.7(11.4) CDR 0.5: Sample size, 90(36); age, 74.5(7.5) CDR 0: Sample size, 205(66); age, 66.4(9.8)		CS	3.0T S	MNI	Graph
[146]	CDR 0M-: Sample size, 37(17); age, 38.9(9.7) CDR 0M+: Sample size, 44(17); age, 34.6(8.0) CDR 0.5M+: Sample size, 24(8); age, 44.5(11.7) AD, CDR 1-2M+: Sample size, 15(6); age, 49.3(9.7)		CS	3.0T S	MNI	ICA
[149]	ADAD	CDR 0M-: Sample size, 25(10); age, 30.9(10) CDR 0M+: Sample size, 31(12); age, 33.9(8.5) CDR 0 M+: Sample size, 15(5); age, 41.4(10.4) CDR 0.5 M+: Sample size, 8(5); age, 49.4(8.7)	CS	3.0T S	MNI	SB
	LOAD	CDR 0: Sample size, 343(117); age, 68.7(9.5) CDR 0.5: Sample size, 74(38); age, 74.0(7.7) CDR 1: Sample size, 27 10); age, 70.1(11.4)				
[152]	Apo ε4 -: Sample size, 62(19); age, 63.3(7.4) Apo ε4 +: Sample size, 38(9); age, 58.8(8.5)		CS	3.0T S	TAL	SB
[154]	Apo ε4 -: Sample size, 18(10); age, 28.6(3.9) Apo ε4 +: Sample size, 18(7); age, 28.4(4.9)		CS	3.0T S	HOB	ICA
[157]	Apo ε4 -: Sample size, 62(21); age, 64.4(7.0) Apo ε4 +: Sample size, 33(13); age, 62.6(7.6)		CS	1.5T GE	MNI	ICA
[163]	mild AD: Sample size, 12(8); age, 77.6(7.1) compare baseline and after treatment		Cohort	3.0T GE	TAL	SB

Abbreviations: AD, Alzheimer's disease; ADAD, autosomal dominant Alzheimer's disease; Apo, apolipoprotein; CDR, Clinical Dementia Rating Scale; CS, cross-sectional study; GE, General Electronics; Graph, Graph analysis; HOB, Harvard-Oxford brain; ICA, Independent Component Analysis; LOAD, late-onset Alzheimer's disease; M-, mutation negative; M+, mutation positive; MCI, Mild cognitive impairment; MNI, Montreal Neurological Institute; S, Siemens; SB, seed-based analysis; SD, standard deviation; T, tesla; TAL, Talairach.

Supplementary Table S4. Characteristics of main rs-fMRI studies associated with the executive control network (ECN) in late-life depression (LLD) patients included in the review.

References	Experimental Details						
	LLD		Healthy Control				
	Sample Size (Male)	Age Mean (SD)	Sample Size (Male)	Study Type	Scanner	Reference Space	Analysis Method
[186]	11(1)	64.9(4.5)	18(7)	CS	3.0T GE	MNI	SB
[188]	22(7)	67.6(5.5)	22(9)	CS	3.0T GE	MNI	ReHo
[189]	14(7)	67.6(4.0)	18(1)	Cohort	1.5T GE	MNI	SB
[192]	79(52)	66.3(5.9)	21(9)	CS	3.0T P	MNI	SB

Abbreviations: CS, cross-sectional study; GE, General Electronics; MNI, Montreal Neurological Institute; ReHo, Regional homogeneity; SB, seed-based analysis; SD, standard deviation; T, tesla.

Supplementary Table S5. Characteristics of main rs-fMRI studies associated with the executive control network (ECN) in Alzheimer's disease (AD) and mild cognitive impairment (MCI) patients included in the review.

