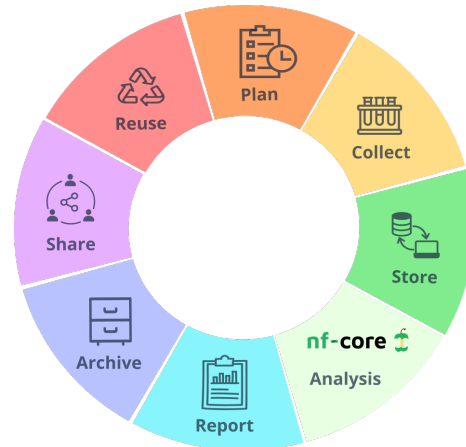




FAIR-Datenmanagement in Biobanken: Mehrwert und Anwendungsszenarien

Steffen Greiner



Barletta Solari, F., & Pawar, S. (2025).
Research Data Management Life Cycle.
Zenodo.
<https://doi.org/10.5281/zenodo.15016612>

13. Nationales Biobanken-Symposium 2025

Berlin, 22.09.2025 - 23.09.2025



<https://doi.org/10.5281/zenodo.17160126>



Wofür steht FAIR

Auffindbarkeit (*Findable*):

Globale Persistente Identifier (PID)
Metadaten Verlinkung und Indexierung

Zugänglichkeit (*Accessible*):

Standardisierte Kommunikationsprotokolle zum Datenabruf,
Authentifizierung und Rechtemanagement.

Interoperabilität (*Interoperable*):

Standardisierte zugängliche Sprache
Maschinenlesbarkeit

Wiederverwendbarkeit (*Re-usable*):

Eindeutige Lizenz zur Datennutzung
Provenance
Erfüllung domänenspezifischer Standards



Findable



Accessible



Interoperable



Reusable

Definition of FAIR data, National Library of Medicine
<https://www.nlm.nih.gov/>



Wofür steht FAIR nicht?

- FAIR $\neq$ Standard
- FAIR $\neq$ Schema Dogmatismus
- FAIR $\neq$ Human-Readable
- FAIR $\neq$ Open Data
- FAIR $\neq$ Domänen spezifisch



FAIR - Vorteile

- **Findable**

Domänen- und Regionsübergreifende Forschung

- **Accessible**

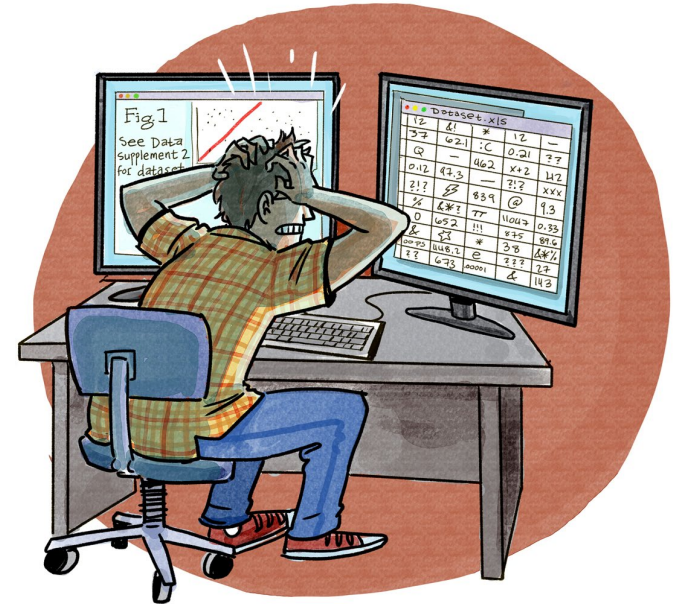
Klare Zugriffsanforderungen und Lizenzen

- **Interoperable**

Einheitliche Datenauswertung statt “Data Wrangling”

- **Reusable**

Neue Erkenntnisse statt Datenredundanz



Roche DG, Kruuk LEB, Lanfear R, Binning SA (2015)
Public Data Archiving in Ecology and Evolution: How
Well Are We Doing?. PLOS Biology 13(11): e1002295.,
Figure 1 <https://doi.org/10.1371/journal.pbio.1002295>



