Image Data Resource (IDR)

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ABiS-GBI course

05 July 2023

@openmicroscopy, @IDRNews

GLOBAL BIOIMAGING
growing collaboration

ABIS

EMBL-EBI

https://idr.openmicroscopy.org

The Image Data Resource (IDR): a scalable resource for FAIR biological imaging data

- **Public access**
- **Reference datasets** - complete datasets containing molecular and functional annotations, associated with an existing or upcoming publication.
- **Study integration** - integrating studies or datasets with other datasets via **genes**, **compounds** or **phenotypes**.
- **Curated metadata**
- **Cloud re-analysis**

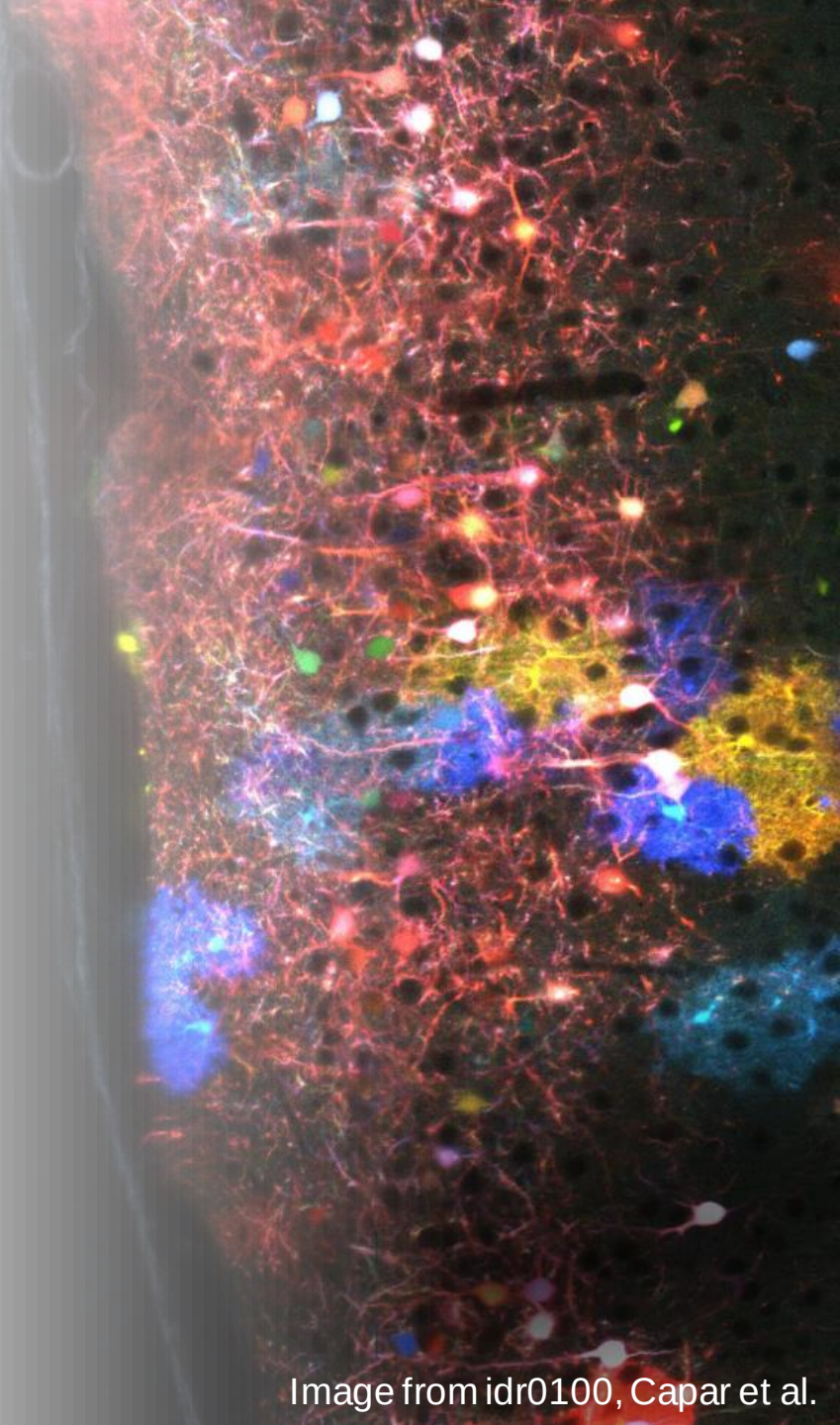
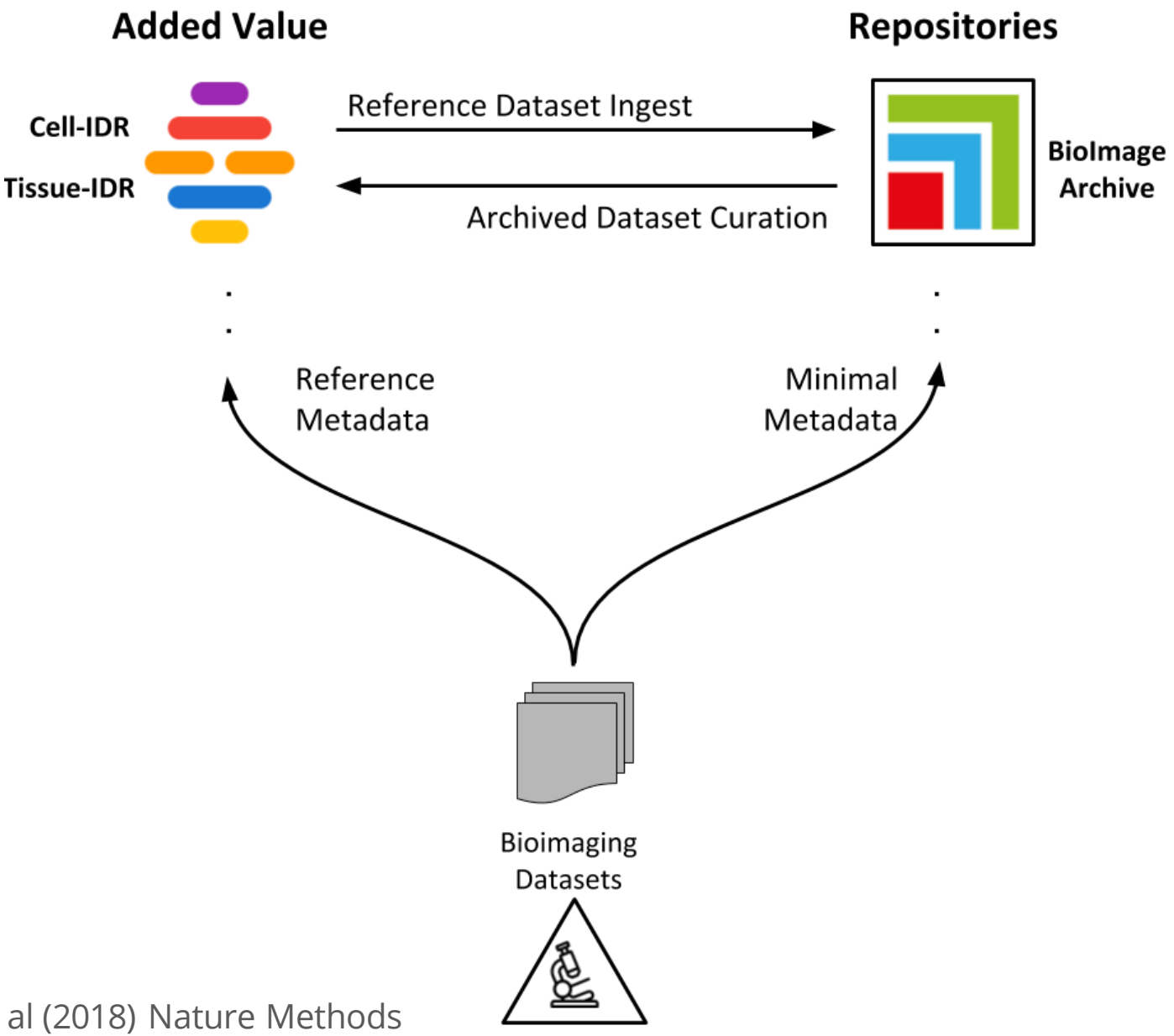


Image from idr0100, Capar et al.

Image Data Resource (IDR):

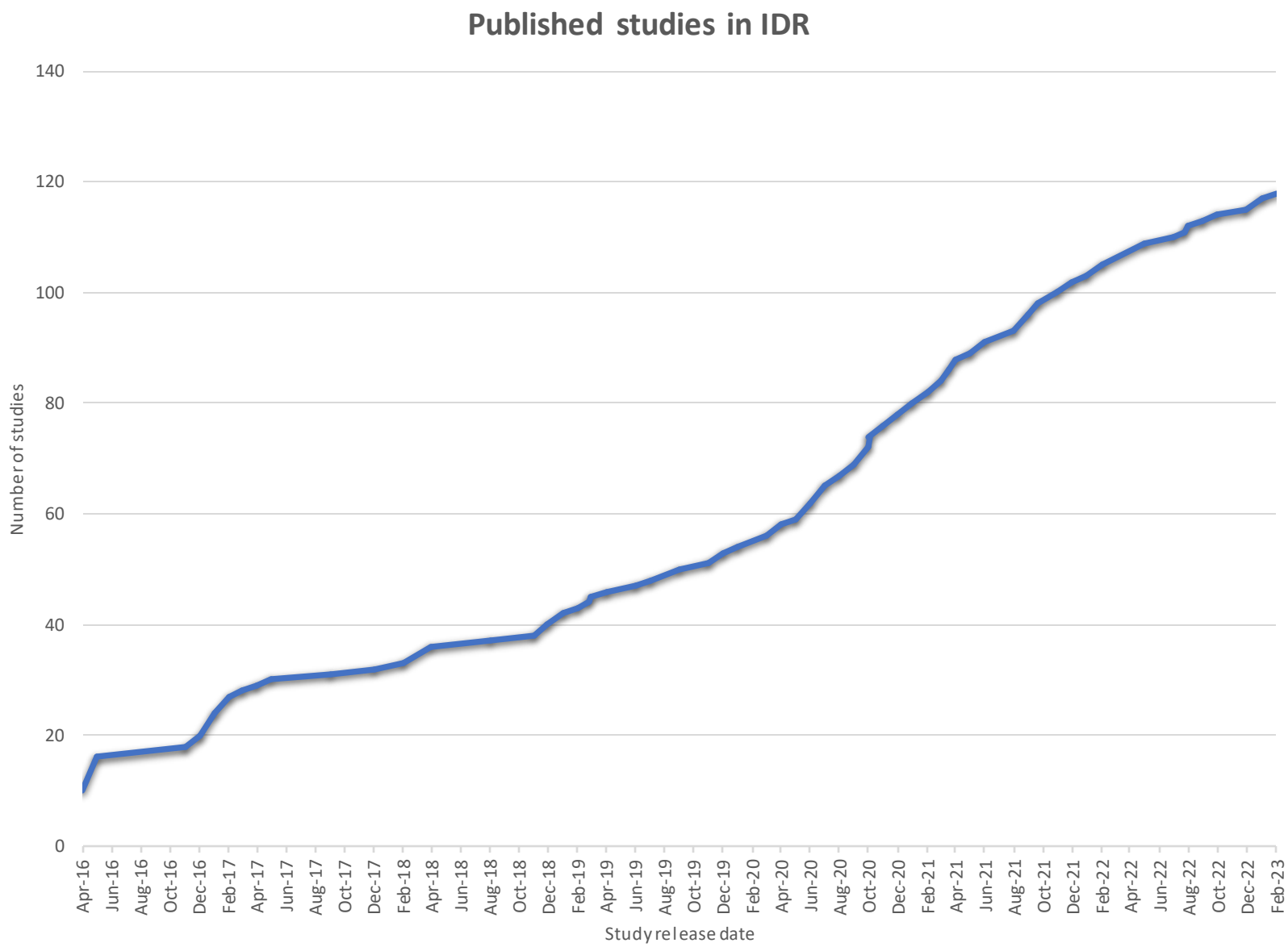
- is a public version of OMERO
- is READ-ONLY server

Building the BioImage Ecosystem



Ellenberg et al (2018) Nature Methods

IDR studies


Published studies in IDR
Number of studies
0
20
40
60
80
100
120
140
Apr-16
Jun-16
Aug-16
Oct-16
Dec-16
Feb-17
Apr-17
Jun-17
Aug-17
Oct-17
Dec-17
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Apr-21
Jun-21
Aug-21
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Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Dec-22
Feb-23
Study release date

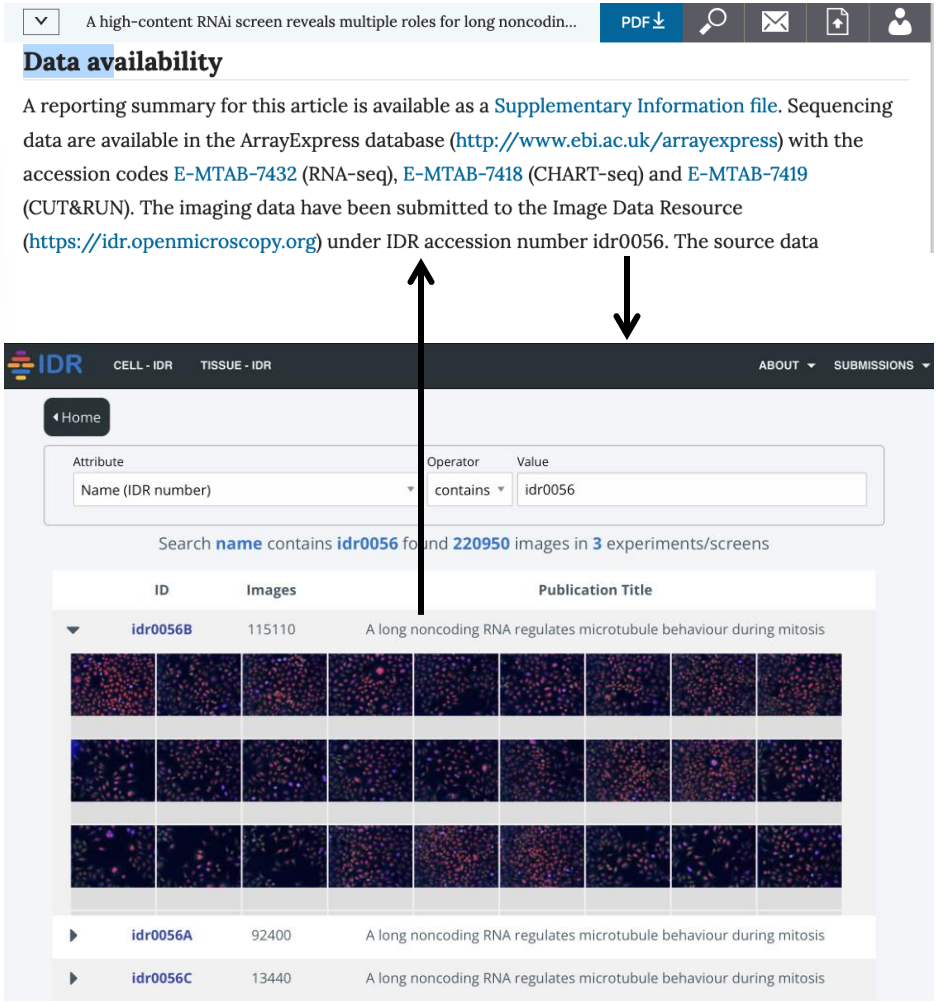
IDR metrics

June 2023	
Raw data size	361 TB
Image files	32 M
5D Images	13 M
2D Planes	112 M
Organisms	71
Genes	89 K
Antibodies	12 K
Compounds	40 K

IDR studies and publications

>115 cross-published studies

cross-referenced via accessions and DOIs



https://idr.openmicroscopy.org/about/studies.html

https://idr.openmicroscopy.org

Submitting Data to IDR

To submit data to IDR, email *idr@openmicroscopy.org*

Upload original, raw image files.

Fill in metadata templates.

Data published in IDR!

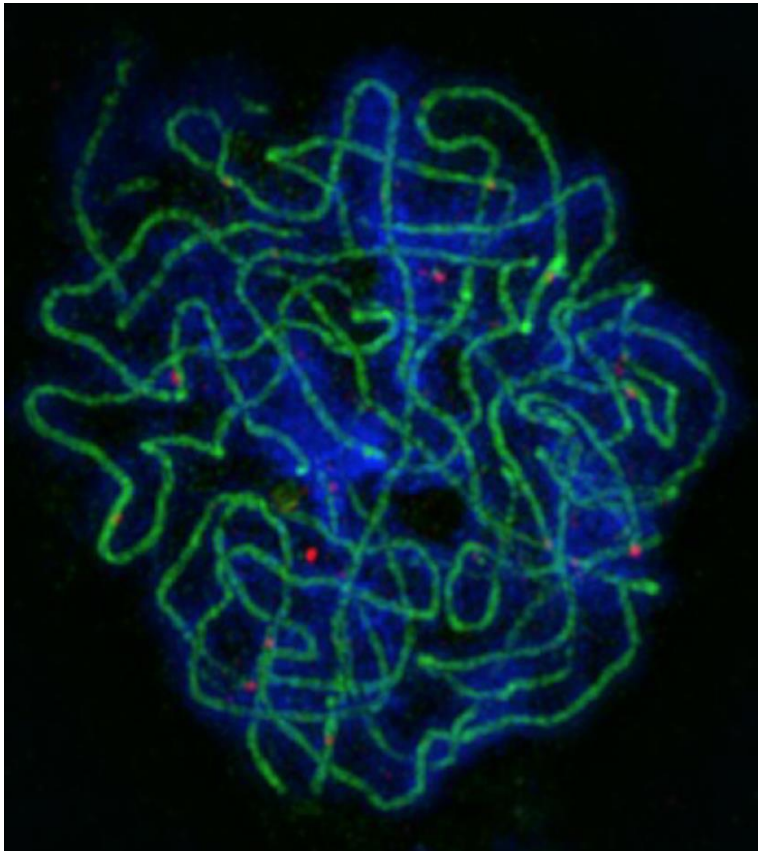


Image from idr0107, Morgan et al.

Guidance for Data Depositors

- ***What data can be submitted to the IDR?***
  - IDR accepts and publishes **cell** and **tissue reference** image datasets.
  - Non-reference cell or tissue image datasets are redirected to BioStudies or the BioImage Archive.
  - If dataset is EM data, it is redirected to EMPIAR.
  - IDR publishes **fully anonymized** data. Full de-identification from Private Health Identifiers (PHI) and Personal Identifying Information (PII) required by submitters before data transfer.

Guidance for Data Depositors

- ***What constitutes an IDR reference dataset?***
  - Datasets **associated** with an existing or upcoming publication.
  - **Complete** datasets – not just images supporting one figure in the publication.
  - Datasets whose metadata can be **integrated** with other datasets via identifiers from well-known biomolecular resources (Ensembl, NCBI Entrez Gene, RefSeq, PubChem, ChEBI etc.).
  - Datasets generated using new imaging **methods** or new analysis methods.
  - Datasets that are likely to be **re-analysed or incorporated** into other studies or integrated with other imaging datasets.

Guidance for Data Depositors

- ***Is there a size limit for data deposition?***

  - There is **no size limit** to the data that can be published in IDR.
  - For very large depositions (>10TB), please contact IDR as early as possible as special arrangements may be needed for data transfer.

