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EBRAINS data curation services

A demonstration of the curation process

EBRAINS workshop - Madrid - Ulrike Schlegel - 12.11.2019



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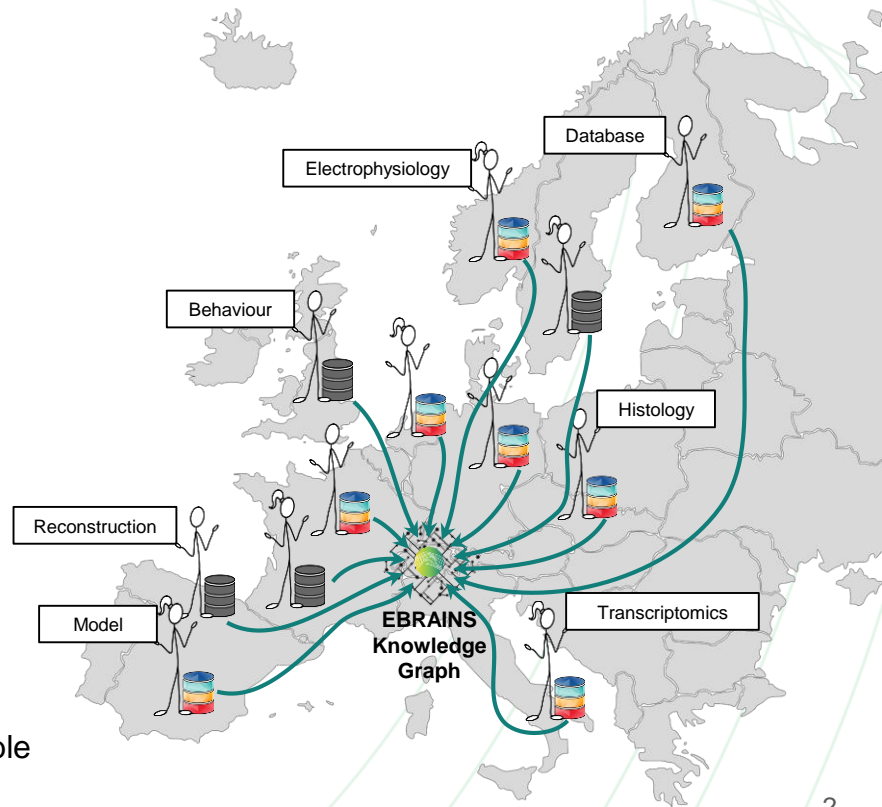
Why do we need neuroscience data curation in the HBP?

- data providers from all over Europe with local repositories
- EBRAINS Knowledge Graph - data sharing platform developed by the KG team at EPFL (Switzerland)

How is the data integrate to the Knowledge Graph?


Solution: **EBRAINS data curation service** aiming to make data FAIR*

*Findable, Accessible, Interoperable and Reusable



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How a curated dataset looks like and where to find it



 DATASET

Distribution of muscarinic acetylcholine receptors (type 2) in adult male C57BL/6 mice (coronal sections)

Description:
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DOI for these data: [DOI: 10.25493/MKHD-XB.J](https://doi.org/10.25493/MKHD-XB.J)

Contributors: [Ulrike Schlegel](#); [Martha Hvioslef-Eide](#); [Kristian Lensjø](#); [Marianne Fyhn](#)

Data download:  [download all related data as ZIP](#) 


License: [Creative Commons Attribution 4.0 International](#)

Viewer:  [Show subject G06 in brain atlas viewer](#)

Custodians:  [Schlegel, Ulrike](#)


Brain atlas:
Allen Mouse Common Coordinate Framework v3 2017

Brain region:


-  [Brain stem](#)
-  [Cerebrum](#)