Kosten nicht FAIRer Daten

- **10.2 Milliarden Kosten**

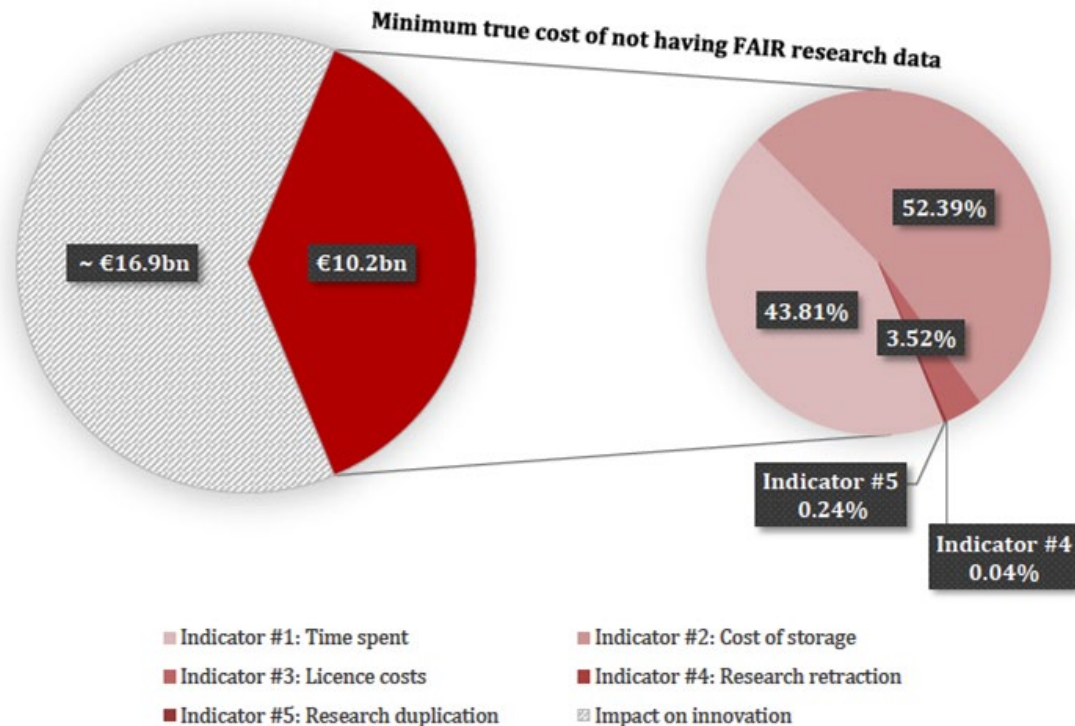
Zeitverlust → ~ 4.45 Mrd €

Redundante Speicherung → ~ 5.33Mrd €

- **Hohe Dunkelziffer:**

Domänenübergreifender Austausch

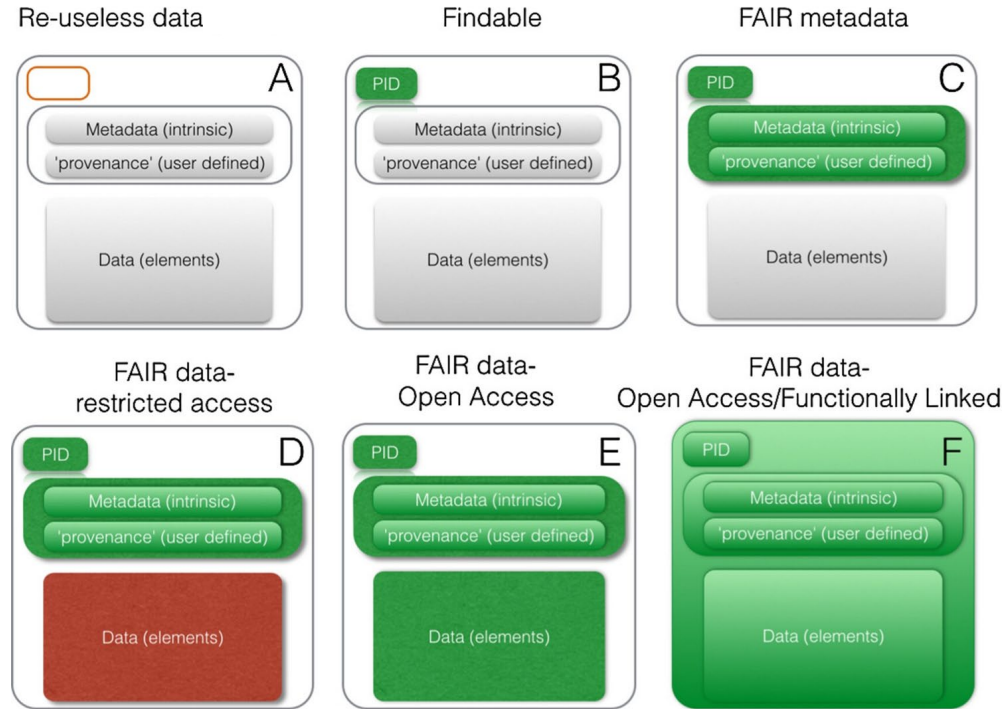
Wirtschaftliches Potenzial



Europäische Kommission, Generaldirektion Forschung und Innovation und PwC EU Services, Cost-benefit analysis for FAIR research data : cost of not having FAIR research data, Publications Office, 2018, <https://data.europa.eu/doi/10.2777/02999>. Figure 5: Cost breakdown.



FAIR Spektrum



Adapted from Mons B, Neylon C, Velterop J, Dumontier M, da Silva Santos LOB, Wilkinson MD. Cloudy, increasingly FAIR; revisiting the FAIR Data guiding principles for the European Open Science Cloud. Information Services and Use. 2017;37(1):49-56. doi:10.3233/ISU-170824. Figure 1.

