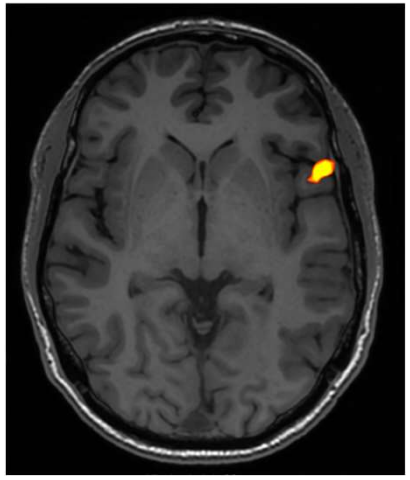
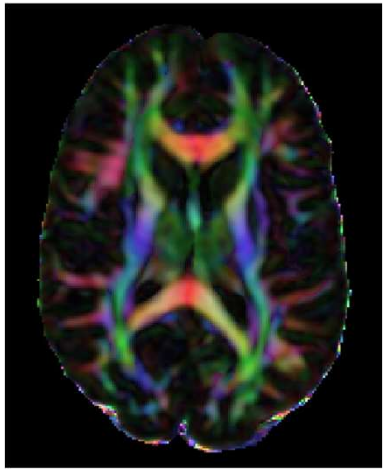
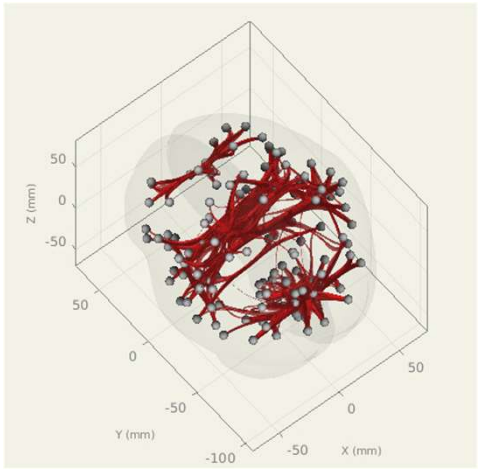
Center for Experimental and Biomedical Imaging in Örebro (CEBIO)

- an MRI research facility







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Director CEBIO
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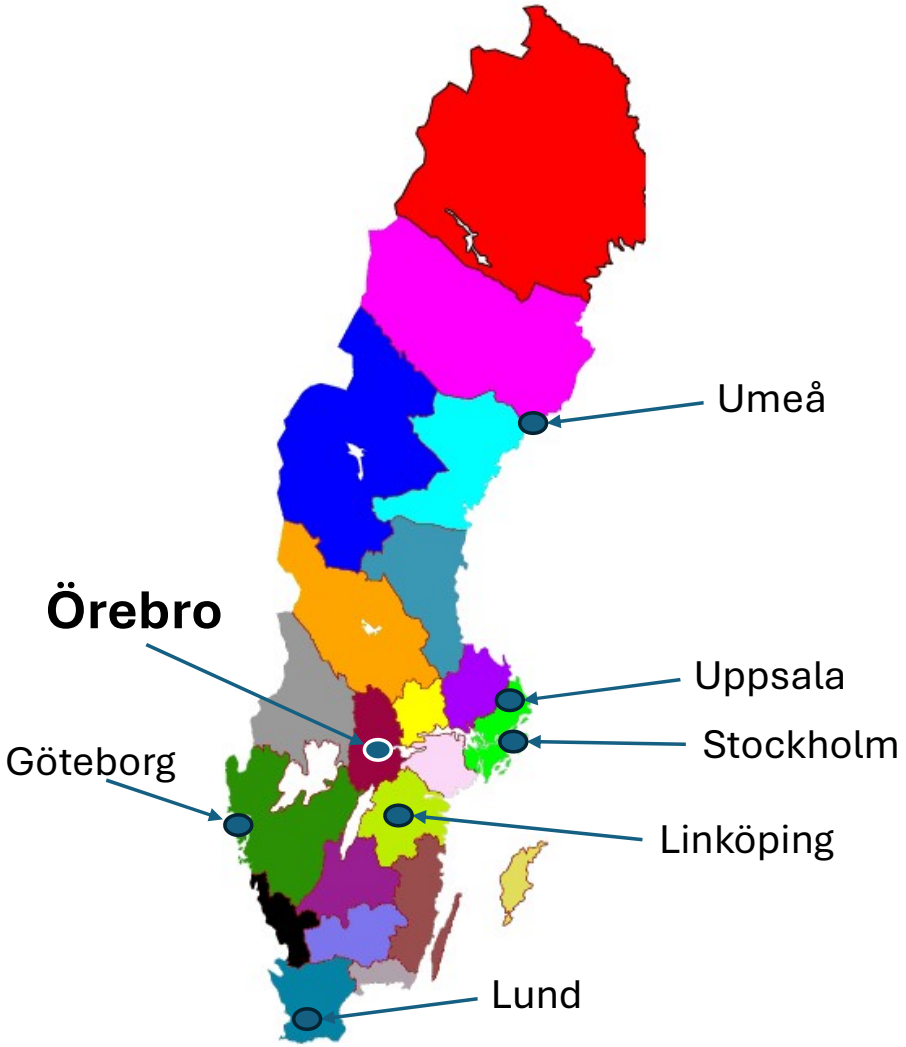

