

第45回日本分子生物学会年会フォーラム
「生命科学のデータベース活用法」

糖鎖科学ポータル GlyCosmos

公益財団法人野口研究所
山田一作



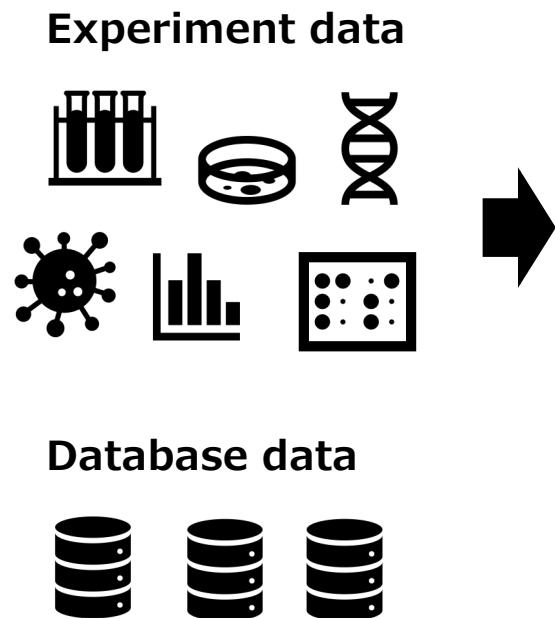
JSCR 日本糖質学会

2022年11月30日 19:00～
19:45～19:57

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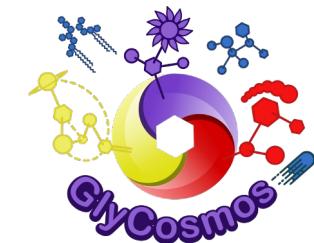
Data integration



Standardization

- Glycan structure data
- Glycomics data
- Glycoproteomics data
- Protein interaction data
- Microbial data
- Pathways/interaction data
- ...

The GlyCosmos Glycoscience Portal



Standards

- **Glycan Notation**

- Text: WURCS and GlycoCT
- Symbol: SNFG (Symbol Nomenclature For Glycans)



- **Ontologies**

- GlycoRDF: Glycomics data
- GlycoCoO: Glycoconjugate data

- **Guidelines**

- **DBCLS guidelines for RDFizing databases**
- **MIRAGE**: Minimum Information Required for a Glycomics Experiment



MIRAGE RECOMMENDATIONS



/ABOUT US /OPEN SCIENCE /PUBLICATIONS /PROJECTS /SYMPOSIA /TALKS /FUNDING /SEARCH

D/E

HOME BACKGROUND AIMS GUIDELINES EXAMPLES PEOPLE PUBLICATIONS MEETINGS CONTACT

PROJECTS > MIRAGE > RECOMMENDATIONS

MIRAGE RECOMMENDATIONS

As an platform for discussing and advancing glycomics, MIRAGE is paving the way for a number of related projects that include the development of software tools and repositories as well as the support of the use of an agreed nomenclature for the graphical representation of glycan structures. In order to promote these achievements, the MIRAGE Commission recommends the community to refer to these projects when glycan data are published and/or deposited.