Daten FAIR-ifizierung

- Domänenspezifische Standards, Richtlinien und Datenbanken:



Kurierte Ressource zum Auffinden von Policies,
Organisationen, Datenbanken,
Daten und Metadaten Standards

- 28 Einträge zum Thema Biobanking (19:12, 20.09.2025)

z.B. **MIABIS**, **ISO 20387:2018** etc.



GENERAL INFORMATION

This record replaces or incorporates the following deprecated resources:

[Minimum Information About Biobank data Sharing CORE 2.0](#)

[MIABIS Individual-Level Component 1.0](#)



Type

Registry

Description

Homepage

Year of Creation

Maintainers

Countries developing this resource

Object types in scope for this resource

Subjects

Domains

Taxonomic Range

User Defined Tags

[VIEW RELATION GRAPH](#)

Minimum Information About Biobank data Sharing CORE 3.0 (MIABIS CORE 3.0)

[DOI: 10.25504/FAIRsharing.296020](#)

Reporting guideline

Standard

MIABIS Core 3.0 represents the minimum information required to initiate collaborations between biobanks and to enable the exchange of biological samples and data. The aim is to facilitate the reuse of bio-resources and associated data by harmonizing biobanking and biomedical research. The attributes are defined in accordance with epidemiological literature and terminology. Compared to version 2.0 (which can still be used in historical applications), it removes Study component and replaces it with Research Project, enables providing detailed decomposition of aggregate statistics using star-schema.

<https://github.com/BBMRI-ERIC/miabis>

2023

hopet@ics.muni.cz

None found

N/A

Life Science

Biobank

All

N/A



FAIRsharing.org: MIABIS CORE 3.0; Minimum Information About Biobank data Sharing CORE 3.0,
DOI: [10.25504/FAIRsharing.296020](#), **Last Edited:** Tuesday, March 25th 2025, 14:15, **Last Editor:** delphinedauga,
Last Accessed: Saturday, September 20th 2025, 19:05, **Last Reviewed:** Tuesday, March 25th 2025, 14:15



miabis Public

Watch 7 Fork 11 Star 24

master 7 Branches 0 Tags

Go to file Add file Code

CeceliaEngels Merge pull request #92 from BBMIRI-ERIC/repairERDink 0aff785 · last month 648 Commits

- .github chore: update ci 7 months ago
- vitepress fix: broken navigation links 4 months ago
- BiobankServices Update README.md last year
- Core Update Database-implementation.md 7 months ago
- DatasetTypes Update README.md last year
- DigitalPathology Update README.md 5 months ago
- Sample+Donor+Event Merge pull request #78 from BBMIRI-ERIC/CeceliaEngels-p... 5 months ago
- drafts Merge pull request #89 from BBMIRI-ERIC/CeceliaEngels-... last month
- mappings Update and rename Mapping-SampleTypeV1.1.md to Sam... 5 months ago
- public feat: setup vitepress framework 7 months ago
- .gitignore feat: add CI 7 months ago
- Makefile feat: add CI 7 months ago
- README.md Update README.md last month
- all attributes.md Update all attributes.md 11 months ago
- all lists.md Update all lists.md 7 months ago
- all structured data.md Update all structured data.md 9 months ago
- index.md fix: broken navigation links 4 months ago
- package-lock.json feat: setup vitepress framework 7 months ago
- package.json feat: setup vitepress framework 7 months ago

MIABIS: Minimum Information About Biobank data Sharing

The Minimum Information About Biobank data Sharing (MIABIS) is a biobank-specific terminology enabling the sharing of minimal biobank-related data for different purposes across a wide range of database implementations.