References	Demographic Group: Sample Size, N (Male); Age, Mean (SD)	Study Type	Scanner	Reference Space	Analysis Method
[181]	MCI-R: Sample size, 13(6); age, 69.8(6.0); MCI-S: Sample size, 33(17); age, 71.0(6.4) MCI-P: Sample size, 19(9); age, 71.1(7.2) HC: Sample size, 36(18); age, 70.8(1.1)	Cohort	3.0T P	MNI	ICA
[197]	AD: Sample size, 14(5); age, 70.4(5.6) MCI: Sample size, 12(4); age, 73.6(6.2) HC: Sample size, 16(4); age, 69(5.1)	CS	1.5T P	MNI	ICA
[198]	mild AD/MCI: Sample size, 13(9); age, 72(9) HC: Sample size, 12(7); age, 72(7)	CS	1.5T S	MNI	ICA

Abbreviations: AD, Alzheimer's disease; CS, cross-sectional study; ICA, Independent Component Analysis; MCI, Mild cognitive impairment; MCI-R, MCI patients reversed to normal states and stabilized to a normal condition for 24 months; MCI-S, MCI patients stabilized in the MCI condition for 24 months; MCI-P, MCI patients progressed to AD and stabilized in the AD condition for 24 months; MNI, Montreal Neurological Institute; P, Philips; S, Siemens; T, tesla.

Supplementary Table S6. Characteristics of main rs-fMRI studies associated with the salience network (SN) in late-life depression (LLD) patients included in the review.

References	Experimental Details						
	LLD		Healthy Control				
	Sample Size (male)	Age Mean (SD)	Sample Size (Male)	Study Type	Scanner	Reference Space	Analysis Method
[39]	39(9)	68.6(6.5)	29(12)	CS	3.0T GE	MNI	ICA
[77]	A-LLD: Sample size, 7, age, 69.9(4.9) NA-LLD: 9, 68.3(6.1) HC: 10, 68.6(7.0)			CS	1.5T S	MNI	SB
[215]	32(14)	68.3(6.5)	32(13)	CS	3.0T GE	MNI	ICA
[216]	LLD: Sample size, 71(48); age, 71.0(6.6) compare baseline and after treatment			Cohort	3.0T S	MNI	SB

Abbreviations: A-LLD, apathetic LLD; ICA, Independent Component Analysis; CS, cross-sectional study; GE, General Electronics; MNI, Montreal Neurological Institute; NA-LLD, non-apathetic LLD; SB, seed-based analysis; SD, standard deviation; T, tesla.

Supplementary Table S7. Characteristics of main rs-fMRI studies associated with the salience network (SN) in Alzheimer's disease (AD) and mild cognitive impairment (MCI) patients included in the review.

References	Demographic Group: Sample Size, N (Male); Age, Mean (SD)	Study Type	Scanner	Reference Space	Analysis Method
[166]	Old: Sample size, 20(6); age, 73.9(8.2) Young: Sample size, 20(6); age, 73.9(8.2)	Regression analysis	1.5T S	MNI	ICA
[170]	AD: Sample size, 12(5); age, 63.3(7.7) bvFTD: Sample size, 12(6); age, 60.8(4.6) HC: Sample size, 12(5); age, 62.0(8.2);	CS	1.5T S	MNI	ICA
[217]	PiB-: Sample size, 26(14); age, 81.2(5.9) PiB+: Sample size, 13(7); age, 83.8(8.0)	CS	3.0T P	MNI	SB
[218]	CN, Apo ε4 --: Sample size, 56(35); age, 79(N/A) CN, Apo ε4+-: Sample size, 26(14); age, 78(N/A)	CS	N/A	MNI	ICA/SB
[219]	AD: Sample size, 35(17); age, 65.8(8.3) aMCI: Sample size, 18(10); age, 70.2(7.9) HC, Y: Sample size, 75(38); age, 23.8(4.0) HC, O: Sample size, 21(7); age, 65.0(8.2)	CS	3.0T S	MNI	ICA

a. Regression analysis within- and between-network FC are related to both global and regional Aβ deposition. Abbreviations: AD, Alzheimer's disease; Apo, apolipoprotein; bvFTD, behavior variant Frontal Temporal Dementia; CN, cognitively normal; CS, cross-sectional study; ICA, Independent Component Analysis; aMCI, amnestic Mild cognitive impairment; MNI, Montreal Neurological Institute; O, old; P, Philips; PiB-, regional beta-amyloid load (the distribution volume ration, DVR) <1.061; PiB+, regional beta-amyloid load (the distribution volume ration, DVR) >1.061; S, Siemens; T, tesla; Y, young.