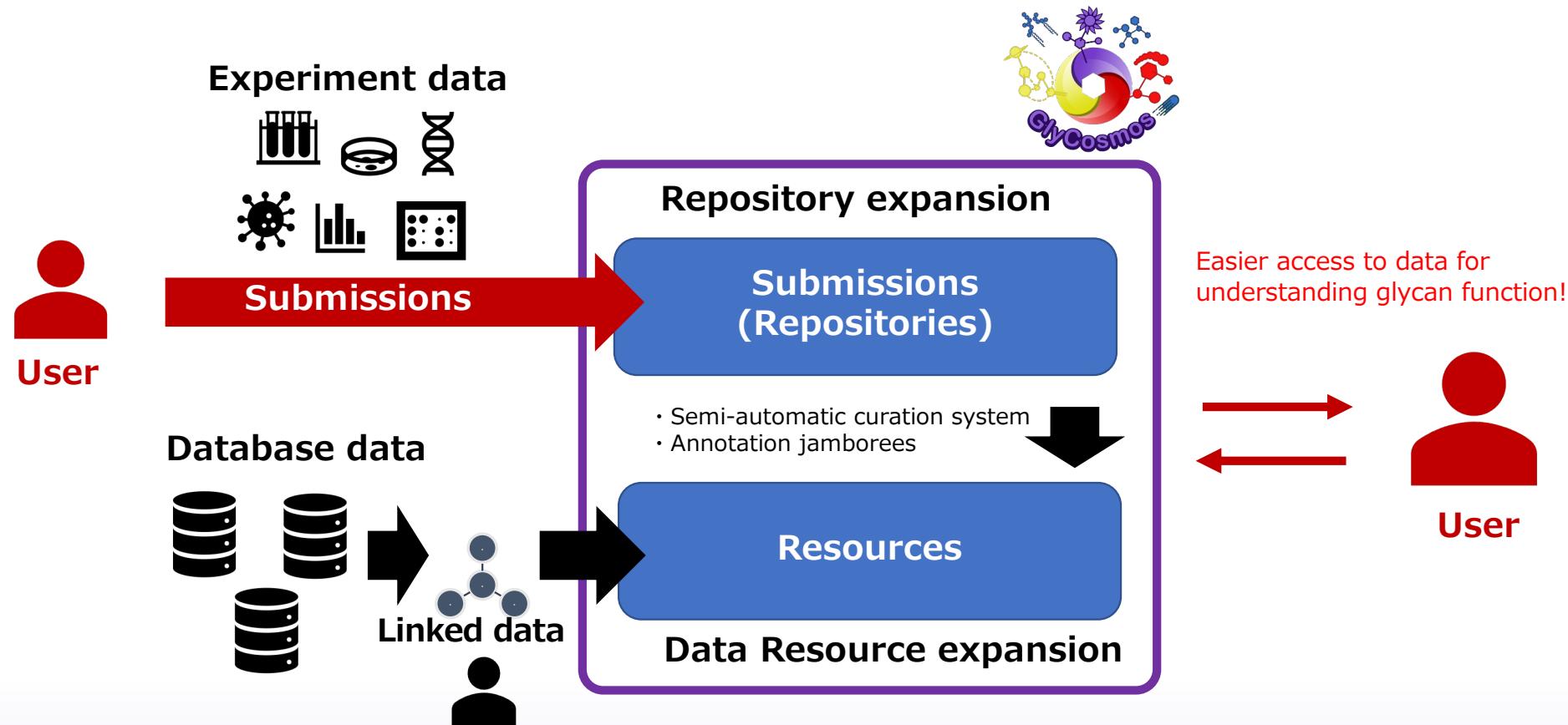
REPOSITORIES AND DATABASES

Data	MIRAGE Guidelines	Repository	Database
Glycans	Sample Preparation	GlyTouCan	GlyTouCan MonosaccharideDB Carbohydrate Structure DB (CSDB)
MS data	Mass Spectrometric Analysis	GlycoPOST (raw data) UniCarb-DR (glycan annotations)	UniCarbDB
Glycan array data	Glycan Microarray Analysis	GlyGen microarray Imperial College Microarray Portal	CarbArrayART
Liquid chromatography data	Liquid Chromatography Analysis		GlycoStore
NMR data	NMR Glycan Recognition NMR Glycan Structures		NMRShiftDB
Lectin array data	Lectin Microarray Analysis (in preparation)		LM-GlycomeAtlas

