

BLISS

Seeing lithium...

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MRC

Medical
Research
Council

Bipolar Disorder
1 in 100 people
Highly recurrent
Suicidality 30%

Response Stratification target

Lithium
Unique profile
Proven efficacy
Toxicity



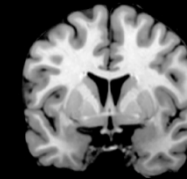
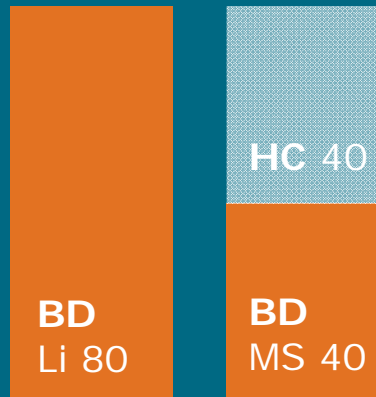
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CROSS SECTIONAL DESIGN

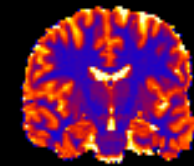
Euthymic BD
Maintenance

Innovative analysis

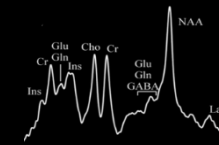
Matched groups
Range of response



Anatomy



Relaxometry



¹H MRS

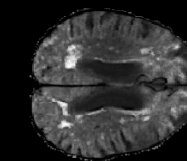
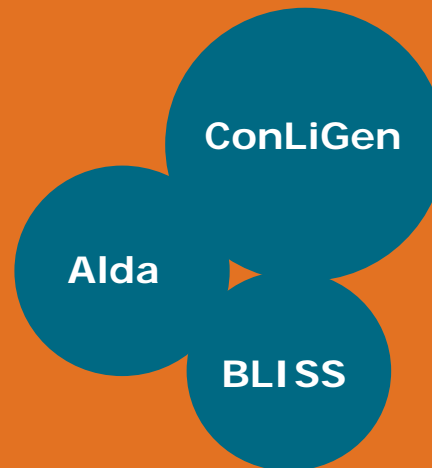
Cognitive
testing

