The OpenNeuroPET project: enabling FAIR data sharing for Positron Emission Tomography

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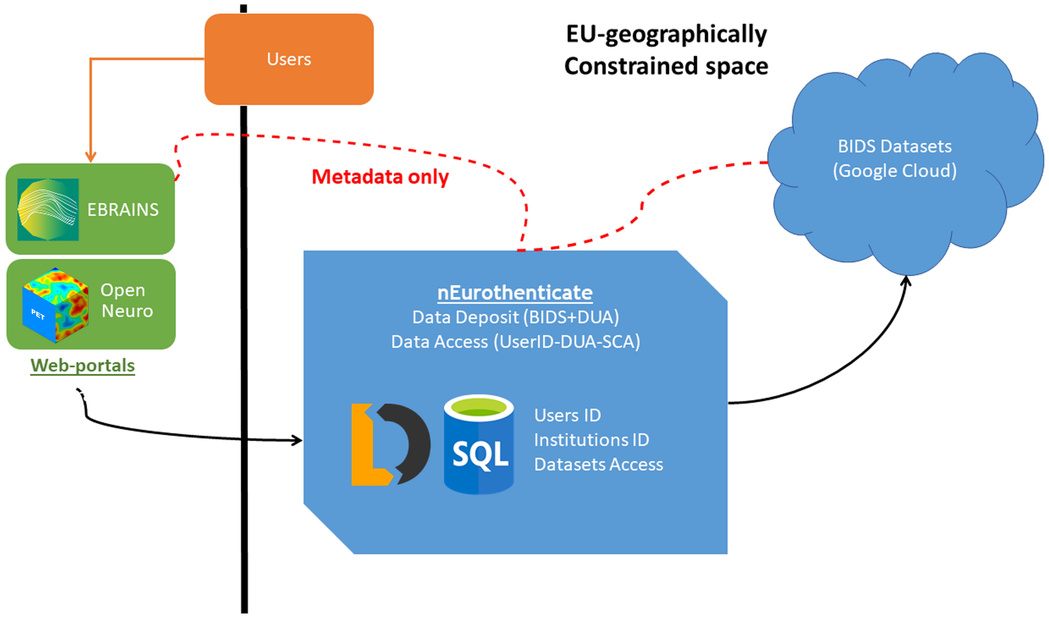
novo nordisk fonden

NIH National Institutes of Health

Goals

(1) share and promote sharing of positron emission tomography (PET) brain imaging data either openly on OpenNeuro or securely (following General Data Protection Regulation (GDPR) rules) by developing a new informatic platform: nEUrothenticate
(2) encourage the use of the Brain Imaging Data Structure (BIDS) [1] by developing a new user friendly tools to curate datasets.
(3) develop pipelines for automated quality control (QC) and for molecular imaging template building.

FAIR neuroPET data



Findable while EU data are stored securely, metadata schemas are publicly available, with dedicated pages on OpenNeuro similar to open data

Accessible users will be able to register to be fully identified - each datasets comes with rules (DUA, SCC, etc) than can be signed by users - giving access token to EU data,

Interoperable
Reusable As an OpenNeuro EU data gateway, all data must comply with the Brain Imaging Data Structure ensuring usability, thanks to the specifiction and rich metadata.

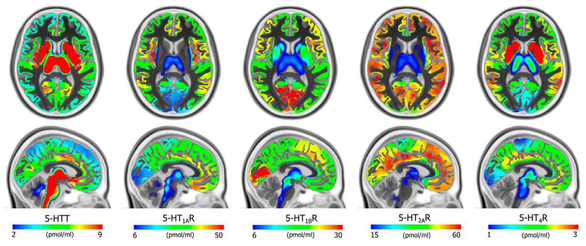
PET data curation

Unlike MRI or MEEG, there is a sparsity of metadata available in PET data headers. We created ecat (HRRT scanner) and DICOM converters and other tools to help users add additional metadata to produce BIDS compliant datasets More tools to convert e.g. semi-structured spreadsheets of blood samples, are being developped to help users.

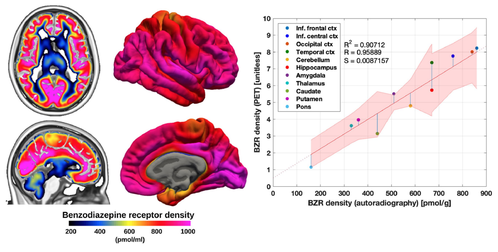
```
OldNotBidsPETDataSet/
├── MR_image
│   ├── 24310.cropped.hdr
│   ├── 24310.cropped.img
│   └── 24310_rois.mat
├── retest_scan_sub01
│   ├── sub01_8__PLASMA.txt
│   └── sub01_8_anon.v
└── test_scan_sub01
    ├── sub01_7_PLASMA.txt
    └── sub01_7_anon.v
```

```
machine:NewBidsDataSet user$ tree
.
├── README
├── dataset_description.json
├── participants.json
├── participants.tsv
└── sub-01
    ├── ses-retestscan
    │   └── pet
    │       ├── sub-01_ses-retestscan_pet.json
    │       ├── sub-01_ses-retestscan_recording-Manual_blood.json
    │       ├── sub-01_ses-retestscan_recording-Manual_blood.tsv
```

Atlasing



[5][6]



[7]

References

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[4] Wilkinson, M. et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018.
[5] Beliveau, V. et al. (2017). A high-resolution in vivo atlas of the human brain's serotonin system. J Neurosci. 37, 120 - 128.
[6] Beliveau, V. et al. (2020). The Structure of the Serotonin System: a PET Imaging Study. NeuroImage, 205, 116240.
[7] Nørgaard, et al. (2021). A high-resolution in vivo atlas of the human brain's benzodiazepine binding site of GABAA receptors. NeuroImage, 232, 117878.