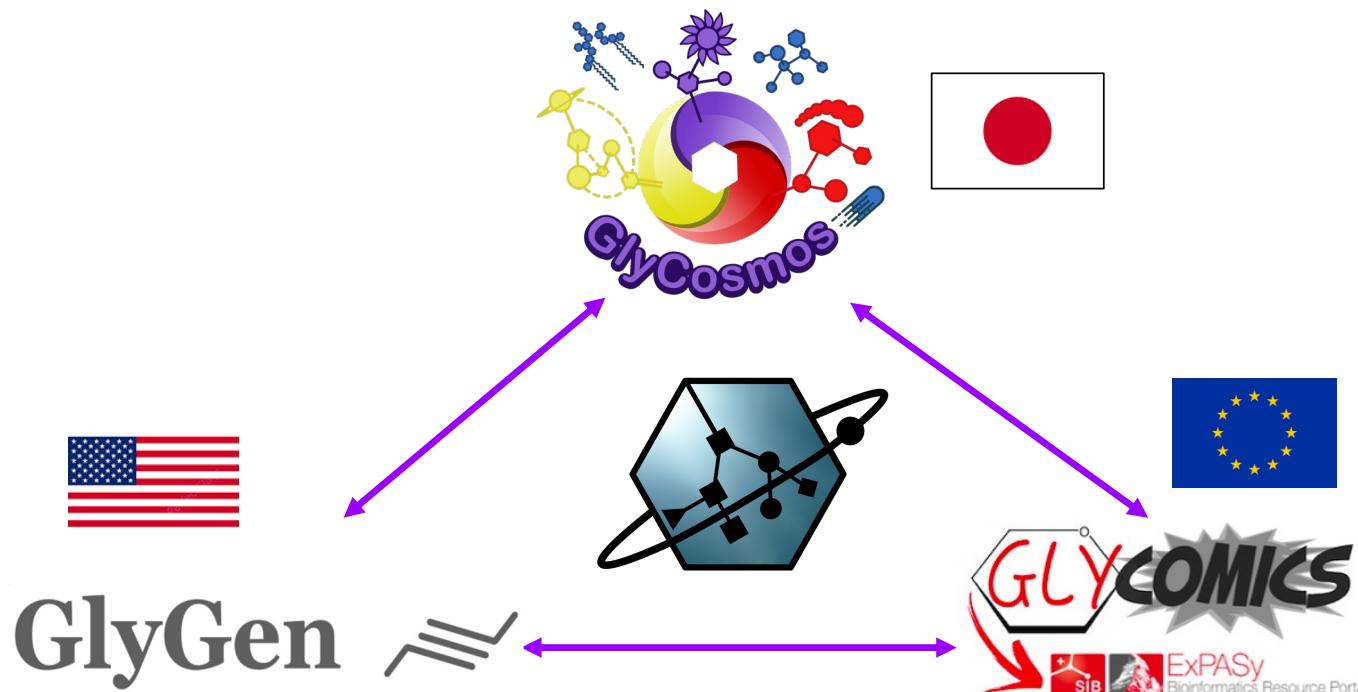
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GlyCosmos Data Flow



GlySpace Alliance



- Must be under an open-data license, CC-BY 4.0 or more permissive
- All data must have unhindered access
- Any software provided should be at least GNU General Public License v3.

The GlyCosmos Glycoscience Portal

- Submissions (Repositories) →

- GlyTouCan (glycans)
- GlycoPOST (raw MS data)
- UniCarb-DR (annotated glycomics data)
- GlyComb (glycoconjugates)

- Resources →

- Glycomes
- Glycans
- Glycoconjugates
- Glycogenes
- Diseases
- Pathways
- etc.

- Tools

- Standards

The GlyCosmos Portal is a Web portal aiming to integrate the glycosciences with the life sciences. It consists of Standards, Repositories and Data Resources, providing information about genes, proteins, lipids, pathways and diseases.

Submissions

- GlyTouCan Glycan Structure Repository
- GlyComb (beta) Glycoconjugate Repository
- GlycoPOST Glycomics MS Repository
- UniCarb-DR Glycomics MS Repository

Welcome to GlyCosmos!!