miabis.bbmri-eric.eu

biobank biobanking biobank-data biosample data-sharing-standard

Readme Activity Custom properties 24 stars 7 watching 11 forks Report repository

Contributors 17

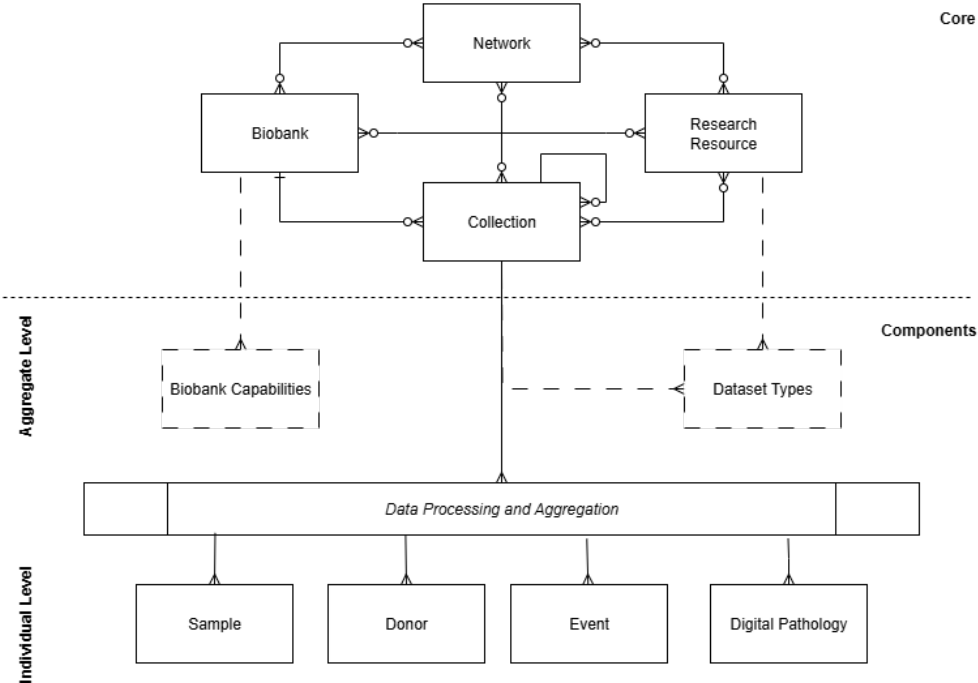
Deployments 40

github-pages last month + 39 deployments

Languages

- TypeScript 92.6%
- CSS 2.6%
- Makefile 2.5%
- JavaScript 2.3%

<https://github.com/BBMRI-ERIC/miabis>, accessed 20.09.2025



<https://github.com/BBMRI-ERIC/miabis/blob/master/drafts/assets/2025%20ERD%20MIABIS%20general.png>, accessed 20.09.2025



Daten FAIR-ifizierung

- Vergleich der (Meta)-daten

RDA Indikatoren



- Best Practices Beispiele zum FHIR Datenstandard:

FHIR for FAIR
MIABIS for FHIR



Ziel: FAIR Konformität (Meta)-Daten

10.3 FAIR Data Maturity Indicators and priority

	PRINCIPLE	INDICATOR_ID	FAIR DATA MATURITY INDICATOR	PRIORITY
F	F1	RDA-F1-01M	Metadata is identified by a persistent identifier	Essential
	F1	RDA-F1-01D	Data is identified by a persistent identifier	Essential
	F1	RDA-F1-02M	Metadata is identified by a globally unique identifier	Essential
	F1	RDA-F1-02D	Data is identified by a globally unique identifier	Essential
	F2	RDA-F2-01M	Rich metadata is provided to allow discovery	Essential
	F3	RDA-F3-01M	Metadata includes the identifier for the data	Essential
	F4	RDA-F4-01M	Metadata is offered in such a way that it can be harvested and indexed	Essential
	A1	RDA-A1-01M	Metadata contains information to enable the user to get access to the data	Important
	A1	RDA-A1-02M	Metadata can be accessed manually (i.e. with human intervention)	Essential
	A1	RDA-A1-02D	Data can be accessed manually (i.e. with human intervention)	Essential
A	A1	RDA-A1-03M	Metadata identifier resolves to a metadata record	Essential
	A1	RDA-A1-03D	Data identifier resolves to a digital object	Essential
	A1	RDA-A1-04M	Metadata is accessed through standardised protocol	Essential
	A1	RDA-A1-04D	Data is accessible through standardised protocol	Essential
	A1	RDA-A1-05D	Data can be accessed automatically (i.e. by a computer program)	Important
	A1.1	RDA-A1.1-01M	Metadata is accessible through a free access protocol	Essential
	A1.1	RDA-A1.1-01D	Data is accessible through a free access protocol	Important
	A1.2	RDA-A1.2-01D	Data is accessible through an access protocol that supports authentication and authorisation	Useful
	A2	RDA-A2-01M	Metadata is guaranteed to remain available after data is no longer available	Essential
	I1	RDA-I1-01M	Metadata uses knowledge representation expressed in standardised format	Important
I	I1	RDA-I1-01D	Data uses knowledge representation expressed in standardised format	Important
	I1	RDA-I1-02M	Metadata uses machine-understandable knowledge representation	Important
	I1	RDA-I1-02D	Data uses machine-understandable knowledge representation	Important
	I2	RDA-I2-01M	Metadata uses FAIR-compliant vocabularies	Important
	I2	RDA-I2-01D	Data uses FAIR-compliant vocabularies	Useful
	I3	RDA-I3-01M	Metadata includes references to other metadata	Important
	I3	RDA-I3-01D	Data includes references to other data	Useful
	I3	RDA-I3-02M	Metadata includes references to other data	Useful
	I3	RDA-I3-02D	Data includes qualified references to other data	Useful
	I3	RDA-I3-03M	Metadata includes qualified references to other metadata	Important
R	I3	RDA-I3-04M	Metadata include qualified references to other data	Useful
	R1	RDA-R1-01M	Plurality of accurate and relevant attributes are provided to allow reuse	Essential
	R1.1	RDA-R1.1-01M	Metadata includes information about the licence under which the data can be reused	Essential
	R1.1	RDA-R1.1-02M	Metadata refers to a standard reuse licence	Important
	R1.1	RDA-R1.1-03M	Metadata refers to a machine-understandable reuse licence	Important
	R1.2	RDA-R1.2-01M	Metadata includes provenance information according to community-specific standards	Important
	R1.2	RDA-R1.2-02M	Metadata includes provenance information according to a cross-community language	Useful
	R1.3	RDA-R1.3-01M	Metadata complies with a community standard	Essential
	R1.3	RDA-R1.3-01D	Data complies with a community standard	Essential
	R1.3	RDA-R1.3-02M	Metadata is expressed in compliance with a machine-understandable community standard	Essential
	R1.3	RDA-R1.3-02D	Data is expressed in compliance with a machine-understandable community standard	Important