RESPONSE TO LITHIUM

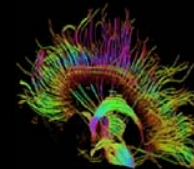
Defining response

Rating response

- Reliability
- Validity
- Suitability

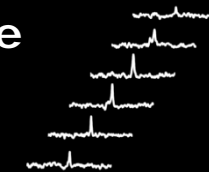


WMHI

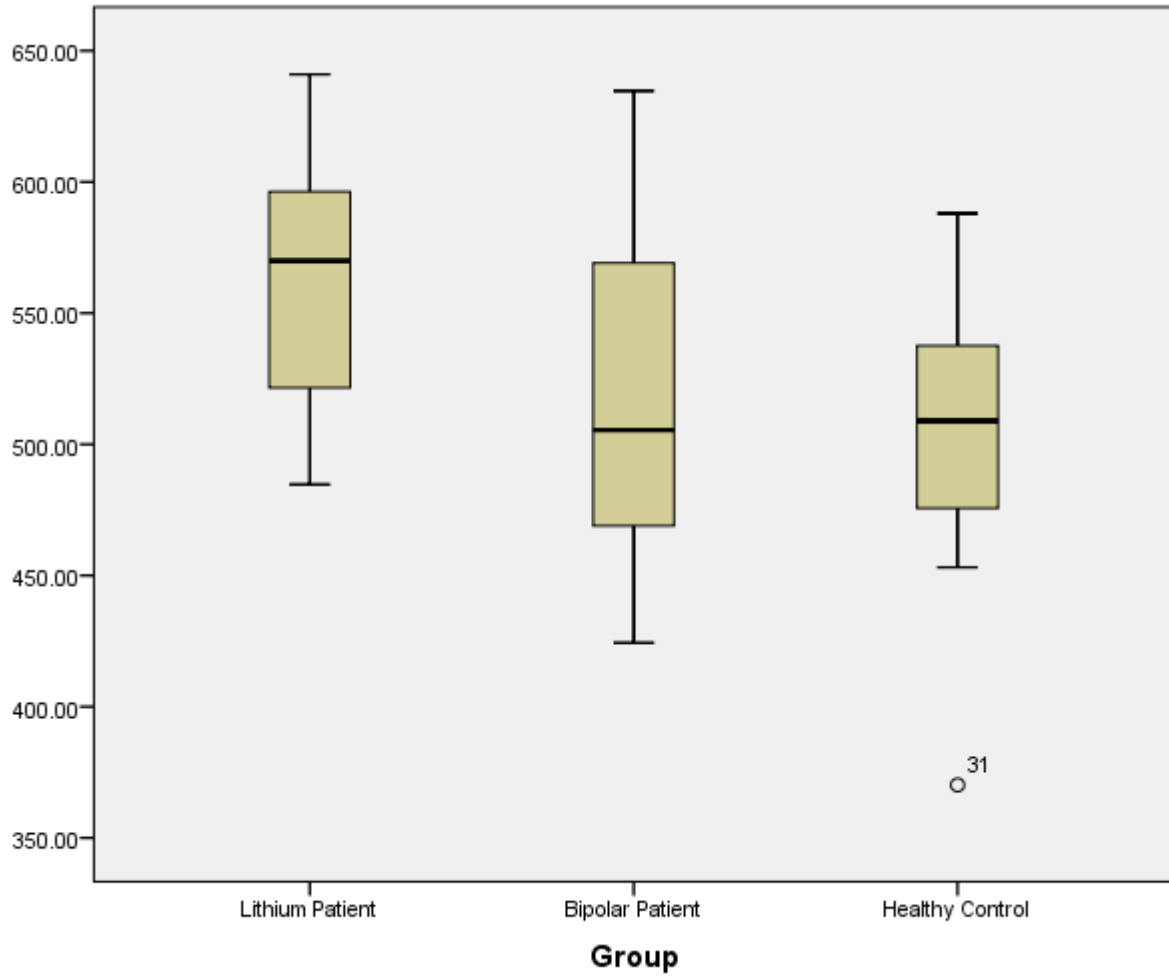


DTI

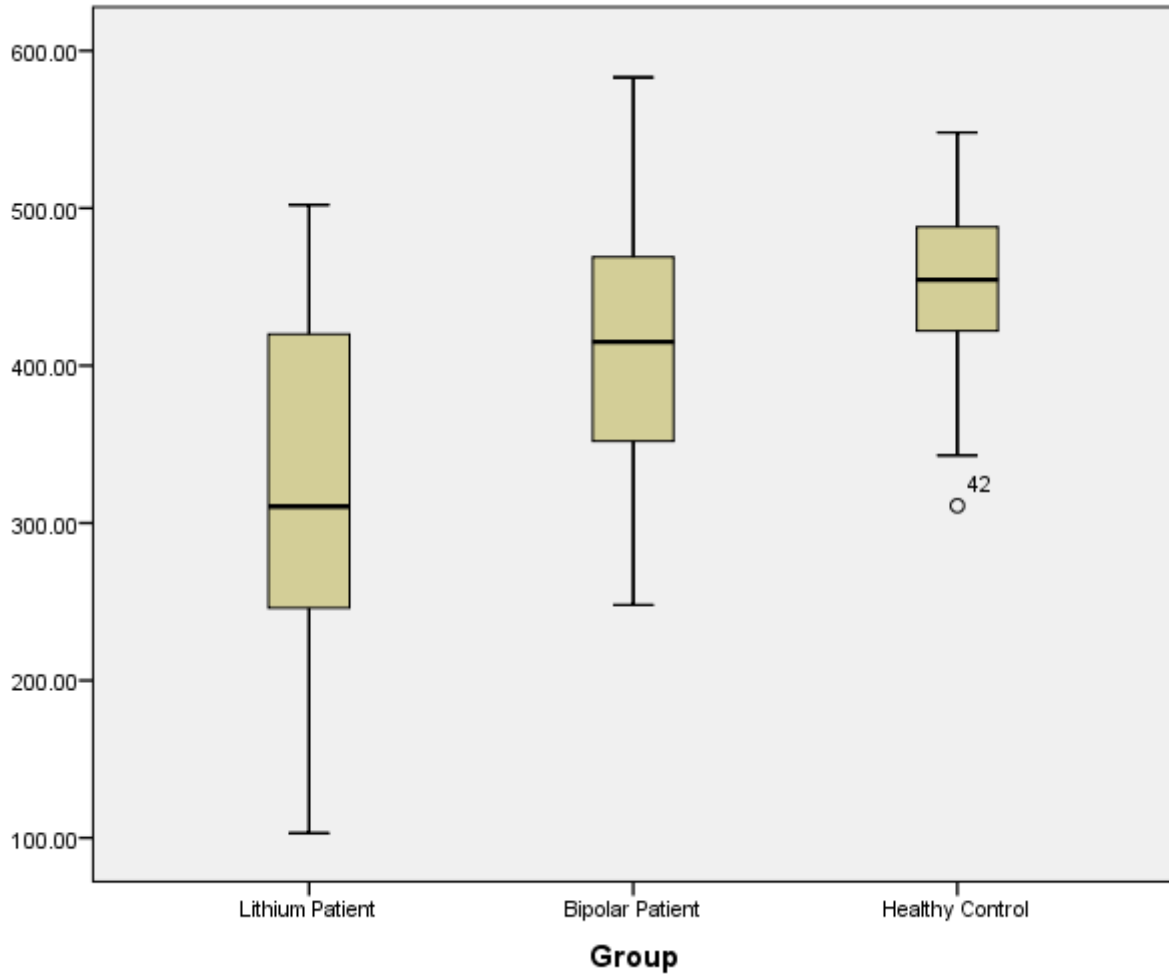
Quantitative
Lithium
MRS



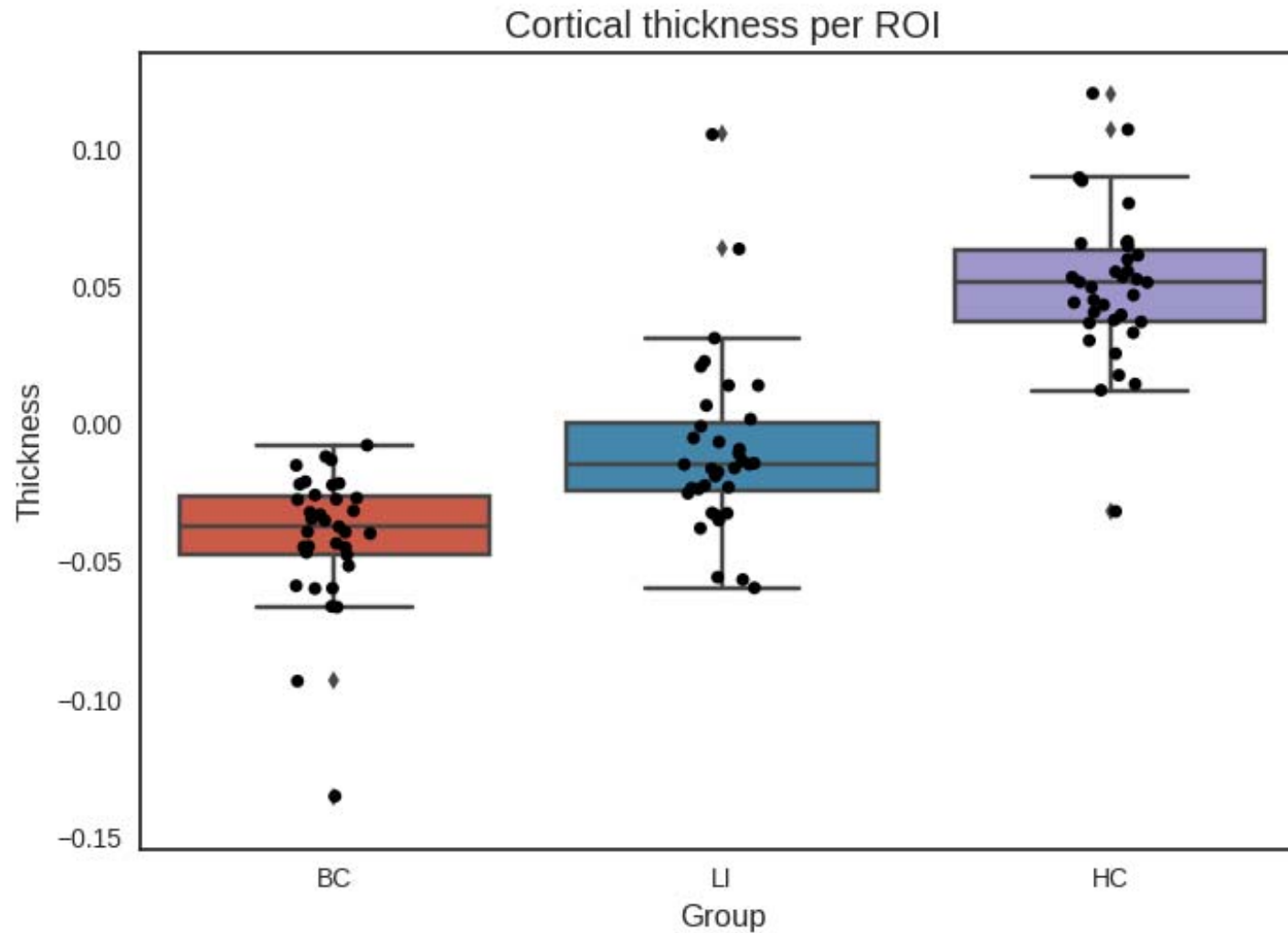
BLISS CPT reaction time



