

SSBD: utilizing OMERO for developing an open database of microscopy images and quantitative data

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SSBD database

- A open database of image/quantitative data
<http://ssbd.qbic.riken.jp> (Since Sep. 2013)

SSBD Database

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Introduction of SSBD

Systems Science of Biological Dynamics (SSBD) database provides a rich set of resources for analyzing quantitative biological data, such as single-molecule, cell, and gene expression nuclei. Quantitative biological data are collected from a variety of species, sources and methods. These include data obtained from both experiment and computational simulation. These quantitative numerical data are represented in a new **Biological Dynamics Markup Language (BDML)**. The new data format allows users to exchange, store, compare and analyze data through the SSBD database. Users can download quantitative biological dynamics data directly in BDML format from the SSBD database. The system utilizes OMERO server to manage image data and experimental conditions. A range of software tools and applications for visualizing and analyzing quantitative biological dynamical data are being developed through a set of SSBD APIs.

News and Events

June 18, 2014: BDML schema 0.18 released!

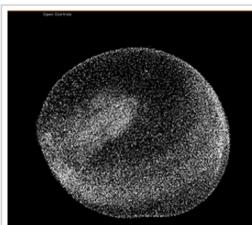
BDML schema version 0.18 has been released. All BDML-files and software have been updated.

March 17, 2014: System maintenance notice (Date: Mar. 19 (JST))

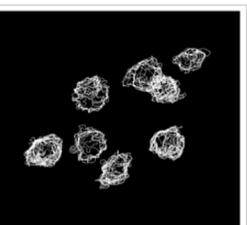
Due to system maintenance, SSBD database will be unavailable Mar. 19, 2014 10:00 am to 13:00 pm (About 4 hours, JST).

[Older news ...](#)

Sample Datasets



Nuclear division dynamics in zebrafish wild-type embryo



Nuclear division dynamics in C. elegans wild-type embryo



Single molecule dynamics in E. coli wild-type

Sign in to SSBD

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Menu

BDML and PDPML schemas can be found [here](#).

OMERO web: Some images can be viewed on [OMERO.web](#). If you have problem viewing the images on the website, please click on the drop-down arrow on the right of 'public data' on the bar above the data tree, select 'Public' group and 'public data' to view the images (click [here](#) for more details).

Introducing SSBD Database

Introducing the
SSBD Database
Systems Science of Biological



Copyright notice

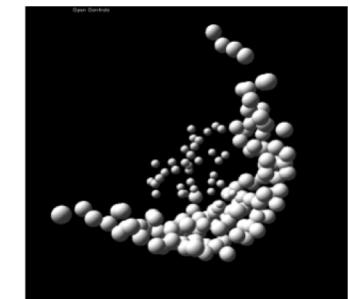
Links

[OME](#) [WDDD](#) [WormBase](#)

Image data



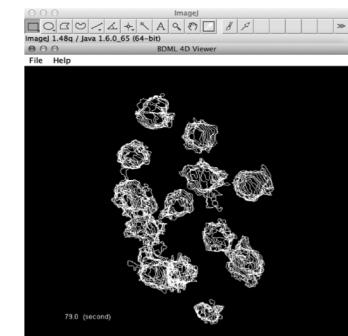
Quantitative data



BDML
format



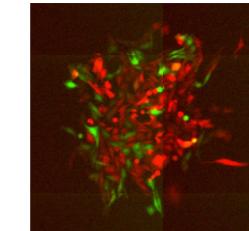
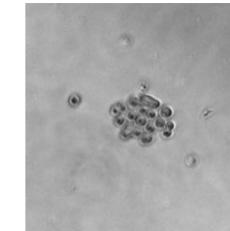
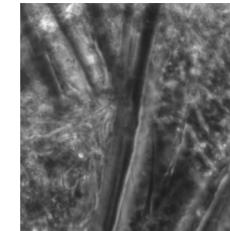
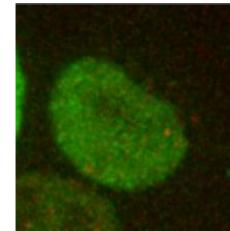
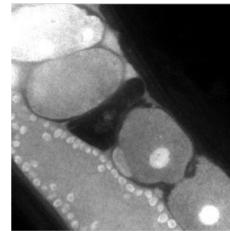
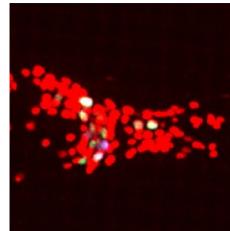
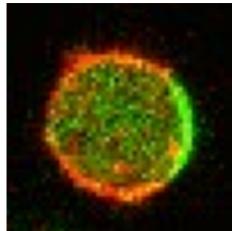
BDML
compatible



Examples of images stored in SSBD

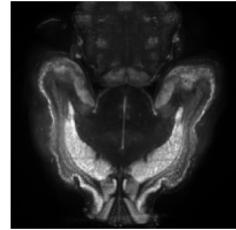
We collect microscopy images that have been published in peer-reviewed journal under authors' permission.

