



創価大学

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自分力の発見

糖鎖関連生命情報を統合化するGlyCosmos Portalの構築

木下聖子

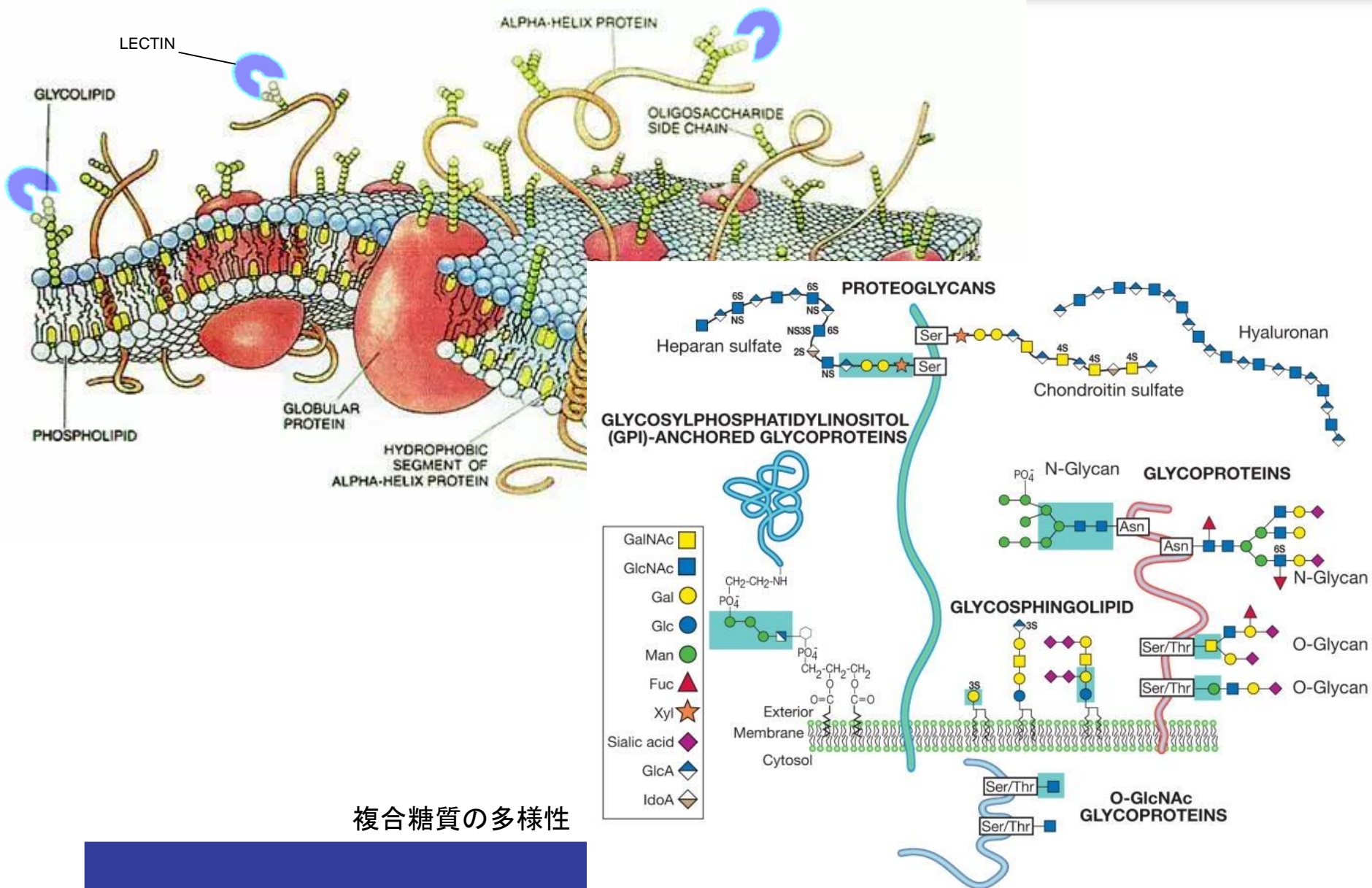
第41回 日本分子生物学会年会

1PW2-09 生命科学のデータベース活用法2018 2018年11月28日



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(c)2018木下 聖子 (創価大学理工学部)

