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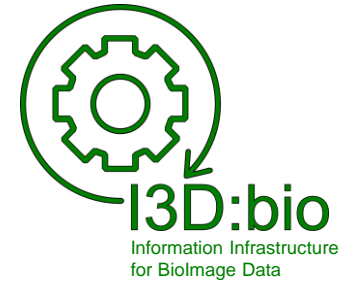
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<https://www.i3dbio.de>

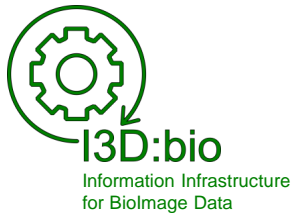
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Research Data Management for Bioimage Data at the **ADD INSTITUTE HERE**

Data organization: Search Function



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Tags and Key-Value Pairs in OMERO (recommendations)

Tags and Key-Value Pairs can be added to:

- Images
- Groups of Images
- Datasets
- Projects

Tags are linked to users or groups

Advanced users:

Annotate Tags and Key-Value Pairs using ontologies and ontology terms (see Chapter on Metadata Curation)

I3D:bio recommendation:

- Use tags for data organization across datasets and projects (categorization)
 - can substitute deep folder hierarchies
- Use Key-Value Pairs for metadata enrichment

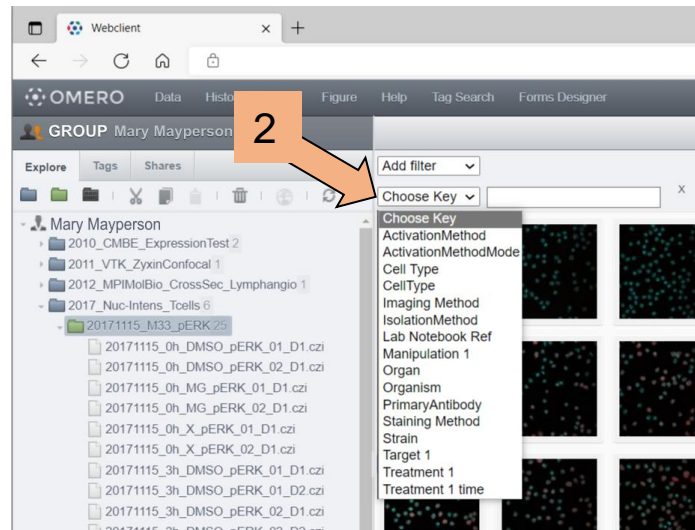
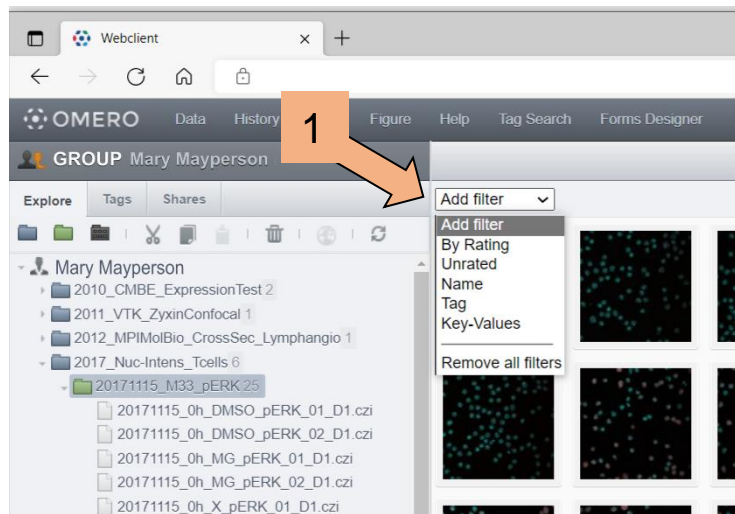
Tags and Key-Value Pairs (here: in OMERO.web)

The screenshot displays the OMERO.web webclient interface. On the left, the 'Explore' panel shows a tree view of files under the 'Mary Mayperson' group. The file '20171123_M36_1_D0h_pERK.czi' is selected. The main area shows a grid of 20 thumbnails of microscopy images. An orange callout box with the text 'Tags and Key-Value Pairs' and two arrows points to the right-hand panel. This panel contains the 'General' tab, which shows the image title '20171123_M36_1_D0h_pERK.czi', its ID (57934), and owner (Mary Mayperson). Below this, the 'Image Details' section lists various metadata fields. At the bottom of this panel, the 'Tags' section shows 0 tags, and the 'Key-Value Pairs' section shows 2 pairs, which are listed in a table below.