Dictyostelium cell *C. elegans* neuronal cell *C. elegans* oocyte Mouse ES cell Mouse iPS cell Mouse cultured cell Hamster cultured cell

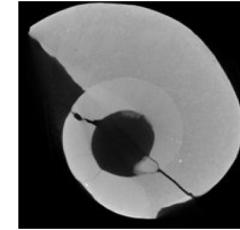


(Watabe et al. 2015) (Toyoshima et al. 2016) (Takayama & Onami 2016) (Ochiai et al. 2015) (Tanaka & Fujita 2015) (Yonemura 2014) (Matsuda et al. 2015)

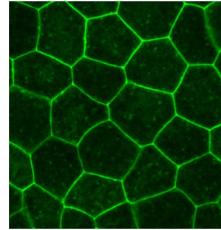
Mouse



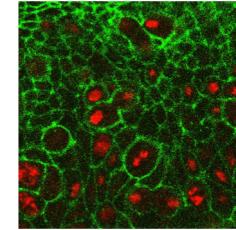
D. cf. damesi



X. laevis



D. melanogaster



1200
1000
800
600
400
200
0

Quantitative data
Image data

483

460

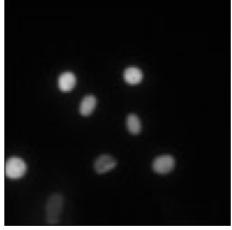
336

633

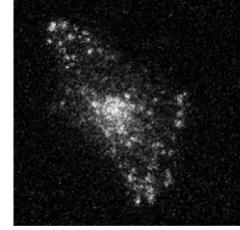
Number of datasets

2013 2014 2015 2016 2017

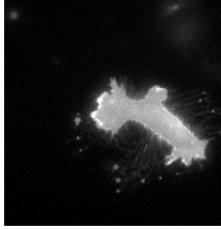
Rat



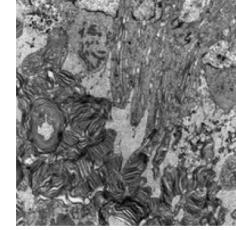
Dog



Human



Human



(Aoki et al. 2013)

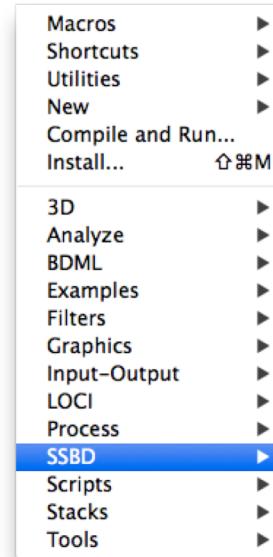
(Takai et al. 2015)

(Kunida et al. 2012)

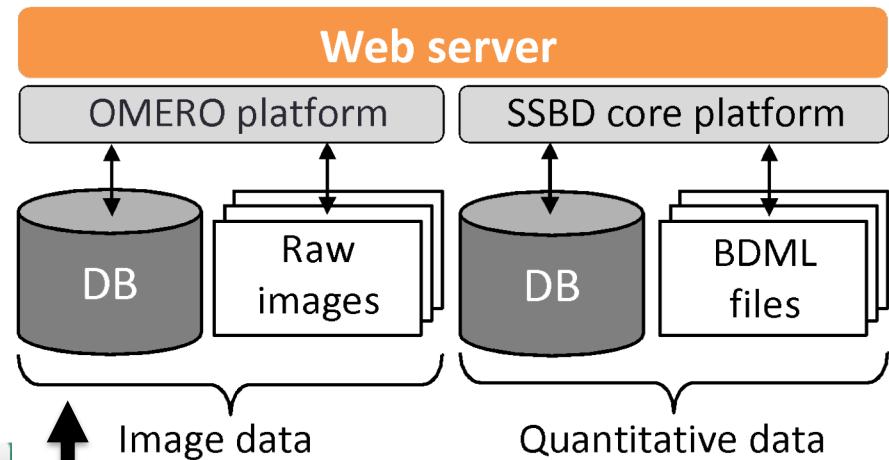
(Shirai et al. 2016)

ImageJ connection service

- Developing a session ID providing service as an OMERO/Django app.
- Sharing an ImageJ plugin (OMERO insight-ij) modified to request a connection from ImageJ to SSBD by the session ID.