MIABIS on FHIR Implementation Guide, 1.0.0, RDA Indicators Figure 10.3

<https://build.fhir.org/ig/HL7/fhir-for-fair/RDAMetrics.html>, accessed 21.09.2025

13. Nationales Biobanken Symposium (Nr.)

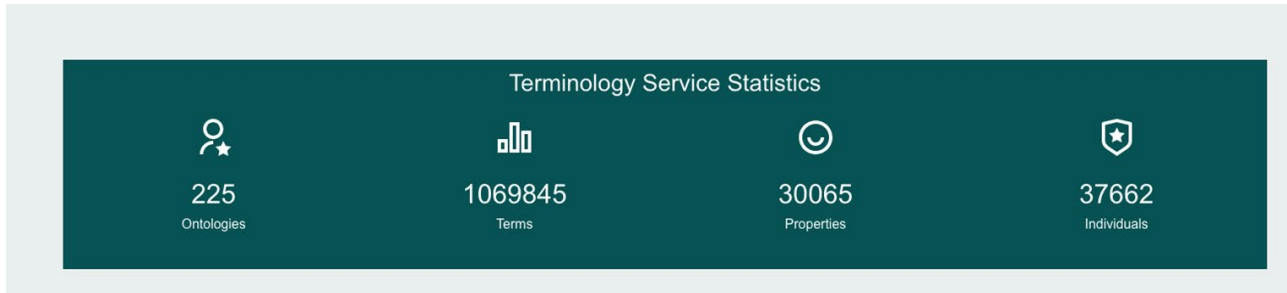


Domänenspezifisch - Ontologien

- Einheitliches Domänenspezifisches Vokabular
- Maschinlesbarkeit
- **TIB Terminology Service**

TIB

LEIBNIZ-INFORMATIONSZENTRUM
TECHNIK UND NATURWISSENSCHAFTEN
UNIVERSITÄTSBIBLIOTHEK



Terminology Service Statistics". Technische Informationsbibliothek (TIB), 2025. <https://terminology.tib.eu/ts>.



Search

☒ Exact match☐ Obsolete terms☐ Include imported terms☐ Advanced search

Filter Results

[Clear All Filters](#)

Type

☐ class2☐ entity2

Ontologies

☐ BTO1☐ UBERON1

Collections

☐ NFDI4CHEM☐ ESS☐ DataPLANT☐ NFDI4ING☐ FID BAUdigital☐ FAIR Data Spaces☐ CoyPu☐ TIB☐ FID move☐ NFDI4Energy☐ Foundational Ontologies☐ NFDI4CAT☐ FAIRmat☐ Educational Resources☐ NFDI4CULTURE

2 results found for "blood"

Language enResult Per Page 10

[class] blood BTO_000089
http://purl.obolibrary.org/obo/BTO_000089

1: The fluid that circulates in the heart, arteries, capillaries, and veins of a vertebrate animal carrying nourishment and oxygen to and bringing away waste products from all parts of the body. 2: A comparable fluid of an invertebrate.
database_cross_reference: From_Merriam-Webster's_Online_Dictionary_at_www.Merriam-Webster.com:http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=blood

Ontology: bto

[class] blood UBERON_000178
http://purl.obolibrary.org/obo/UBERON_000178

A fluid that is composed of blood plasma and erythrocytes.
database_cross_reference: FMA:9670, Wikipedia:Blood, <http://orcid.org/0000-0002-6601-2165>, <https://github.com/obophenotype/uberont/issues/9>

Ontology: uberon

Also in: ENVO ENVO2023 FLOPO OBI BAO EFO HP PATO

[Previous](#) [Next](#)

Terminology Service Search". Technische Informationsbibliothek (TIB), 2025.
<https://terminology.tib.eu/ts/search?q=blood&page=1&exact=true>, accessed 20.09.2025



The BRENDA Tissue Ontology

<http://purl.obolibrary.org/obo/bto.owl>

Overview Class Tree Property Tree Individuals Class List Notes (0) Github Panel Change Management

Ontology language: en

The BRENDA Tissue Ontology

A structured controlled vocabulary for the source of an enzyme. It comprises terms for tissues, cell lines, cell types and cell cultures from uni- and multicellular organisms.