Umeå
Örebro
Uppsala
Stockholm
Göteborg
Linköping
Lund

Örebro University + Region Örebro County


March 20, 2020
(~ 8000 kg)
BeMá-LYFT

CEBIO

Center for Experimental and Biomedical Imaging in Örebro

Region Örebro County
Research and education

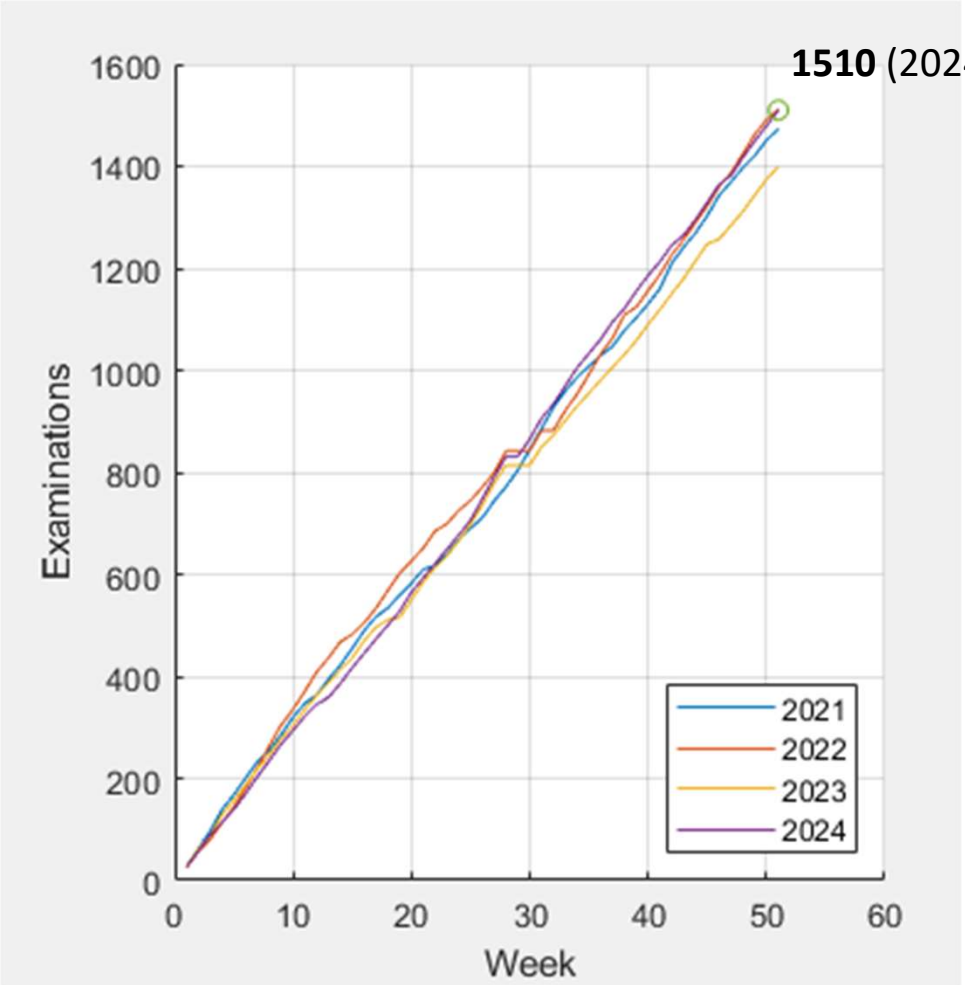
ÖREBRO UNIVERSITY

Preparation room

Lab

Office for researcher

Production



1510 (2024)

Scanner used for:

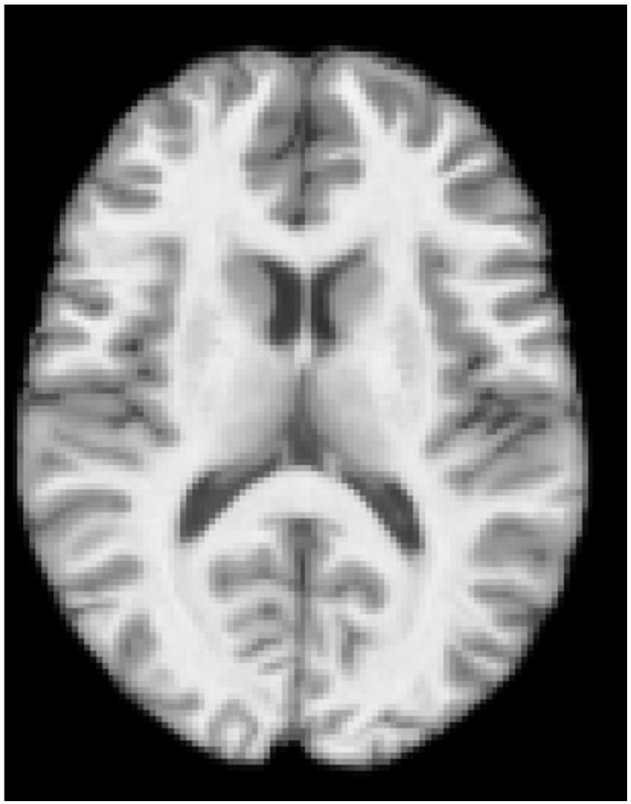
- Research
- Education
- Clinic

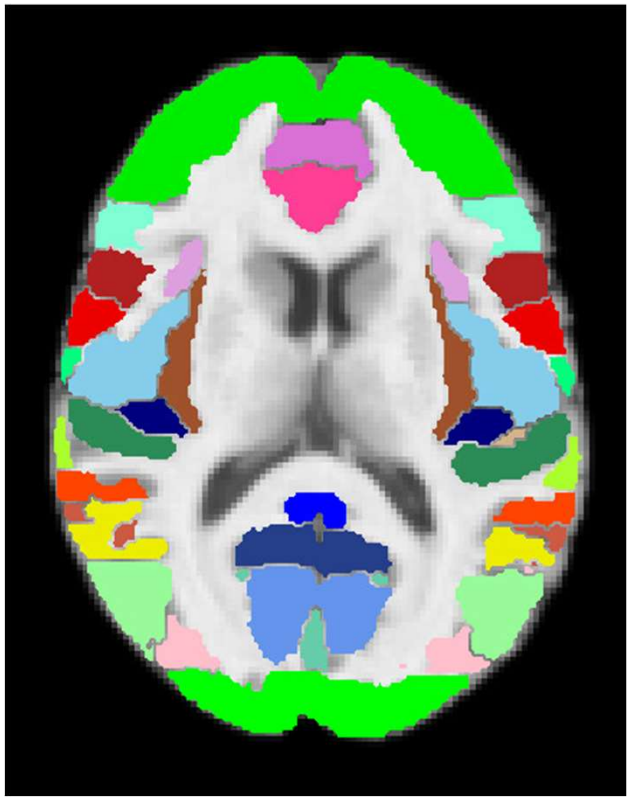
What kind of information is acquired?

- Structural/anatomical
- Structural connectivity
- Functional MRI (fMRI)
- Resting state fMRI
- Molecular (GABA, Glutamate), spectroscopy

Structural/anatomical information 1(2)

- using region-of-interests (ROIs)