Resources

- Glycomes
- Glycans
- Lectins
- Glycolipids
- Glycans
- Pathways
- Diseases
- Organisms

Tools

- SugarDrawer
- GlycanBuilder
- Glycan Converters
- GlycoMaple
- GALAXY
- MCAW
- GlycoSim
- GRable

Standards

- Ontologies
- Notations

News

Tweets from @GlyCosmos

GlyCosmos @GlyCosmos · Oct 13
@GlyCosmos and @GlyTouCan will be inaccessible on Sat.Oct 13, 9:00 am to 12:00 am Japan Time due to system maintenance.
Apologies for the inconvenience.

The NOBEL PRIZE @NobelPrize · Oct 5
BREAKING NEWS:
The Royal Swedish Academy of Sciences has decided to award the 2022 NobelPrize in Chemistry to Carolyn R. Bertozzi, Morten Meldal and K. Barry Sharpless "for the development of click chemistry and bioorthogonal chemistry".

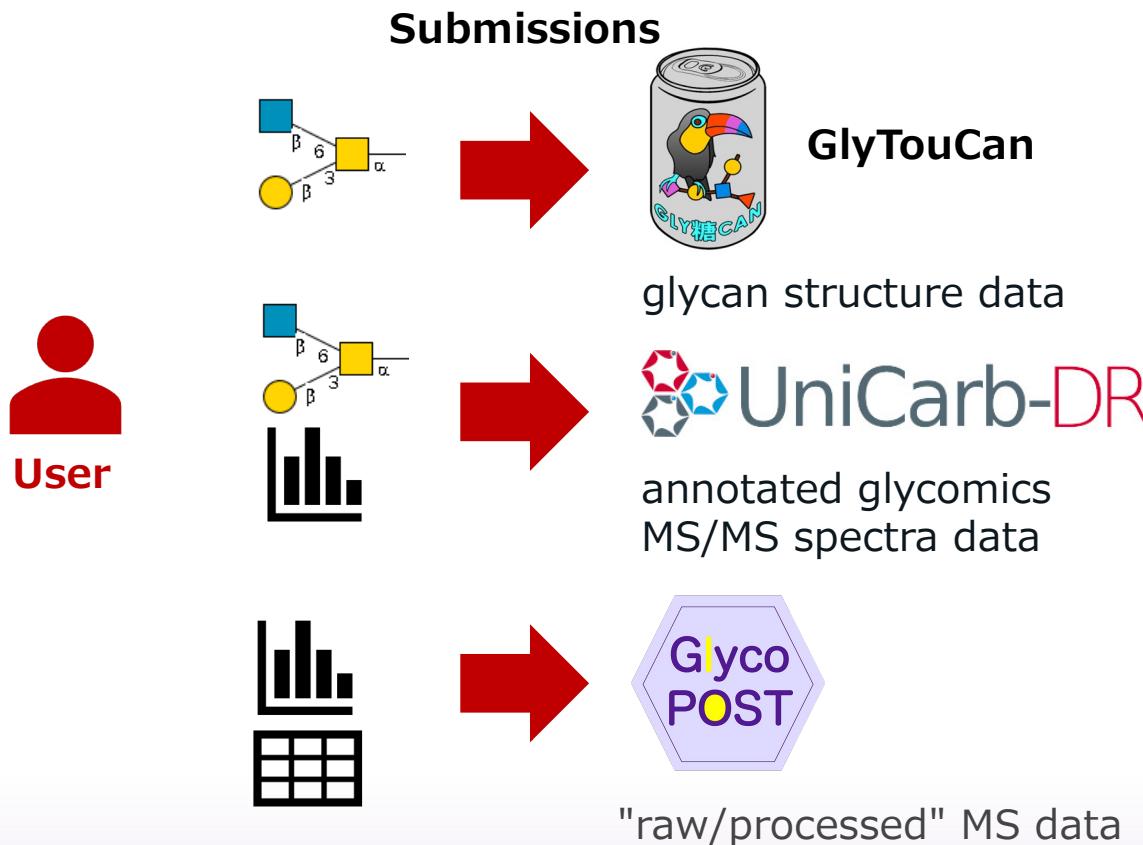
Carolyn R. Bertozzi Morten Meldal K. Barry Sharpless "for the development of click chemistry and bioorthogonal chemistry"
The Royal Swedish Academy of Sciences