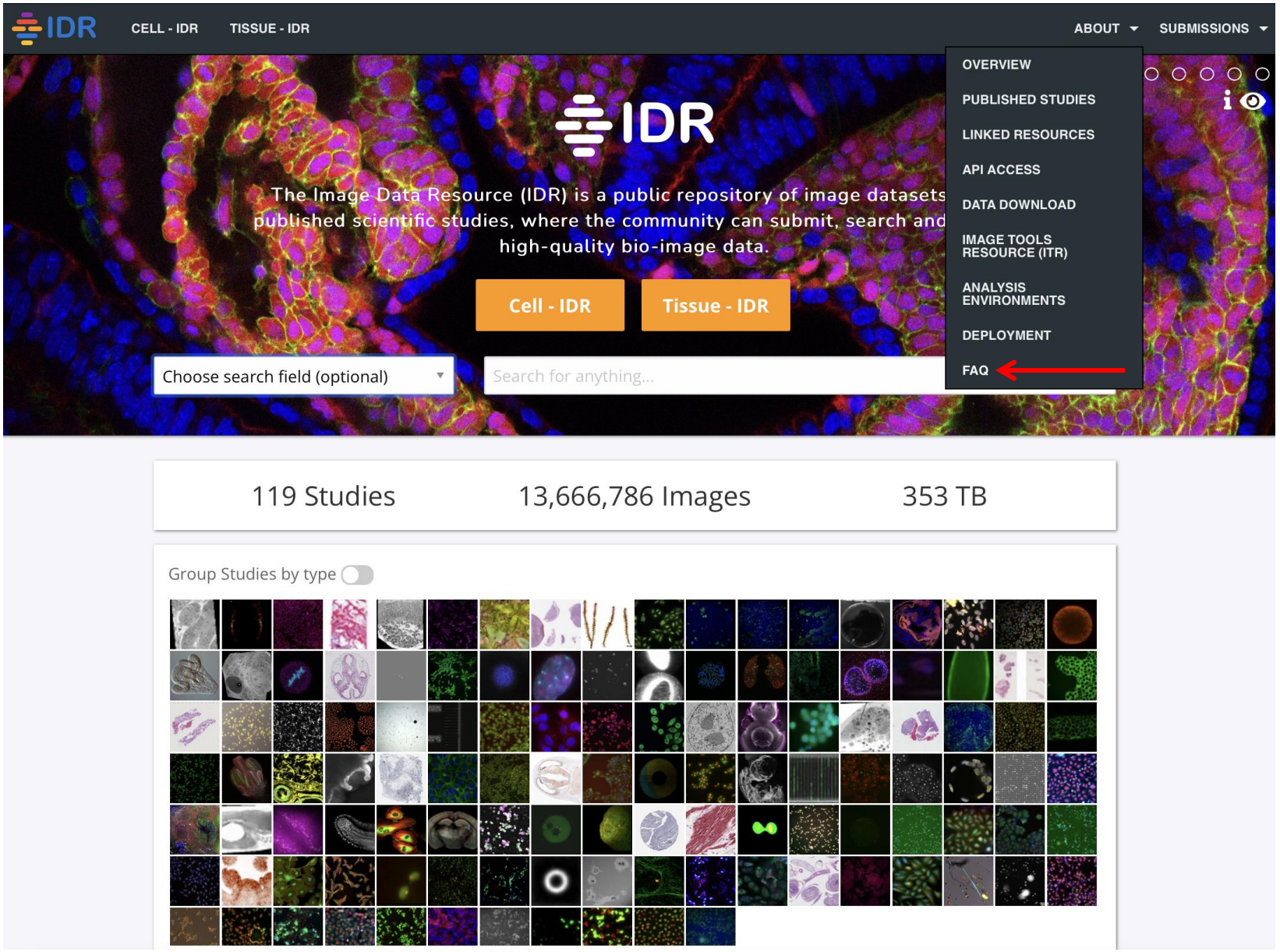
Guidance for Data Depositors

- ***How much does it cost to publish data in IDR?***
  - Data deposition and publication is **free-of-charge** to the authors and is supported by grants from the BBSRC, Wellcome Trust and the European Commission.

Guidance for Data Depositors

- ***Which license are datasets published under in IDR?***
  - To to make IDR datasets as widely re-usable as possible, accepted datasets will be published under the Creative Commons Attribution 4.0 International license (**CC BY 4.0**, https://creativecommons.org/licenses/by/4.0/) or a more permissive license.

FAQs



https://idr.openmicroscopy.org

https://idr.openmicroscopy.org

IDR Submission Process

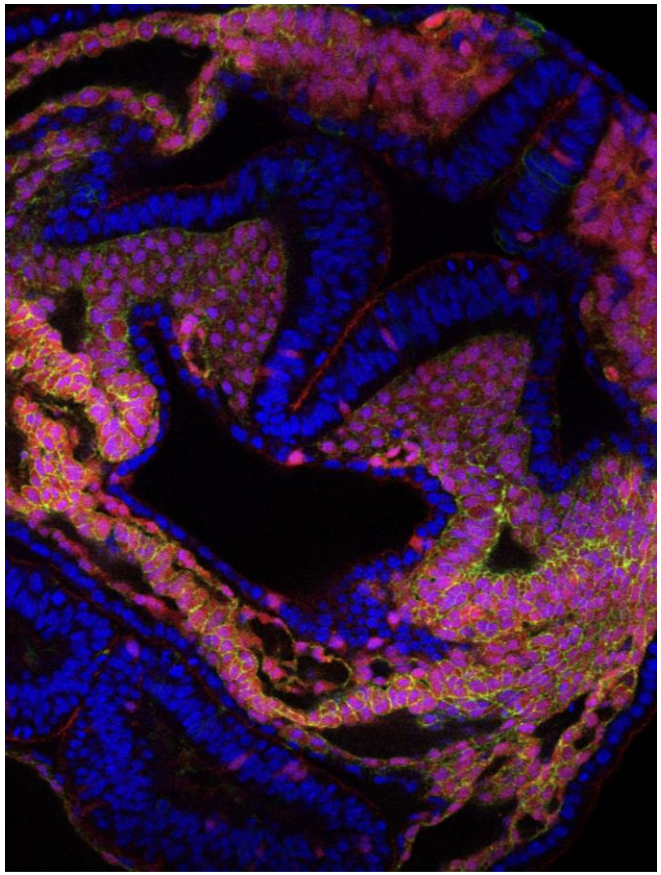


Image from idr0124, Esteban et al.

Main types of data

- **Images** – upload original raw data, plus analyzed or processed data (if useful).
- **Metadata** – fill in templates to provide information on study and images.

Metadata Preparation for IDR

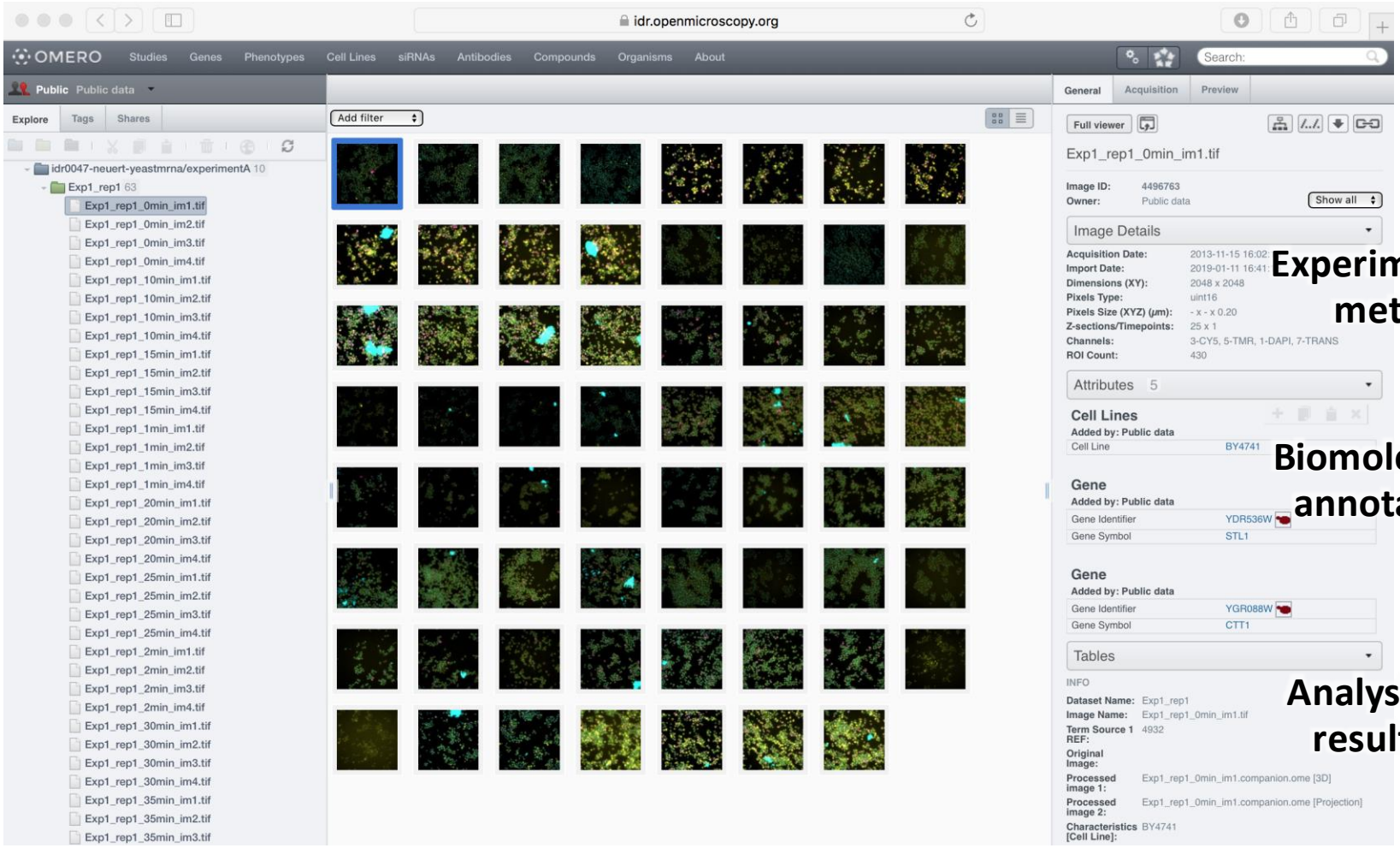
- Two study types

Screen – high content screens (HCS) or imaging studies performed in a plate format (e.g. 96 well plates).

Experiment – non-screen datasets or studies which group images into a number of distinct experiments.

- Empty templates can be downloaded at https://github.com/IDR/idr0000-lastname-example/archive/master.zip
- Examples of completed templates of other studies can be found at https://github.com/IDR/idr-metadata/

Metadata Curation in IDR



Experimental metadata

Biomolecular annotations

Analysis results

idr0047, Li et al, Scientific Data DOI:10.1038/s41597-019-0106-6

Trying to make image data FAIR

IDR

Findable – Original image data cross-linked from publication by DOI

Accessible – Metadata retrievable, open API

Interoperable – Uses common defined vocabularies

Reusable – Licensed (CC0 or CC BY 4.0), provenance included

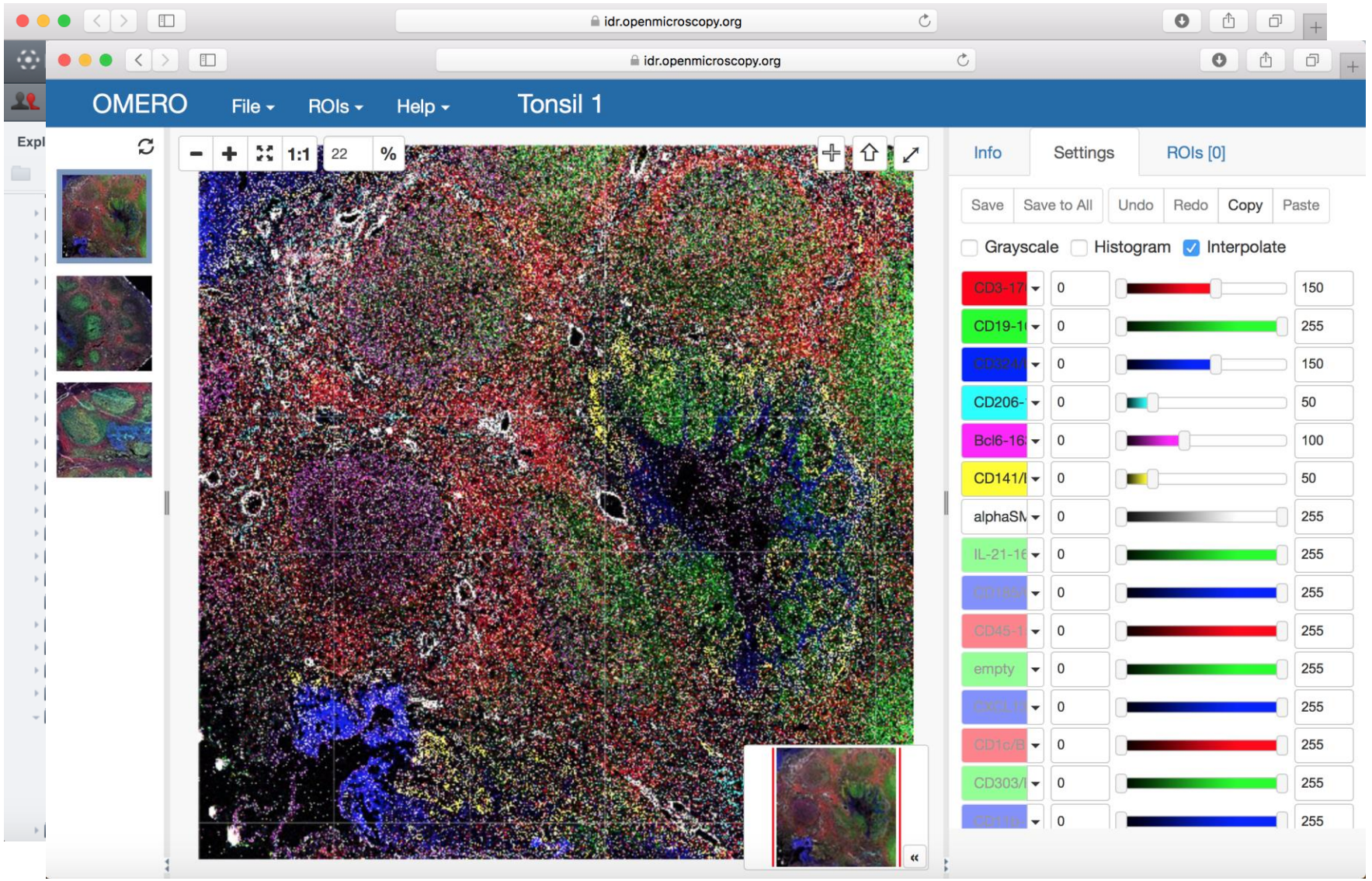
Value of Curation

Biocuration: to easily find extensive and interlinked information at well-documented, stable resources.

Examples in IDR

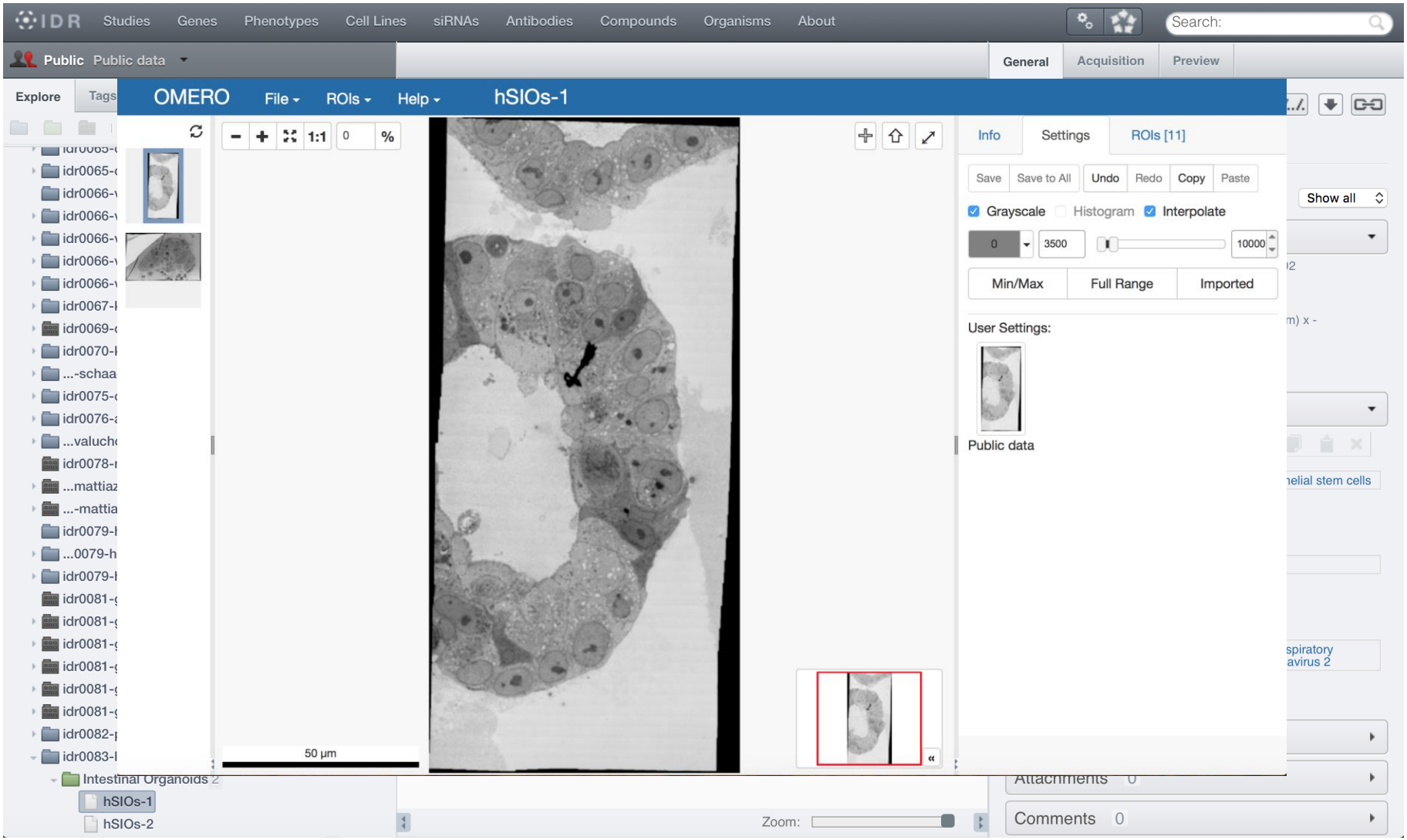
- Image Visualisation using IDR Web viewer
- Linked Metadata within IDR
- Link to External Resources
- Querying Metadata within IDR
- Interactive Analysis