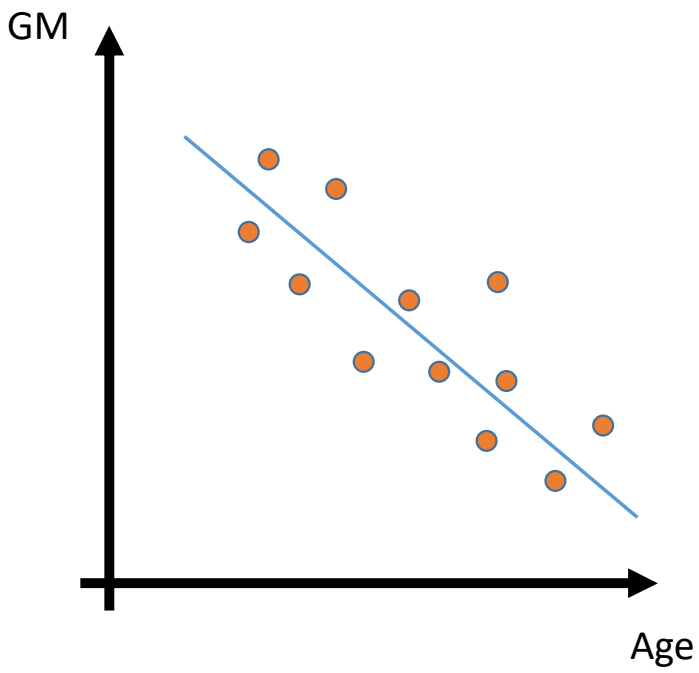


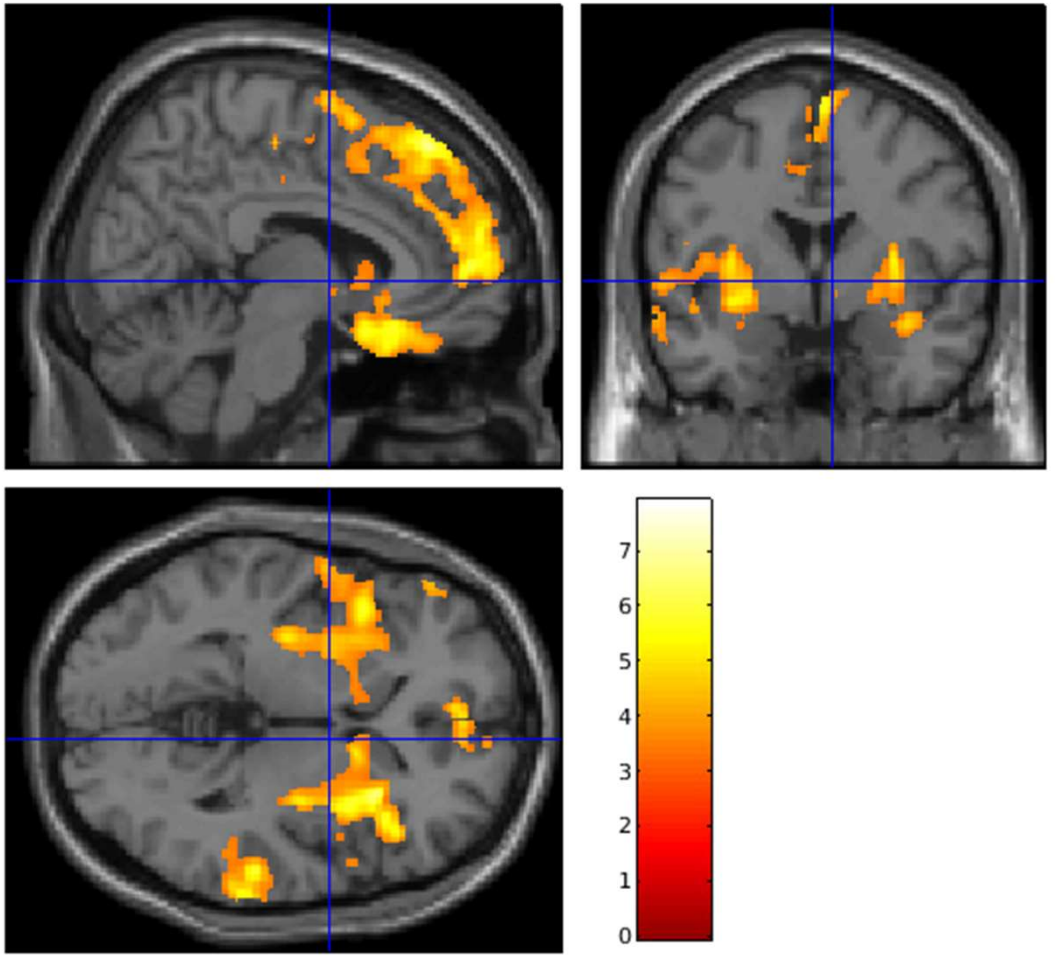


ROI	CSF	Grey matter	White matter
{'Left Inf Lat Vent' }	0.027047	0.03938	3.4647e-05
{'Right Lateral Ventricle' }	7.1039	0.70544	0.18616
{'Left Lateral Ventricle' }	8.3291	0.61837	0.30922
{'Right Pallidum' }	0	0.22254	1.1229
{'Left Pallidum' }	0	0.28518	1.0977
{'Right Putamen' }	0.0034435	3.9359	0.21139
{'Left Putamen' }	0.0014815	4.0461	0.27953
{'Right Thalamus Proper' }	0.31017	5.4621	2.0577
{'Left Thalamus Proper' }	0.28537	5.4709	2.3582
{'Right Ventral DC' }	0.99205	0.98746	3.8865
{'Left Ventral DC' }	0.99345	0.96972	3.9632
{'Right vessel' }	0	0	0
{'Left vessel' }	0	0	0
{'Optic Chiasm' }	0.18792	0.11301	0.066708
{'Cerebellar Vermal Lobules I-V' }	1.9341	2.9814	1.0594
{'Cerebellar Vermal Lobules VI-VII' }	0.76628	1.8421	0.31004
{'Cerebellar Vermal Lobules VIII-X' }	0.43396	1.8928	0.48199
{'Left Basal Forebrain' }	0.28424	0.35123	0.0067143
{'Right Basal Forebrain' }	0.28011	0.2702	0.014024
{'Right ACgG anterior cingulate gyrus'}	1.4466	2.8899	0.3479
{'Left ACgG anterior cingulate gyrus' }	1.1568	3.9038	0.52477
{'Right AIns anterior insula' }	0.81908	3.4443	0.28361
{'Left AIns anterior insula' }	1.0656	3.4555	0.27119
{'Right AOrG anterior orbital gyrus' }	0.36689	1.566	0.22104
{'Left AOrG anterior orbital gyrus' }	0.36834	1.5366	0.23429
{'Right AnG angular gyrus' }	2.4216	9.1158	1.9375
{'Left AnG angular gyrus' }	3.0154	7.7038	1.5395
{'Right Calc calcarine cortex' }	0.52044	2.6168	0.97421
{'Left Calc calcarine cortex' }	0.64287	3.0139	0.82216
{'Right CO central operculum' }	0.83524	2.9043	0.3956
{'Left CO central operculum' }	1.0622	3.0804	0.4498
{'Right Cun cuneus' }	1.1548	3.8649	1.0999
{'Left Cun cuneus' }	1.204	3.5212	0.91804
{'Right Ent entorhinal area' }	0.60165	2.0289	0.083394
{'Left Ent entorhinal area' }	0.63609	2.032	0.091565
{'Right FO frontal operculum' }	0.61335	1.4352	0.11823
{'Left FO frontal operculum' }	0.53643	1.38	0.10081
{'Right FPP frontal pole' }	1.9691	2.9699	0.32007
{'Left FPP frontal pole' }	2.0068	3.0284	0.30267
{'Right FuG fusiform gyrus' }	0.73626	6.5149	1.0444
{'Left FuG fusiform gyrus' }	0.70553	6.4331	1.1734

Structural/anatomical information 2(2)

- voxel-based morphometry (VBM)