Follow @GlyCosmos YouTube Channel Open GlyCosmos Channel

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Submissions (Repositories)



under construction

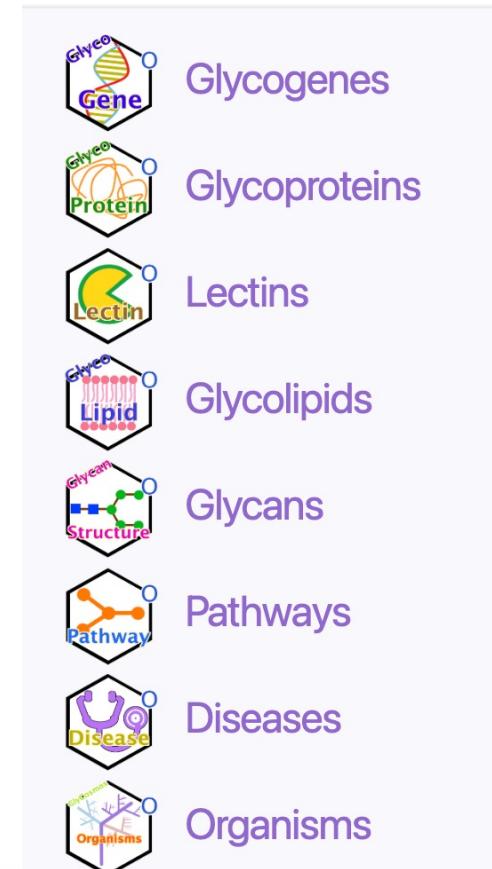
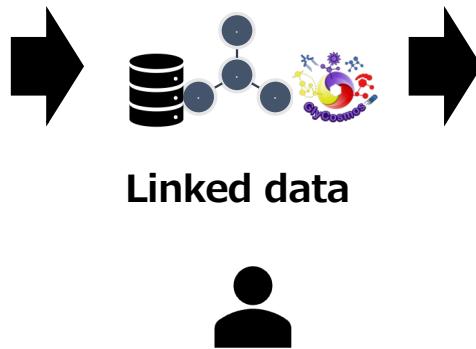
- Glycoconjugate structure data
- Lectin data
- Pathways/interaction data
- Microbial data

Resources

Database data



TOHSA



Data Resources

Metadata for Data Resources			
		Database	Last Updated
Allian	GlyCosmo	GlyCosmos Glycoproteins	
CAZy	GlyCosmo	GlycoGene Database (GGDB)	Database Last Updated
DisGe	GlyCosmo	GlycoMaple	GlycoGene Database (GGDB) January 26, 2018
FlyGly	GlyCosmo	LM-GlycomeAtlas	
GALA	GlyCosmo	Lectin Frontier DataBase (LfDB)	Database Last Updated
GlyCo	GlyCosmo	MatrixDB	Lectin Frontier DataBase (LfDB) July 12, 2019
	GlyCosmo	GlycoNAVI-C	
	GlyCosmo	PSICQUIC	Database Last Updated
	GlyCosmo	GlycoNAVI-L	PSICQUIC March 30, 2022
	GlyCosmo	Pathogen Adherence to Carbohydrate Database (PACDB)	Database Last Updated
	GlyCosmo	Plant GARDEN	Pathogen Adherence to Carbohydrate Database (PACDB) June 1, 2016
	GlyCosmo	GlycomeAtlas	Database Last Updated
	GlyCosmo	SugarBind	Plant GARDEN May 28, 2020
	GlyCosmo	LIPID MAPS Gene/Proteome Database	Database Last Updated
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Data downloads



Download

GlyCosmos Diseases

Data				Updated	Size	File
Disease ID	Disease Name	Gene Symbol	Gene ID	October 28, 2022	203 KB	Download (.csv)