糖鎖が関わる生体内の環境



複合糖質の多様性

糖鎖研究の位置づけ

米国では 2012 年に米国学術研究会議(the National Research Council of the National Academies)が報告書 Transforming Glycoscience: A Roadmap for the Future (2012) を発表 :

糖鎖研究の対象は**医学 (Medicine)**にとどまらず、**エネルギー (Energy)** や**材料科学 (Materials)** にまで及ぶとしており、これまでこのような大局的な視点で糖鎖研究の将来が位置づけられたことはなかった。

米国ではNIHにおいて、糖鎖に関連する研究が強力に進められている。

一方、世界で使用されている標準的な糖鎖解析法は日本発であり、また**重要な糖鎖構造の解析および6割以上の糖鎖遺伝子のクローニングやその機能解析が我が国の研究者によってなされている。**したがって、**糖鎖科学は我が国が世界をリードしてきた分野**である。

GlyCosmos – Glycoscience Portal



Standards

Glycan Representation

WURCS: Web3 Unique Representation for Carbohydrate Structure



Ontologies

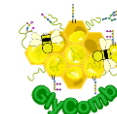
GlycoRDF, GlycoCoO: Glycoconjugate Ontology

Repositories

Glycans - GlyTouCan



Glycoconjugates - GlyComb



MS data - GlycoPOST



Data resources

Pathways



Chemical Structures



Glycomes



GlycomeAtlasV5



Lectins



Genes

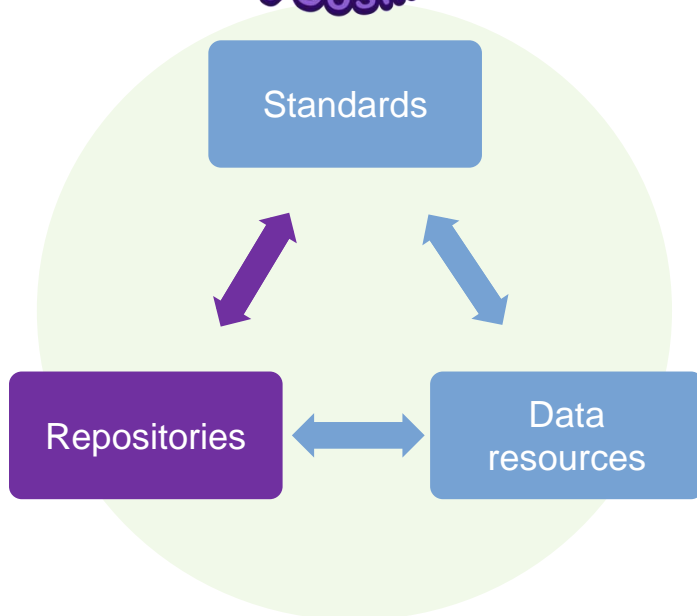


Proteins



Glyco-Disease Genes Database (GDGDB)

Pathogen Adherence to Carbohydrate Database (PACDB)



GlyCosmos Portal (beta version)

SUBMISSIONS

- GlyYouCan
- GlyComb
- GlycoPOST

RESOURCES

Genes/Proteins/Lipids

- GGDB - glycogenes
- GDGDB - glycogene diseases
- GlycoProtDB - glycoproteins
- LfDB - lectins
- GlycoAbun
- GlyCosmos Proteins
- GlyCosmos Lectins
- GlyCosmos Lipids

Glycans/Glycoconjugates

- GlyCosmos Glycans
- GlycoProtDB - glycoproteins
- GlycoAbun
- GlyCosmos Glycoconjugates