Value of Curation – Image Visualisation



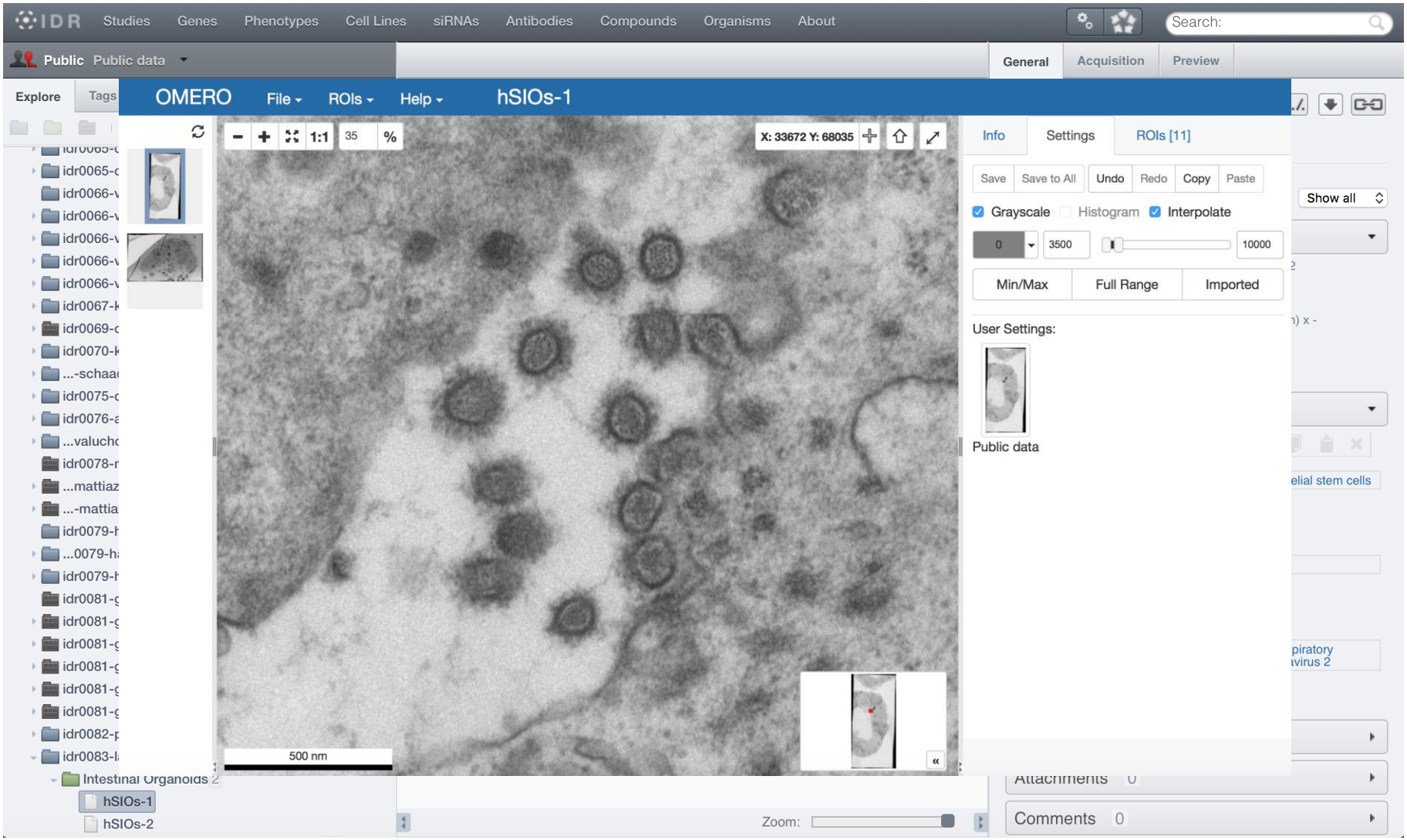
idr0054, Durand et al, Scientific Data DOI:10.17867/10000122

Value of Curation – Image Visualisation



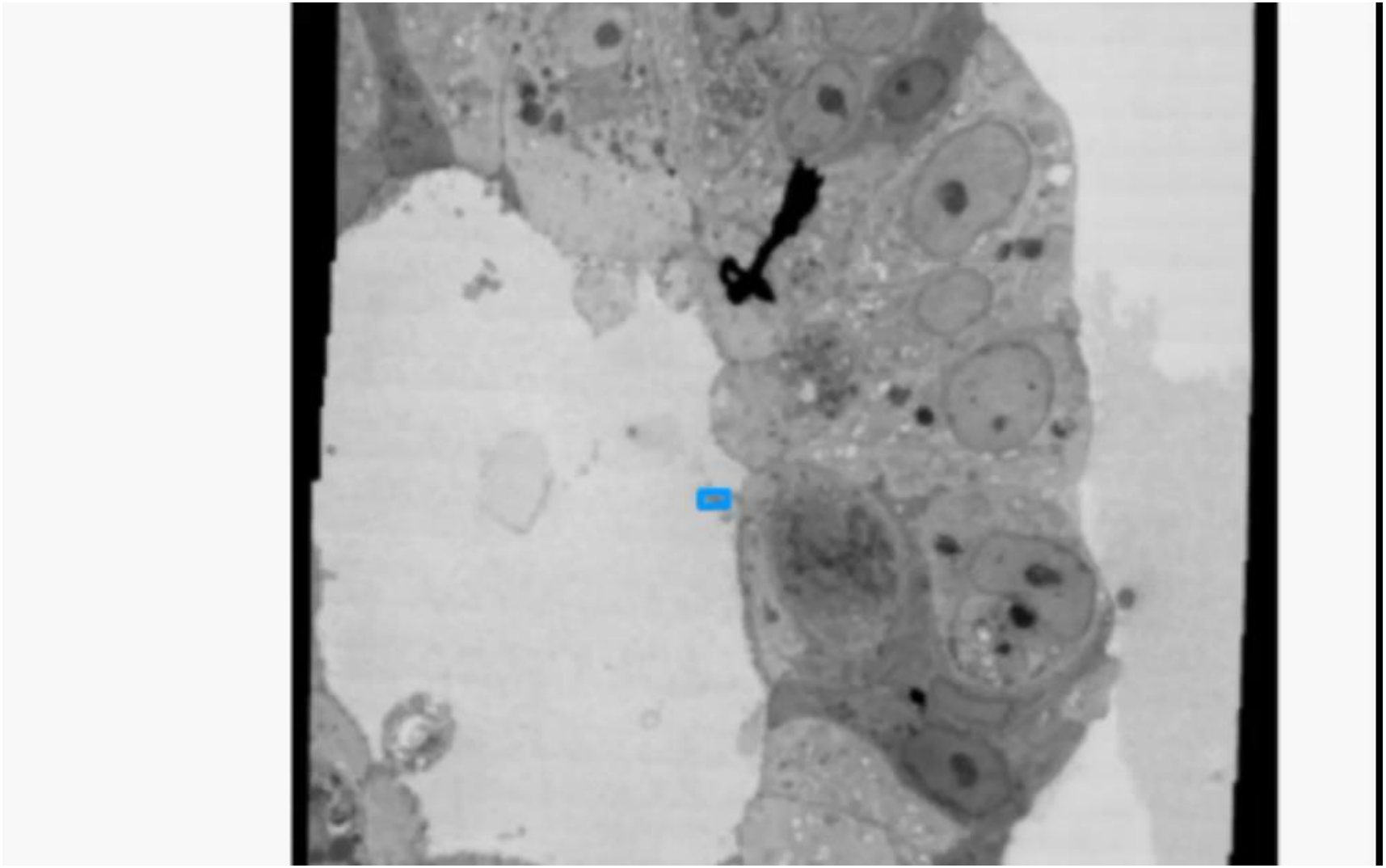
idr0083, Lamers et al *Science* DOI:10.1126/science.abc1669

Value of Curation – Image Visualisation



idr0083, Lamers et al *Science* DOI:10.1126/science.abc1669

Value of Curation – Image Visualisation



idr0083, Lamers et al *Science* DOI:10.1126/science.abc1669

IDR and EMPIAR

IDR

EMPIAR

EMPIAR home | Deposition | REST API | FAQ | About EMPIAR | Policies | Feedback | Share

Attributes 1

Publication DOI

Release Date

License

Copyright

Data Publisher

Data DOI

EMPIAR Accession

Annotation File

EMPIAR-10404

SARS-CoV-2 productively infects human gut enterocytes

Publication: SARS-CoV-2 productively infects human gut enterocytes

Lamers MM, Beumer J, van der Vaart J, Knoops K, Puschhof J, Breugem T, Ravelli RBG, van Schayck JP, Mykytyn AZ, Duimel HQ, van Donselaar E, Riesebosch S, Kuijpers HJH, Schipper D, van de Wetering WJ, de Graaf M, Koopmans M, Cuppen E, Peters PJ, Haagmans B, Clevers H

Science

DOI: 10.1126/science.abc1669

Related IDR entry: idr0083

Deposited: 2020-04-30

Released: 2020-05-01

Last modified: 2020-05-01

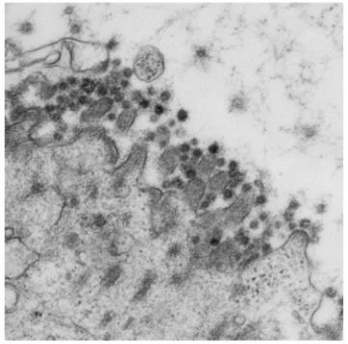
Dataset size: 66.5 GB

Dataset DOI: 10.6019/EMPIAR-10404

Experimental metadata: Download xml

Contains:

stitched maps



Quick links

- EMDB
- PDBe
- BioImage Archive
- EMPIAR Quick tour
- Statistics
- Re-use case study
- EMPIAR@PDBj

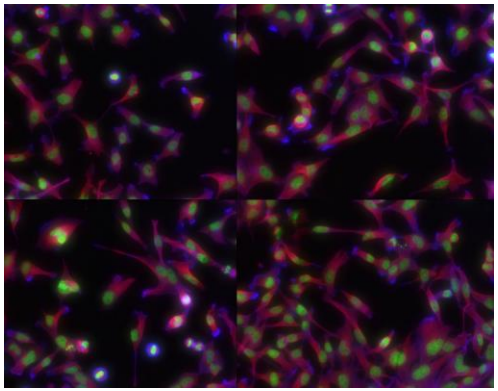
EMPIAR citations

Cryo-EM structure of the potassium-chloride cotransporter KCC4 in lipid nanodiscs.
Reid MS, Kern DM, Brohawn SG. (2020)

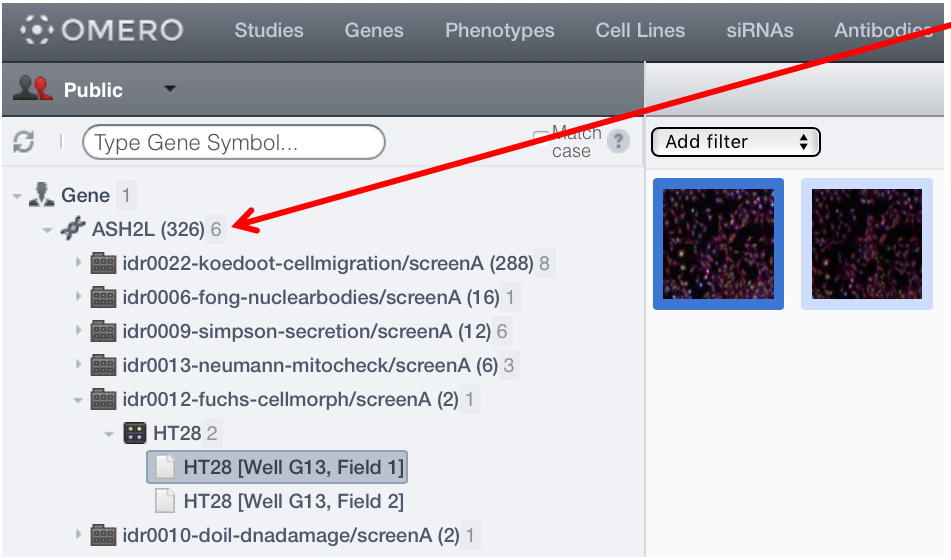
Development of basic building blocks

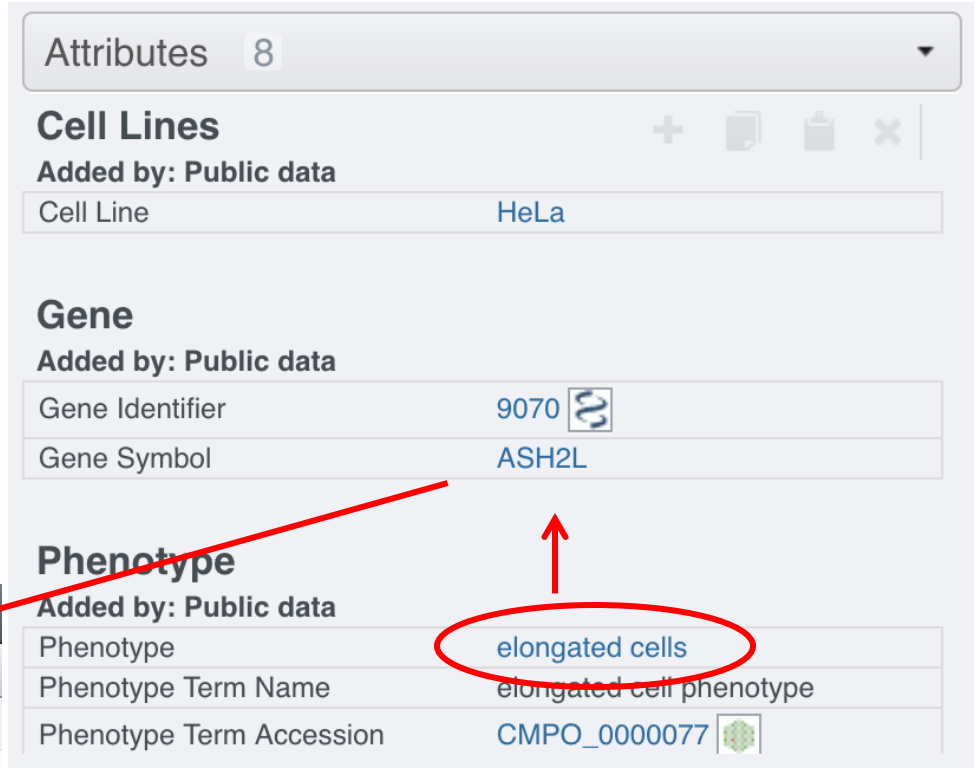
Value of Curation - Linked Metadata

IDR



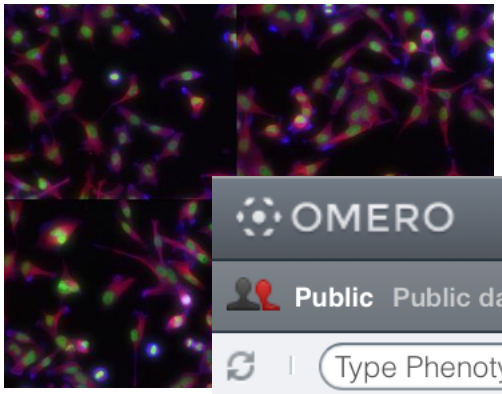
idr0012





Value of Curation - Linked Metadata

IDR



Attributes 8

Cell Lines

Added by: Public data

Cell Line	HeLa

OMERO Studies Genes Phenotypes Cell Lines

Public Public data

Type Phenotype... Match case

Phenotype 1

CMPO_0000077 (20872) 8

- idr0028-pascualvargas-rhogtpases/screenD (3920) 4
- idr0028-pascualvargas-rhogtpases/screenA (3808) 4
- idr0028-pascualvargas-rhogtpases/screenC (3220) 4
- idr0033-rohban-pathways/screenA (2916) 12
- idr0028-pascualvargas-rhogtpases/screenB (2856) 4
- idr0001-graml-sysgro/screenA (2788) 122
- idr0008-rohn-actinome/screenB (1098) 10
- idr0012-fuchs-cellmorph/screenA (266) 55

	9070
	ASH2L
	elongated cells
	elongated cell phenotype
	CMPO_0000077

OMERO Studies Genes Phen

Public

Type Gene Symbol...

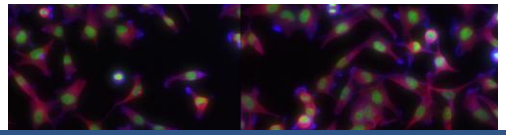
Gene 1

ASH2L (326) 6

- idr0022-koedoot-cellmigration/screenA
- idr0006-fong-nuclearbodies/screenA (1
- idr0009-simpson-secretion/screenA (12
- idr0013-neumann-mitocheck/screenA (6) 3
- idr0012-fuchs-cellmorph/screenA (2) 1
  - HT28 2
    - HT28 [Well G13, Field 1]
    - HT28 [Well G13, Field 2]
- idr0010-doil-dnadamage/screenA (2) 1

Value of Curation - Link to External Resources

IDR



Attributes 8

Cell Lines

Added by: Public data

HeLa

ic data

9070

ASH2L

ic data

elongated cells

Name elongated cell phenotype

Accession CMPO_0000077

NIH National Library of Medicine
National Center for Biotechnology Information

Log in

Gene Gene Search
Advanced Help

Full Report Send to: Hide sidebar >>

ASH2L ASH2 like, histone lysine methyltransferase complex subunit [*Homo sapiens* (human)]

Gene ID: 9070, updated on 4-Apr-2023

Download Datasets

Summary

Official Symbol	ASH2L provided by HGNC
Official Full Name	ASH2 like, histone lysine methyltransferase complex subunit provided by HGNC
Primary source	HGNC:HGNC:744
See related	Ensembl:ENSG00000129691 MIM:604782; AllianceGenome:HGNC:744
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Homo sapiens
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Primates; Haplorrhini; Catarrhini; Hominidae; Homo
Also known as	ASH2; Bre2; ASH2L1; ASH2L2
Summary	Enables beta-catenin binding activity and transcription cis-regulatory region binding activity. Contributes to histone methyltransferase activity (H3-K4 specific). Involved in histone H3-K4 methylation; positive regulation of cell population proliferation; and response to estrogen. Acts upstream of or within cellular response to DNA damage stimulus. Located in nucleus. Part of MLL3/4 complex and Set1C/COMPASS complex. [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in testis (RPKM 20.9), fat (RPKM 13.3) and 25 other tissues See more
Orthologs	mouse all

Table of contents

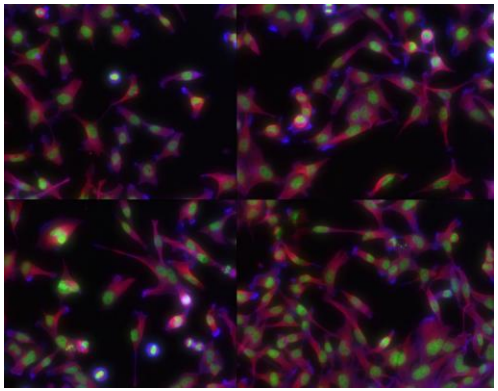
- Summary
- Genomic context
- Genomic regions, transcripts, and products
- Expression
- Bibliography
- Phenotypes
- Variation
- Pathways from PubChem
- Interactions
- General gene information
  - Markers, Related pseudogene(s), Homology, Gene Ontology
- General protein information
- NCBI Reference Sequences (RefSeq)
- Related sequences
- Additional links

Genome Browsers

Genome Data Viewer

Value of Curation - Link to External Resources

IDR



idr0012

Attributes 8

Cell Lines

Added by: Public data

Cell Line	HeLa

Gene

Added by: Public data

Gene Identifier	9070
Gene Symbol	ASH2L

Phenotype

Added by: Public data

elongated cell phenotype

http://www.ebi.ac.uk/cmpo/CMPO_0000077 Copy

Search CMPO Search

henotype

7

A phenotype observation at the level of the cell shape where the cell is elongated, with a length notably greater than its width

Tree view | Term mappings

- cellular phenotype
  - cellular component phenotype
    - cell component morphology phenotype
      - cell component shape phenotype
        - elongated cell phenotype
      - cell morphology phenotype
        - elongated cell phenotype
    - single cell phenotype
      - cell morphology phenotype
        - elongated cell phenotype