Preparation: in vivo

Methods

-  Immunohistochemistry
-  Confocal Microscopy

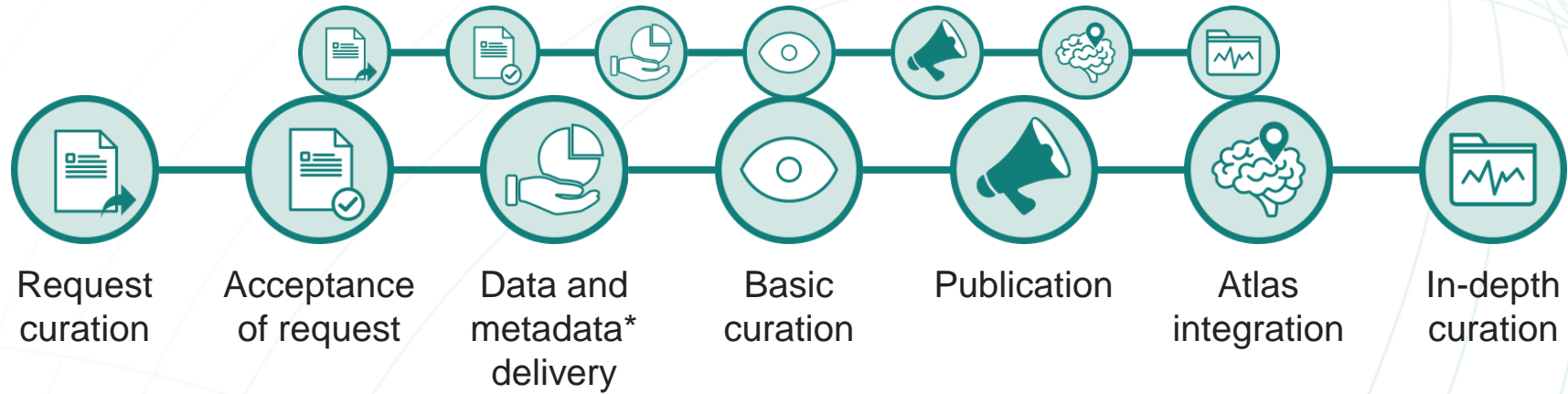
Keywords

-  Coronal Sections
-  Immunohistochemistry
-  Muscarinic Acetylcholine Receptor 2

Files (12)		Subjects (1) 	
Filename			Size
 00-ext-00007_DataDescriptor_M2-C57BLJ6mice.pdf			485 KB
 ext-000007.G06.M2_s142.tif			5 MB
 ext-000007.G06.M2_s154.tif			6 MB
 ext-000007.G06.M2_s166.tif			6 MB

EBRAINS Knowledge Graph

The curation process - Overview



The curation process - Request curation



HBP partners: contact curation team

Non-HBP scientists: fill in [request form for data sharing](#) and requests are evaluate

The screenshot displays the Zammad support system interface. On the left is a dark sidebar with navigation links like 'Dashboard' and 'Overview'. The main area shows a ticket titled 'Response to HBP Data Sharing Request' (Ticket #81107, created 26/02/2019). The ticket content includes a message from Camilla Hagen Blixhavn on behalf of The Rodent Brain Curation team @ UIO, responding to a request from Ulrike. The message discusses the receipt of a request for data sharing and suggests a meeting to discuss initiation of curation. The interface also features a right-hand sidebar with fields for 'OWNER', 'STATE' (set to 'closed'), 'PRIORITY' (set to '1 low'), 'TAGS' (including 'HLST' and 'extended curation'), 'LINKS', and 'ACCOUNTED TIME' (4.36). At the bottom right, there are buttons for 'Stay on tab' and 'Update'.

Zammad - support system



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The curation process - Basic curation



Data providers tasks

Complete [ethics survey](#)

Structure the data in an understandable and consistent way

Write a [data descriptor](#) (summary, methods, data registry, etc.)

Fill in the [online form for metadata collection](#)

Choose a license

Upload data to HBP long-term repository (CSCS)