Version	
VersionIRI	http://purl.obolibrary.org/obo/bto/releases/2021-10-26/bto.owl
IRI	http://purl.obolibrary.org/obo/bto.owl
HomePage	http://www.brenda-enzymes.org
Issue tracker	https://github.com/BRENDA-Enzymes/BTO/issues
License	CC-BY
Creator	BRENDA-Enzymes team
Imports	prov iao uo ro
Collections	- NFDI4CHEM - DataPLANT
Subject	Life Sciences, biology, Medicine
Is Skos	false

Additional information from Ontology source

http://purl.org/dc/elements/1.1/description	A structured controlled vocabulary for the source of an enzyme comprising tissues, cell lines, cell types and cell cultures.		
http://purl.org/dc/elements/1.1/title	The BRENDA Tissue Ontology (BTO)		
http://purl.org/dc/terms/license	https://creativecommons.org/licenses/by/4.0/		
http://www.geneontology.org/formats/obolnOwl#auto-generated-by	OBO-Edit 2.3.1		
http://www.geneontology.org/formats/obolnOwl#date	23:10:2021 16:56		
http://www.geneontology.org/formats/obolnOwl#default-namespace	BrendaTissueOBO		
http://www.geneontology.org/formats/obolnOwl#hasOBOFormatVersion	1.2		
http://www.geneontology.org/formats/obolnOwl#saved-by	Marion		

[- Show less](#)

Metrics

Number of Classes	6569
Number of Properties	37
Number of Individuals	0

Show Ontology Metadata as JSON

Add to Collection

Terminology Service Statistics". Technische Informationsbibliothek (TIB), 2025. <https://terminology.tib.eu/ts/>, accessed 20.09.2025



Universell - Personen & Organisationen

Domänenübergreifend:

ORCID = Open Researcher and Contributor ID 

ROR = Research Organization Registry 



ORCID Repository

- 16-stellige Zeichenkombination in URI
- PIDs und Metadaten > 2490000 Einträgen
- Creative Commons(CC) 0 Lizenz 
- REST API & Sandbox Instance

 <https://orcid.org/0000-0001-8835-2219>



Research Organisation Registry

- 7-stellige Zeichenkombination in URI
- PIDs und Metadaten > 116000 Organisationen
- Creative Commons(CC) 0 Lizenz 
- REST API

 <https://ror.org/00pjxh97>

Universitätsklinikum Tübingen

ORGANIZATION TYPES

Funder, Healthcare

OTHER NAMES

Acronyms

UKT

LOCATIONS

Tübingen (GeoNames ID 2820860), Germany

WEBSITE

<https://www.medizin.uni-tuebingen.de/en/Homepage.html>

OTHER IDENTIFIERS

GRID grid.411544.1

ISNI 0000 0001 0196 8249

Crossref Funder ID 100012940

RELATIONSHIPS

Child Organizations

Poliklinik für Zahnärztliche Prothetik mit Propädeutik

University Children's Hospital Tübingen

Universitäts Frauenklinik

Related Organizations

University of Tübingen

ERN-RND

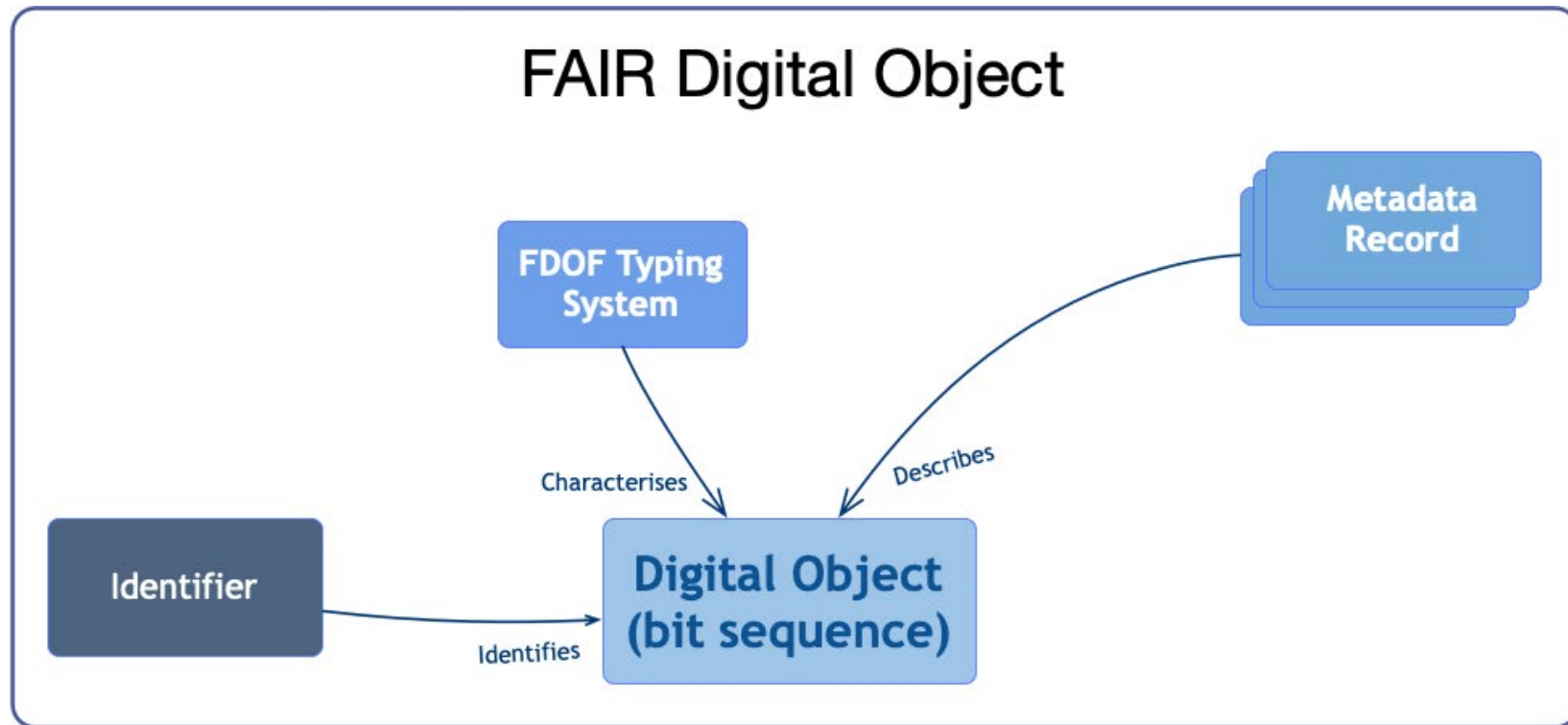
Some record data is not displayed in this view. See [JSON view for full record data](#)