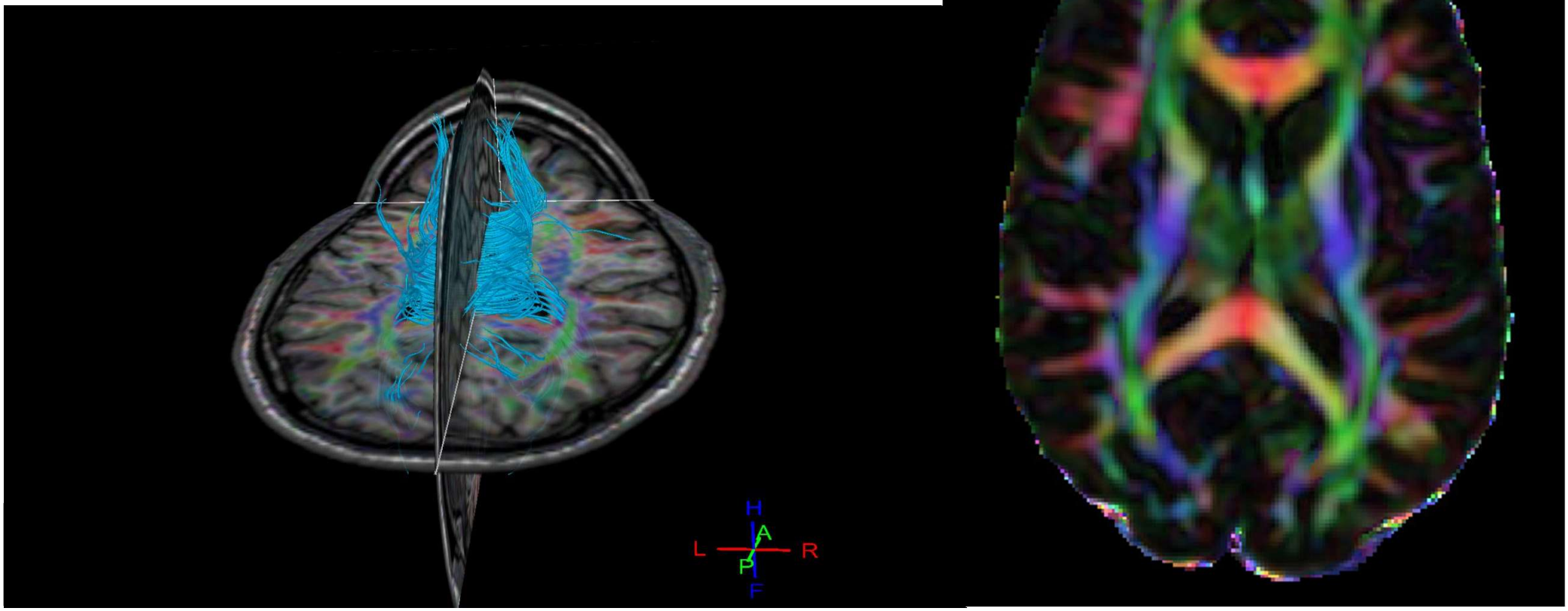




Individual voxel threshold p<0.001, cluster threshold FWEc<0.05

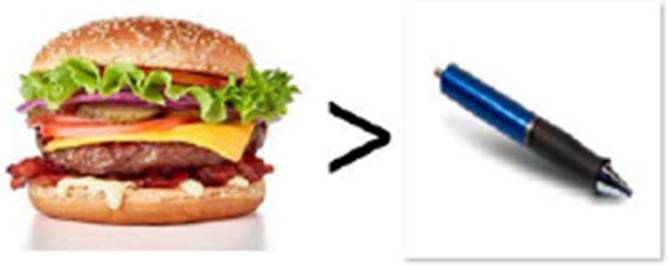
Structural connectivity

- Diffusion Tensor Imaging (DTI)



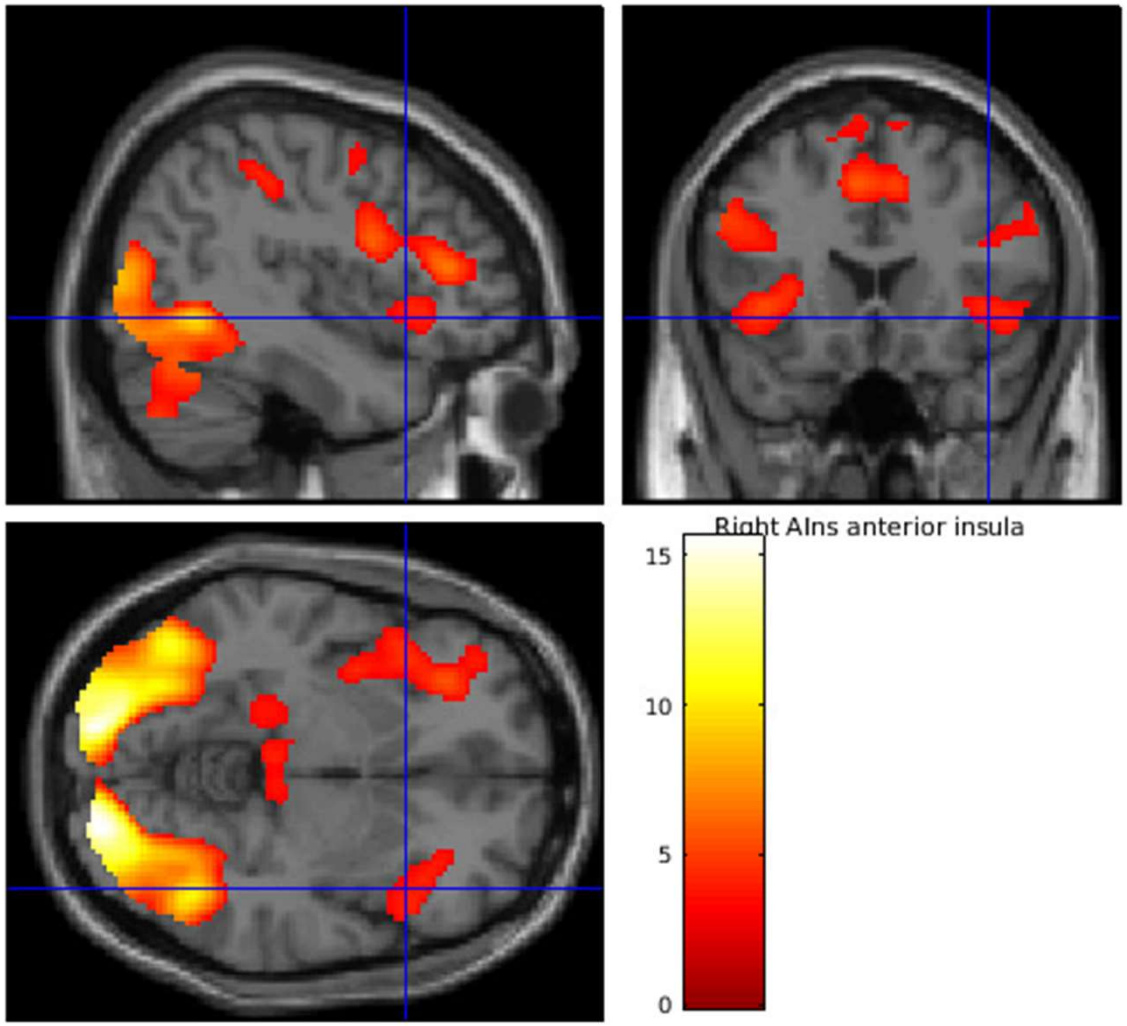
Functional MRI (fMRI)

