Locus coeruleus integrity is related to tau burden and memory loss in autosomal-dominant Alzheimer's disease

Authors:

Martin J. Dahl*[1,2], Mara Mather[2], Markus Werkle-Bergner[1], Briana L. Kennedy[2,3], Samuel Guzman[4], Kyle Hurth[4], Carol A. Miller[4], Yuchuan Qiao[5], Yonggang Shi[5], Helena C. Chui[6], & John M. Ringman[6]

Affiliations:

[1]Center for Lifespan Psychology, Max Planck Institute for Human Development, 14195 Berlin, Germany

[2]Davis School of Gerontology, University of Southern California, 90089 Los Angeles, CA, USA

[3]School of Psychological Science, University of Western Australia, Perth, Australia

[4]Department of Pathology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

[5]Laboratory of Neuro Imaging (LONI), USC Stevens Neuroimaging and Informatics Institute, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

[6]Department of Neurology, Keck School of Medicine, University of Southern California, 90033 Los Angeles, CA, USA

*** Corresponding author**:

MJD (dahl@mpib-berlin.mpg.de)

1. Supplementary information

Table S1: Associations of locus coeruleus intensity and regional tau burden

Region of interest[1]	*rho*	*p*
bankssts	-0.688	0.004
transversetemporal	-0.656	0.007
postcentral	-0.641	0.009
inferiorparietal	-0.641	0.009
inferiortemporal	-0.638	0.009
cuneus	-0.624	0.012
fusiform	-0.609	0.014
parstriangularis	-0.582	0.02
pericalcarine	-0.553	0.029
posteriorcingulate	-0.544	0.032
precuneus	-0.532	0.036
caudalmiddlefrontal	-0.526	0.038
entorhinal	-0.524	0.04
lingual	-0.509	0.046
middletemporal	-0.509	0.046
isthmuscingulate	-0.503	0.049
temporalpole	-0.497	0.052
lateraloccipital	-0.494	0.054
caudalanteriorcingulate	-0.488	0.057
rostralanteriorcingulate	-0.476	0.064
superiorparietal	-0.459	0.076
paracentral	-0.459	0.076
parahippocampal	-0.456	0.078
insula	-0.441	0.089
lateralorbitofrontal	-0.435	0.094
parsorbitalis	-0.418	0.109
frontalpole	-0.409	0.117
parsopercularis	-0.403	0.123
precentral	-0.382	0.145
medialorbitofrontal	-0.376	0.151
superiortemporal	-0.365	0.165
superiorfrontal	-0.312	0.239
rostralmiddlefrontal	-0.282	0.288
supramarginal	-0.232	0.385

Note: [1]Parcellation based on Desikan et al., (2006).
Tau data was averaged across hemispheres before analysis (see *Material and methods*).
Rho and *p* values are based on non-parametric Spearman's correlations (n = 16).

Table S2: Associations of locus coeruleus intensity and cognitive performance

Cognitive task	*rho*	*p*
Craft Story	0.62	0.008
Complex Figure Delay	0.589	0.013
Trails B	0.498	0.042
Number Span Backward	0.459	0.064
SEVLT_total (trial 1–5)	0.447	0.072
CASI	0.286	0.265
SEVLT long delay	0.006	0.981
MoCA	-0.02	0.94
Digit Symbol	-0.16	0.539
CDR	-0.405	0.107

Note: *Rho* and *p* values are based on non-parametric Spearman's correlations (n = 17). See *Material and methods* for a description of the cognitive tasks.

2. References

Desikan, R. S., Ségonne, F., Fischl, B., Quinn, B. T., Dickerson, B. C., Blacker, D., Buckner, R. L., Dale, A. M., Maguire, R. P., Hyman, B. T., Albert, M. S., & Killiany, R. J. (2006). An automated labeling system for subdividing the human cerebral cortex on MRI scans into gyral based regions of interest. *NeuroImage*, *31*(3), 968–980. https://doi.org/10.1016/j.neuroimage.2006.01.021