Curators tasks

The Ethics Compliance team (SP12) informs us about the approval

Validate the organisation and structure of data

Validation of completeness and integration of information to the KG

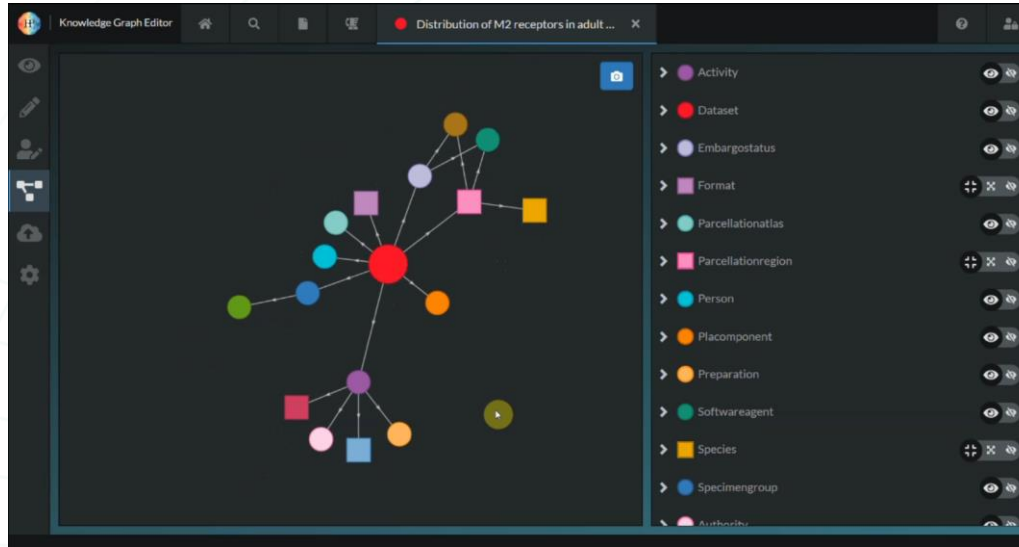
Validation of completeness and integration of information to the KG

Clearly communicate the chosen licence to data users

Validation of completeness and upload of [licence](#) and [metadata file](#)

Long-term maintenance and support throughout entire process

The curation process - Basic curation



The Knowledge Graph Editor

= The metadata management system we use to integrate and release datasets to the EBRAINS Knowledge Graph.



The curation process - Publication



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Custodians: [Schlegel, Ulrike](#)

Brain atlas:
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Brain region:
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• [Cerebrum](#)

Preparation: In vivo

Methods:
• Immunohistochemistry
• Confocal Microscopy

Keywords:
• Coronal Sections
• Immunohistochemistry

DOI for these data: [Schlegel, U., Hvoslef-Eide, M., Lensjø, K., & Fyhn, M. \(2019\). Distribution of muscarinic acetylcholine receptors \(type 2\) in adult male C57Bl/6 mice \(coronal sections\) \[Data set\]. Human Brain Project Neuroinformatics Platform. DOI: 10.25493/MKHD-XBJ](#)

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Data download: [Download all related data as ZIP](#) [Terms of use](#)

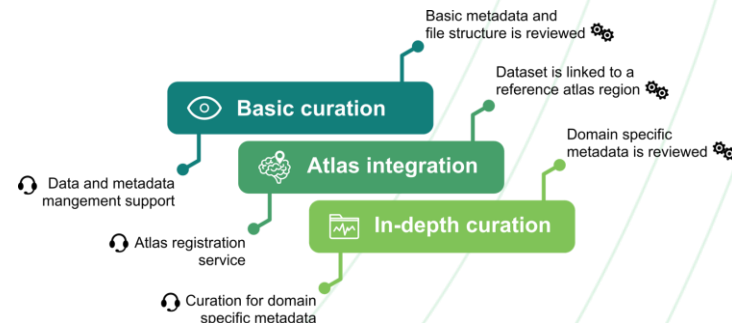
License: [Creative Commons](#)

Viewer: [Show subject](#)

Filename

00-ext-00007.DataDescriptor.M2-C57Bl6mice.pdf Terms of use	485 KB
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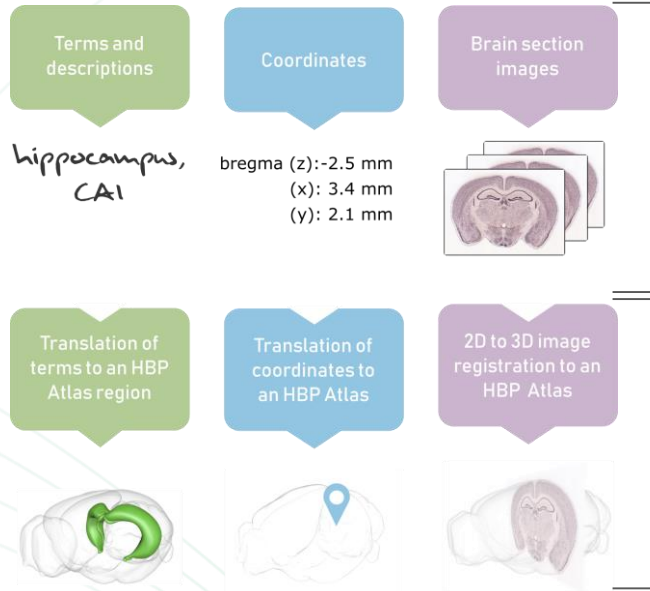
- ✓ Dataset is public, data can be under embargo
- ✓ citeable DOI
- ✓ Dataset underwent basic curation