Record last modified 2024-12-11. Is there an issue with the data on this record? [Suggest a change](#)

Query Result UKT Tübingen, Research Organization
Registry (RoR), 2025. <https://ror.org/>, accessed
20.09.2025



FAIR Digital Objects

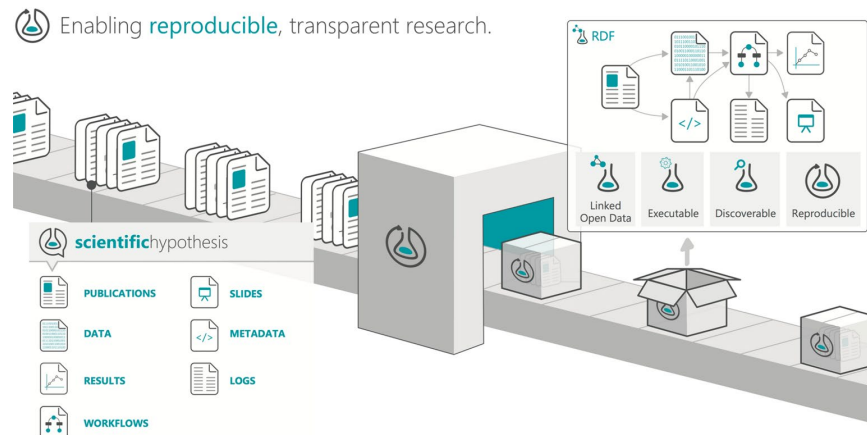




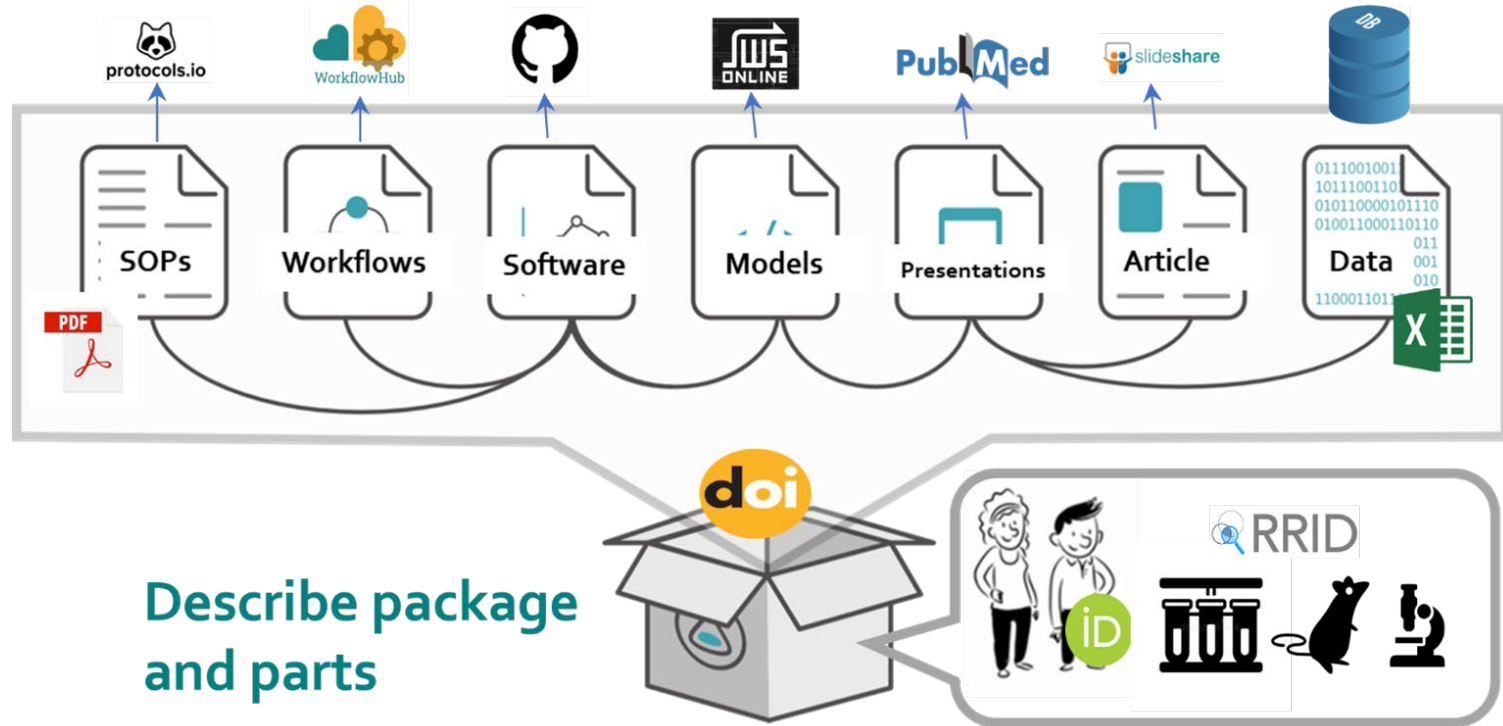
Research Object Crate



- Verknüpfung von Forschungsdaten mit:
Rohdaten und Sekundärdaten
Workflows/Skripte
Präsentationen
Laborbücher (ELN-LIMS)
...
- Basierend auf JSON-LD und Schema.org
Notation
- Ermöglichen spezifische Profile :
Workflow RO-Crate



“Enabling reproducible, transparent research.” researchobject.org.
2025. <https://www.researchobject.org/images/research-objects-illustration.png>, accessed 20.09.2025