Glycomes

- Total Glycome Database
- GlycomeAtlas

Pathways/Diseases

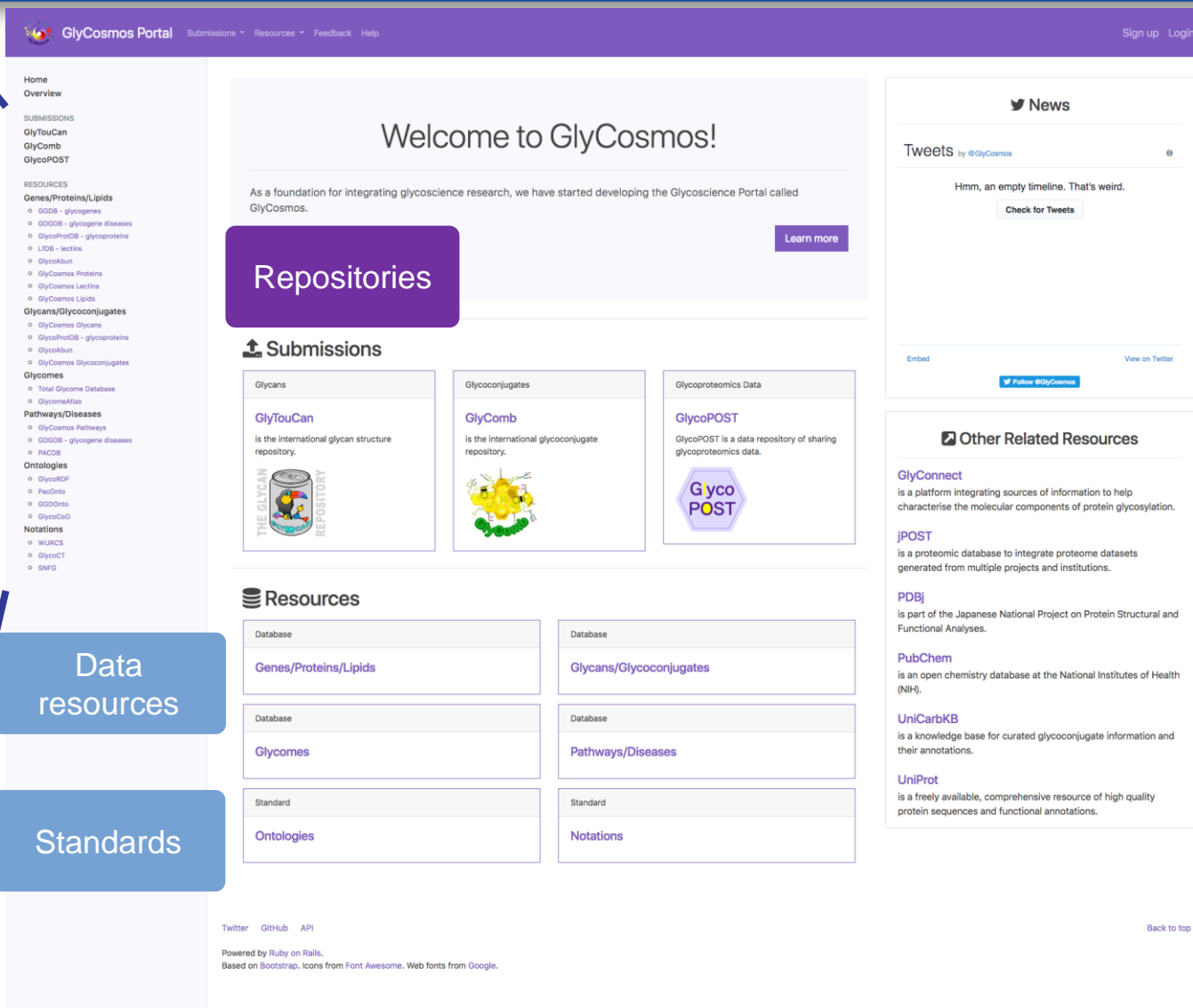
- GlyCosmos Pathways
- GDGDB - glycogene diseases
- PACDB

Ontologies

- GlycoRDF
- PacOnto
- GGDOnto
- GlycoCoO

Notations

- WURCS
- GlycoCT
- SNFG



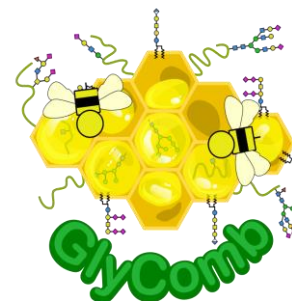
The screenshot shows the GlyCosmos Portal website. At the top, there is a navigation bar with the site name and links for Submissions, Resources, Feedback, and Help. A 'Sign up' and 'Login' link is also present. The main content area features a 'Welcome to GlyCosmos!' message, followed by a 'Repositories' section highlighting GlyYouCan, GlyComb, and GlycoPOST. Below this is a 'Submissions' section with three cards for Glycans, Glycoconjugates, and Glycoproteomics Data. A 'Resources' section is organized into a grid of categories: Database (Genes/Proteins/Lipids, Glycans/Glycoconjugates), Standard (Glycomes, Notations), and another Database (Pathways/Diseases). On the right side, there is a 'News' section with a tweet and an 'Other Related Resources' section listing GlyConnect, jPOST, PDBj, PubChem, UniCarbKB, and UniProt. A footer contains social media links and technical information.