- Depends on paradigm

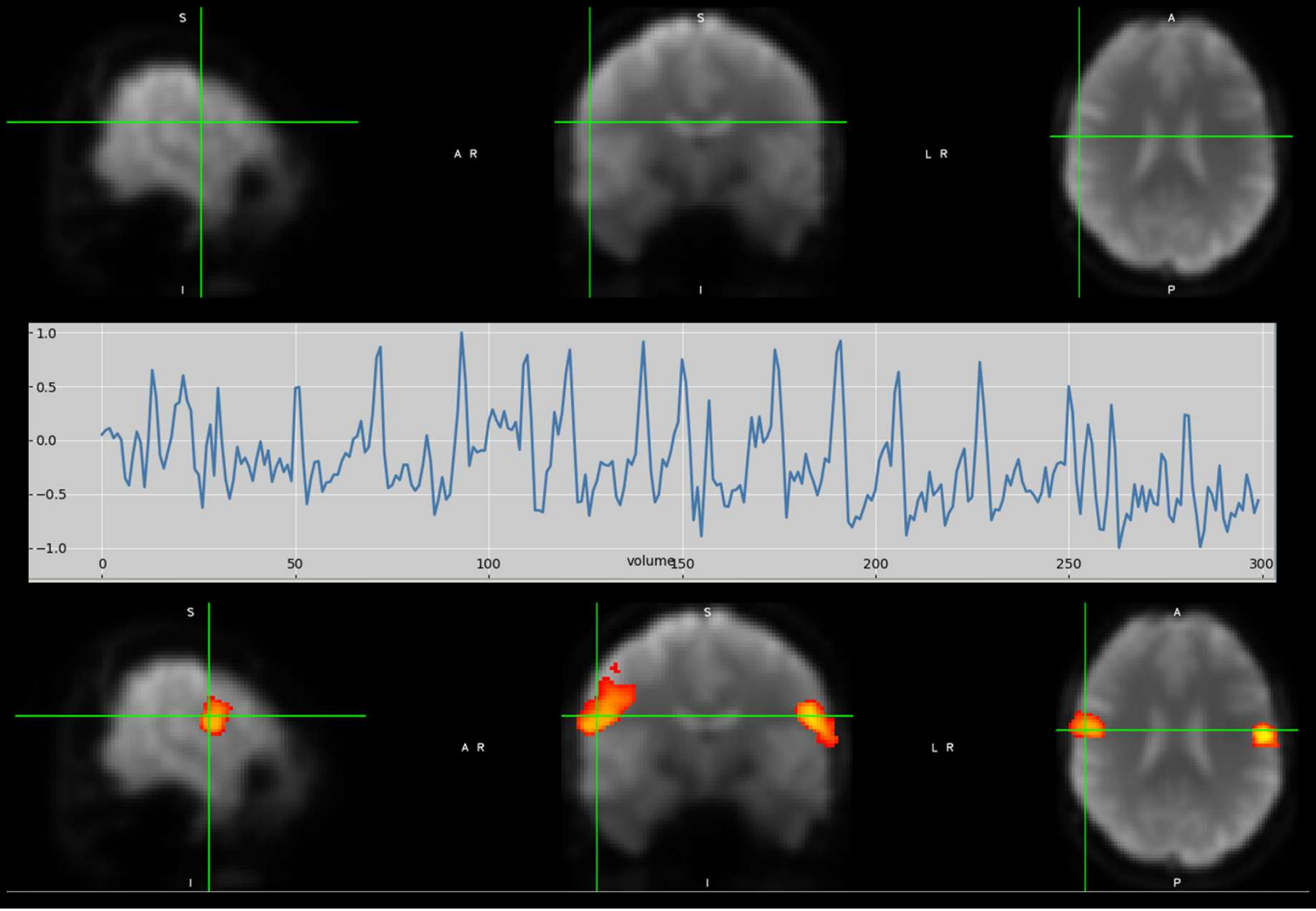


HEDF > **Non-Food**

High-Energy Density Food

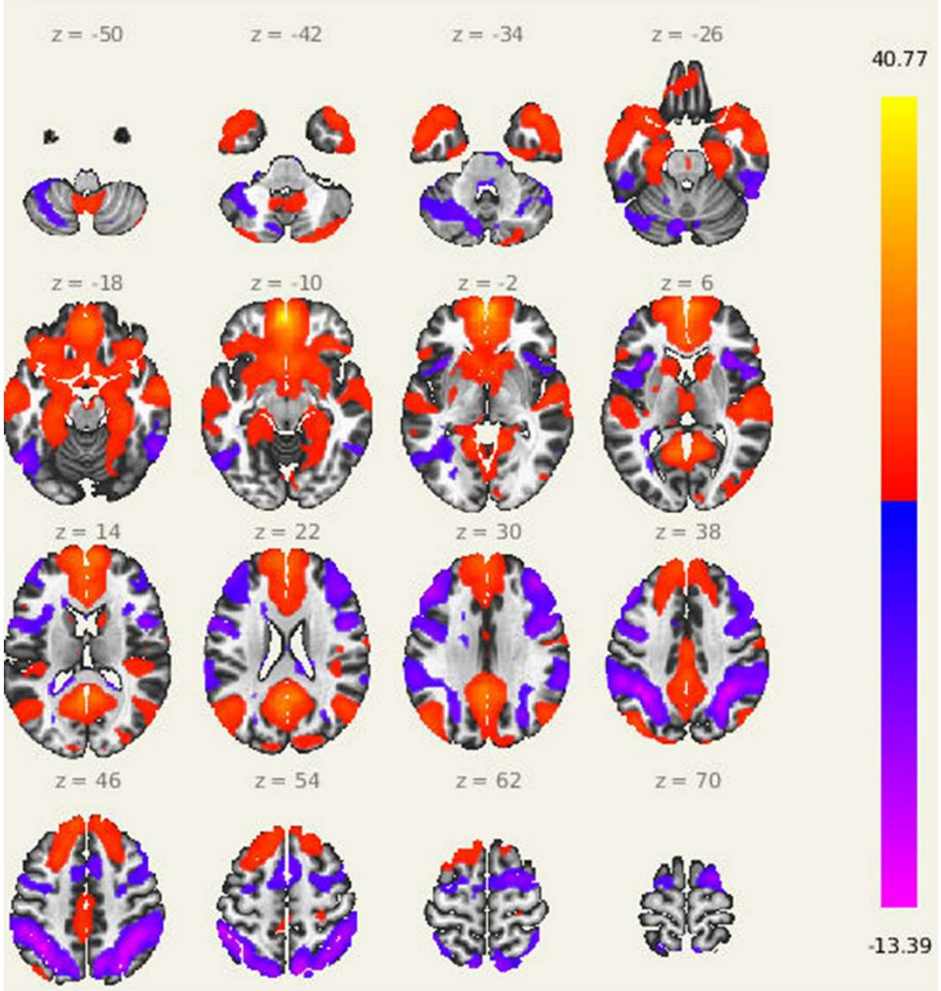