GlyCosmos Glycans

GlyCosmos Lectins

Data		Updated	Size	File
Lectin Name, UniProt ID, PDB IDs, LfDB ID, Monosaccharide Specificity, Organism, MCAW IDs		September 16, 2022	204 KB	Download (.csv)

GlyCosmos Pathways

Glycan Images

Data		Updated	Size	File
IUPAC PNG image files	November 28, 2022	653 MB ~	Download (.zip)	
SNFG PNG image files	November 28, 2022	667 MB ~	Download (.zip)	
SNFG SVG image files	November 28, 2022	565 MB ~	Download (.zip)	
UOXF color PNG image files	November 28, 2022	720 MB ~	Download (.zip)	

GlyCosmos GlycoGenes

GlyCosmos Proteins

Glyco-Disease Genes Database (GDGDB)

Data		Updated	Size	File
Concept UI, Disease Name, Gene Symbol, Alias Disease Name, Disease Type, UniProt ID, Disease IDs	December 7, 2021	25 KB	Download (.csv)	
Gene ID, Gene Symbol, Concept UI, PubMed	January 25, 2017	7 KB	Download (.csv)	

GlyCosmos Glycolipids

GlycoGene Database (GGDB)

Data		Updated	Size	File
Gene ID, Gene Symbol, GGDB ID, Reaction, Acceptor, Product. PubMed	January 26, 2018	73 KB	Download (.csv)	

Data	
Category, Main Class, Sub Class, Common Name, LIPIDBANK ID, KEGG CID, CHEBI ID, Exact Mass, Formula	

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Programmatic Access

GlyCosmos API

API Document

<https://api.glycosmos.org/>

GlyTouCan Data

GlyTouCan Data related APIs.

GLYCAN LIST API

Get all accession numbers and WURCS sequences from GlyTouCan.

GET /sparqlist/glytoucan-data

Get all GlyTouCan IDs

cURL Example:

```
wget https://api.glycosmos.org/sparqlist/glytoucan-data
```

Example URI

GET https://api.glycosmos.org/sparqlist/glytoucan-data

GlyCosmos RDF

SPARQL Endpoint

<https://ts.glycosmos.org/sparql>

RDF Schemas

Enter SPARQL Query

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX dcterms: <http://purl.org/dc/terms/>
PREFIX dbpedia: <http://dbpedia.org/property/>
PREFIX dbpedia2: <http://dbpedia.org/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>

PREFIX bp: <http://www.biopax.org/release/biopax-level3.owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