Graph view | Reset tree | Show all siblings

Term information

Subsets
cmpo

has broad synonym
- bipolar cell

id
- CMPO:0000077

prefLabel
- elongated cell

Ontologies

IDR

Organism	NCBI Taxonomy https://www.ncbi.nlm.nih.gov/taxonomy
Study Type Screen Type (HCS) Screen Technology Type (HCS) Library Type (HCS) Protocol	Experimental Factor Ontology (EFO) https://www.ebi.ac.uk/efo/
Imaging Method	Biological Imaging Methods Ontology (FBbi) https://www.ebi.ac.uk/ols/ontologies/fbbi
Phenotype	Cellular Microscopy Phenotype Ontology (CMPO) https://www.ebi.ac.uk/cmpo/
Gene	Ensembl https://www.ensembl.org/ NCBI Gene https://www.ncbi.nlm.nih.gov/gene/
Protein	UniProt https://www.uniprot.org/
Clinical/Pathology	SNOMED CT https://bioportal.bioontology.org/ontologies/SNOMEDCT
Compound	PubChem https://pubchem.ncbi.nlm.nih.gov/

Value of Curation – Querying Metadata

IDR

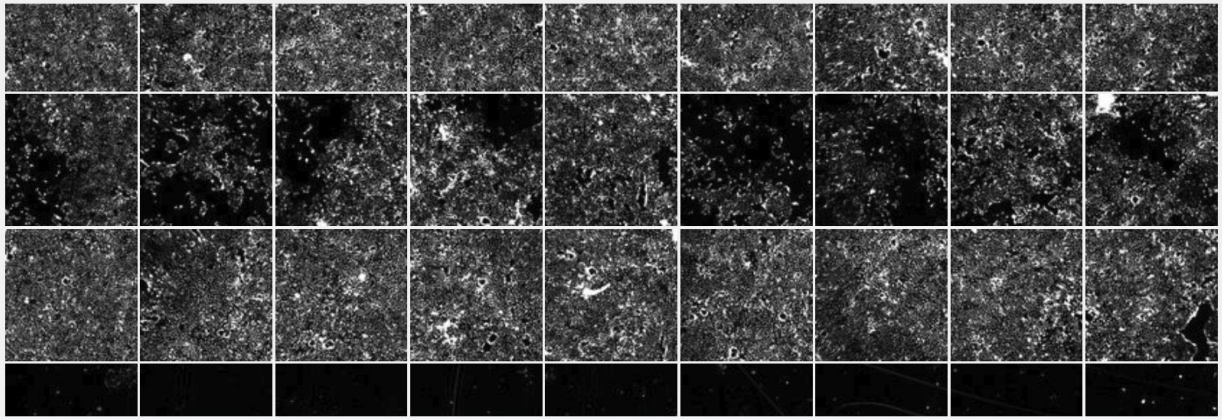
IDR CELL - IDR TISSUE - IDR ABOUT SUBMISSIONS

Home

Attribute: Compound Name | Operator: contains | Value: Remdesivir

Search **Compound Name** contains **Remdesivir** found **216** images in **1** screen

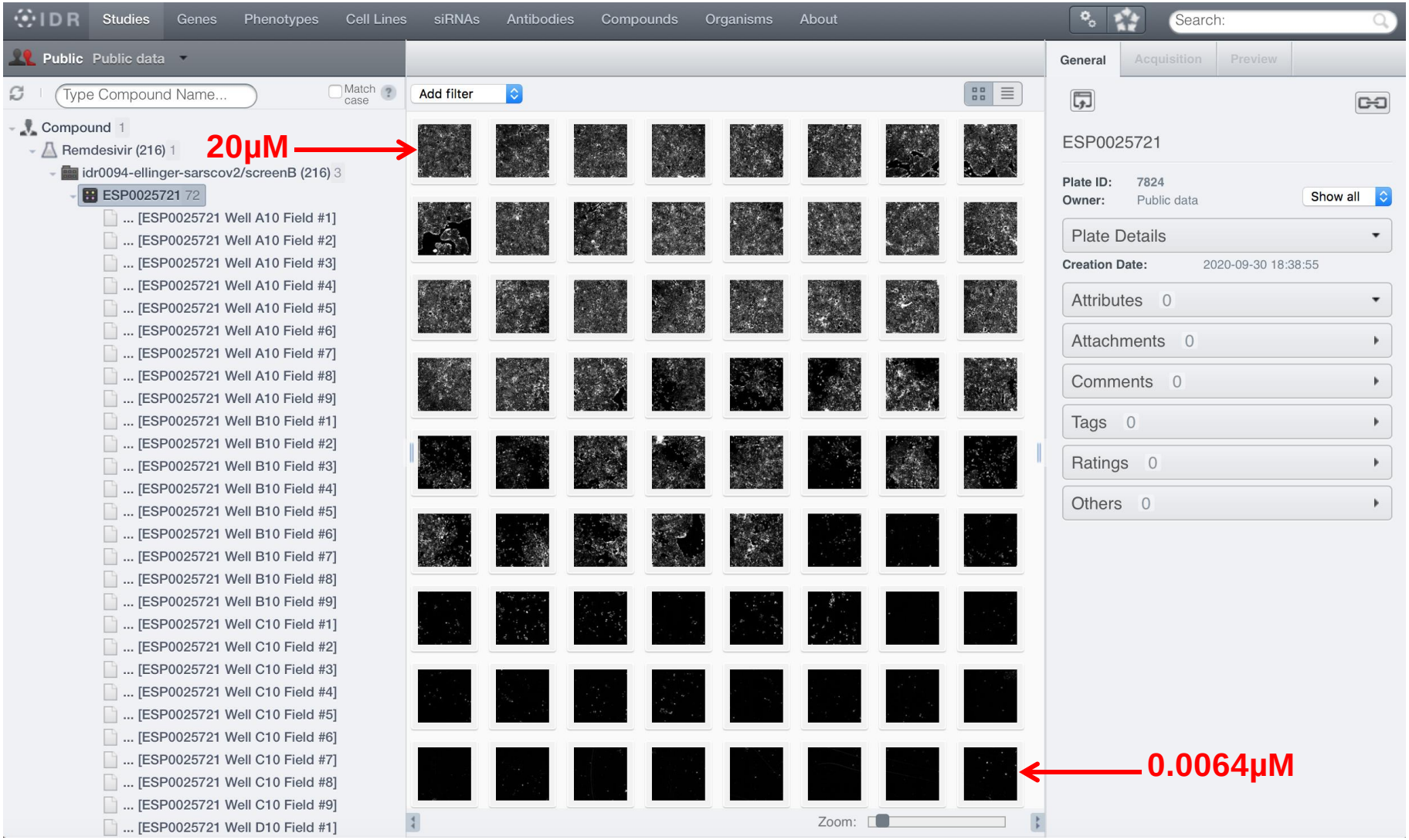
ID	Images	Publication Title
idr0094B	216	A SARS-CoV-2 cytopathicity dataset generated by high-content screening of a larg...



Screenshot

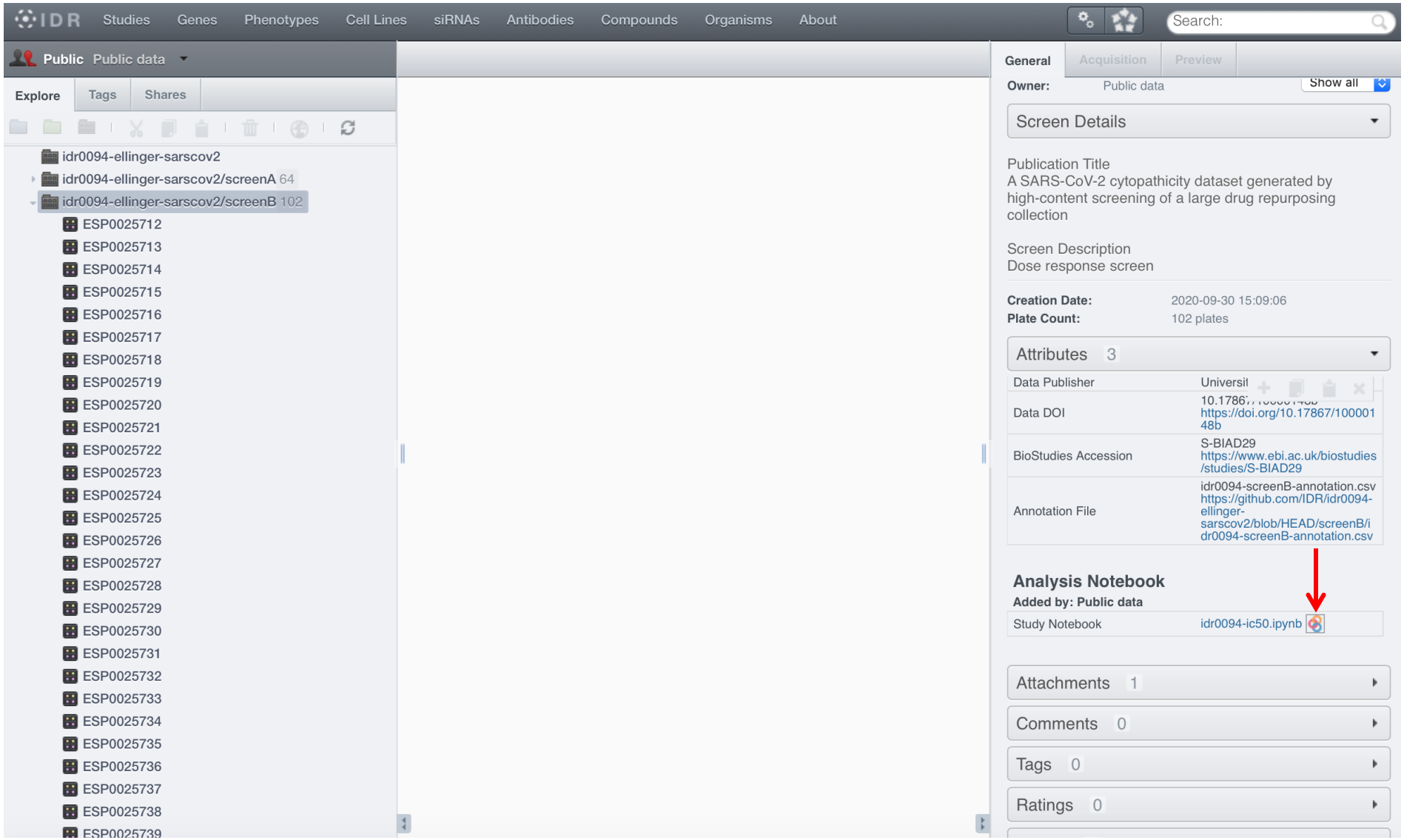
OME IMAGING GLOBAL BIOIMAGING growing collaboration UKRI Biotechnology and Biological Sciences Research Council Glencoe SOFTWARE

SARS-CoV-2 and Remdesivir



idr0094, Ellinger et al *Sci Data* DOI:10.1038/s41597-021-00848-4

Value of Curation – Interactive Analysis



idr0094, Ellinger et al *Sci Data* DOI:10.1038/s41597-021-00848-4

IC50 exploration

This notebook demonstrates how to process plates associated to the paper A SARS-CoV-2 cytopathicity dataset generated by high-content screening of a large drug repurposing collection. We explore the metadata linked to idr0094-ellinger-sarscov2/screenB.

Calculate the half maximal inhibitory concentration IC50

The half maximal inhibitory concentration (IC50) is a measure of the potency of a substance in inhibiting a specific biological or biochemical function. IC50 is a quantitative measure that indicates how much of a particular inhibitory substance (e.g. drug) is needed to inhibit, in vitro, a given biological process or biological component by 50%.

In [11]:
```
calculate_IC50 <- function(data){
  IC50 <- NA
  data.LL.4 <- NULL
  ctest <- filter(data, Inhibition != "NaN")
  data.LL.4 <- drm(Inhibition ~ Concentration, data = ctest, fct = LL.4(), control = drmc(errorm=FALSE))
  if (is.null(data.LL.4$convergence)) {
      IC50 <- ED(data.LL.4, 50, interval = "delta")[1]
  }
  returned_values <- list("ic50" = IC50, "data" = data.LL.4)
}
```

In [12]:
```
values <- calculate_IC50(data)
IC50 <- values$ic50
IC50
```

```
Estimated effective doses

       Estimate Std. Error   Lower   Upper
e:1:50  0.80772    0.12019 0.55701 1.05842
```

0.807715887041243

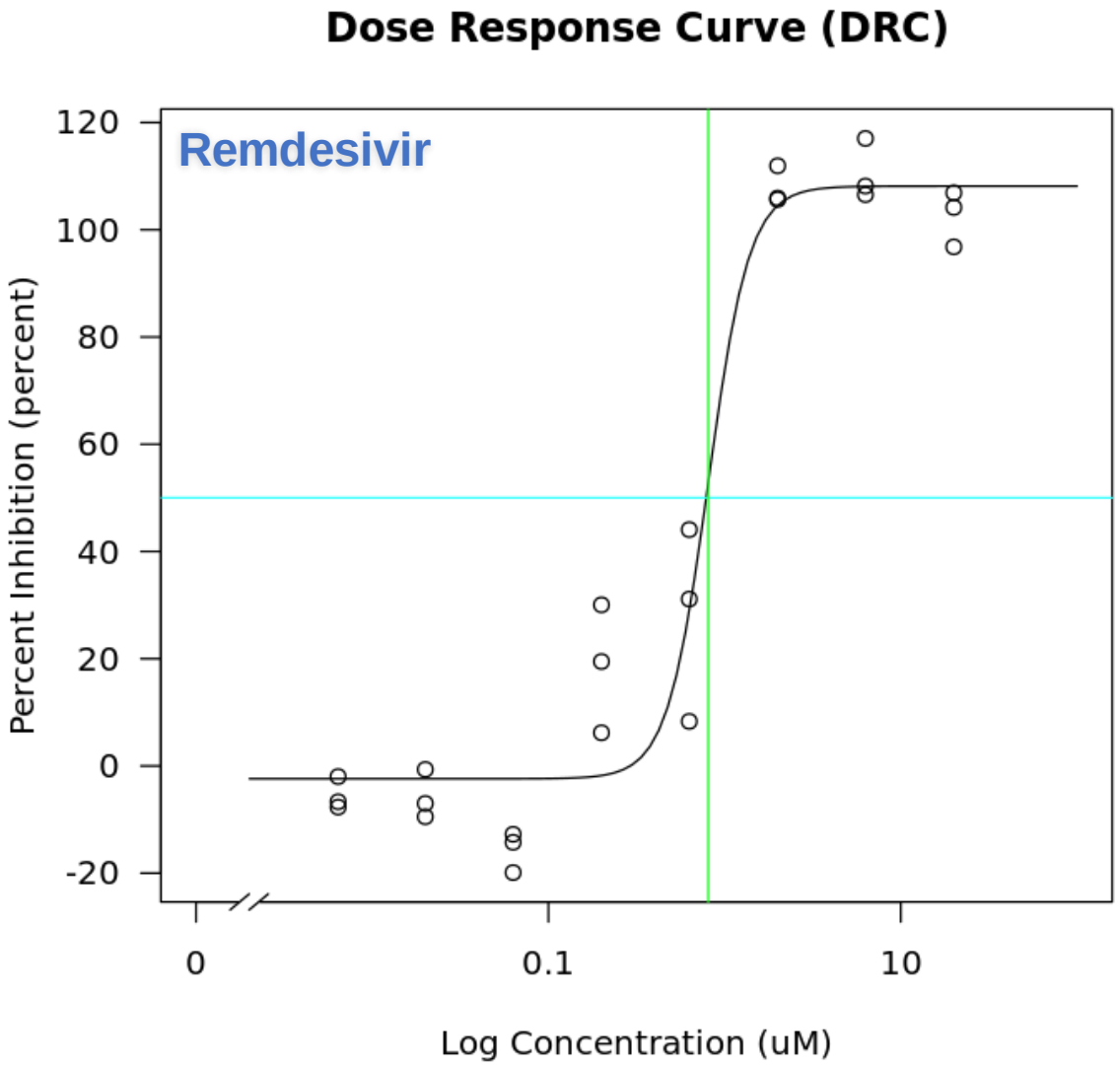
Discussion

The activity of the reference compound, remdesivir (IC50 = 0.76 µM) was confirmed in this study. Remdesivir targets the viral nsp12 RNA-dependent RNA polymerase[8] and is currently under evaluation in an adaptive, randomized, double-blind, placebo-controlled phase III clinical trial[9].

Plot the Dose Response curve

In [13]:
```
options(repr.plot.width=6, repr.plot.height=5.8)
plot(values$data, broken = TRUE, type = "all",
     main = "Dose Response Curve (DRC)", xlim = c(0, 100),
     xlab = "Log Concentration (uM)",
     ylab = "Percent Inhibition (percent)")
abline(h = 50, col = "cyan")
abline(v = IC50, col = "green")
```