Key	Value
primary_AB	anti-p-ERK1/2 (Cell Signaling)
secondary_AB	goat anti-rabbit Alexa-Fluor-647
Cell type	CD4+ T cells
Organ	spleen
Organism	Mus musculus
Strain	C57BL/6

Filter Datasets for Tags and Key-Value Pairs (here: in OMERO.web)

At the Dataset-level, use filters to show a set of images based on Key-Value-Pairs or Tags



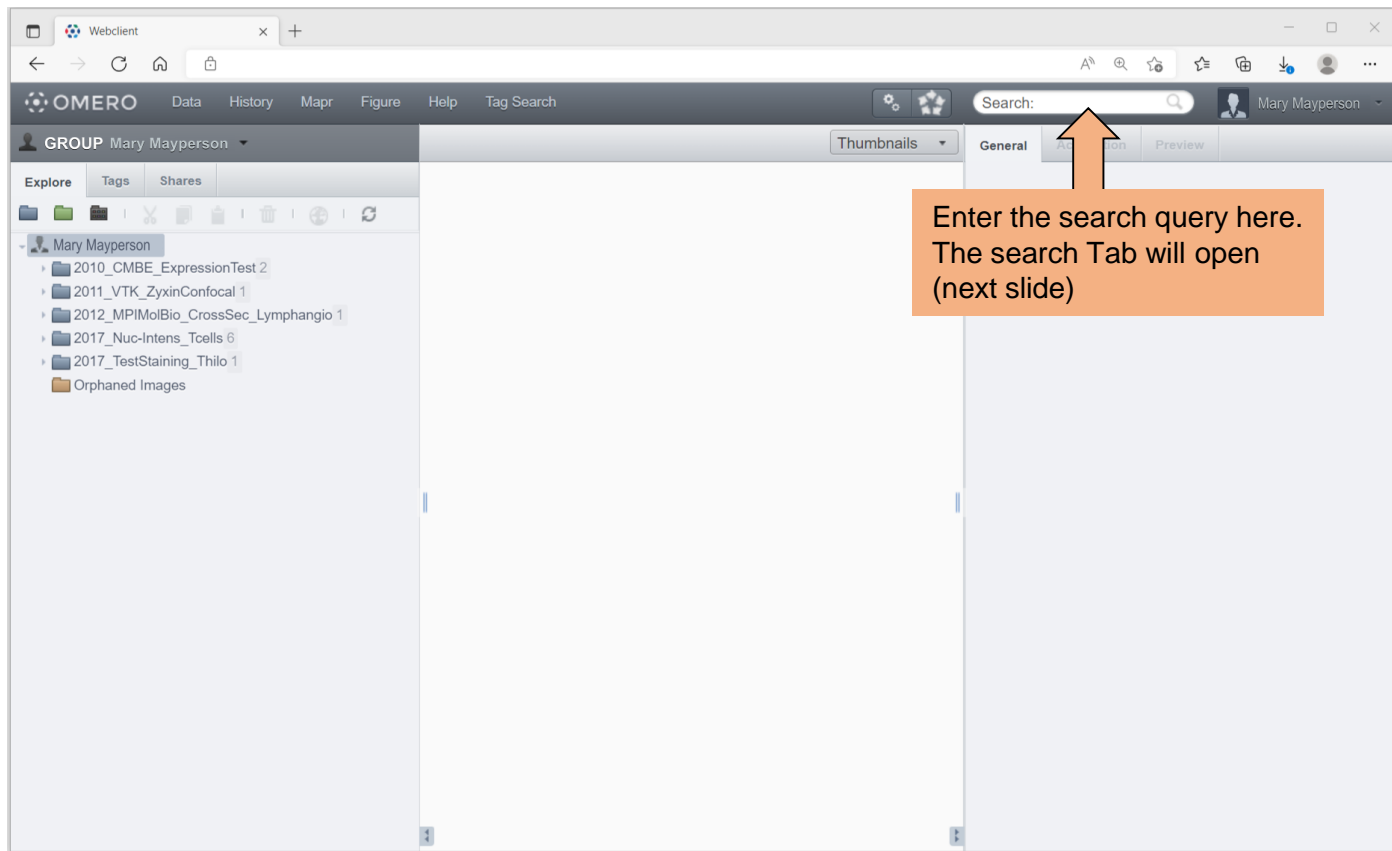
Example shown here: Filtering by Key-Values
(also showing which Keys were used on this Dataset)

