A brain imaging repository of normal subjects across the life course: Brain Images of Normal Subjects (BRAINS)

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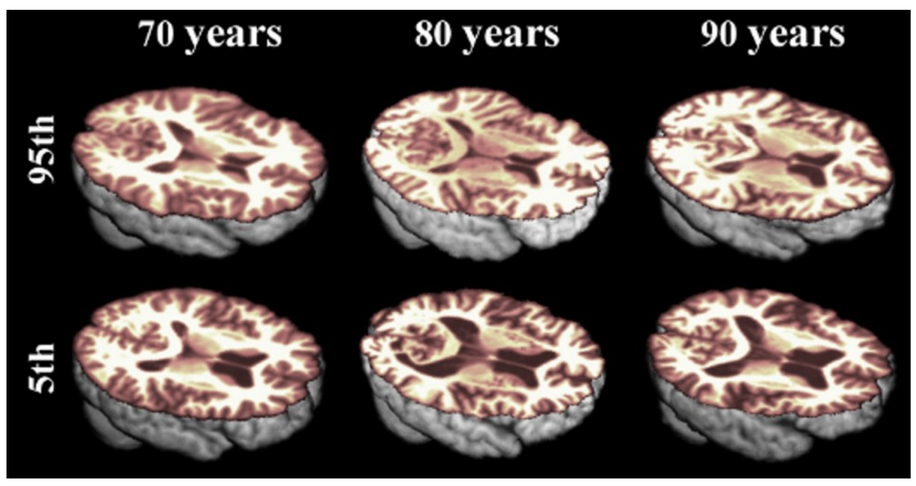
Background & rationale (1)

- An integrated, searchable repository
- Normal brain images and linked phenotypic data
- Reuse previously collected data, share and archive
- A better reference of normal human brain size and integrity across the life-course

The definition of 'normal' is not simple, so this Imagebank can be searched by a range of measures such as: gestational age at birth, blood pressure, medications, other risk factors, and MRI sequences,T1, T2, T2*, FLAIR, and DTI.



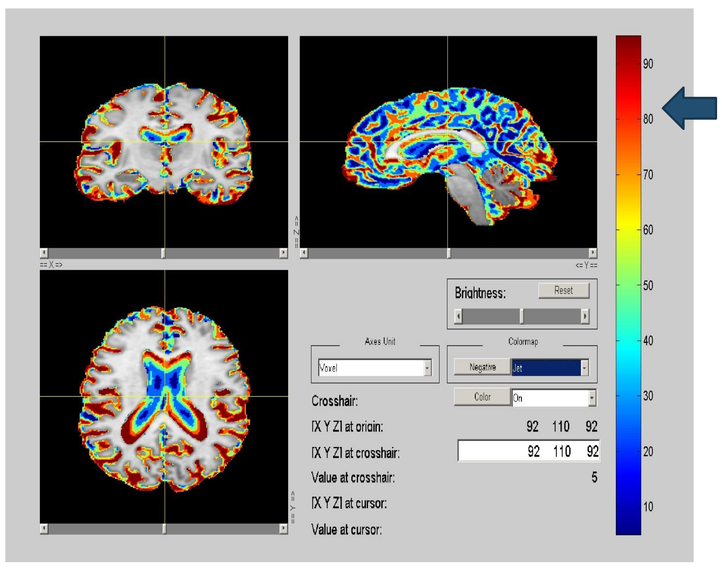
A reference for variability in normal brain architecture with ageing, e.g. 5th & 95th percentiles – a ranked atlas of example images (2, 3).

The availability of clinically relevant MRI sequences from healthy volunteers across the life-course, linked with related phenotypical, demographic and cognitive measures, without diagnosed disease is an essential resource.

Uses

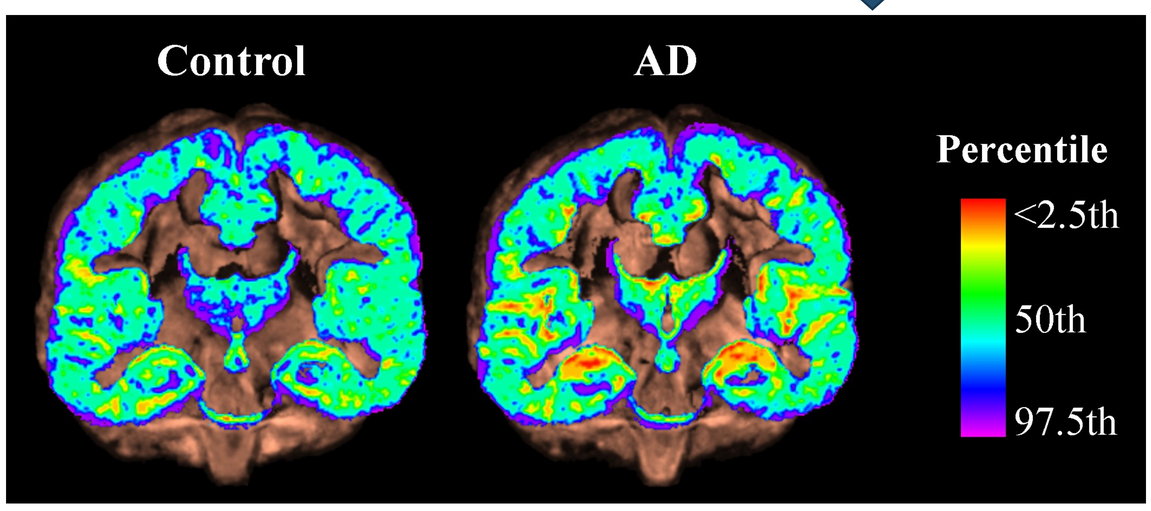
a) Clinicians: a reference atlas for interpretation of brain images in clinical diagnosis, such as having access to healthy subject reference images and linked data closely matched to a patient's scan, to improve diagnostic accuracy.

b) Researchers: for analysis and to develop and test new methods, e.g. machine learning, to detect brain pathology and associated clinical manifestations (3):



Early markers of neurodevelopmental impairment e.g. Alzheimer's dementia: red areas indicate excessive Cerebro-spinal fluid for age.

Precise estimates of disease risk, e.g. red areas indicate reduced Grey Matter in a subject with Alzheimer's Dementia.



Conclusions & future plans

- BRAINS is a living Imagebank where new data will be added.
- Initially BRAINS will contain previously collected data from n=867 healthy volunteer subjects (0-81 years of age) from projects in Aberdeen, Glasgow and Edinburgh. A list of included studies and funders is available on our web site.
- A further n = 2119 subjects (prenatal to 90 years) from 15 other projects in Scotland are being added.

brainsimagebank.ac.uk

References

1) Job DE et al NeuroImage 2016; 2) Farrell C et al Eur. Radiol. 2009; 3) Dickie DA et al PLOSONE 2013