The curation process - Atlas integration



Goal: Representing all shared data in the same reference atlas space



Data providers location documentation

Atlas integration by curators

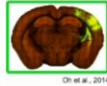


The curation process - Atlas integration

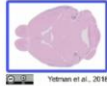


Mapping several datasets to a common atlas framework enables new opportunities

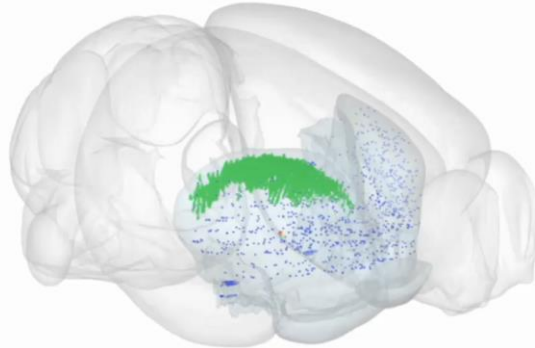
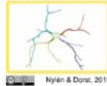
Axonal tracing



Immunohistochemistry



Neuronal reconstruction



**Covisualisation
of data in a 3D
interactive
reference brain
atlas**



The curation process - Atlas integration



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Contributors: Ulrike Schlegel; Martha Hvoslef-Eide; Kristian Lensje; Marianne Fyhn

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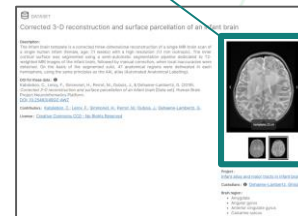
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ext_000007_G06_M2_s166.tif Terms of use	6 MB

Subjects (1)

View the data in the [Film Strip Viewer](#) with or without an atlas overlay

View the brain region in the [Brain Atlas Viewer](#)

[Preview](#) data files



The curation process - In-depth curation



The Neural Activity Resource Browser

= system to browse and visualise neural activity data that underwent in-depth curation (e.g. electrophysiology or two-photon imaging data)

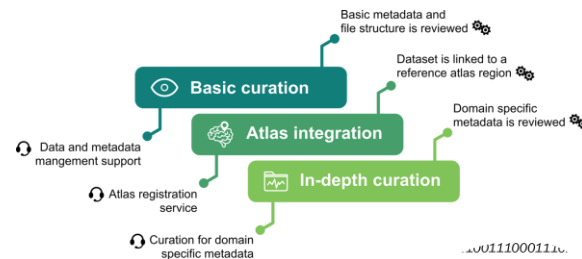


Summary

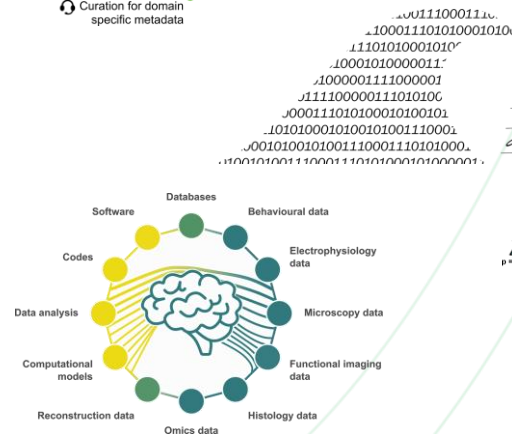


EBRAINS data curation service...

- ✓ ...is structured in three stages performed by qualified curators with neuroscientific background
- ✓ ...ensures high quality of metadata and use of a “common language” to increase the findability of data
- ✓ ...is essential to make data adhere better to FAIR guidelines
- ✓ ...addresses reproducibility and transparency challenges
- ✓ ...brings heterogeneous neuroscience data to its common denominator - the brain



Findable
Accessible
Interoperable
Reusable



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Meet us in Heidelberg!