(You can also filter by Name or Rating)

Search function to find data, e.g., based on Tags or Key-Value Pairs 1/3

Use the *Search* field to look for data across

- Users
- Groups
- Projects
- Datasets



Enter the search query here.
The search Tab will open
(next slide)

Search function to find data, e.g., based on Tags or Key-Value Pairs 2/3

Refine your search query

Optional:
Restrict for which fields you wish to search

Example 1:
Search for images with both **Tags**

The screenshot shows the OMERO Webclient interface. On the left, the 'Search' panel is active, showing a search query 'DMSO-control' AND 'phospho-ERK'. Below the search bar, there are options to 'Restrict by Field' (Name, Description, Annotations, Files, Tags) and 'Search for' (Images, Datasets, Projects, Wells, Plates, Screens). The 'Scope' is set to 'All Groups' and 'All Users'. The 'Date' is set to 'Import date'. A 'Search' button is at the bottom of the panel. Two orange arrows point from the text 'Refine your search query' and 'Optional: Restrict for which fields you wish to search' to the search and restriction options respectively.

The main panel displays 8 results in a table with columns: Type, Name, Acquired, Imported, Group, and Link. The results are filtered by the search query.

Type	Name	Acquired	Imported	Group	Link
Image	20171115_0h_DMSO_pERK_01_D1.czi	2022-04-08 13:50:20	2022-04-08 13:50:20	OE0629	Browse
Image	20171115_0h_DMSO_pERK_02_D1.czi	2022-04-08 13:50:22	2022-04-08 13:50:22	OE0629	Browse
Image	20171115_3h_DMSO_pERK_02_D2.czi	2022-04-08 13:50:31	2022-04-08 13:50:31	OE0629	Browse
Image	20171115_3h_DMSO_pERK_03_D2.czi	2022-04-08 13:50:32	2022-04-08 13:50:32	OE0629	Browse
Image	20171115_3h_DMSO_pERK_01_D2.czi	2022-04-08 13:50:34	2022-04-08 13:50:34	OE0629	Browse
Image	20171115_3h_DMSO_pERK_01_D1.czi	2022-04-08 13:50:44	2022-04-08 13:50:44	OE0629	Browse
Image	20171115_3h_DMSO_pERK_02_D1.czi	2022-04-08 13:50:53	2022-04-08 13:50:53	OE0629	Browse
Image	20171115_3h_DMSO_pERK_03_D1.czi	2022-04-08 13:50:41	2022-04-08 13:50:41	OE0629	Browse

On the right, the 'General' tab is selected, showing details for the selected image: 20171115_0h_DMSO_pERK_01_D1.czi. The details include Image ID (58103), Owner (Mary Mayperson), Image Details, Add Description, Import Date (2022-04-08 13:50:20), Dimensions (XY): 1912 x 1912, Pixels Type: uint16, Pixels Size (XYZ) (µm): 0.07 x 0.07 x - 1 x 1, Z-sections/Timepoints: 1 x 1, Channels: Ch2-T1, Ch1-T2, ROI Count: 0. Below this, the 'Tags' section shows 2 tags: 'phospho-ERK' and 'DMSO control'. The 'Key-Value Pairs' section shows 2 pairs: 'PrimaryAntibody' with value 'anti-phospho-ERK' and 'CellType' with value 'CD4+ T cell'.