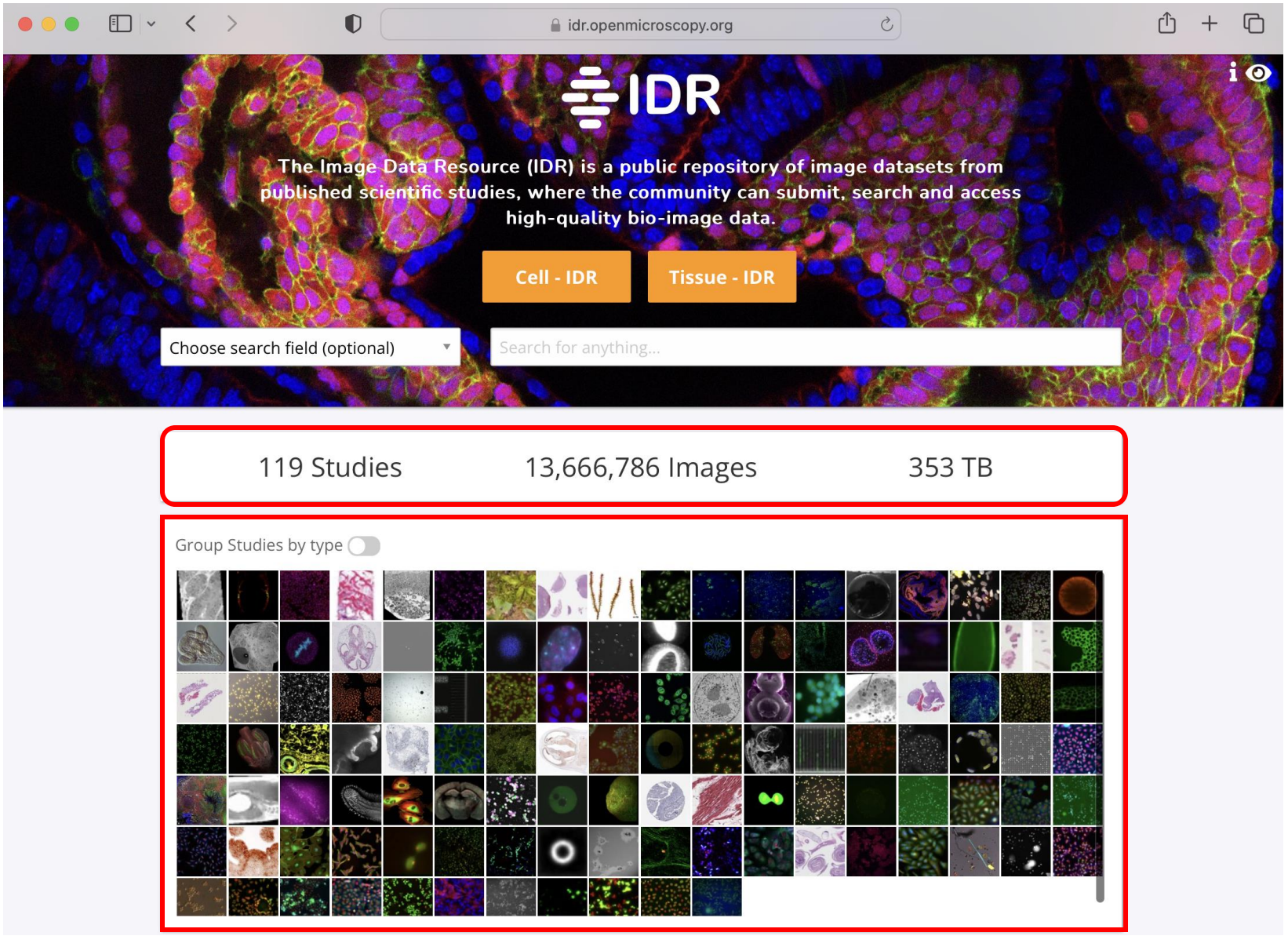
Dose Response Curve of Remdesivir



IDR and WorkflowHub

https://workflowhub.eu/workflows/238

IDR Homepage



https://idr.openmicroscopy.org

Studies in IDR

IDR

119 Studies

13,666,786 Images

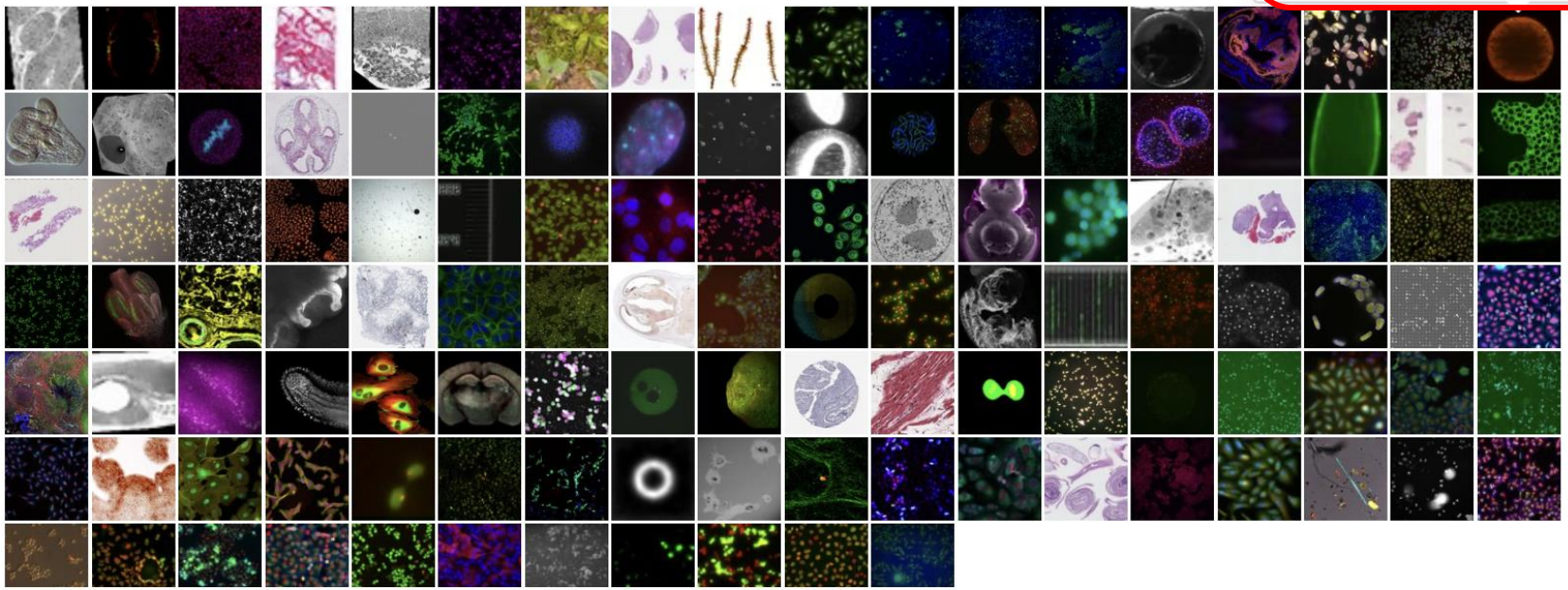
3

idr0118 **Keenan SE et. al**

1 Experiment **20 Images**

Dynamics of Drosophila endoderm specification

Group Studies by type



https://idr.openmicroscopy.org

Navigation from study thumbnail

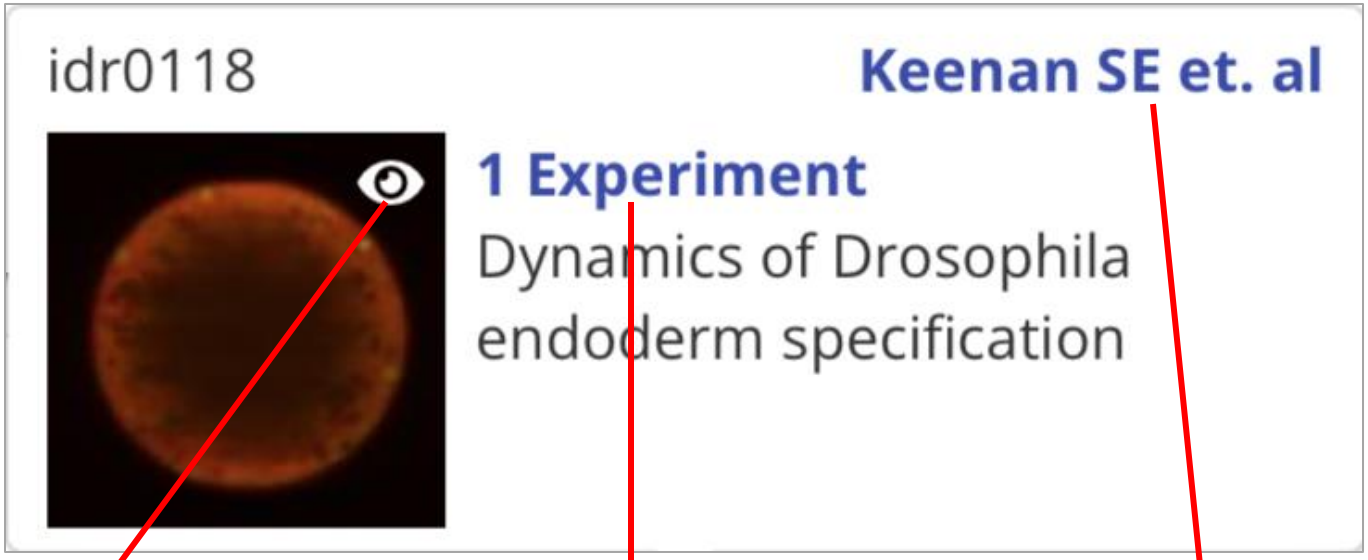


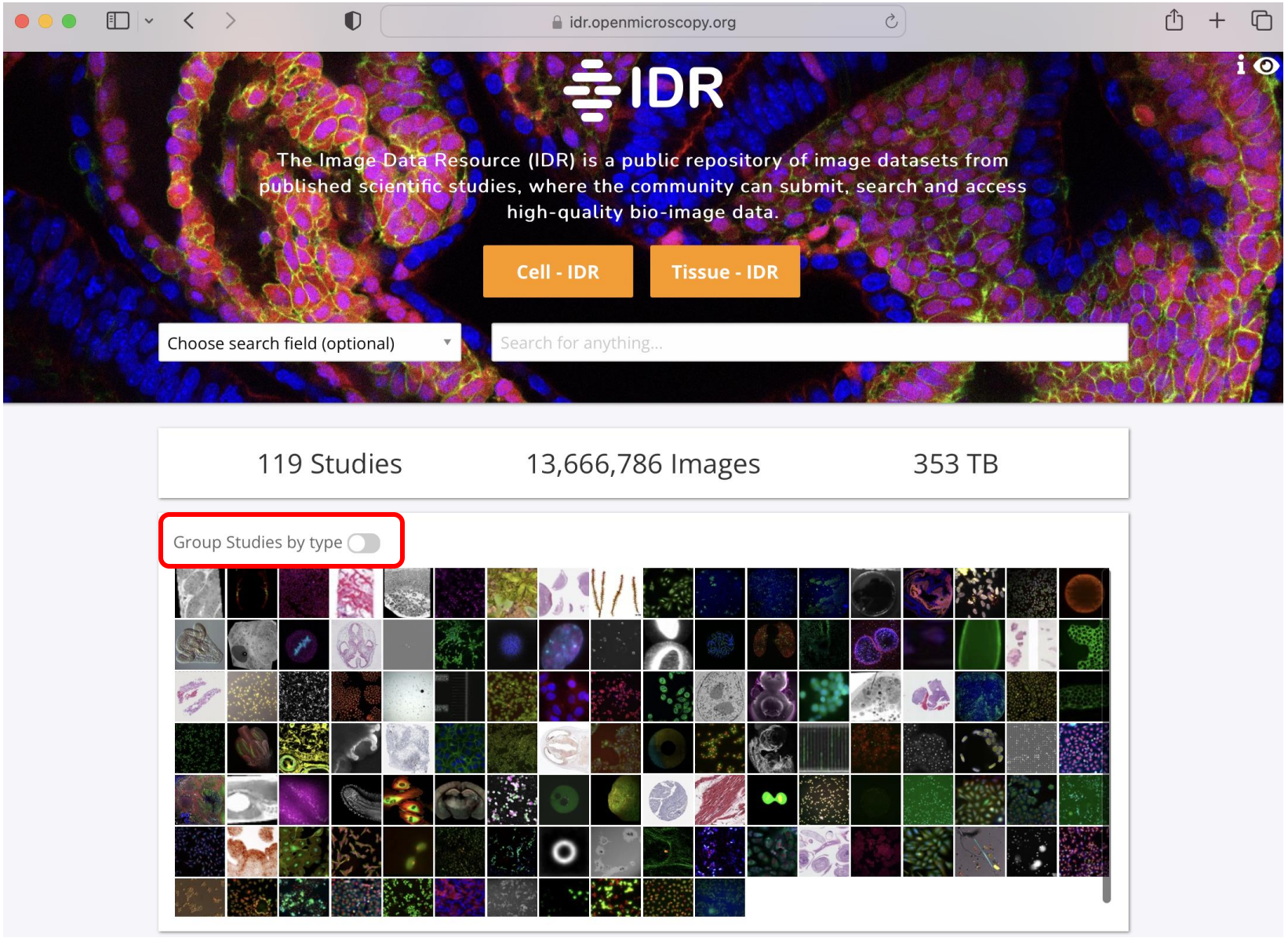
Image viewer

Study data

Publication (PubMed)