BLISS D2 item processing

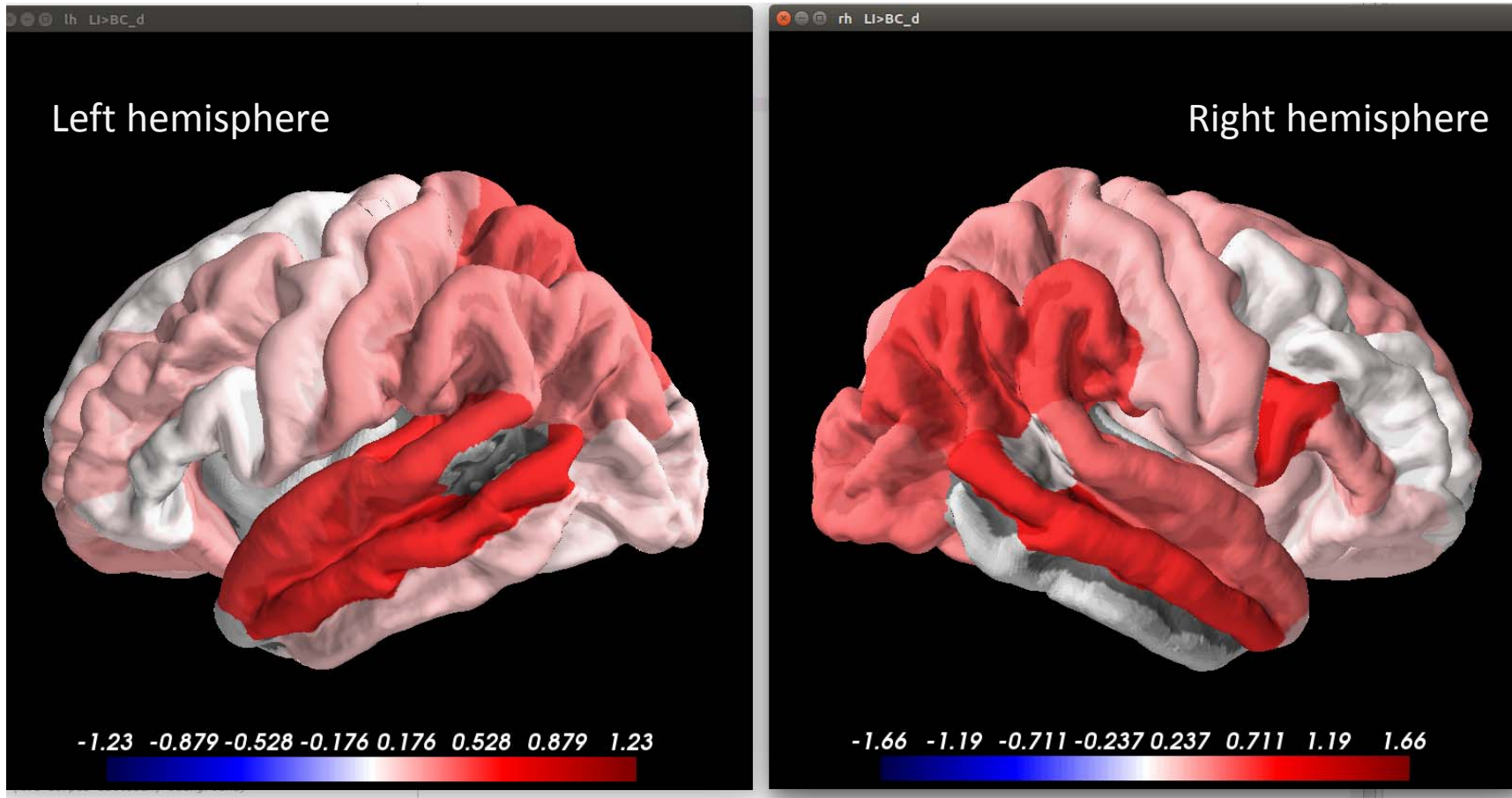


BLISS Cortical Thickness



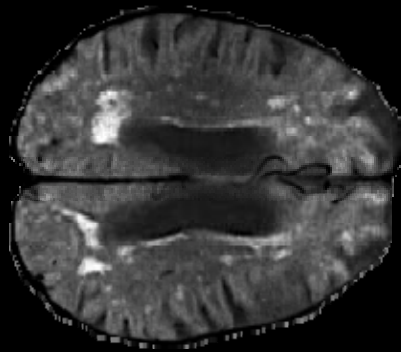
BLISS Cortical Thickness

Lithium group > bipolar control group

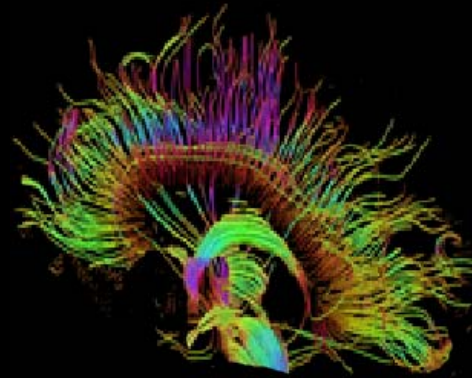


BLISS Diffusion Tensor Imaging

Fractional anisotropy is held to be lowered in BD
Lithium has the potential to normalise FA