resting state fMRI (rsfMRI)

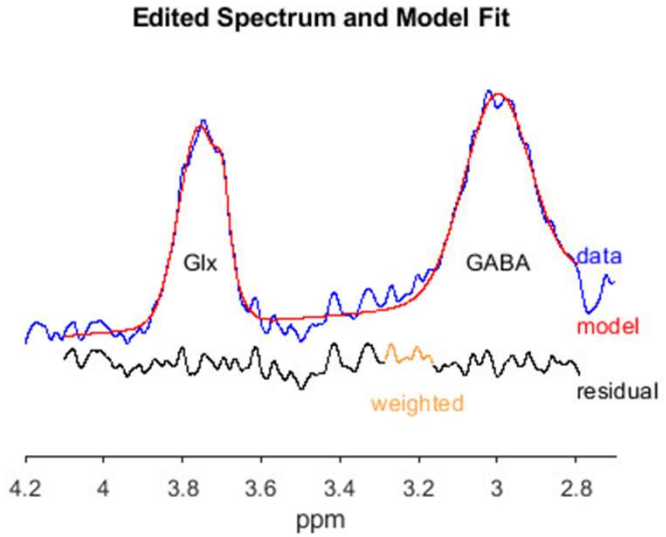


resting state fMRI (rsfMRI)

- Networks
(Default Mode Network, DMN)