SSBD internal view



<http://ssbd.qbic.riken.jp/image/publicKey/>

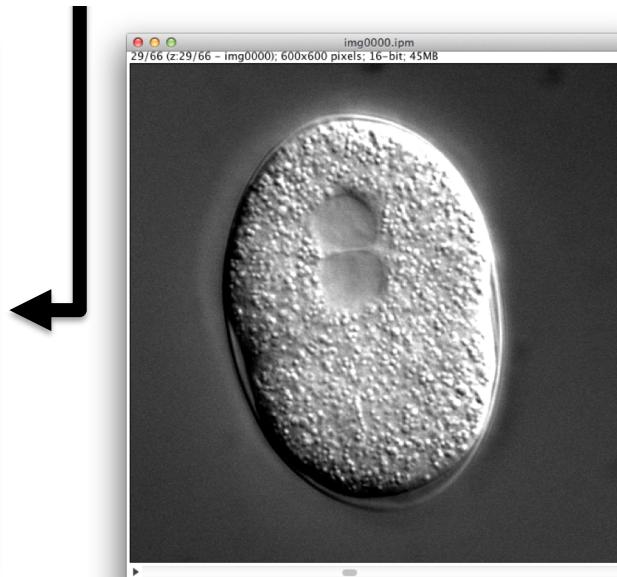


Image search service

- Creating key-value metadata for images.
- Developing an image search service as an OMERO/Django app.
- Arrowing public user accession.

<http://ssbd.qbic.riken.jp/image/search/>

We would like to develop a more integrated service ...

The screenshot shows the SSBD Database interface. On the left, there's a search interface with categories like Home, Resources, Manuals, Publications, News, and Software. A red box highlights the 'Image Search' button. Below it is a 'Microscopy Image Search' section with a dropdown for 'Dataset' and a 'All Fields' search bar. The results show 1 to 10 of 323 entries, each with a thumbnail image, organism name, license, and download link. On the right, there's an integrated OMERO viewer showing a grid of microscopy images. A red box highlights the 'public user' section where dataset details like ID, owner, and creation date are listed. Another red box highlights the 'Attributes' panel on the far right, which displays key-value metadata for the selected dataset, including License (CC BY-NC-SA), Organization (RIKEN), and Description (3D time-lapse microscopy images about nuclear division dynamics in B0336.10(RNAi) embryo). The number 5 is in the bottom right corner.

SSBD Database

Browse through categories:

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Image Search Data Search > Archive Data

» Japanese

Microscopy Image Search

Dataset All Fields

All Fields

Results: 1 to 10 of 323

1. OMERO Dataset ID: 1
ORGANISM: C. elegans, NAME: RNAI_B0336.10_040518_01, LICENSE: CC BY-NC-SA, DESCRIPTION: 3D time-lapse microscopy images about nuclear division dynamics in B0336.10(RNAi) embryo. PubMed: https://www.ncbi.nlm.nih.gov/pubmed/23172286, DOWNLOAD: http://ssbd.qbic.riken.jp/data/source/Ce_KK_P002/RNAI_B0336.10_040518_01.zip

Viewing an image (OMERO Image ID: 1)

2. OMERO Dataset ID: 2
ORGANISM: C. elegans, NAME: RNAI_B0336.10_040518_02, LICENSE: CC BY-NC-SA, DESCRIPTION: 3D time-lapse microscopy images about nuclear division dynamics in B0336.10(RNAi) embryo. PubMed: https://www.ncbi.nlm.nih.gov/pubmed/23172286, DOWNLOAD: http://ssbd.qbic.riken.jp/data/source/Ce_KK_P002/RNAI_B0336.10_040518_02.zip

OMERO

Explore Tags Shares

Add filter

public data

10-Komatsuaki-MolDyn 1

11-Toyoshima-NeuAct 14

12-Takayama-Oocyte 119

13-Watabe-MolDyn 2

14-Ochiai-MolDynMS2 1

15-Harima-GenExp 2

16-Tanaka-FluidDyn 4

17-Aoki-MolDyn 2

18-Kunida-MolDynRho 2

19-Tanaka-FluidDyn 1

oda-WormEmbryoRNAI 187

...0336.10_040518_01 180

img0000.ipm

img0001.ipm

img0002.ipm

img0003.ipm

img0004.ipm

img0005.ipm

img0006.ipm

img0007.ipm

img0008.ipm

img0009.ipm

img0010.ipm

Search: public user

General Acquisition Preview

RNAI_B0336.10_040518_01

Dataset ID: 1
Owner: public data
Show all

Dataset Details

See details in Kyoda et al. (2013) Nucleic Acids Res 41: D732-D737
Creation Date: 2016-11-08 21:40:02

Key-value metadata

Attributes 1

Added by: public data

License: CC BY-NC-SA

Contactname: Shuichi Onami

Organization: RIKEN

Department: Quantitative Biology Center

Laboratory: Laboratory for Developmental Dynamics

Contributors: Eru Adachi, Eriko Masuda, Yoko Nagai, Yoko Suzuki, Taeko Oguro, Koji Kyoda, Shuichi Onami

Description: 3D time-lapse microscopy images about nuclear division dynamics in B0336.10(RNAi) embryo (rpl-23(RNAi) embryo)

Organism: C. elegans

PubMed: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3712286/>