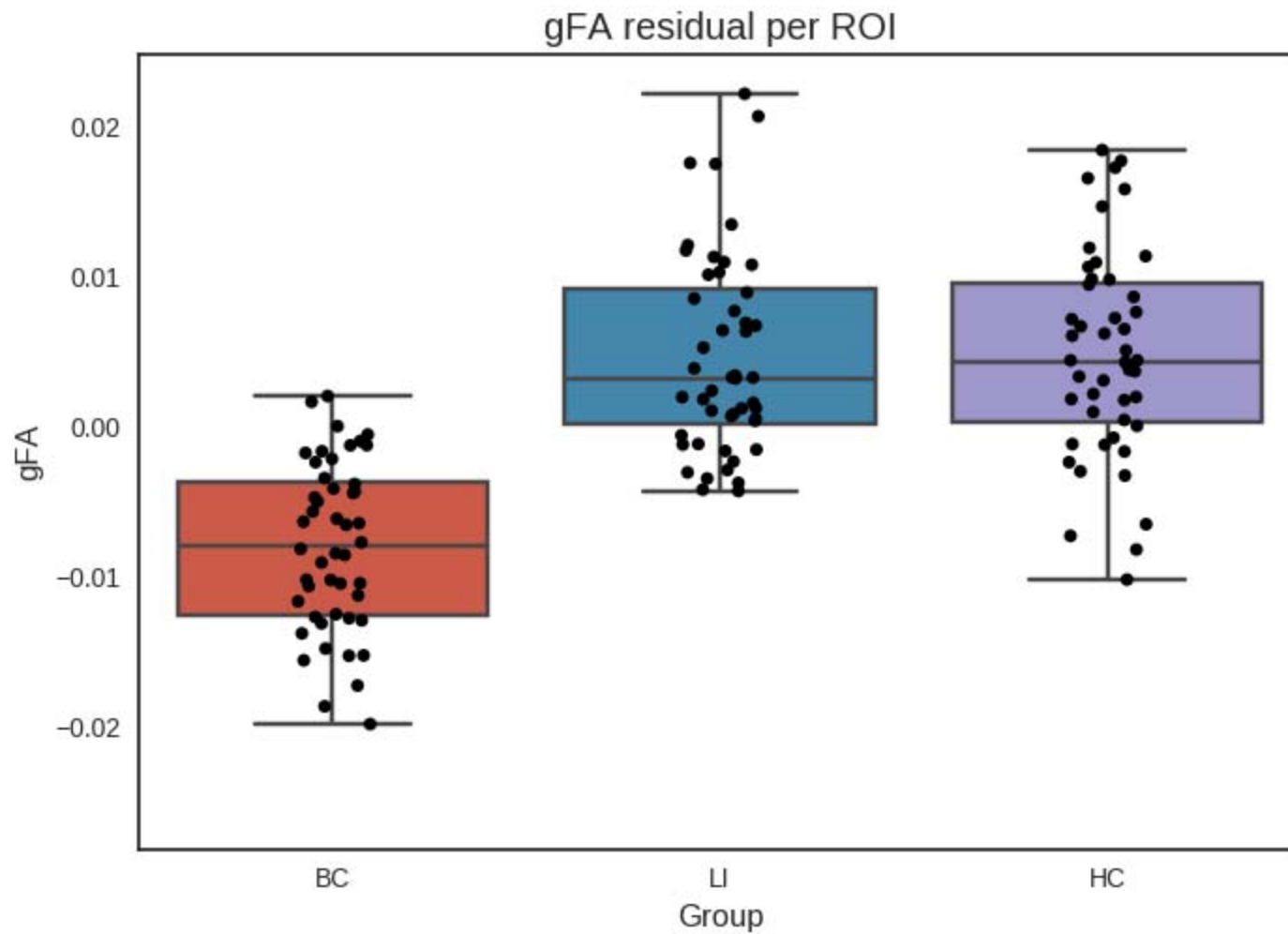


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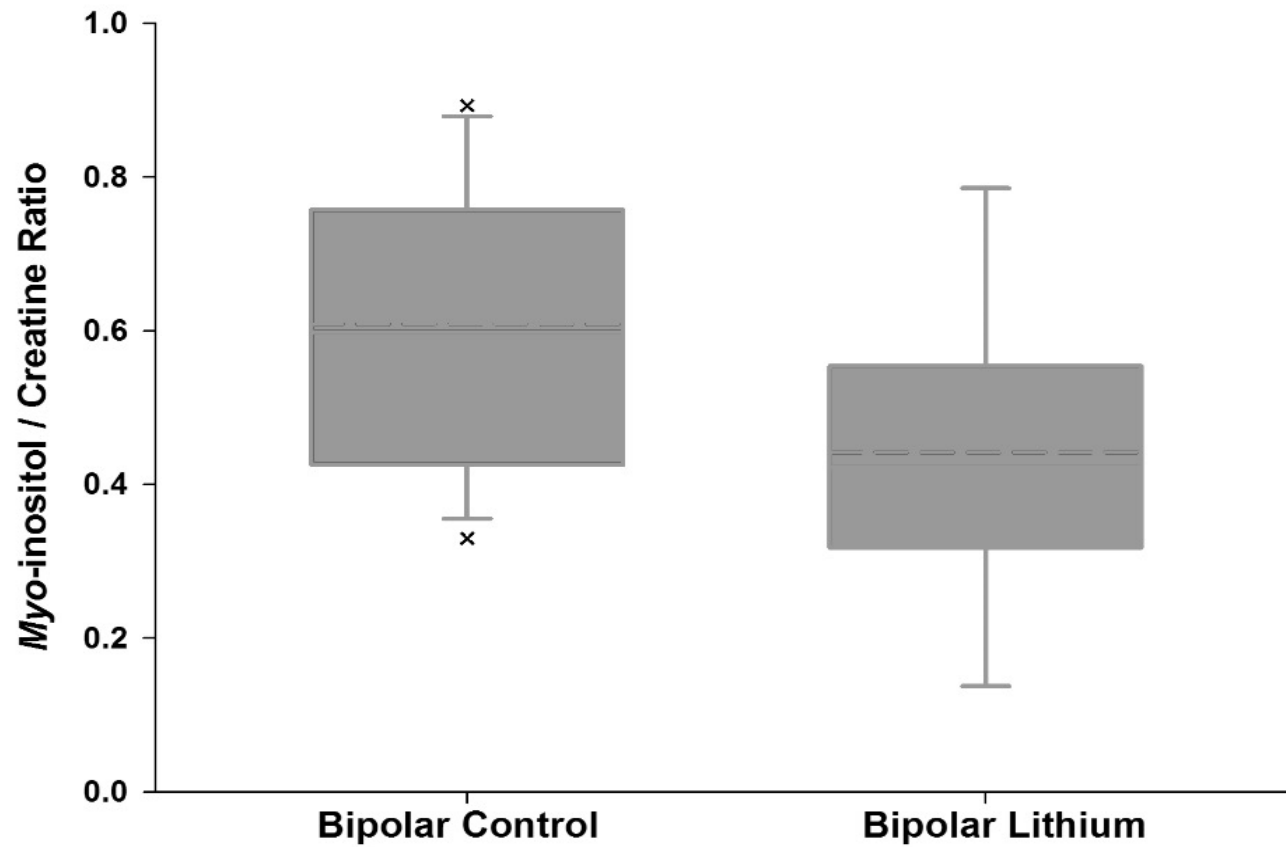


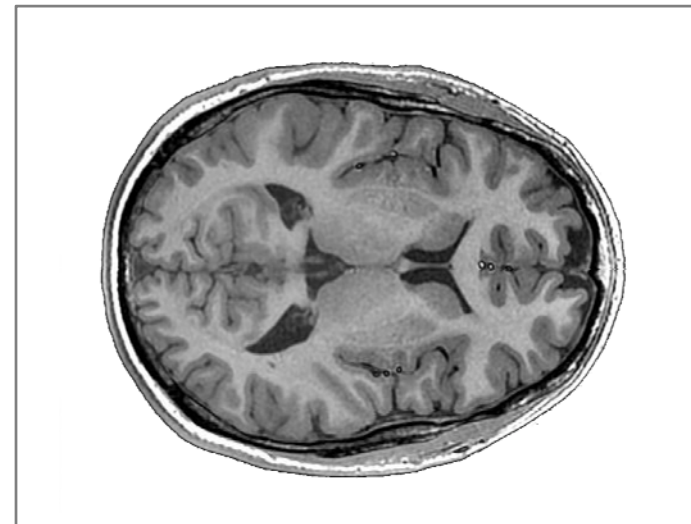
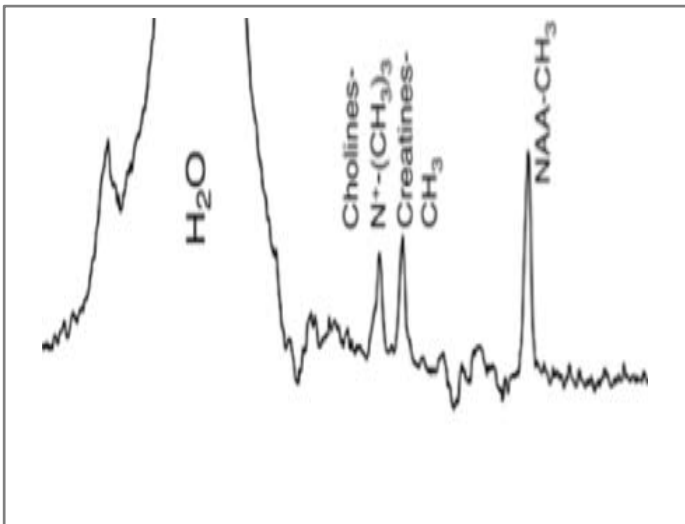
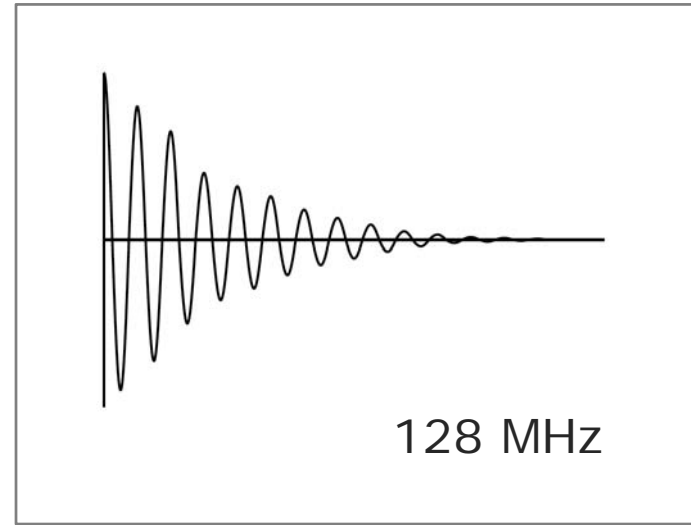
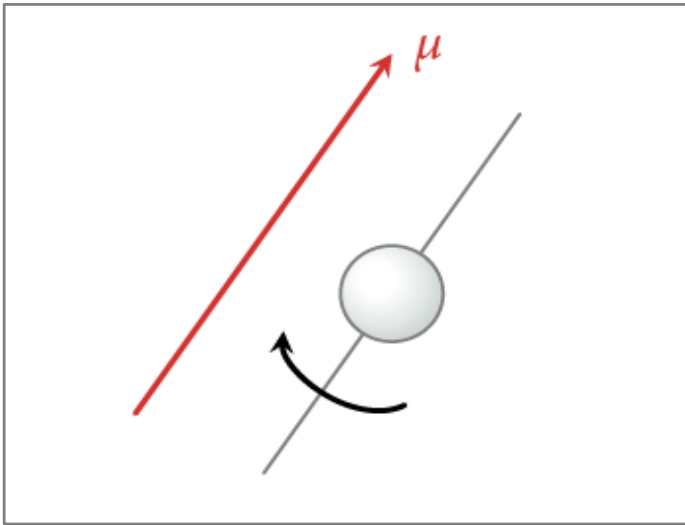
DTI