Data resources

Standards



糖鎖構造



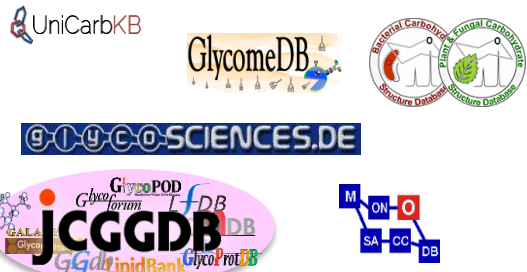
複合糖質
(糖タンパク質・
糖脂質)



糖鎖・糖タンパク質の
質量分析データ

Repositories

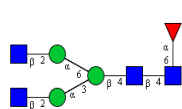
Glycan Databases



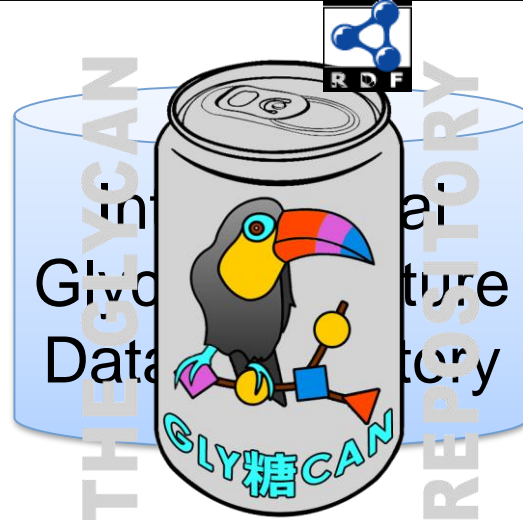
Unique Glycan ID

+

Structure Data

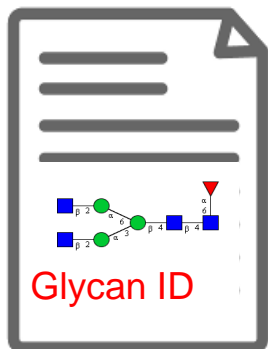


Sharing

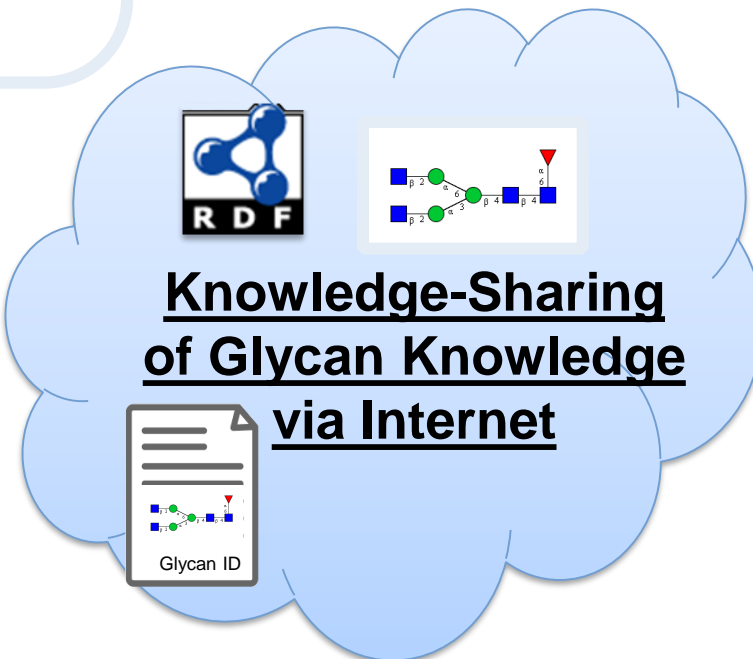


④ Curation

Annotation Data



Research Paper



Knowledge-Sharing of Glycan Knowledge via Internet

Glycan ID

③ Manuscript submission

MIRAGE
WIBVCE

② Obtain Unique Glycan ID

① Structure Registration



Glycan Research

Letter to Glycoforum

GlyTouCan: an accessible glycan structure repository

**Michael Tiemeyer², Kazuhiro Aoki², James Paulson³,
Richard D Cummings⁴, William S York², Niclas G Karlsson⁵,
Frederique Lisacek⁶, Nicolle H Packer^{7,8}, Matthew P Campbell⁷,
Nobuyuki P Aoki⁹, Akihiro Fujita⁹, Masaaki Matsubara²,
Daisuke Shinmachi⁹, Shinichiro Tsuchiya⁸, Issaku Yamada¹⁰,
Michael Pierce², René Ranzinger², Hisashi Narimatsu¹¹,
and Kiyoko F Aoki-Kinoshita^{9,1}**