How to increase the FAIRness of your Research - an HBP training course about data sharing

26th of November 2019 | Heidelberg, Germany



<https://www.humanbrainproject.eu/en/education/participatecollaborate/infrastructure-events-trainings/>

Registration deadline: 18th of November 2019



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Thank you for your attention!

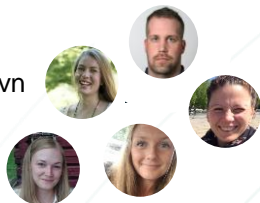
curation-support@ebrains.eu



Curation team members

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Camilla Hagen Blixhavn
Ida Aasebø
Ulrike Schlegel
Ingrid Reiten



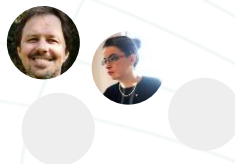
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Stefan Köhnen



CNRS, France

Andrew Davison
Elodie Legouée
Yann Zerlaut
Glynis Mattheisen



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Timo Dickscheid (FZ Jülich, Germany)

Other contributors



Storage and computing



The Data Curation Team



@HBPNeuroinf



Co-funded by the
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Extra Slides

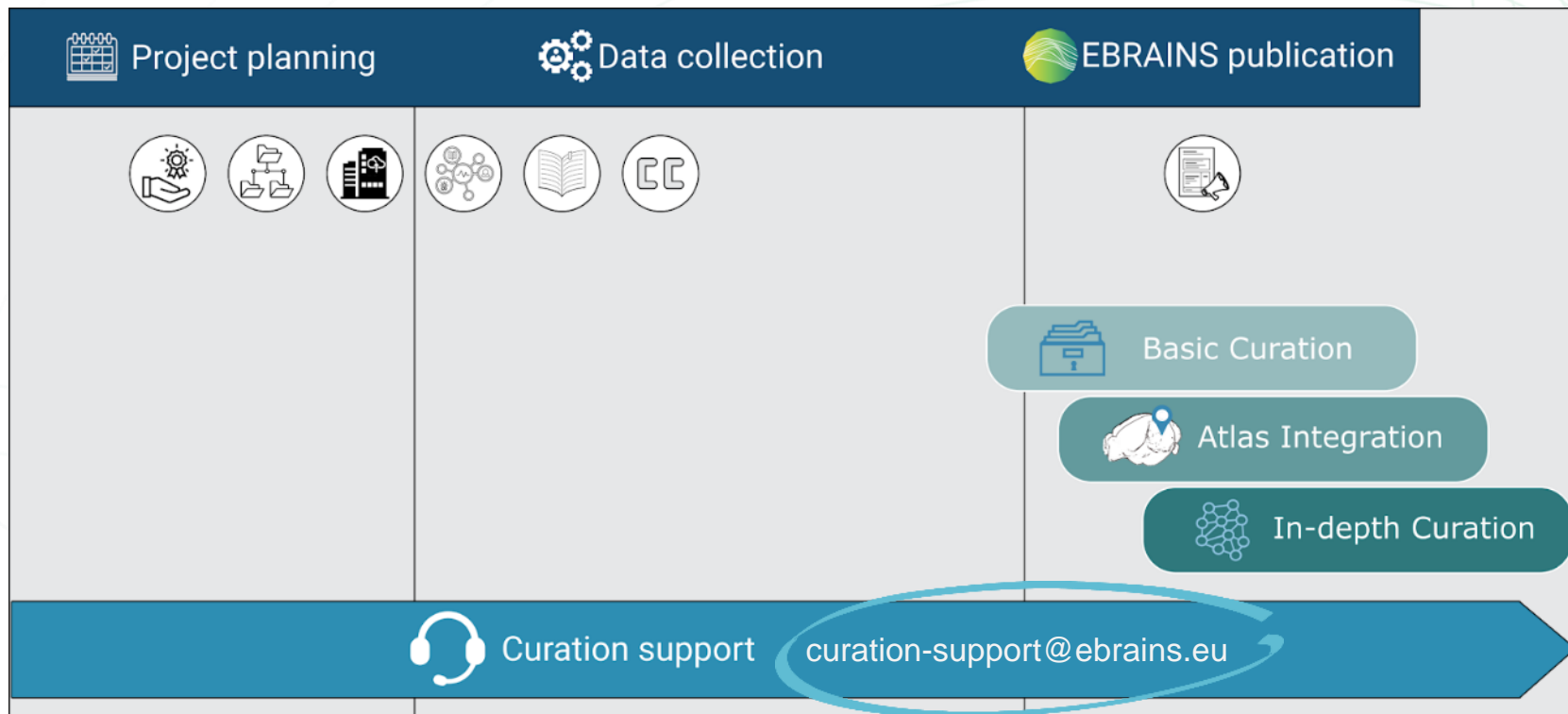


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Curation process - overview



FAIR guidelines

FAIR Principles

Make your data:

- **F**indable
- **A**ccessible
- **I**nteroperable
- **R**eusable

Findable

- Descriptive metadata
- Persistent identifiers

Accessible

- Determining what to share
- Participant consent and risk management
- Access status

Interoperable

- XML standards
- Data Documentation Initiative
- CDISC

Reusable

- Rights and licence models
- Permitted and non-permitted use

<http://datafairport.org/>



SCIENTIFIC DATA

Amended: Addendum

OPEN

SUBJECT CATEGORIES

- » Research data
- » Publication characteristics

Comment: The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson et al.⁹



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MINDS

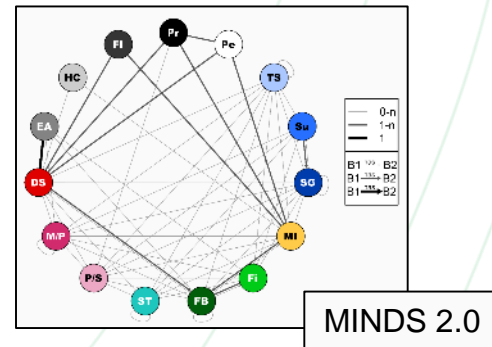
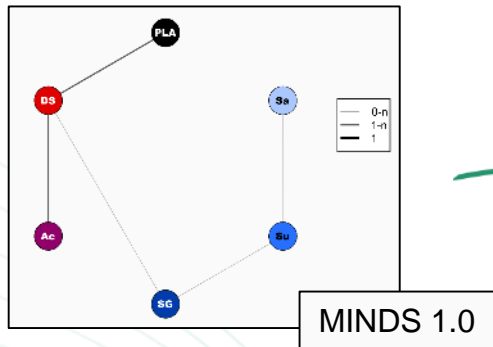


Standardizing basic metadata:

MINDS

Minimal
Information
for
Neuroscience
Data Sets

- **metadata standard** seeking to describe the whole span of neuroscience
- Need to be **flexible** enough to capture experiment-specific aspects, yet **strict** enough to guarantee comparability across experimental data



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Benefits of data sharing

BENEFITS of sharing your data via the **EBRAINS** platform



Receive
**DATA MANAGEMENT
SUPPORT**



Store your data in a
**LONG-TERM
REPOSITORY**



Get a citeable DOI
and ensure
PROPER CREDIT



Enable data
REUSE



Foster new
COLLABORATIONS



Get new
**FUNDING
OPPORTUNITIES**

EDITORIAL

**nature
neuroscience**

Got data?

Data sharing is not only good citizenship for researchers, but is also required by funding agencies and many journals. The scientific community needs to develop better incentives to encourage compliance and reward those who share.



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The needs and concerns of neuroscientists

Data/model providers

FAIR* data services

Data/model consumers

Data curation



Basic
Curation



Atlas
Integration



In-depth
Curation

Increased impact and visibility of own research

Organising data in a presentable and useful way

Concerns about misuse of my data

Unsure about copyright and licensing

Not receiving appropriate credit or acknowledgment

To deposit data with confidence in reliable repositories

Possibilities to find and access shared data

Validate own findings

Complement existing data you have collected

Avoid duplication of effort

Foster collaboration

Access to stored data

Needs and concerns

Needs and concerns

The combination of all **FAIR data services** that **EBRAINS** has to offer, covers the needs and concerns about data sharing of both data providers and consumers.



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References:

- [1] Research, Nature (2018): *State of Open Data 2018*. (<https://doi.org/10.6084/m9.figshare.7234985.v1>)
- [2] Wouter Los (High Level Expert on Scientific Data, 2010): *Riding the wave - How Europe can gain from the rising tide of scientific data*. (Final report of European Commission)

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