Goble, C. (2024, Februar 16). FAIR Digital Research Objects: Metadata Journeys. University of Auckland Seminar, Auckland. Zenodo. <https://doi.org/10.5281/zenodo.10710142>, Accessed 21.09.2025



Impulse zur FAIR-ification medizinischer Datensätze

- Wiederverwendung bestehender Datensätze statt Neu Messungen

Kollaboration mit nicht akademischen Partnern → FAIR Data Space

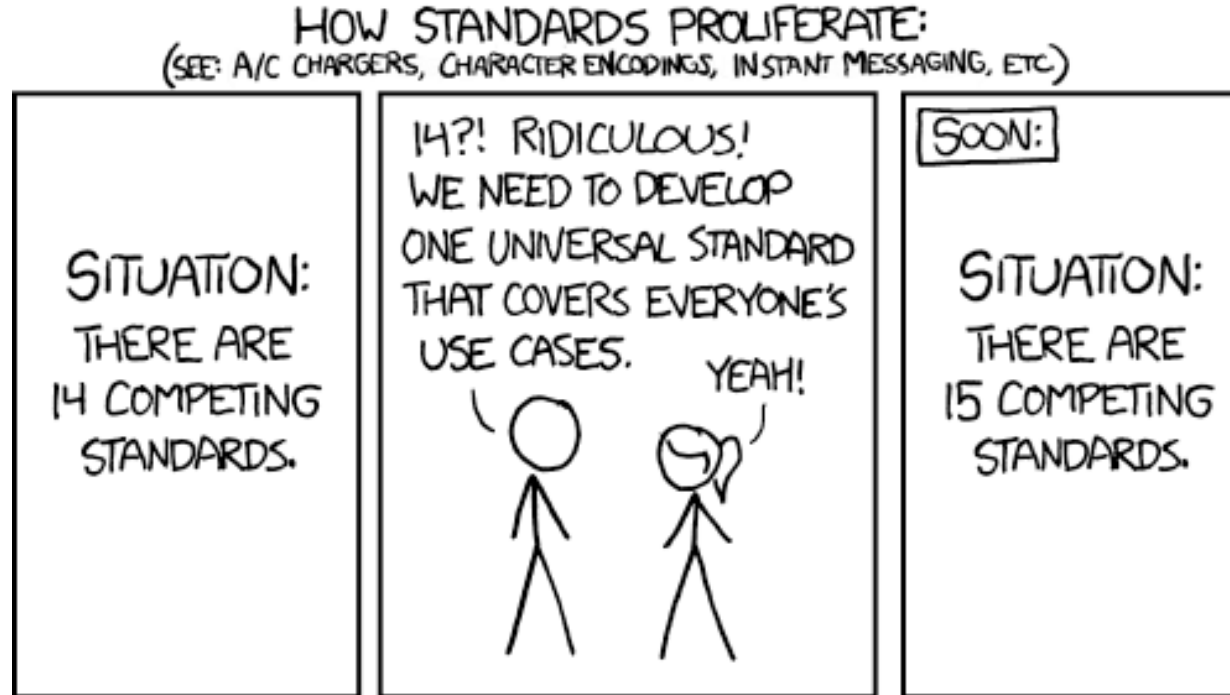
Einführung und Harmonisierung FAIR Compliant Standards → FDOs

- Gezielte Förderung von FDOs als Projektergebnis statt Publikationen

Forschungssoftware, Data Stewardship



CoARA
Coalition for Advancing
Research Assessment



Danke für eure Aufmerksamkeit!