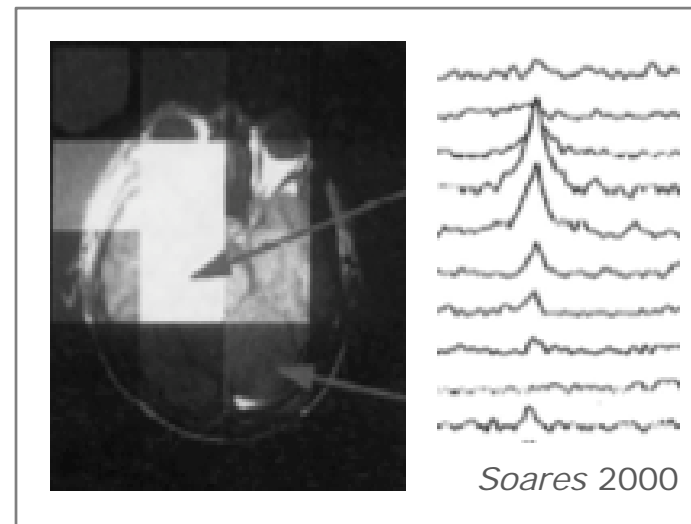
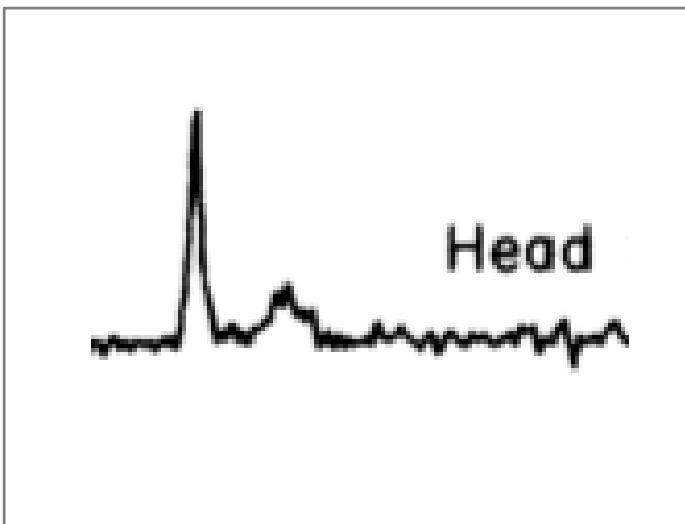
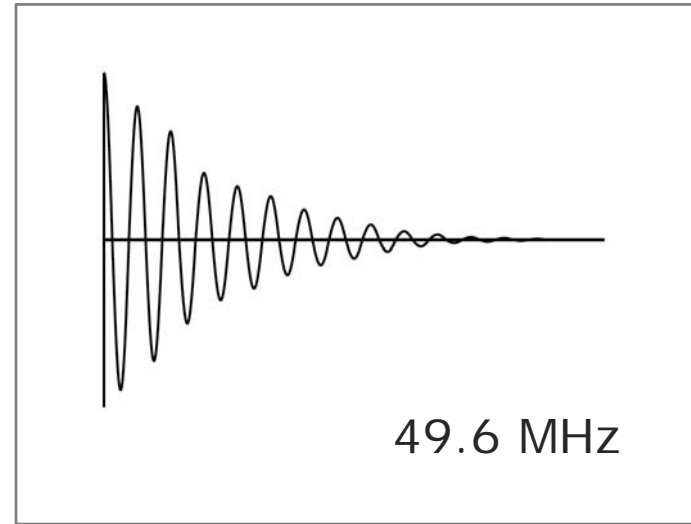
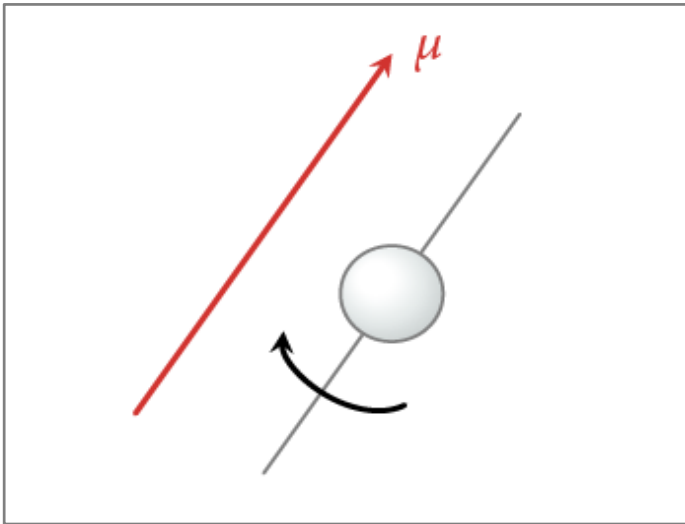
BLISS Diffusion Tensor Imaging