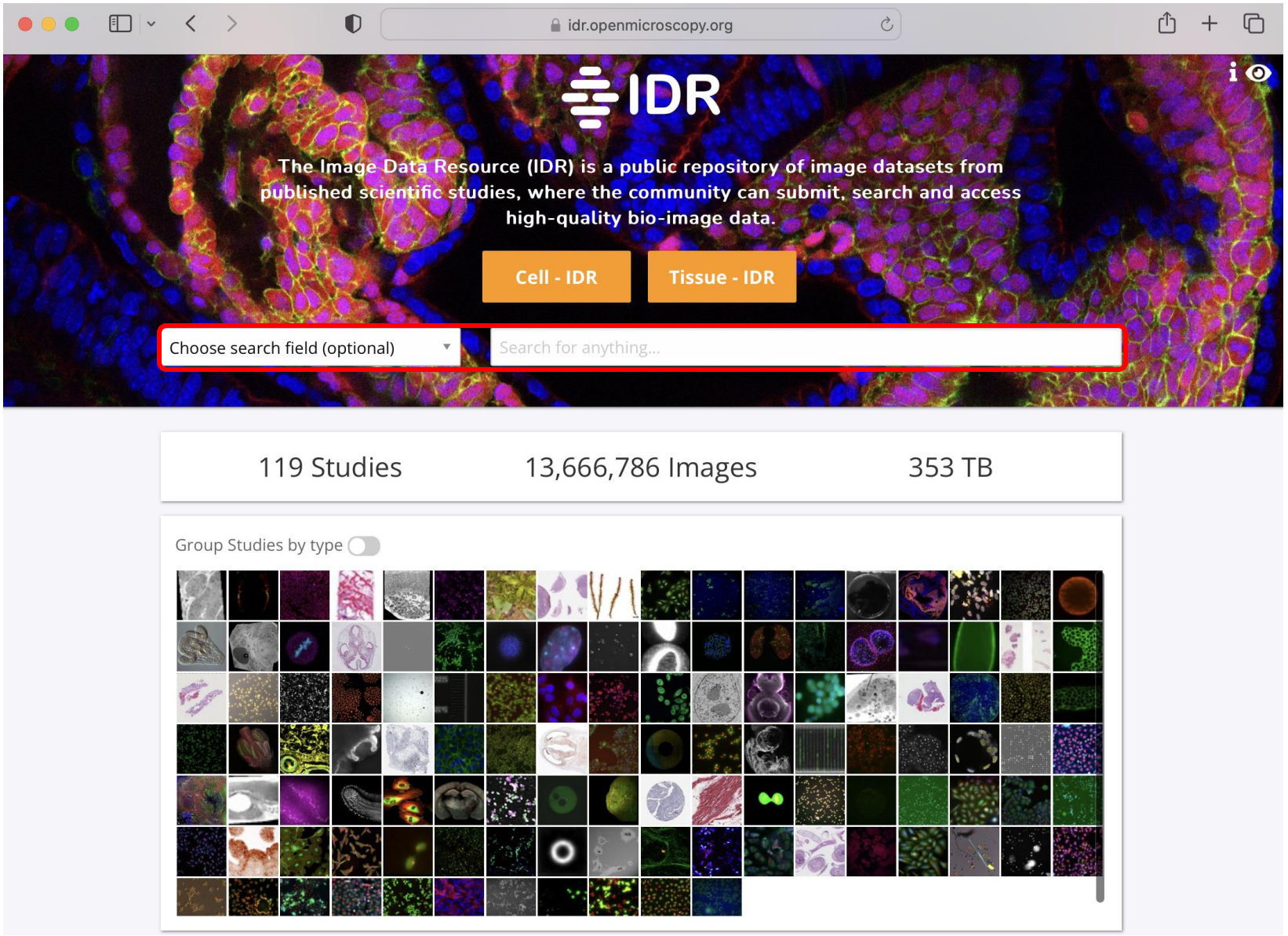
https://idr.openmicroscopy.org

IDR Homepage



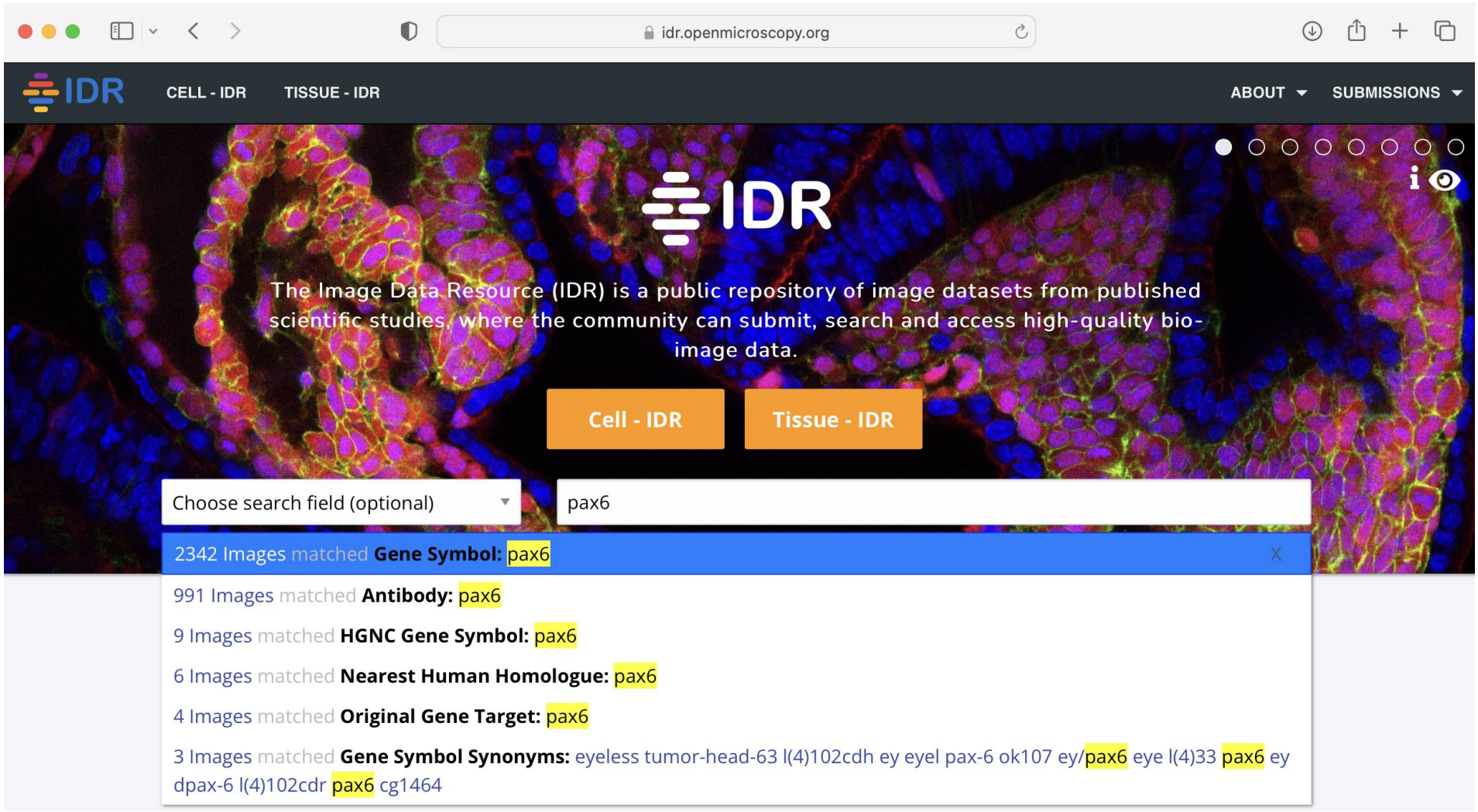
https://idr.openmicroscopy.org

IDR Homepage



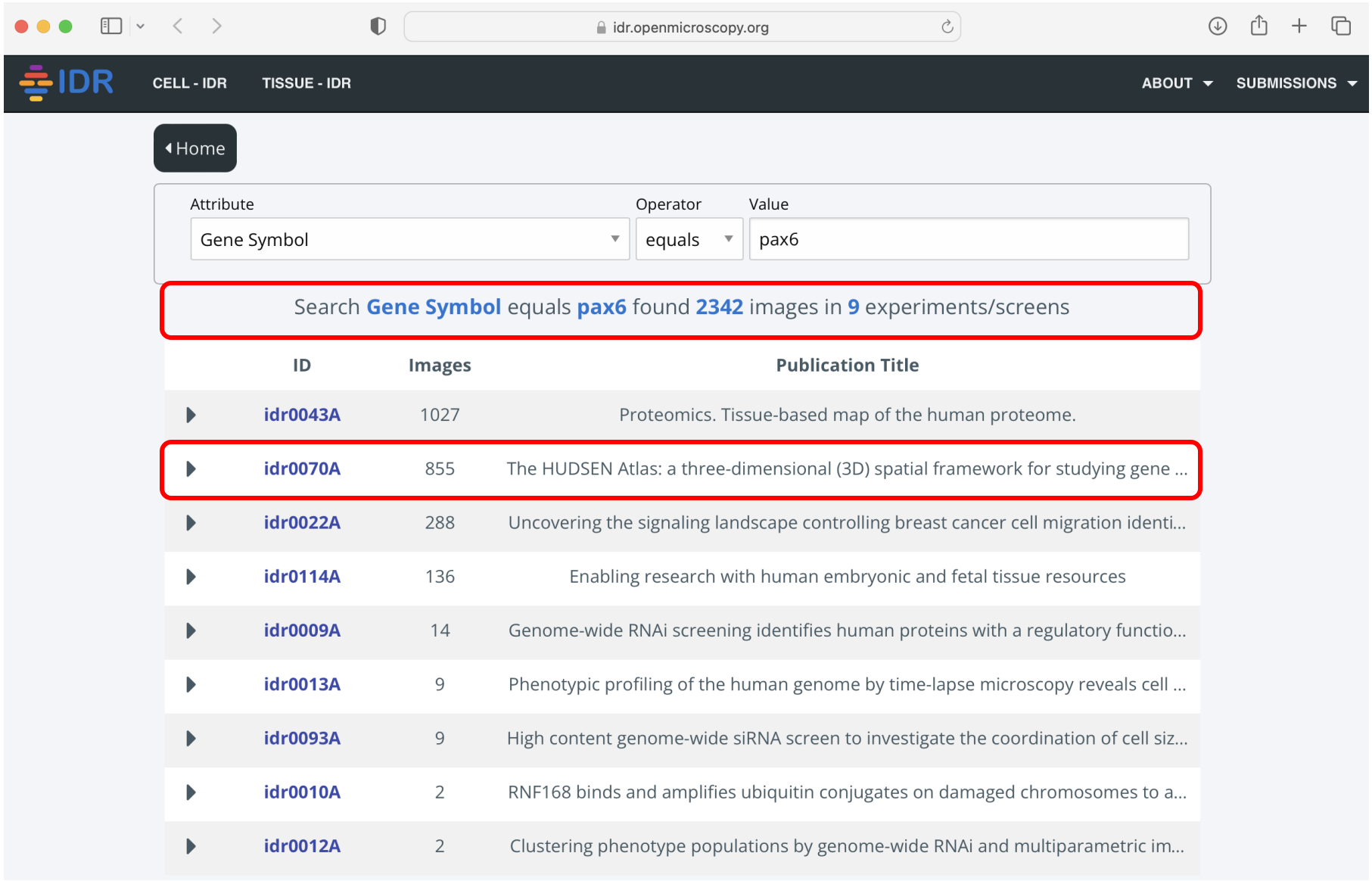
https://idr.openmicroscopy.org

IDR Search



https://idr.openmicroscopy.org

IDR Search



https://idr.openmicroscopy.org

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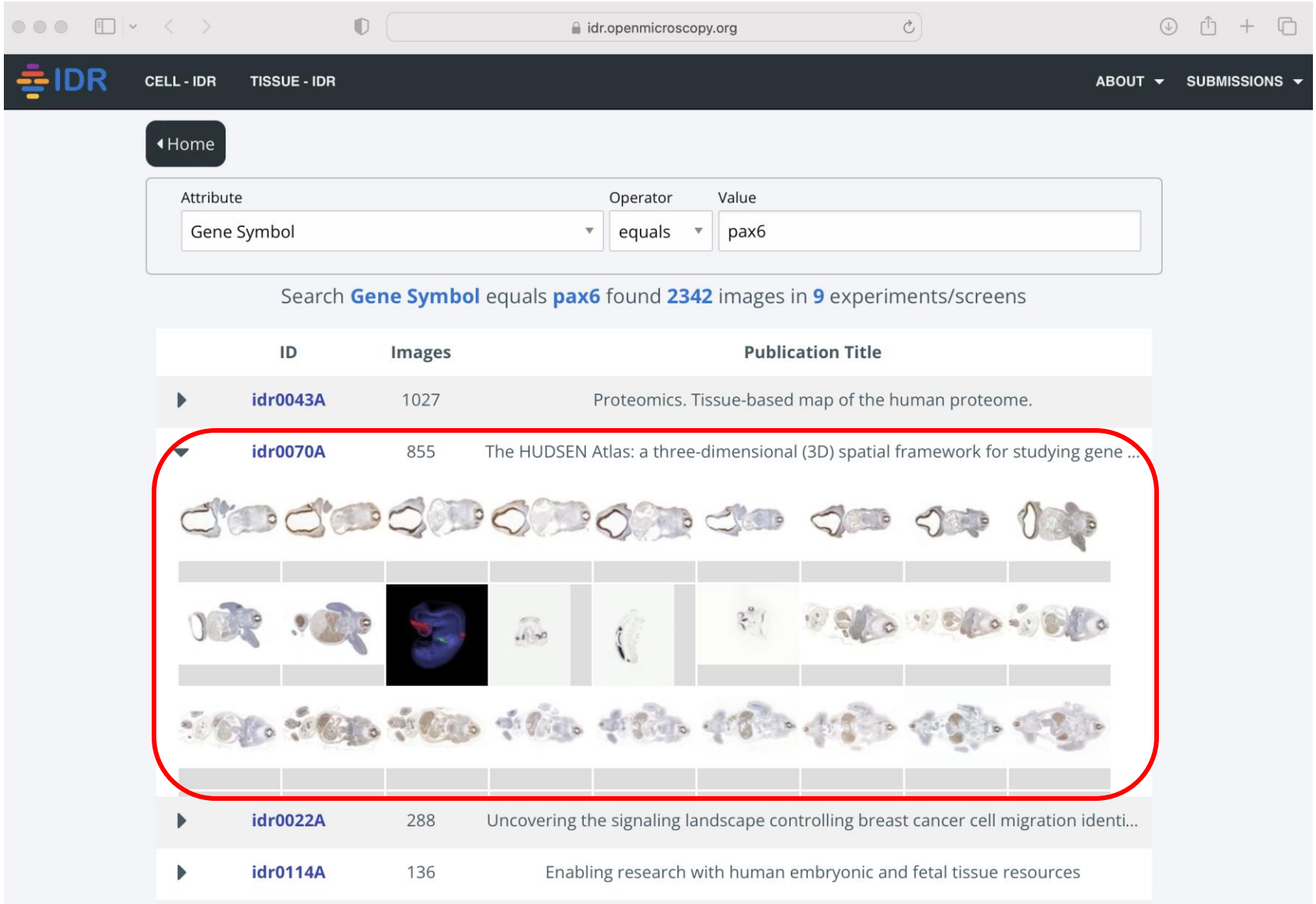
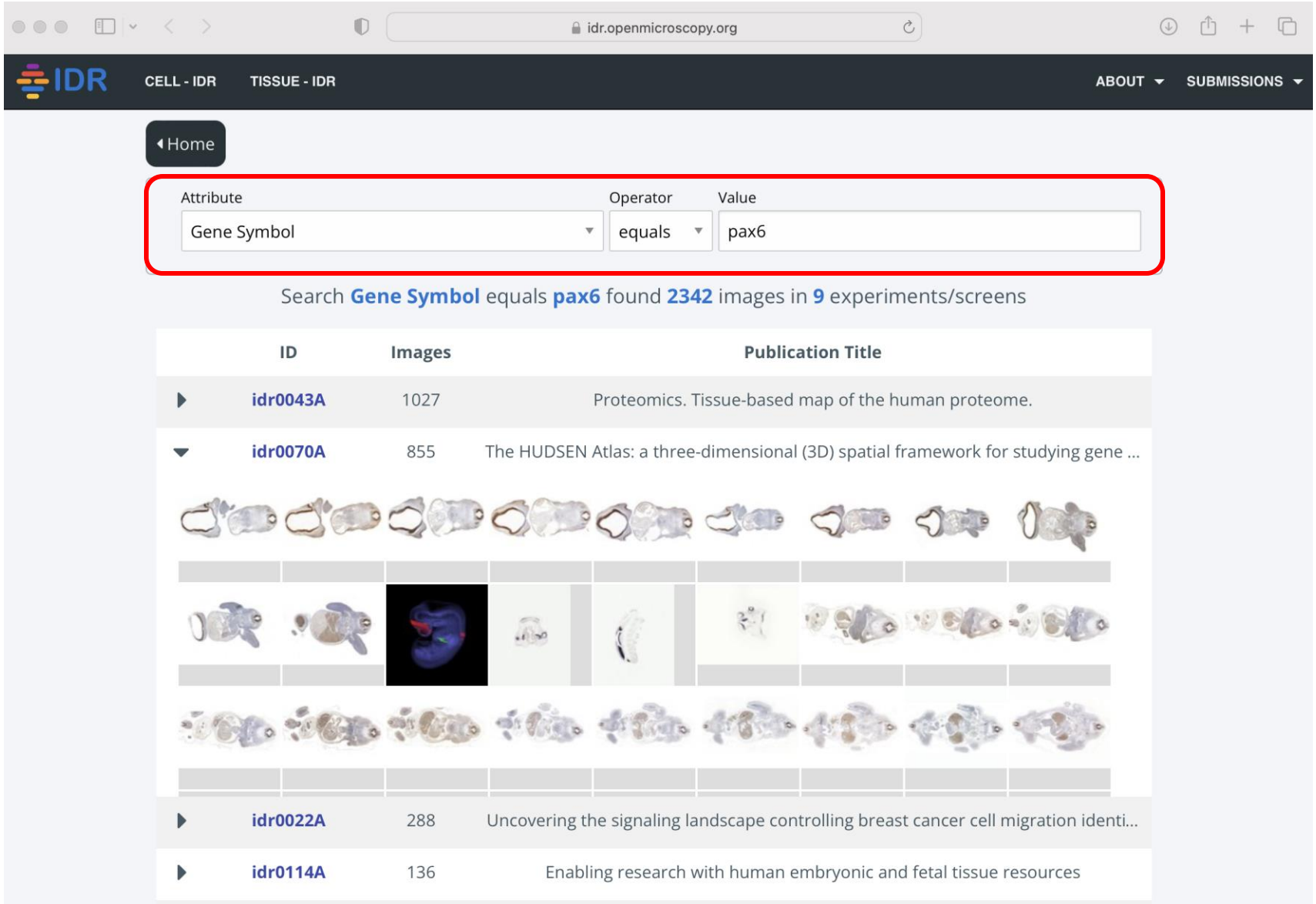


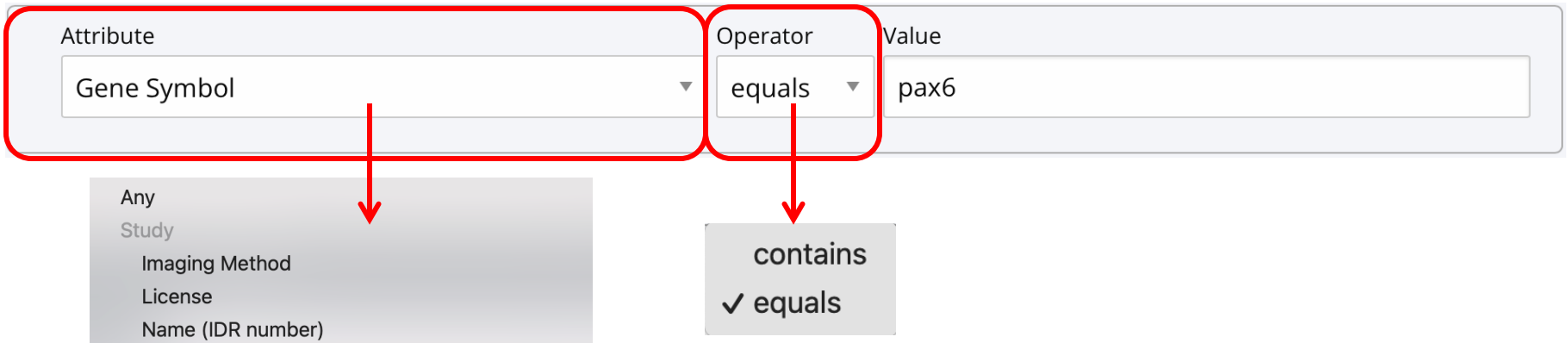
https://idr.openmicroscopy.org

IDR Search

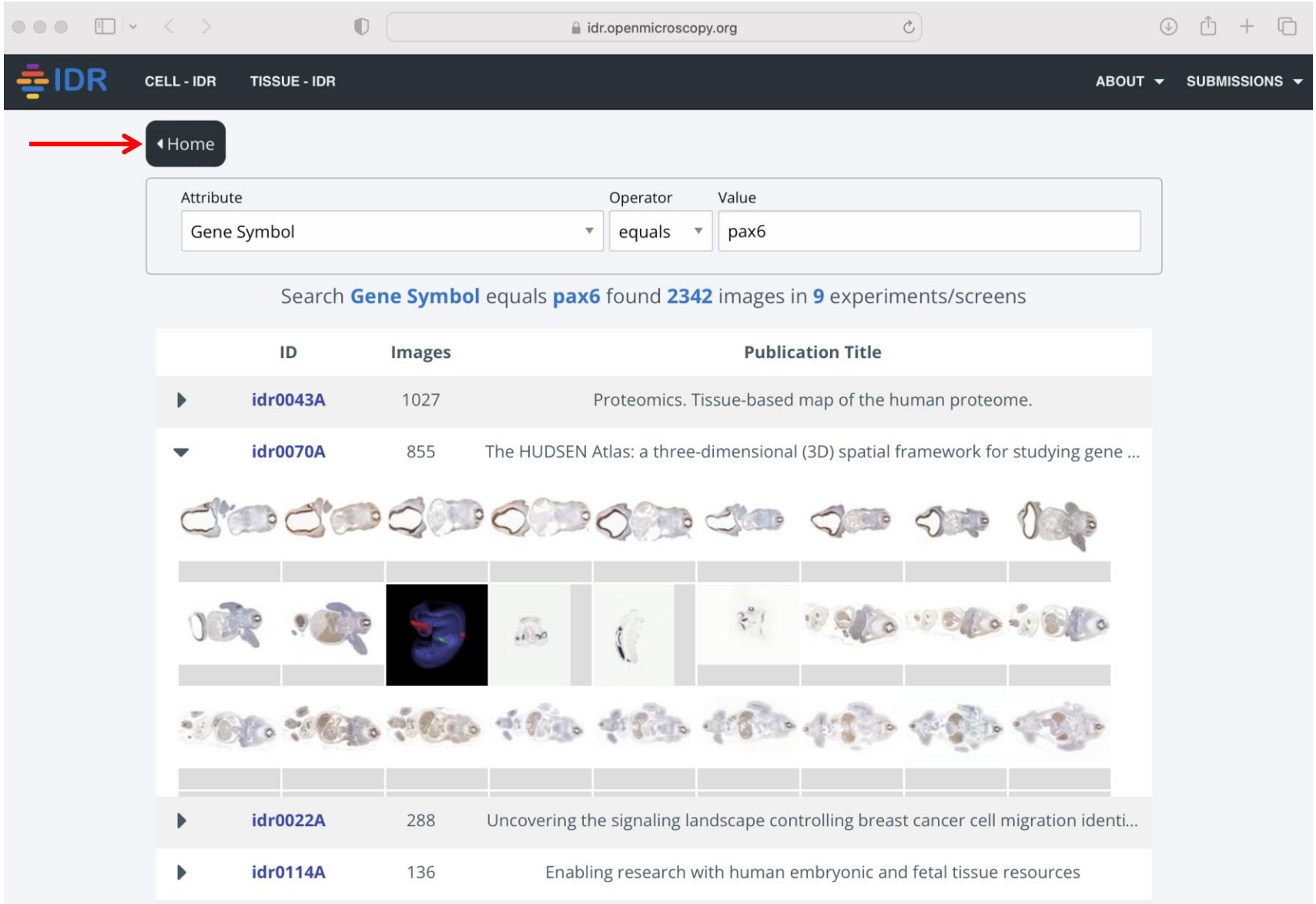


https://idr.openmicroscopy.org

IDR Search


Attribute
Gene Symbol
Operator
equals
Value
pax6
Any
Study
Imaging Method
License
Name (IDR number)
Organism
Publication Authors
Publication Title
Screen Technology Type
Screen Type
Study Type
Image
Antibody
Antibody Identifier
Cell Line
Compound Name
Gene Identifier
✓ Gene Symbol
InChIKey
Pathology
Pathology Identifier
Phenotype
Phenotype Term Accession
Protein
PubChem CID
siRNA Identifier
siRNA Pool Identifier
contains
✓ equals

IDR Search



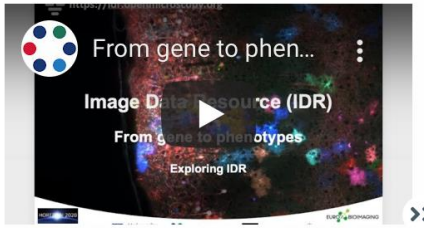
https://idr.openmicroscopy.org

Examples of using IDR

Exploring IDR | Analyze Data

From publication to IDR

Find a specific IDR study from a publication. View images and Regions of Interest (ROIs) in IDR. Explore study metadata.



From gene to phenotypes

Query images by gene. Explore retrieved images and metadata, including associated phenotypes. View images in context of a plate.

From compound to analytics

Query images by compound. Find SARS-CoV-2 dataset. Explore images in relation to analytical data submitted by authors.

Exploring IDR | Analyze Data

The IDR server is built with **OMERO**, allowing access to all image data and metadata via an open API in Python, R, Java, MATLAB and REST/JSON. See the **OMERO API guide** for more information.

For examples of analysis tools working with OMERO to access and analyze data, see the **analysis tools guide**.

Analysis environment setup

Set-up local or on-the-cloud analysis environment. Access images and metadata using API. Run analysis examples. Add your own code.

Segment image and compare

Fetch image and labels from IDR. Segment nuclei using **StarDist**. Compare new labels with original. Validate software package. Save locally segmentation polygons as geojson.

https://idr.openmicroscopy.org

IDR and HumanMine

Which diabetes related genes are expressed in the pancreas?