Search function to find data, e.g., based on Tags or Key-Value Pairs 3/3

Refine your search query

Optional:
Restrict for which fields you wish to search

Example 2:
Search for images with specific value in **Key-Value Pairs**

The screenshot shows the OMERO Webclient interface. The search bar contains 'CD4+'. The 'Restrict by Field' section has 'Annotations' selected. The 'Search for' section has 'Images' selected. The 'Scope' is set to 'All Groups' and 'Data owned by' is 'All Users'. The 'Date' is set to 'Import date'. The 'Search' button is visible. The results table shows 66 results. The first few rows are:

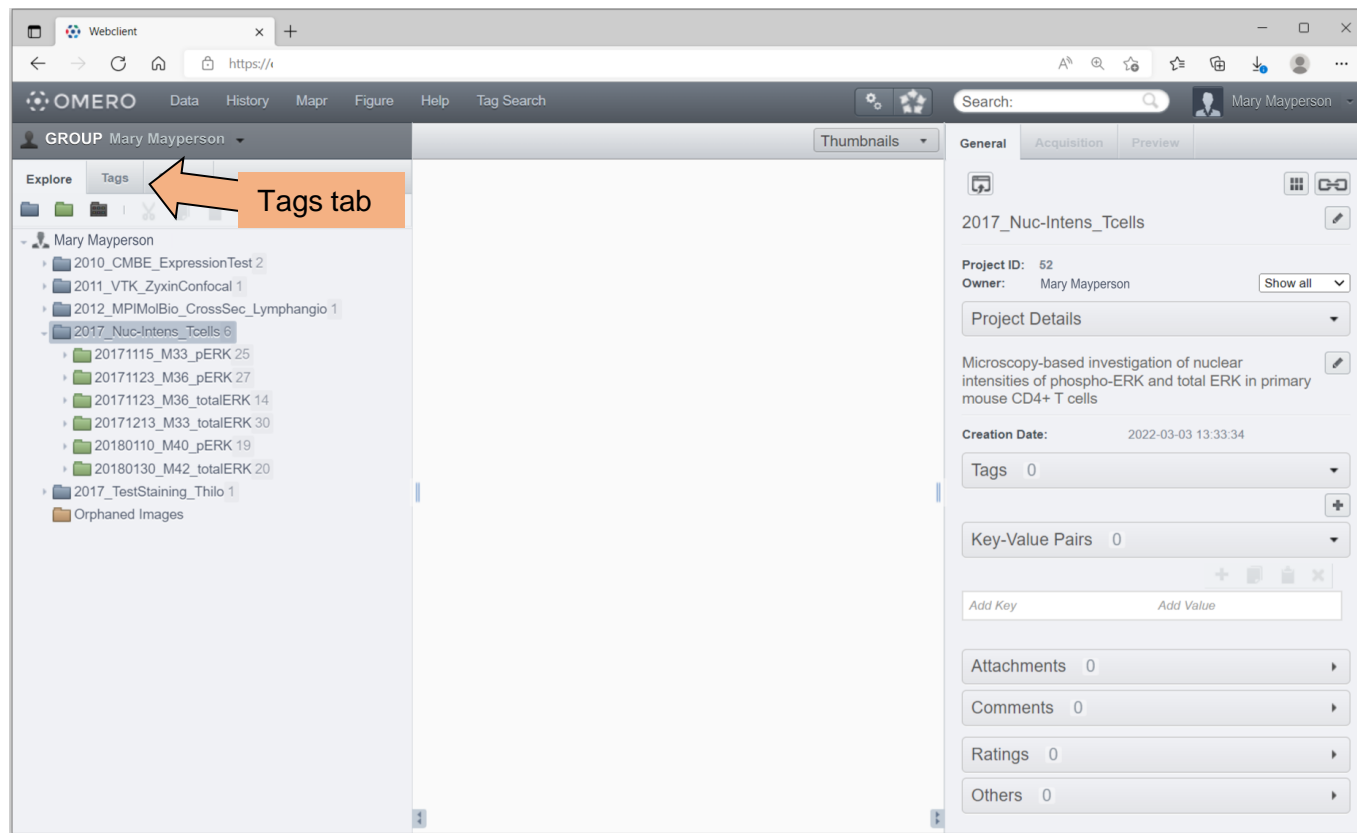
Type	Name	Acquired	Imported
Image	20171115_0h_X_pERK_01_D1.czi	2022-04-08 13:50:14	2022-04-08 13:50:14
Image	20171115_0h_X_pERK_02_D1.czi	2022-04-08 13:50:17	2022-04-08 13:50:17
Image	20171115_0h_MG_pERK_01_D1.czi	2022-04-08 13:50:18	2022-04-08 13:50:18
Image	20171115_0h_MG_pERK_02_D1.czi	2022-04-08 13:50:23	2022-04-08 13:50:23
Image	20171115_0h_DMSO_pERK_01_D1.czi	2022-04-08 13:50:20	2022-04-08 13:50:20
Image	20171115_0h_DMSO_pERK_02_D1.czi	2022-04-08 13:50:22	2022-04-08 13:50:22
Image	20171115_3h_DMSO_pERK_02_D2.czi	2022-04-08 13:50:31	2022-04-08 13:50:31
Image	20171115_3h_DMSO_pERK_03_D2.czi	2022-04-08 13:50:33	2022-04-08 13:50:33
Image	20171115_3h_DMSO_pERK_01_D2.czi	2022-04-08 13:50:34	2022-04-08 13:50:34