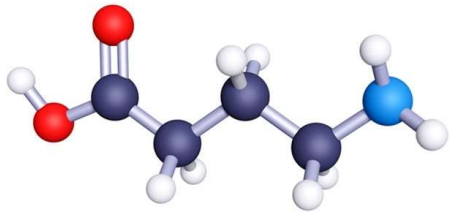


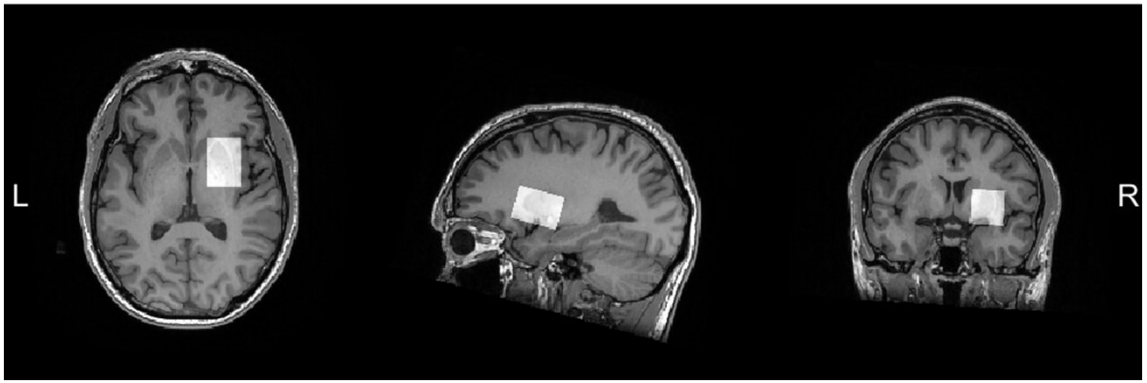
Spectroscopy

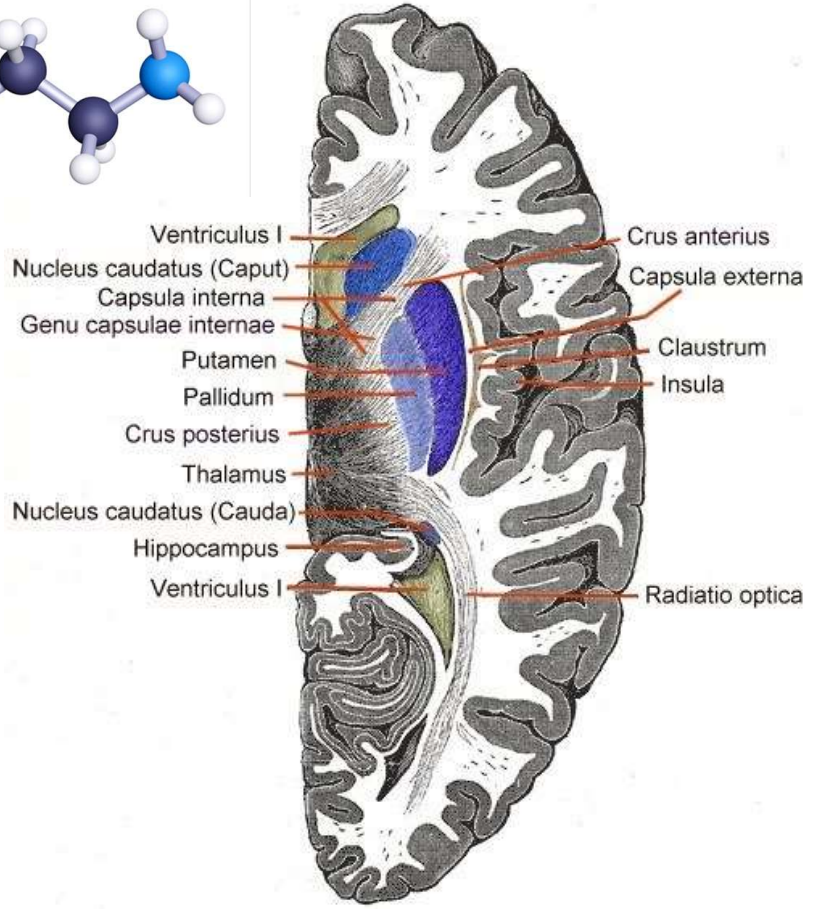


Quantification

GABA+/Water:	1.86 i.u.
GABA+/Cr:	0.13
Glx/Water:	4.62 i.u.
Glx/Cr:	0.09
FitVer:	200226

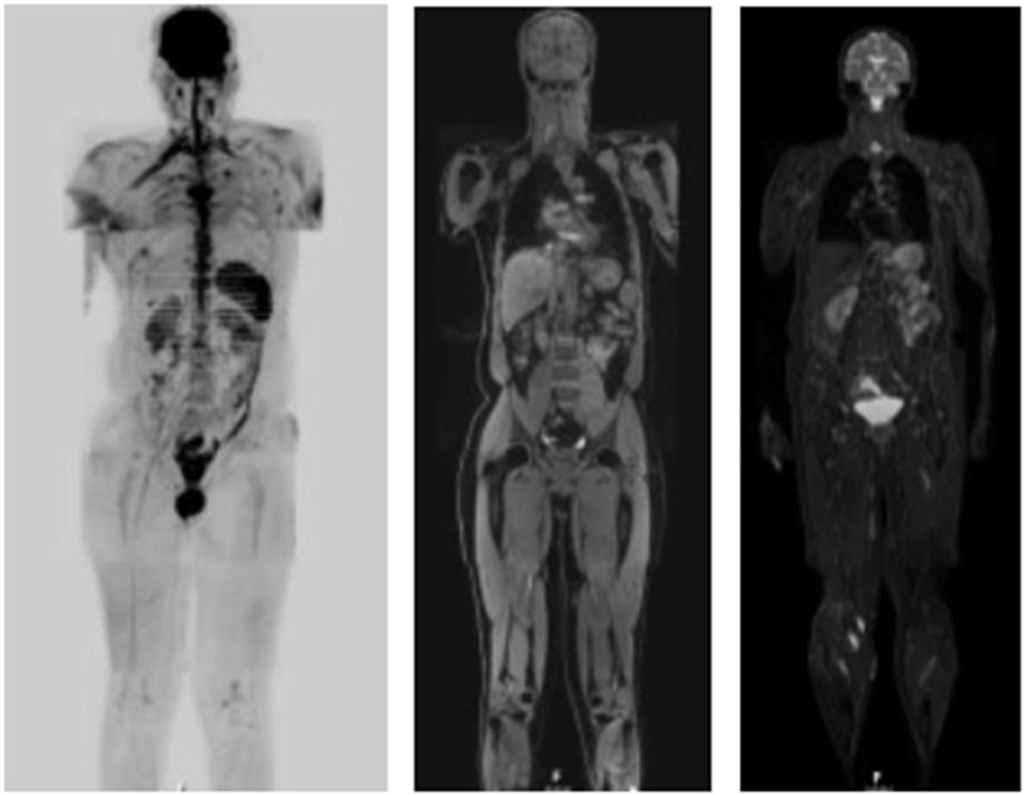






On-going projects including …

- Obesity (interventional study,)
- 2 x ADHD (intervention, central stimulant or physical activity)
- Schizophrenia (intervention, immunotheraphy)
- Nutrition (intervention, probiotics)
- Post-covid (longitudinal, observational study)
- Aging and memory (cohort, inclusion 1965)
- Immunotheraphy of cancer (intervention)



Concluding remarks

- Advantegous having CEBIO integrated with the hospital
- Lots of data – secure capabilities for processing and analysis
- Experienced staff (research nurses) perform examinations together with researchers
- Plan for incidential findings
- Not all MR research at CEBIO (e.g. cardiac MRI)
- Researchers need support in image processing and analysis
- MRI not harmful (but don't forget MRI safety)
- Course "Manner at scanner"

Thank you for the attention!