HumanMine

v12 February 2022

An integrated database of *Homo sapiens* genomic data

https://www.humanmine.org/humanmine

```
TISSUE = "Pancreas"
DISEASE = "diabetes"
```

```
query.add_constraint("proteinAtlasExpression.tissue.name", "=", TISSUE)
query.add_constraint("proteinAtlasExpression.level", "ONE OF", ["Medium", "High"])
query.add_constraint("organism.name", "=", "Homo sapiens")
query.add_constraint("diseases.name", "CONTAINS", DISEASE)
```

```
<BinaryConstraint: Gene.diseases.name CONTAINS diabetes>
```

Collect the genes

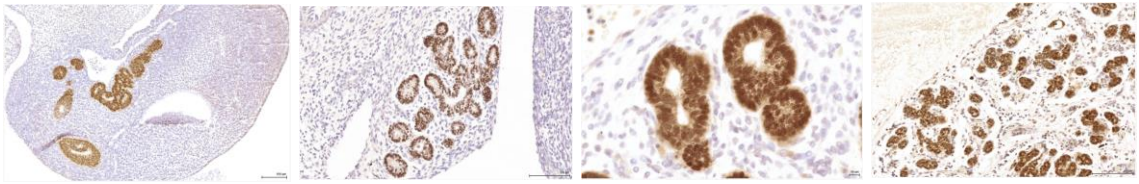
```
upin_tissue = list()
for row in query.rows():
    upin_tissue.append(row["symbol"])
unique = set(upin_tissue)
genes = sorted(genes, reverse=True)
```

Genes found

WFS1 VEGFA TCF7L2 TBC1D4 SOD2 SLC30A8 PTPN22 **PDX1**
MIA3 KCNJ11 IRS2 IRS1 INSR INS IGF2BP2 IER3IP1
HNF4A HNF1B HMGA1 HFE GPD2 GCK ENPP1 EIF2AK3
DNAJC3 CEL CAPN10 APPL1 AKT2 ABCC8

IDR MULTIOMICS API

Images linked to gene PDX1



CS16 CS21 9PCW 15PCW

Developmental stage

Search for images in IDR associated to the genes found in Humanmine

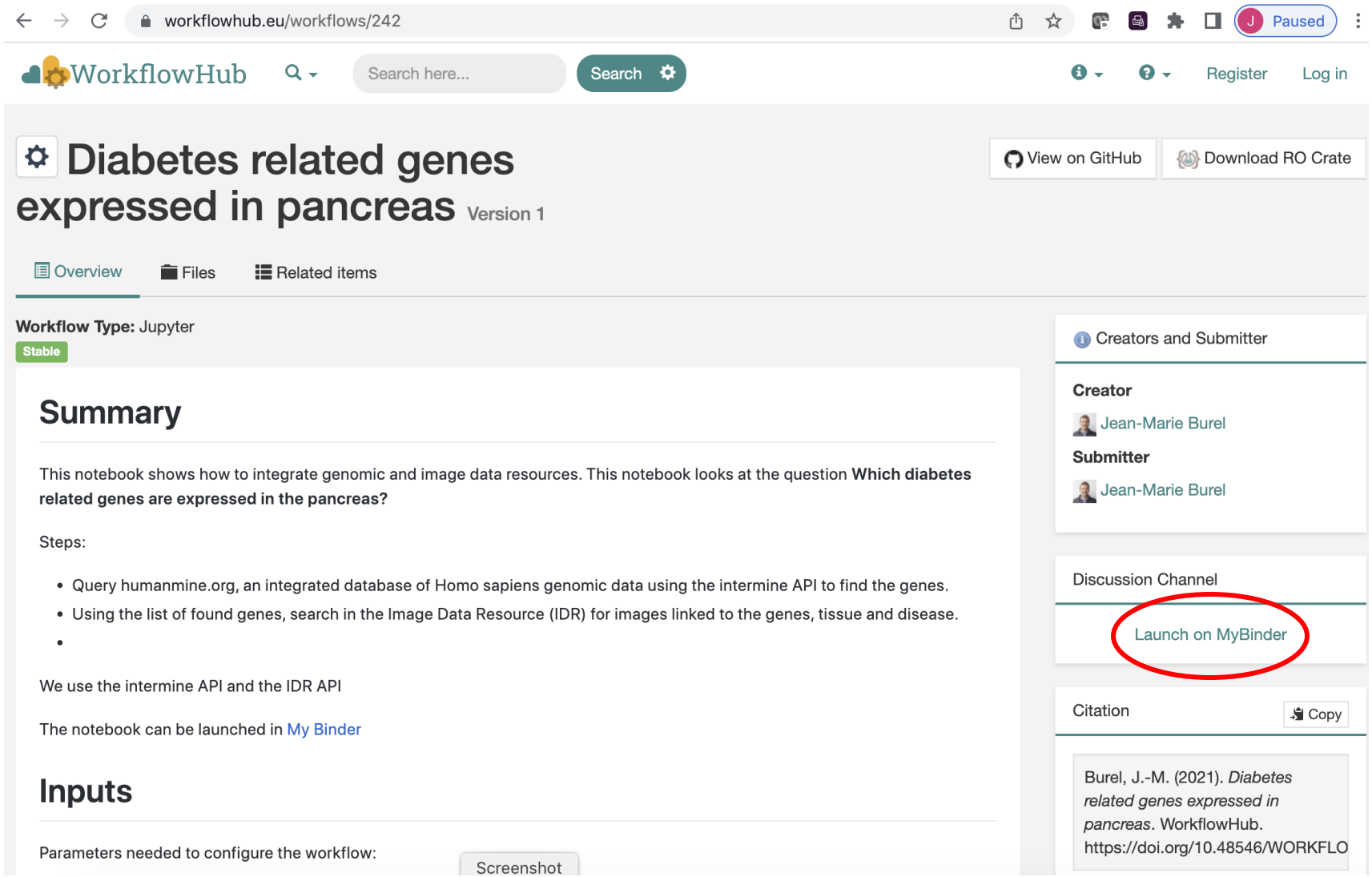
From the list of genes found using the intermine API, we are now looking in Image Data Resource for studies linked to those genes and with *tissue* as a `Sample Type`.

```
TYPE = "gene"
SAMPLE_TYPE = "tissue"
EXPRESSION_KEY = "Expression Pattern Description"
EXPRESSION = "Islets" # "Brain"
KEYS = {'phenotype':
    ('Phenotype',
     "Phenotype Term Name",
     "Phenotype Term Accession",
     "Phenotype Term Accession URL",
    )
}
```

```
projects = list()
for gene in genes:
    qs1 = {'key': TYPE, 'value': gene}
    url1 = URL.format(**qs1)
    json = session.get(url1).json()
    for m in json['maps']:
        qs2 = {'key': TYPE, 'value': gene}
        url2 = SCREENS_PROJECTS_URL.format(**qs2)
        json = session.get(url2).json()
        for p in json['projects']:
            value = find_type("project", p['id'])
            if value > -1:
                projects.append(value)
```

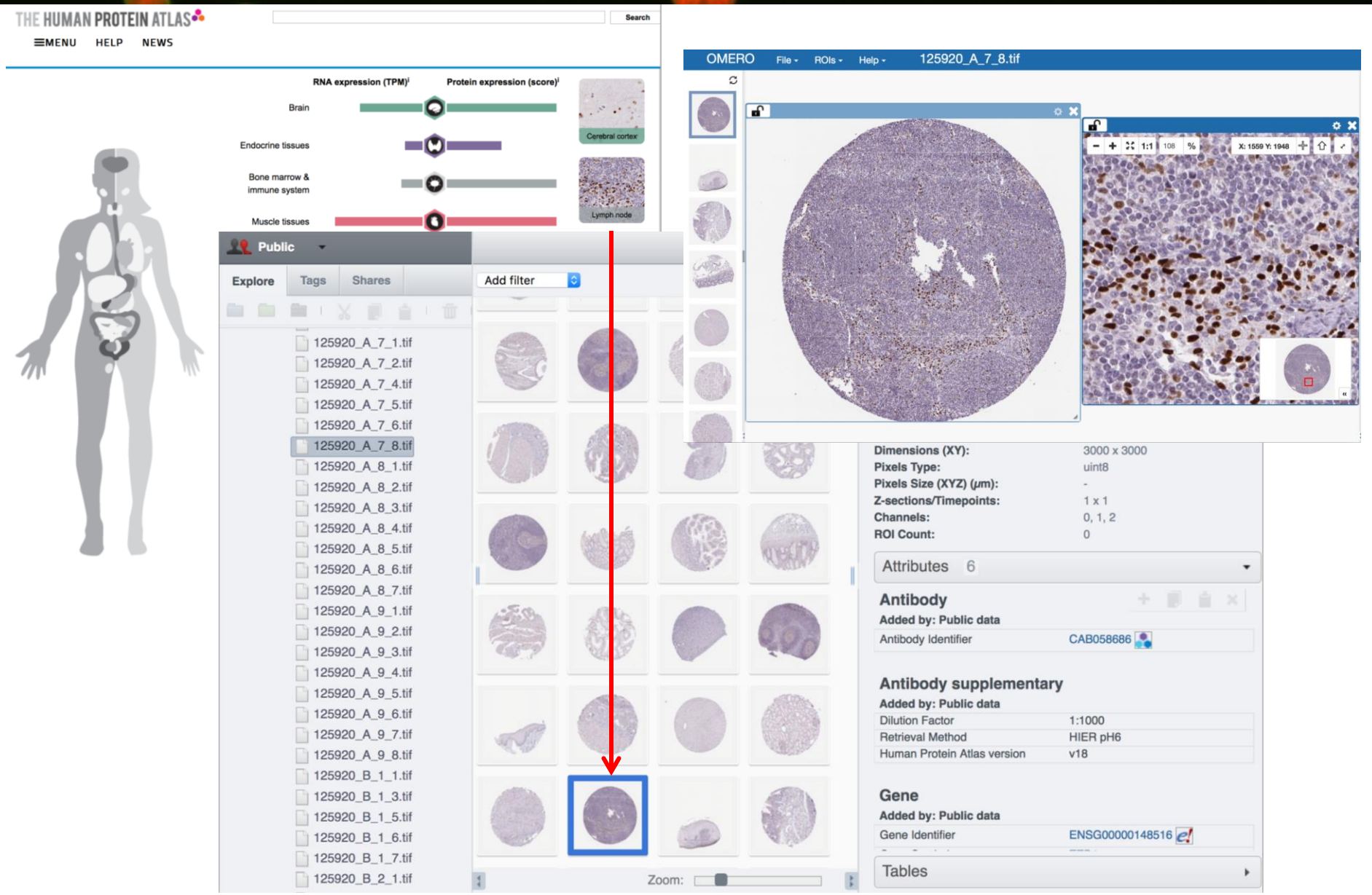
idr0070, Kerwin et al, *Journal of Anatomy* DOI: 10.1111/j.1469-7580.2010.01290.x

IDR and HumanMine



https://workflowhub.eu/workflows/242

IDR and Human Protein Atlas

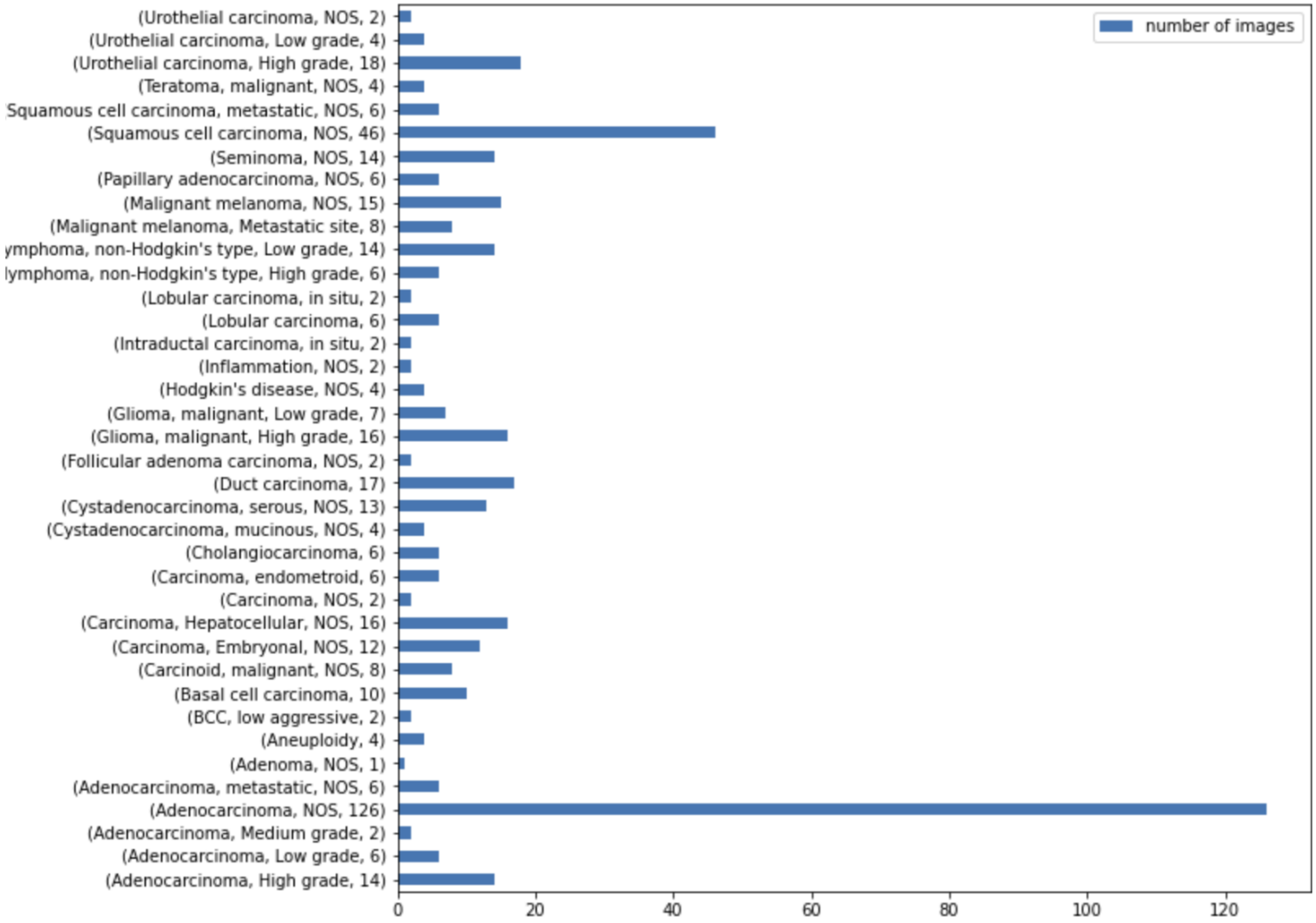


idr0043, Uhlen et al *Science* DOI:10.1126/science.1260419, https://www.proteinatlas.org

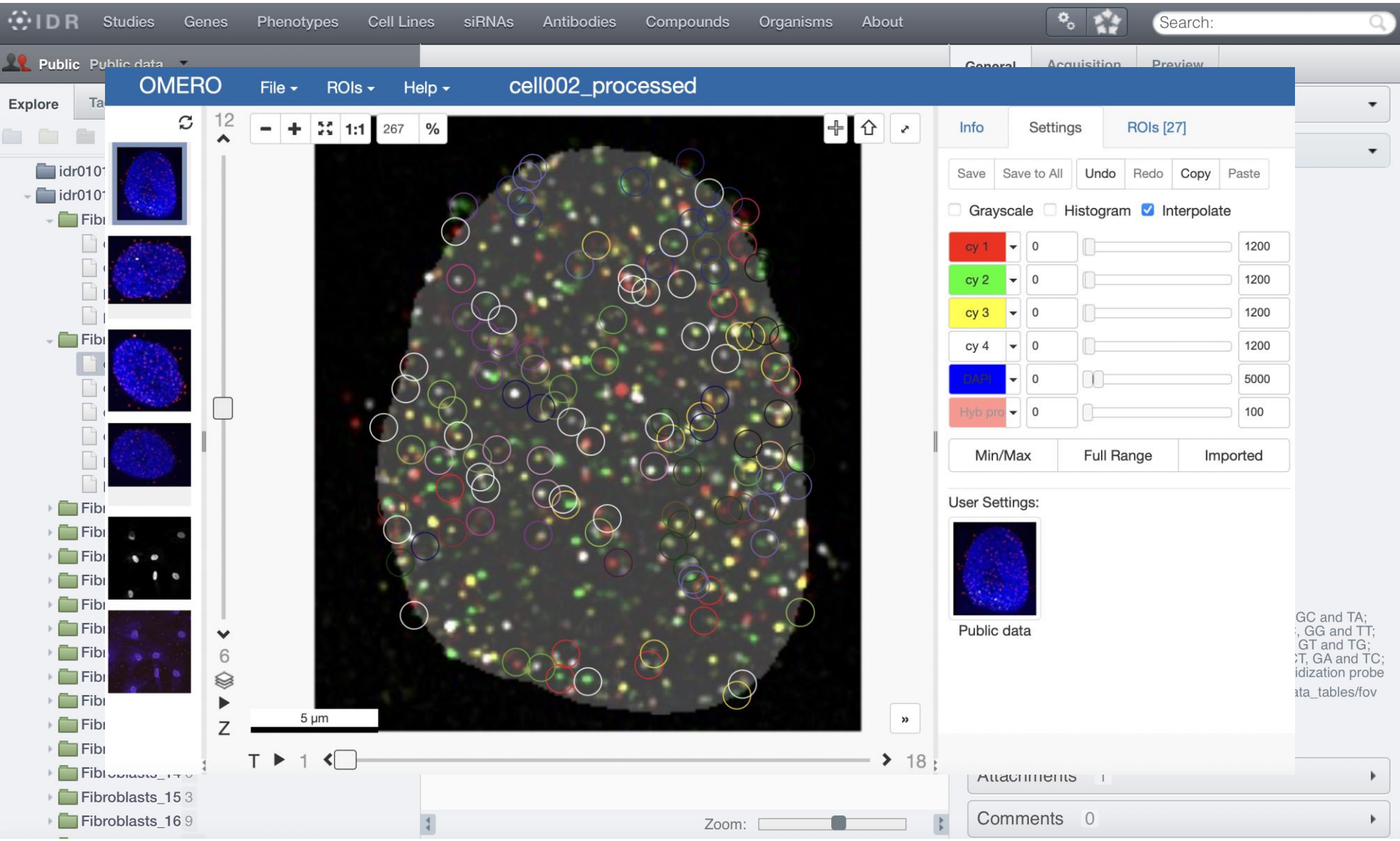
IDR and Human Protein Atlas

Human Protein Atlas:

Number of images associated to the gene PDX1 with abnormal pathology status



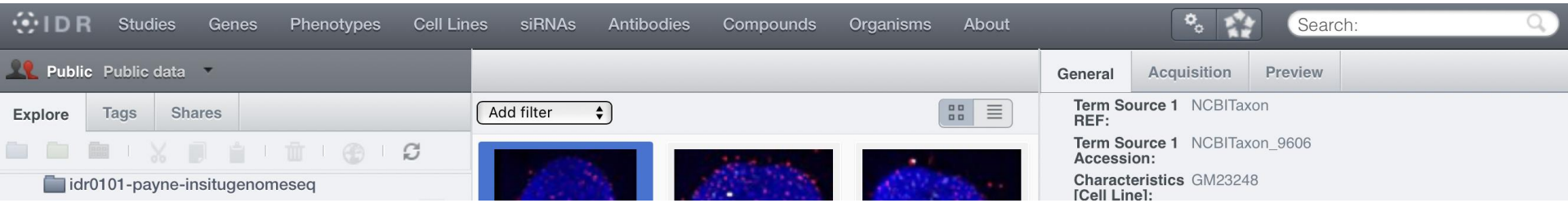
In Situ Sequencing - Linking Multimodal Metadata



idr0101, Payne et al *Science* DOI:10.17867/10000169

In Situ Sequencing - Linking Multimodal Metadata

IDR



bulk_annotations

Download as CSV: Whole Table

Show current page as: CSV | JSON

To filter rows you can use a query based on named columns. For example, to filter for rows where **shape** is greater than **6609251** add ?query=shape>6609251 to the URL.