The 'Image Details' panel on the right shows the following information:

- Image ID: 58100
- Owner: Mary Mayperson
- Image Details: 1912 x 1912, uint16, 0.07 x 0.07 x - 1 x 1, Ch2-T1, Ch1-T2, 0
- Tags: 1
- Key-Value Pairs: 2
- Added by: Mary Mayperson
- Key: PrimaryAntibody, Value: anti-phospho-ERK
- Added by: Mary Mayperson
- Key: CellType, Value: CD4+ T cell
- Organism: Mus musculus
- Organ: Spleen
- IsolationMethod: MACS negative sort

No need to search – Use Tags for dynamic data re-organization (1/3)

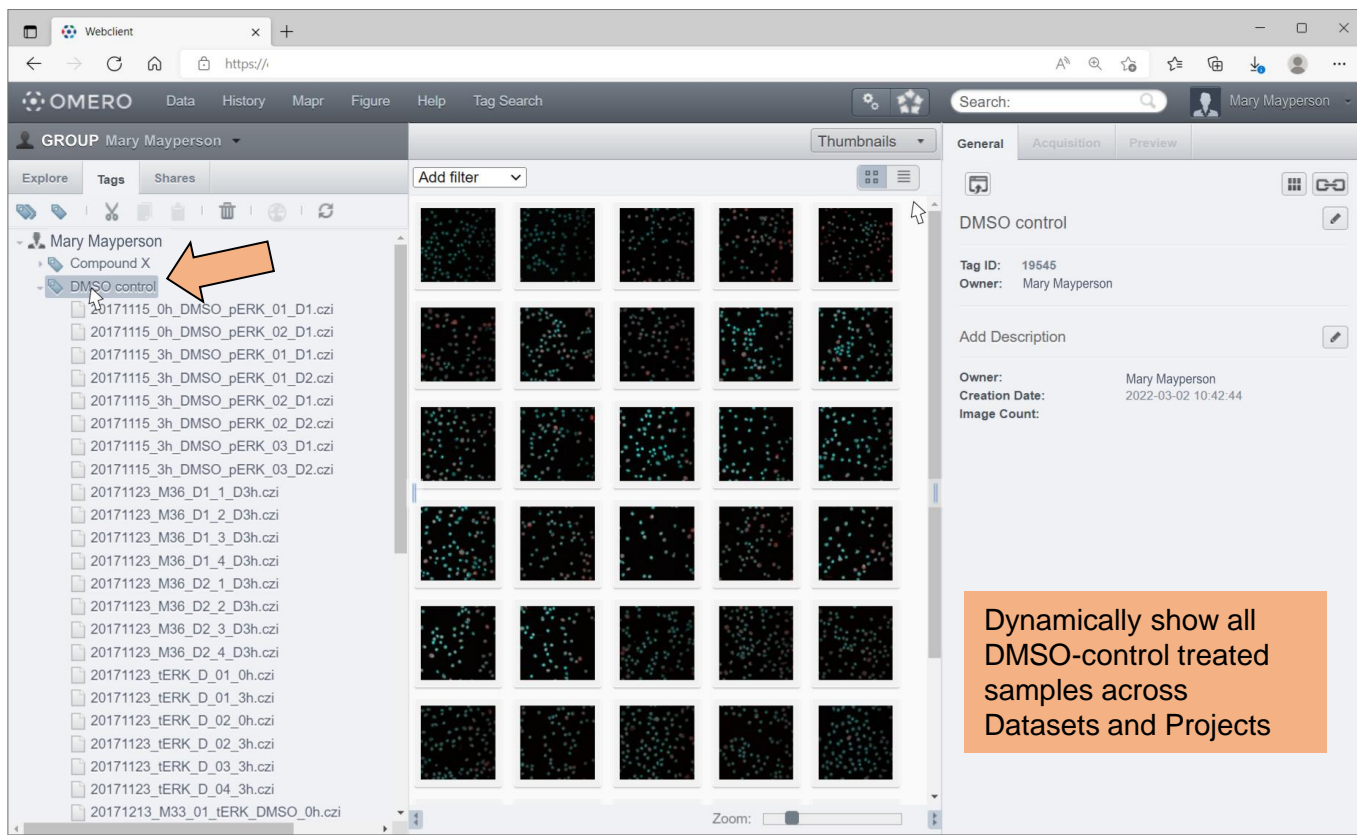
If you have annotated your data with Tags, use the **Tags** tab to view files based on the Tags