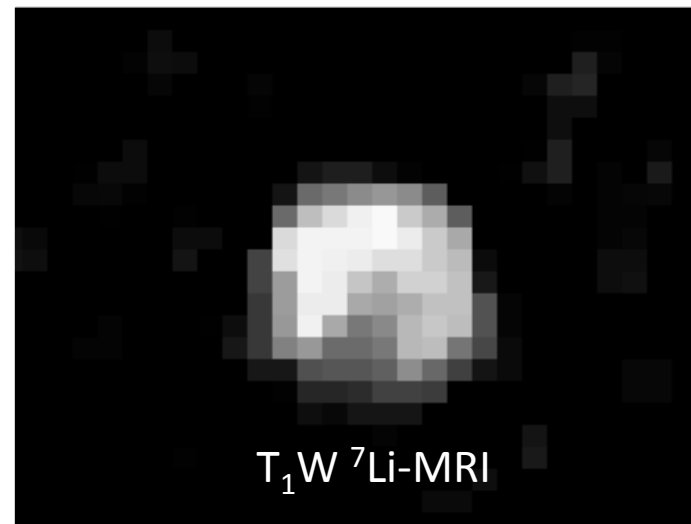
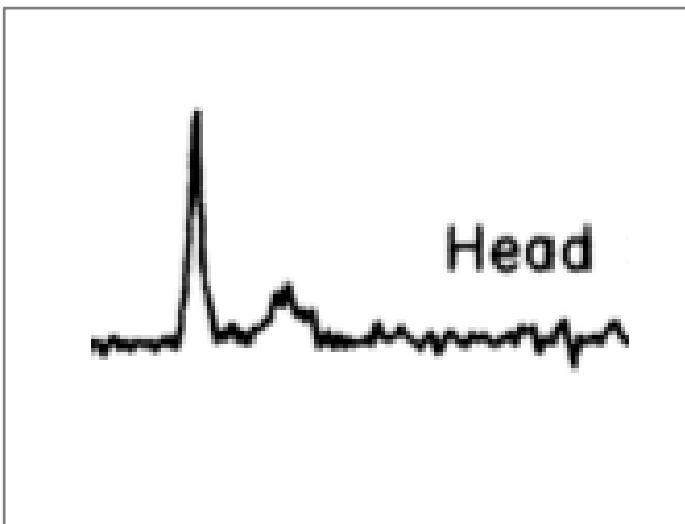
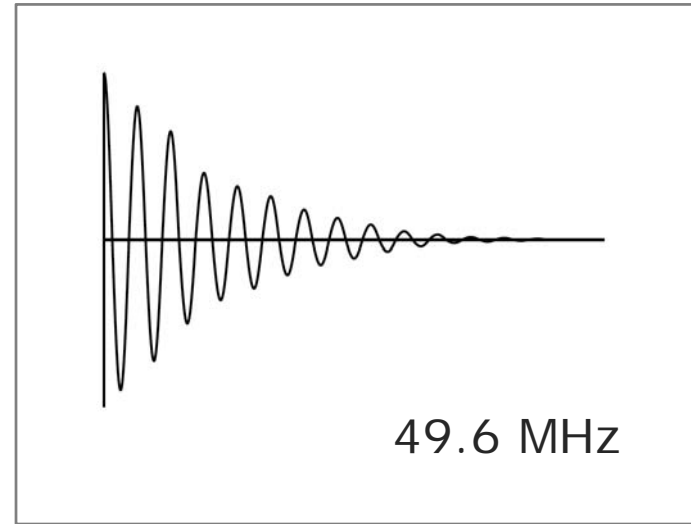
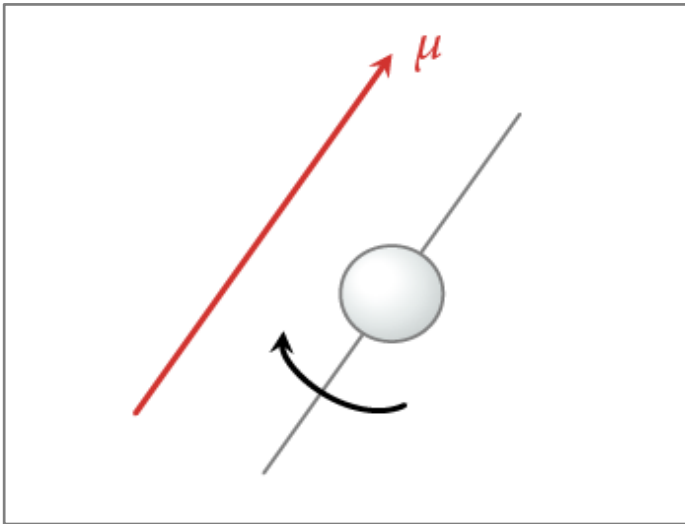


BLISS ^1H MRS frontal WM voxel









Phantom insights

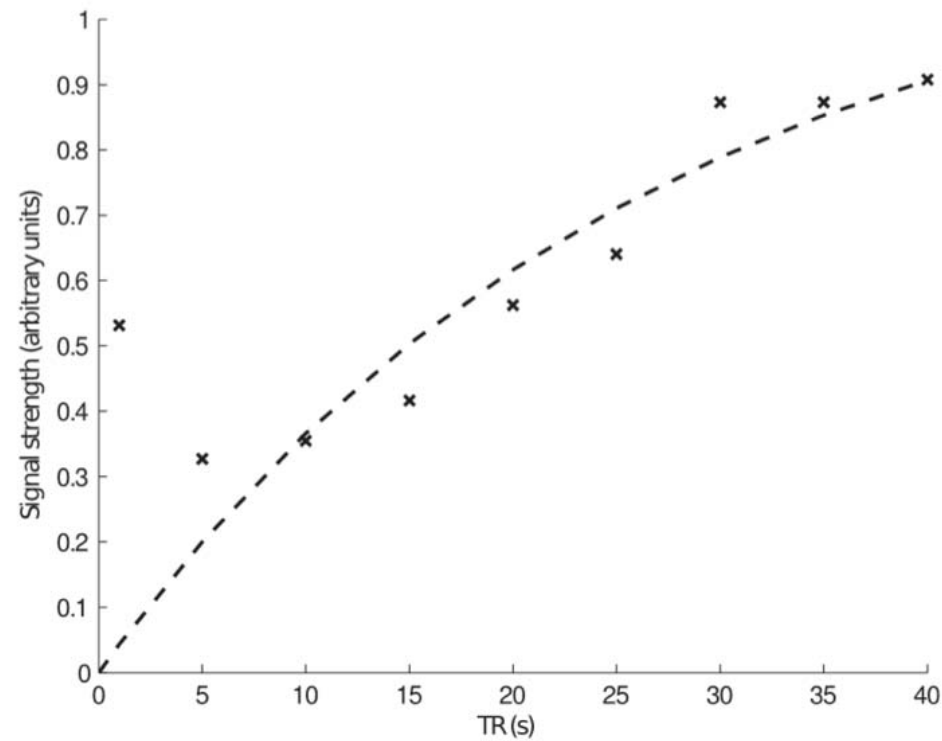


Figure 6.4: T_1 relaxation data for an aqueous solution of 50 mM lithium chloride in a 2000 ml volume phantom. The increase in signal intensity with the shortest TR is discussed in the text.