SELECT (COUNT(distinct ?subject) AS ?numbers)
FROM <http://rdf.glycosmos.org/Pathways_LPS>
WHERE {
    ?subject rdf:type bp:Pathway
}
```

Results per page: 25

Output: HTML

Submit Query Reset

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Tools



SugarDrawer



GlycanBuilder



Glycan Converters



GlycoMaple



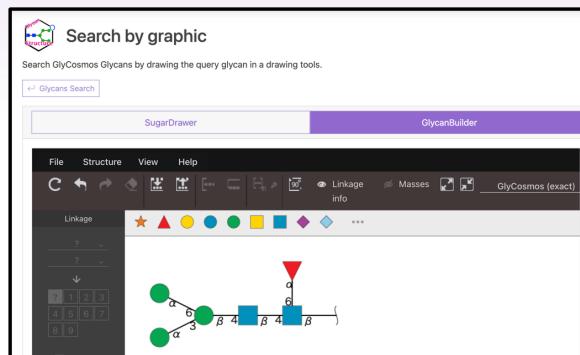
GALAXY



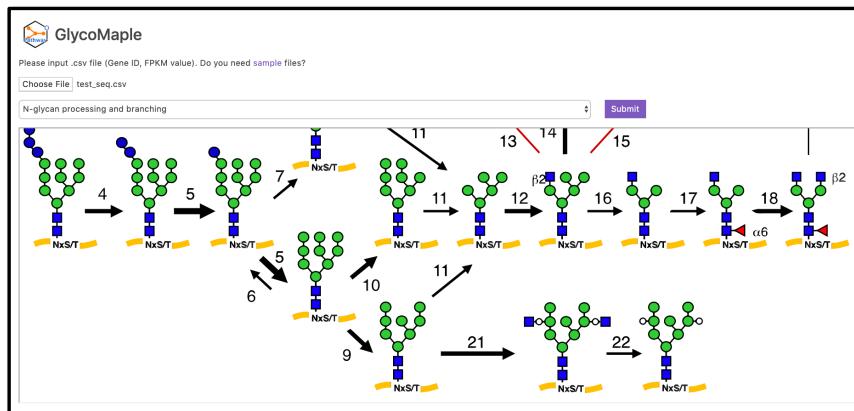
MCAW



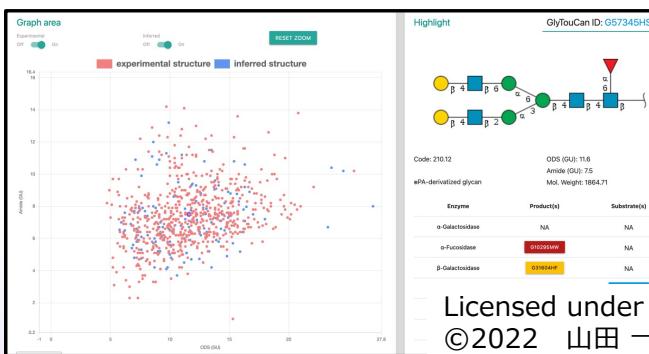
GlycoSim



SugarDrawer and **GlycanBuilder** are glycan structure drawing tools. You can search the database using the drawn glycan structure as a query.



GlycoMaple is a pathway visualization tool using gene expression data.



GALAXY is an application that can search for candidate glycan structures from HPLC data.

Video manual

GlyCosmosChannel
@glycosmoschannel444
チャンネル登録者数 6人

ホーム 動画 ショート 再生リスト コミュニティ チャンネル 概要 検索 >

最近アップロードされた動画 人気の動画

GlyCosmos Portal: GlyCosmos Pathwaysの使い方 4:06
GlycanBuilder2: How to hide glycosidic bond and reducing end... 0:24
GlycoPOST: user registration 0:28
GlycoPOST: submit project 1:36

GlycoPost: How To Submit Preset. 0:52
SugarDrawer: Edit the glycan containing uncertain linkage using... 0:18
SugarDrawer: Edit substituent using the "Add Substituent" function 0:33
SugarDrawer: Edit monosaccharide using the "Add Monosaccharide" ... 1:15

SugarDrawer: Draw glycan using the "Load Structure" function 0:36
Glycosmos Portal: GlycoMapleの使い方① 2:46
SugarDrawer: Generate GlycoCT, WURCS and SVG from editing... 1:05
SugarDrawer: WUF 鎮構造を描画する 0:23

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News

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Tweets from @GlyCosmos



GlyCosmos

@GlyCosmos · Oct 13

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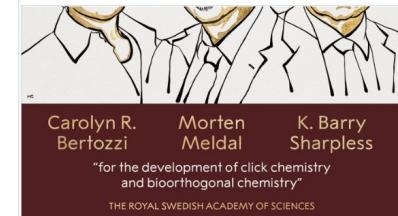
GlyCosmos Retweeted



The Nobel Prize

@NobelPrize · Oct 5

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Carolyn R. Bertozzi

Morten Meldal

K. Barry Sharpless

"for the development of click chemistry and bioorthogonal chemistry"

THE ROYAL SWEDISH ACADEMY OF SCIENCES

376 29K



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Acknowledgements

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 Akihiro Fujita
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AIST

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Niigata University

Shujiro Okuda
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 Akira Seno

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Morihisa Fujita
 Yifan Huang
 Weize Kong



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