No need to search – Use Tags for dynamic data re-organization (2/3)

The Tags tab allows for a dynamically re-organized data-tree representation based on your Tags

→ Advantage over deep folder hierarchies



Using Tag Search (OMERO.webtagging extension)

Tag Search
allows combining
tags
(if it is installed)

Example:
Review all
images from
control-treated
samples for the
staining target
across
repetitions

The screenshot shows the OMERO webclient interface. The top navigation bar includes 'Data', 'History', 'Mapr', 'Figure', 'Help', and 'Tag Search'. An orange arrow points to the 'Tag Search' menu item. The left sidebar shows 'TAG SEARCH' with 'Selected Tags' including 'DMSO control' and 'phospho-ERK'. Below this, 'Preview' is checked, and 'RESULTS' show counts for Project, Dataset, Screen, Plate, and Image. The main area displays a table of filtered results with columns for Object, Name, Import Date, Group, and Link. The right sidebar shows tabs for General, Acquisition, and Preview.

Object	Name	Import Date	Group	Link
	20171115_3h_DMSO_pERK_03_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_0h_DMSO_pERK_01_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_01_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_01_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_02_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_0h_DMSO_pERK_02_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_02_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_03_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse

Using Tag Search (OMERO.webtagging extension) – create figures

Example:
Use the Tag Search results to prepare a comprehensive figure using OMERO.figure

The screenshot shows the OMERO web interface. On the left, the 'TAG SEARCH' section shows 'Selected Tags: DMSO control' and 'phospho-ERK'. Below this, the 'Preview' section shows 'RESULTS' with counts for Project (0), Dataset (0), Screen (0), Plate (0), Plate Acquisition/Run (0), and Image (8). The main area displays a table of search results with columns: Object, Name, Import Date, Group, and Link. An orange arrow points to the 'Link' column header. On the right, a dropdown menu is open, showing options: 'Image viewer', 'OMERO.figure' (highlighted), 'OMERO.iviewer', and 'FPBioimage'. Below the menu, the 'General' tab is active, showing metadata for the selected image, including 'Added by: Mary Mayperson', '8 Annotations linked to: 8 objects', 'PrimaryAntibody: anti-phospho-ERK', 'CellType: CD4+ T cell', 'Organism: Mus musculus', 'Organ: Spleen', 'Attachments: 1', 'Comments: 0', 'Ratings: 0', and 'Others: 0'.

Object	Name	Import Date	Group	Link
	20171115_3h_DMSO_pERK_03_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_0h_DMSO_pERK_01_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_01_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_01_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_02_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_0h_DMSO_pERK_02_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_02_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_03_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse

Using Tag Search (OMERO.webtagging extension) – quick split view

Example:
Use the Tag Search results to produce a quick comparative figure of the Split View

The screenshot shows the OMERO webclient interface. On the left, the 'TAG SEARCH' panel displays 'Selected Tags: DMSO control' and 'phospho-ERK'. Below this, the 'RESULTS' section shows a list of objects with columns for Object, Name, Import Date, Group, and Link. The main panel displays a table of 8 objects, each with a thumbnail image and a 'Browse' link. On the right, the 'General' panel shows 'Selected 8 objects' and a 'Split View Figure...' button, which is highlighted by an orange arrow. Below this, the 'ANNOTATIONS' section shows 'Tags 2' and 'Key-Value Pairs'. The 'Add annotations to 8 objects' section shows 'Add Key' and 'Add Value' fields. The 'Added by: Mary Mayperson' section shows '8 Annotations linked to: 8 objects' and 'PrimaryAntibody anti-phospho-ERK'. The 'Added by: Mary Mayperson' section also shows '8 Annotations linked to: 8 objects' and 'CellType CD4+ T cell', 'Organism Mus musculus', and 'Organ Spleen'. The 'Attachments' section shows '1' attachment, 'Comments' 0, 'Ratings' 0, and 'Others' 0.