Phantom insights

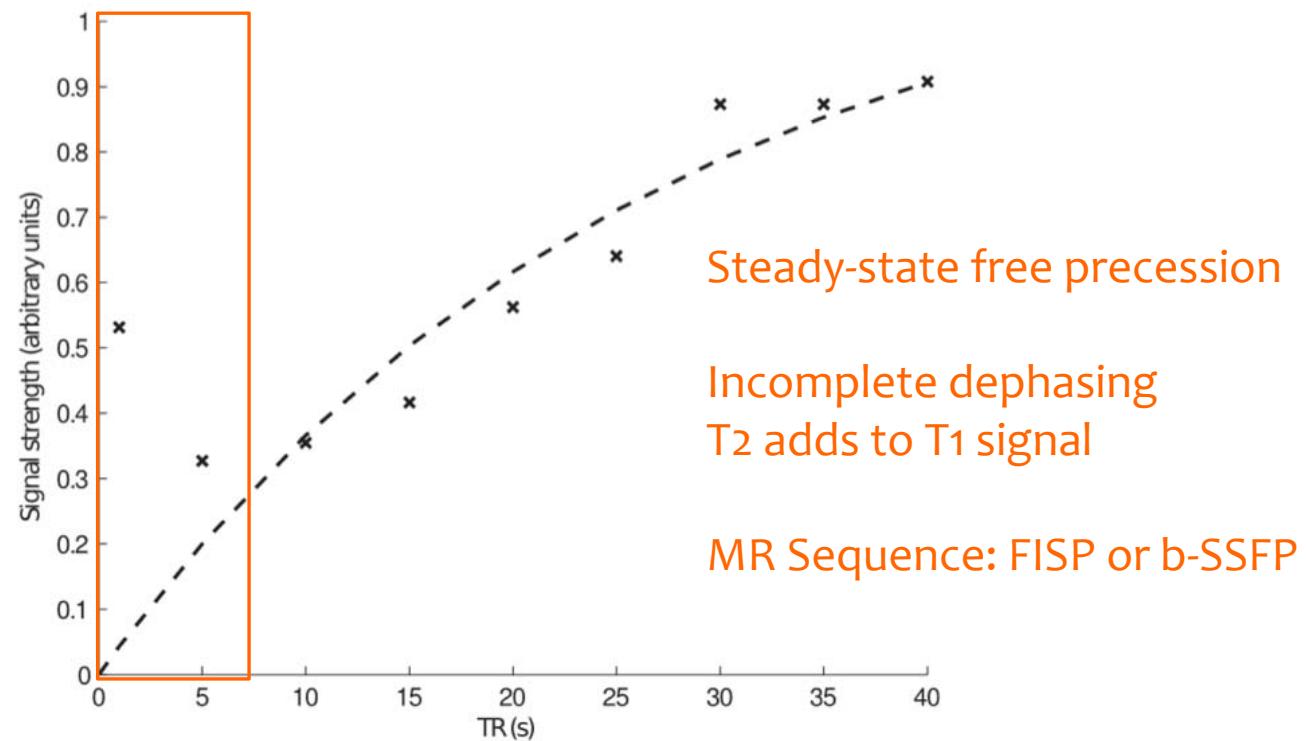
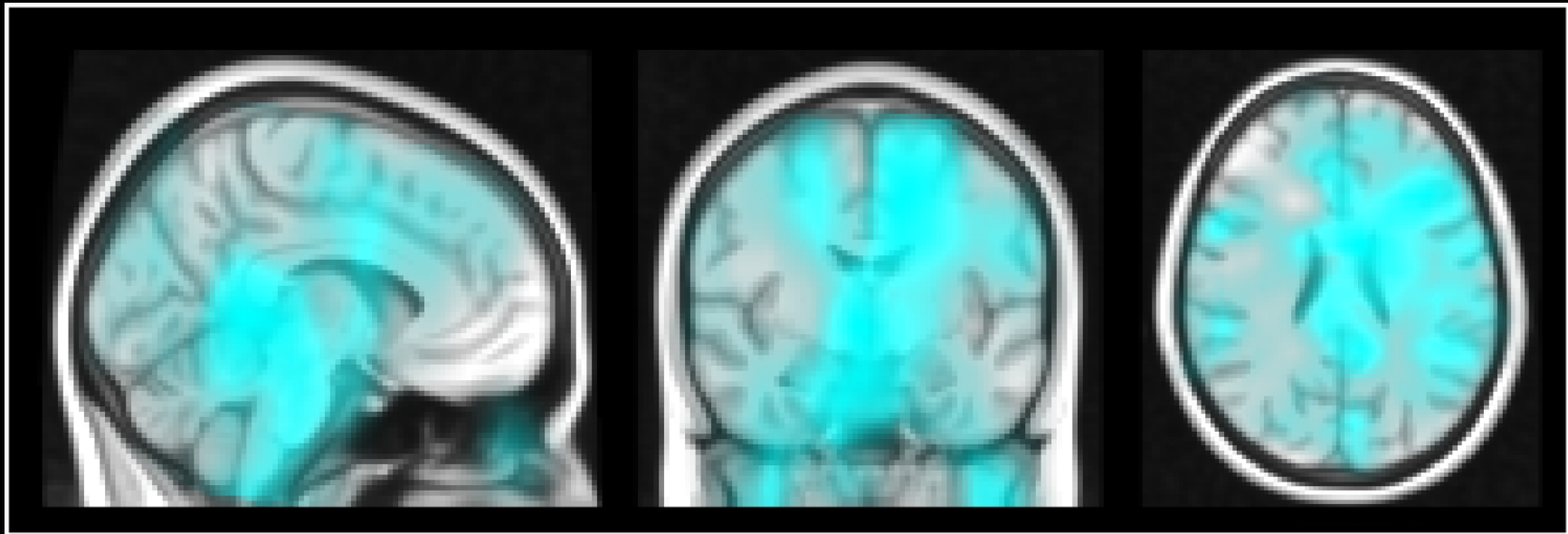


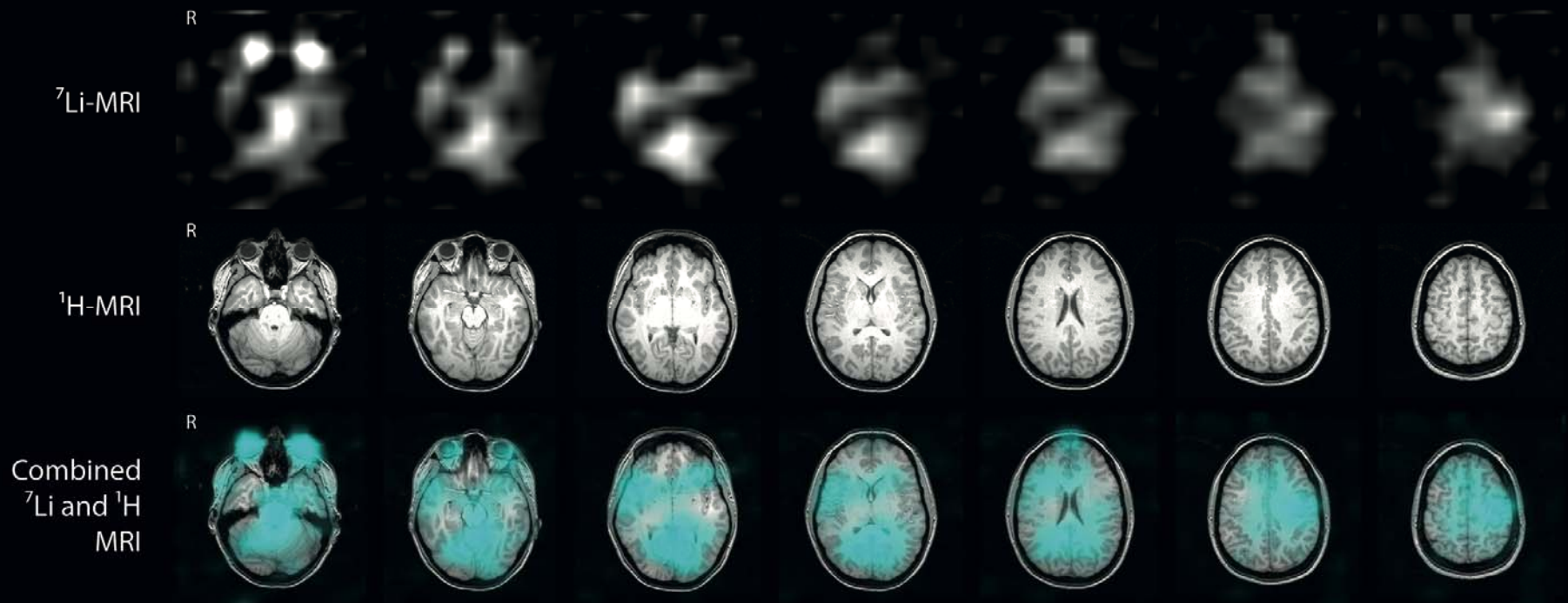
Figure 6.4: T_1 relaxation data for an aqueous solution of 50 mM lithium chloride in a 2000 ml volume phantom. The increase in signal intensity with the shortest TR is discussed in the text.