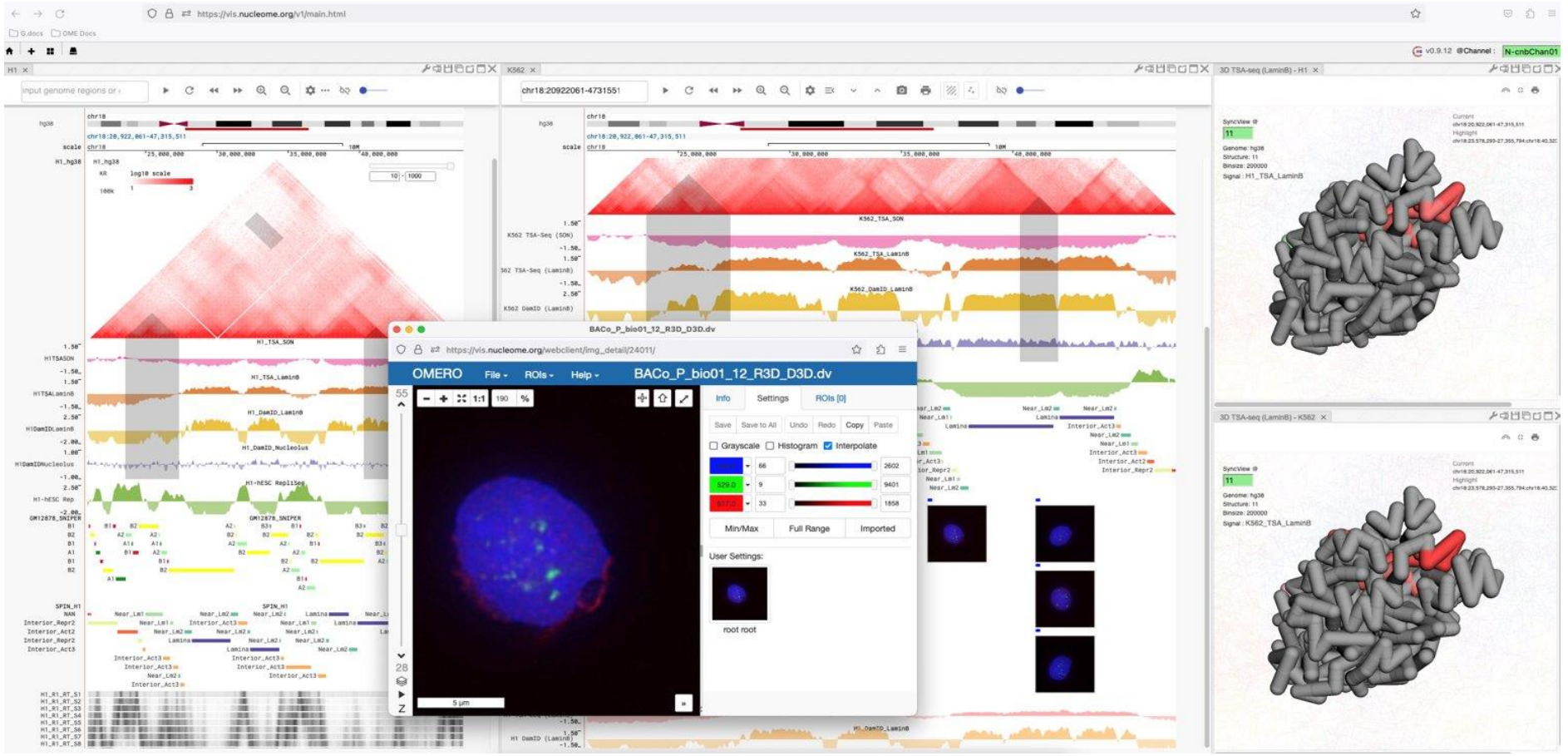
For a more complex example, try ?query=(shape>6609251)&(shape<6609254)

Table rows: **301**.

Roi	shape	cell_id	fov	fov_cell	amp_ind	x_um	y_um	z_um	region_size	hg38_chr	hg38_pos	umi_rol	purity_score	umi_seq	
2363501	6609251	1	1	2	6	15.2752294921875	19.9336328125	1.5	6	1	194631781	133144213232111000	0.619711344073634	TTGTATTAGTTTATGAATGCTGCCA	1331
2363501	6609252	1	1	2	11	13.7585400390625	17.2252587890625	2.1	2	1	150295182	131323132424211000	0.833464665274033	AGGTAACAGCCGCCGGTGAAGCCCT	1313
2363501	6609253	1	1	2	31	14.950224609375	17.116923828125	1.5	3	1	225100477	121224444112341000	1.41730804431887	CATTGAGAATGCTAGTTCGTATTCA	1214
2363501	6609254	1	1	2	53	4.550068359375	12.133515625	1.8	3	1	159490134	134342412243342000	1.9908484714265902	AAGGTTGCATAGAGAAAGGTTACCT	1243
2363501	6609255	1	1	2	78	5.3084130859375	12.56685546875	1.8	3	1	23787304	132213213124423000	1.1026393293151202	GTATTAGTTTTGGTGTAGTATGCCA	1322
2363501	6609256	1	1	2	232	13.650205078125	15.816904296875	1.5	4	1	153996406	241442114442434000	2.32473562719153	CTACGGATTATATGTCTTCTTTCCT	2414
2363501	6609257	1	1	2	389	13.3252001953125	18.63361328125	2.4	4	1	173788354	224242441214242000	2.04123888148904	ATAGTTGAGGATCGAGCGGGGGTAT	2113
2363501	6609258	1	1	2	440	2.2750341796875	14.083544921875	1.5	2	1	201029547	233331413324421000	1.45461949740511	TGGACGATCGAGGGTACTGGTGCCA	2313
2363501	6609259	1	1	2	478	4.116728515625	13.3252001953125	1.8	1	1	35436829	243342432343222000	2.10121851879784	CGTGCGTGTTTGATTAGGTTTTCCT	2433
2363501	6609260	1	1	2	673	4.3333984375	13.650205078125	1.5	4	1	27082504	333423423413433000	2.12571952800988	TTTAGGGTTGATGGTACTGTTGCCA	3334
2363501	6609261	1	1	2	705	4.4417333984375	15.816904296875	2.1	2	1	92374532	312144232424141000	1.74120631396678	GTGTATACTATTTTCATCTGTGTCA	3121
2363501	6609262	1	1	2	780	5.3084130859375	13.866875	1.2	5	1	104368084	324221333321412000	2.53998829881878	TTGAGTAAAGTATCCGTCGTTGCCA	3244
2363501	6609263	1	1	2	785	5.7417529296875	14.083544921875	1.8	6	1	52747838	333343312121144000	2.47414362805048	ATTTCGTGCTTGTAGGTGCGGTCCT	3333
2363501	6609264	1	1	2	857	5.5250830078125	15.383564453125	1.8	2	1	178366318	333341322341142000	1.27093181216116	TAAGTAGGCCGTGAGACGTAGTCCT	3334
2363501	6609265	1	1	2	993	5.0917431640625	13.216865234375	1.5	2	1	112059828	433212413342332000	1.05738785313283	TGCAATTTTGAGTTGGTGGATGCCA	4332
2363501	6609266	1	1	2	1081	3.3583837890625	11.916845703125	1.2	5	1	57737183	414422212422322000	0.958035105708203	AGCCATGCCCCTTTTATTCATCCCT	4143
2363501	6609267	1	1	2	1083	3.03337890625	14.950224609375	1.8	2	1	226248521	414234421211223000	1.33164034014242	GTTGGAAAGTAGATTCGAAAAGTAT	4142
2363502	6609268	1	1	2	35	13.7585400390625	6.6084326171875	1.8	2	2	11330392	124244422331142000	2.9277222459427406	ATTGTTTTAAAAGTCGAGTATTCCT	2422
2363502	6609269	1	1	2	351	17.6585986328125	10.83349609375	1.2	4	2	154125297	214132314424122000	1.5961370210682602	GCTCAATACCAGTGGCGGATGGTCA	2141
2363502	6609270	1	1	2	613	10.183486328125	14.950224609375	1.8	1	2	79069289	222223234132422000	1.82441769480011	CTTGGAACCCAAATTTTTACTTTCA	2222

idr0101, Payne et al *Science* DOI:10.17867/10000169

In Situ Sequencing - Linking Multimodal Metadata



Jhu et al, 2022, *Nature Methods*, 10.1038/s41592-022-01559-3
http://vis.nucleome.org/entry/

Data Download and Reuse

Imaging data for all studies published in IDR is available for download using the Aspera protocol (https://idr.openmicroscopy.org/about/download.html).

Datasets are published under the Creative Commons Attribution 4.0 International license (CC BY 4.0) or a more permissive license.

- **Share** — copy and redistribute the material in any medium or format.
- **Adapt** — remix, transform, and build upon the material for any purpose, even commercially.
- **Attribution** — credit must be given to the creator.

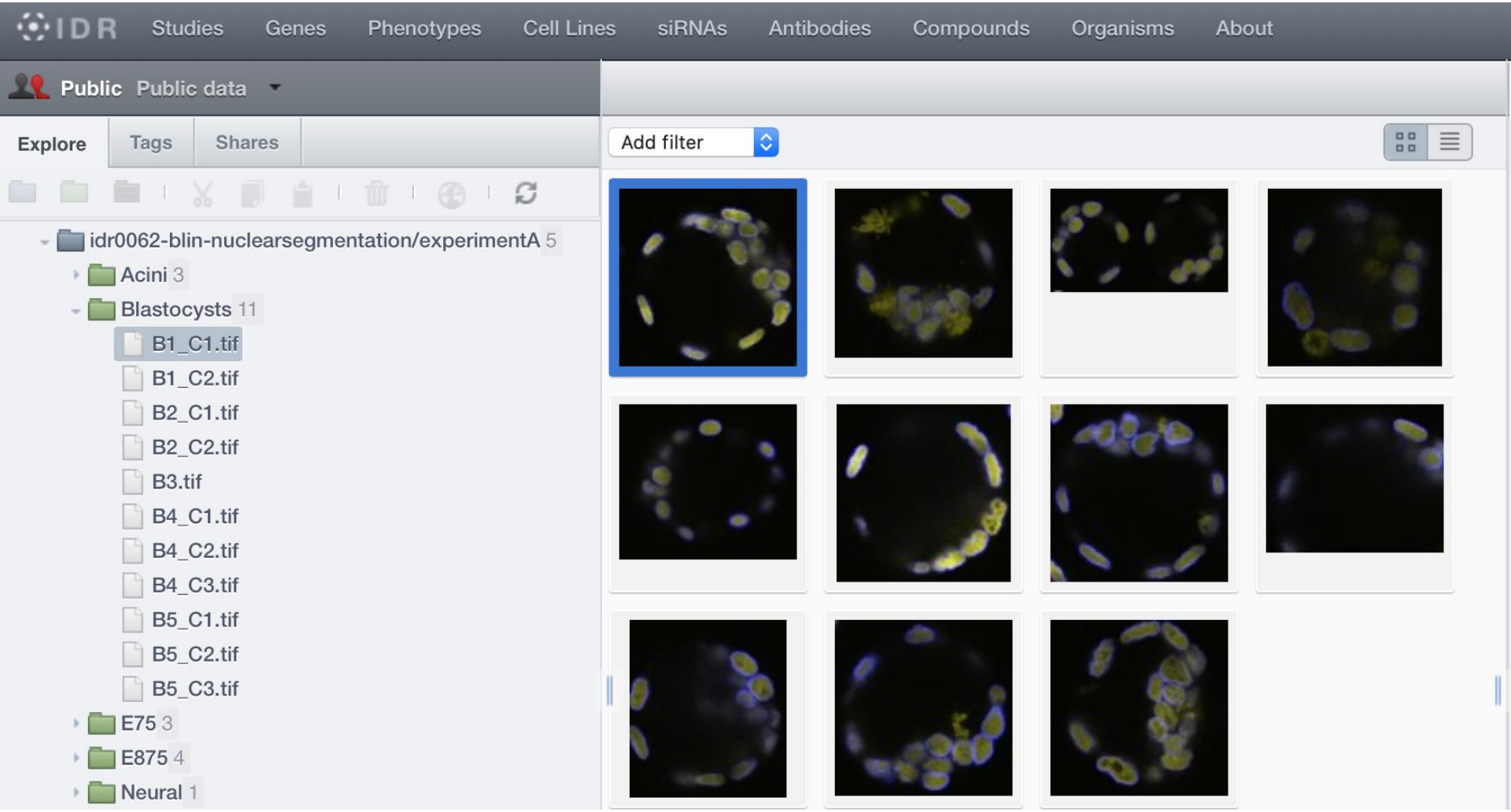
image.sc https://forum.image.sc/

Connect to IDR using APIs

- Java API
- Python API
- R API
- CellProfiler & IDR
- Fiji & IDR
- Orbit & IDR
- QuPath & IDR
- IDR notebooks

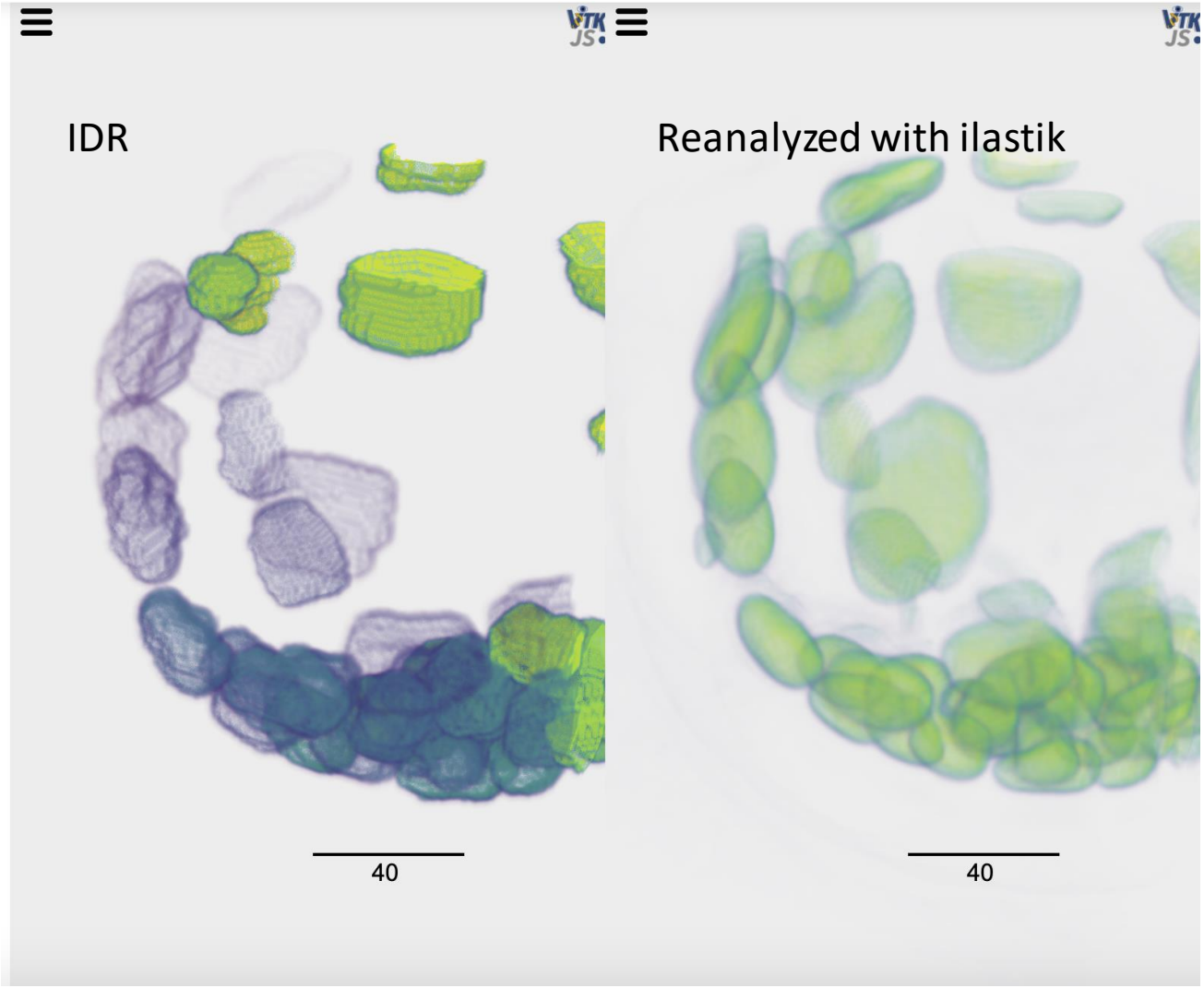
https://github.com/ome/ABIS-GBI-imaging-course-07-2023

Validate chosen tool against data in IDR



idr0062 Blin et al, Plos Biology DOI:10.1371/journal.pbio.3000388

Compare ROIs in IDR to reanalysis output



https://idr.openmicroscopy.org

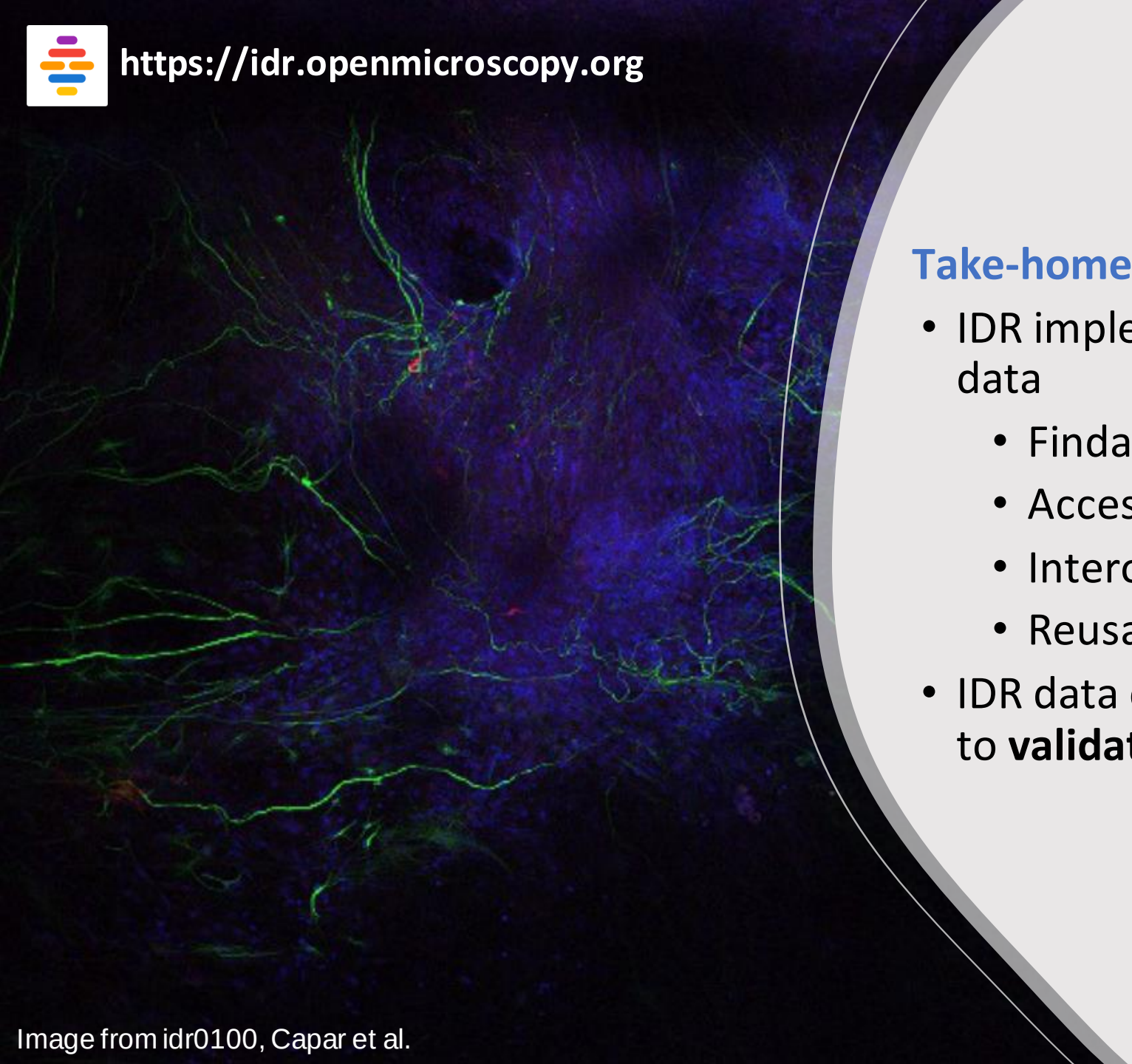


Image from idr0100, Capar et al.

Take-home message:

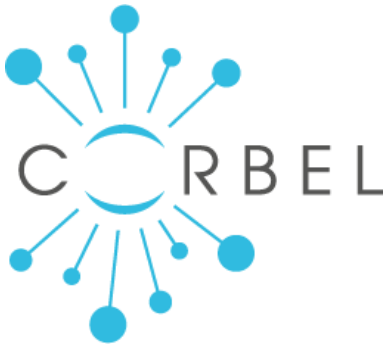
- IDR implements **FAIR** data
  - Findabale
  - Accessible
  - Interoperable
  - Reusable
- IDR data can be used to **validate** tools

Thanks to the funders

IDR

Biotechnology and Biological Sciences Research Council

Chan Zuckerberg Initiative



GLOBAL BIOIMAGING
growing collaboration

MULTI MOT

Thanks to the IDR Team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