Object	Name	Import Date	Group	Link
	20171115_3h_DMSO_pERK_03_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_0h_DMSO_pERK_01_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_01_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_01_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_02_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_0h_DMSO_pERK_02_D1.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_02_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse
	20171115_3h_DMSO_pERK_03_D2.czi	April 8, 2022, 12:50 p.m.	GROUP	Browse

Using Tag Search (OMERO.webtagging extension) – quick split view

The image displays two overlapping screenshots of the OMERO web interface. The background screenshot shows the 'Tag Search' results page for a group named 'Mary Mayperson'. The 'TAG SEARCH' section shows 'Selected Tags' as 'DMSO control' and 'phospho-ERK'. The 'Filter Results' table lists several image objects with names like '20171115_3h_DMSO_pERK_03_D1.czi' and '20171115_0h_DMSO_pERK_01_D1.czi'. The 'Annotations' section on the right shows 'Tags: 2', 'Key-Value Pairs: 16', and lists annotations added by 'Mary Mayperson', including 'PrimaryAntibody: anti-phospho-ERK' and 'CellType: CD4+ T cell'. A 'Split View Figure' dialog is open in the foreground, showing a 3x3 grid of image thumbnails. The top row of thumbnails is labeled 'Ch2-T1', 'Ch1-T2', and 'Ch2-T1 Ch1-T2'. The dialog also includes a 'View Script' slider and 'Cancel' and 'Create Figure' buttons.

Create Split View Figure - Profil 1 - Microsoft Edge
https://omero
p=58116,58103,5811

OMERO
Split Panels Grey: ☐ Merged Names: ☒
Image Name: Ch2-T1 ☒ Ch1-T2 ☒
Ch2-T1 Ch1-T2 Ch2-T1 Ch1-T2
20171115_3h_DMSO_pERK_03_D1.czi
20171115_0h_DMSO_pERK_01_D1.czi
20171115_3h_DMSO_pERK_01_D2.czi
View Script Cancel Create Figure

Webclient
https://o
OMERO
Data History Mapr Figure Help Tag Search
GROUP Mary Mayperson
TAG SEARCH
Selected Tags: DMSO control x phospho-ERK x
Preview: ☒
RESULTS
Project: 0
Dataset: 0
Screen: 0
Plate: 0
Plate Acquisition/Run: 0
Image: 8
Filter Results
Object Name Import Date
20171115_3h_DMSO_pERK_03_D1.czi April 8, 2022, 12:50 p.m.
20171115_0h_DMSO_pERK_01_D1.czi April 8, 2022, 12:50 p.m.
20171115_3h_DMSO_pERK_01_D2.czi April 8, 2022, 12:50 p.m.
20171115_3h_DMSO_pERK_02_D1.czi April 8, 2022, 12:50 p.m.
20171115_0h_DMSO_pERK_02_D1.czi April 8, 2022, 12:50 p.m.
20171115_3h_DMSO_pERK_02_D2.czi April 8, 2022, 12:50 p.m.
20171115_3h_DMSO_pERK_03_D2.czi April 8, 2022, 12:50 p.m.
Activities
Split View Figure
Split view figure created and attached to image 20171115_3h_DMSO_pERK_03_D1.czi.
Clear List
Show all
Annotations
Tags: 2
Key-Value Pairs: 16
Add annotations to 8 objects
Add Key Add Value
Added by: Mary Mayperson
8 Annotations linked to: 8 objects
PrimaryAntibody anti-phospho-ERK
Added by: Mary Mayperson
8 Annotations linked to: 8 objects
CellType CD4+ T cell
Organism Mus musculus
Organ Spleen
Attachments: 0
Comments: 0
Ratings: 0
Others: 0

More information on the search syntax in OMERO:

See the OMERO guides:

<https://omero-guides.readthedocs.io/projects/introduction/en/latest/search-omero.html>