Direct molecular Li imaging



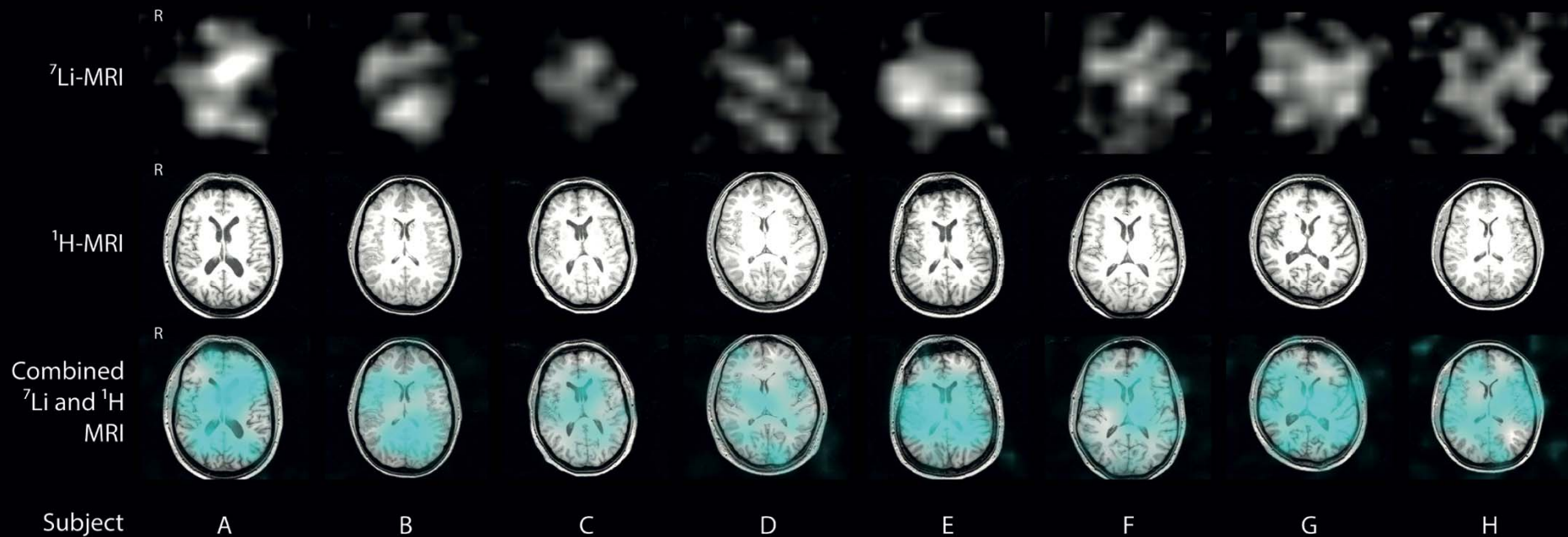
Lithium distribution in the human brain
Euthymic bipolar disorder (n=8) group average in standard space
bSSFP sequence 8 minutes duration at 3T

Direct molecular Li imaging



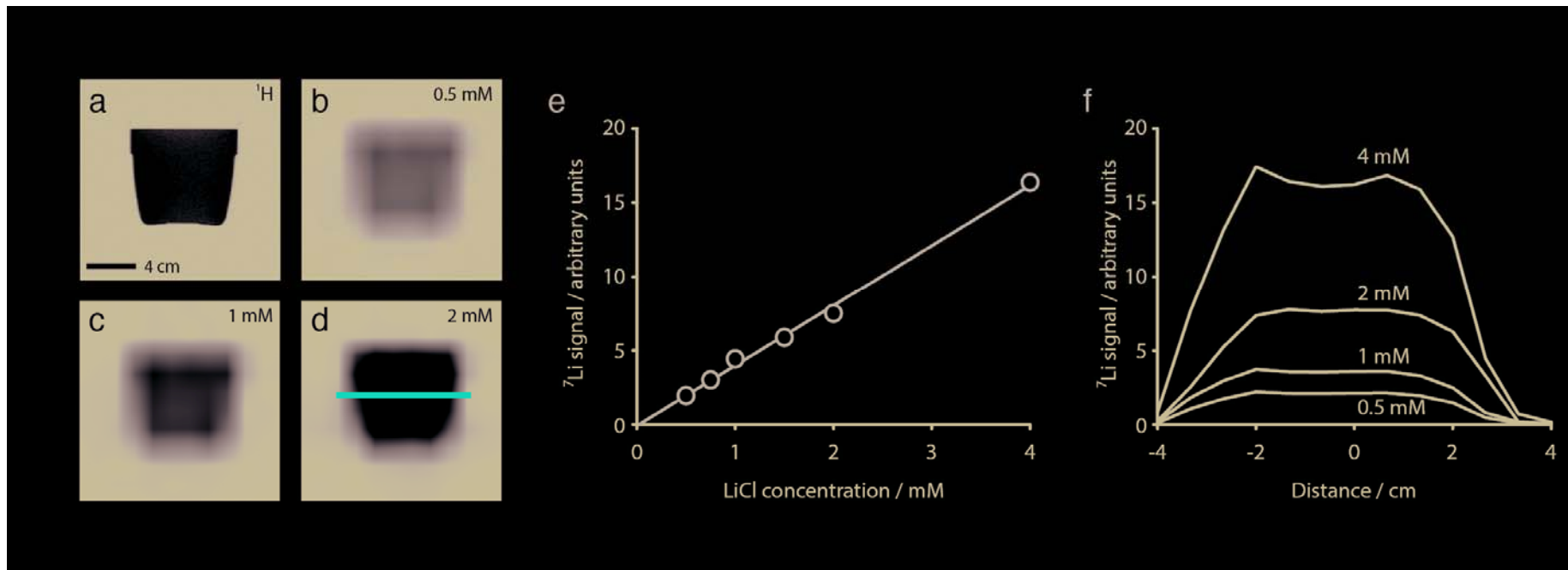
Lithium distribution in the human brain
Euthymic bipolar disorder single subject
bSSFP sequence 8 minutes duration at 3T

Direct molecular Li imaging



Lithium distribution in the human brain
Euthymic bipolar disorder (n=8) individual distributions in native space
bSSFP sequence 8 minutes duration at 3T

^7Li -MRI test objects



Response TO LITHIUM NETWORK



PRIMARY GOALS

Bipolar disorder (BD) is a highly prevalent mental disorder and a leading cause of suicide. Lithium is the key treatment for prevention of BD relapse and suicide.

WP5 Partners



France	INSERM- UMR S1144	Paris	Frank Bellivier & Cynthia Marie-Claire	3T GE/7T Siemens
France	Université de Franche-Comté	Besancon	Emmanuel Haffen (emmanuel.haffen@univ-fcomte.fr)	3T Siemens
UK	Institute of Neuroscience – Newcastle University	Newcastle	David Cousins & Jan Scott	3T Philips
UK	King's Health Economics, King's College London	London	Allan Young & Paul McCrone	3T GE
Germany	Department of Clinical Psychology and Neuropsychology Mainz University	Mainz	Michelle Wessa	3T Siemens
Germany	University Hospital Carl Gustav Carus	Dresden	Michael Bauer	3T Siemens
Germany	LMU München	Munich	Thomas Schulze	3T Philips / (Siemens: starting 2018)
Italy	Fatebenefratelli Institute Brescia IRCCS Laboratory of Biological Psychiatry	Brescia	Annamaria Cattaneo	
Italy	IRCCS Ca' Granda Policlinico di Milano	Milano	Paolo Brambilla & Letizia Squarcina	3T Philips (?system change)
Denmark	Psychiatric Center Copenhagen, Rigshospitalet	Copenhagen	Lars Kessing	3T Siemens
Sweden	University of Gothenburg	Gothenburg	Mikael Landén	3T GE
Norway	Oslo University Hospital	Oslo	Ole Andreassen	3T GE
Spain	Hospital Clinic, University of Barcelona, IDIBAPS, CIBERSAM	Barcelona	Eduard Vieta & Jose M GOIKOLEA	3T Siemens
Spain	Institut Hospital del Mar d'Investigacions Mèdiques	Barcelona	Frances Colom	3T Philips
Poland	Poznan University of Medical Sciences	Poznan	Aleksandra Suwalska	3T Siemens

BLISS recruitment

Cognitive estimates

- Newcastle central population 300K
- Bipolar disorder 1%
- Potential cases 3K
- Proportion on lithium 10%

- Should be 300 identifiable patients

BLISS Single laboratory approach

BIOCHEMISTRY REPORT 2015-16
3258 Individual lithium tests



320 working age adult patients
taking lithium



1486 tests excluded (age >63 or no
patient identifier)

BLISS Single laboratory approach