1. Friedrich Altmann, University of Natural Resources and Life Sciences, Vienna, Austria
2. Antony Bacic, University of Melbourne, Australia
3. Christopher B. Barnett, University of Cape Town, South Africa
4. Júlia Costa, Laboratory of Glycobiology, ITQB NOVA, Portugal
5. Vivien J. Coulson-Thomas, University of Houston, USA
6. Tamara L. Doering, Washington University School of Medicine, USA
7. Nathan Edwards, Georgetown University, USA
8. Michiko Ehara, Asahi University, Japan
9. Tamao Endo, Tokyo Metropolitan Institute of Gerontology, Tokyo, Japan
10. Ten Feizi, Imperial College London, UK
11. Martin Frank, Biognos AB, Sweden
12. Morihisa Fujita, Jiangnan University, China
13. Koichi Fukase, Osaka University, Japan
14. Yuzuru Ikehara, AIST and Chiba University, Japan
15. Makoto Ito, Kyushu University, Japan
16. Yukishige Ito, RIKEN, Japan
17. Kenji Kadomatsu, Nagoya University Graduate School of Medicine, Japan
18. Osamu Kanie, Tokai University, Japan
19. Takane Katayama, Kyoto University, Japan
20. Toshisuke Kawasaki, Ritsumeikan University, Japan
21. Hiroto Kawashima, Chiba University, Japan
22. Carsten Kettner, Beilstein Institut, Germany
23. Kshitij Khatri, Boston University, USA
24. Yoshinobu Kimura, Okayama University, Japan
25. Hiroshi Kitagawa, Kobe Pharmaceutical University, Japan
26. Shinobu Kitazume, RIKEN, Japan
27. Yuriy A. Knirel, N.D. Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, Moscow, Russia
28. Kyoko Kojima-Aikawa, Ochanomizu University, Japan
29. Daniel Kolarich, Griffith University, Australia
30. Matthew R. Kudelka, Emory University, USA
31. Todd L. Lowary, Canadian Glycomics Network Scientific Director and University of Alberta, Canada
32. Thomas Lueteteke, ITech Progress GmbH, Germany
33. Shino Manabe, RIKEN, Japan
34. David Matten, University of Cape Town, South Africa
35. Raja Mazumder, George Washington University, USA
36. Eiji Miyoshi, Osaka University, Japan
37. Antonio Molinaro, University of Napoli Federico II, Italy
38. Yasu S. Morita, University of Massachusetts Amherst, USA
39. Toni M. Mueller, University of Alabama at Birmingham, USA
40. Shunji Natsuka, Niigata University, Japan
41. Shoko Nishihara, Soka University, Japan
42. Sriram Neelamegham, State University of New York, USA
43. Tetsuya Okajima, Nagoya University School of Medicine, Japan
44. Shujiro Okuda, Niigata University, Japan
45. Noorjahan Panjwani, Tufts University School of Medicine, USA
46. Dayoung Park, University of California, Davis, USA
47. Serge Perez, France
48. Salomé S. Pinho, University of Porto and Institute for Research and Innovation in Health, Portugal
49. Melody Porterfield, University of Georgia, USA
50. Alka Rao, CSIR-Institute of Microbial Technology, Chandigarh, India
51. Celso A. Reis, University of Porto, Portugal
52. Rafael Ricci de Azevedo, University of Sao Paulo, Brazil
53. Nancy Schwartz, University of Chicago, USA
54. Siro Simizu, Keio University, Japan
55. Avadhesh Surolia, Indian Institute of Science, Bangalore, India
56. Naoyuki Taniguchi, RIKEN, Japan
57. Carlo Unverzagt, University of Bayreuth, Germany
58. Masahiro Wakao, Kagoshima University, Japan
59. Christopher M. West, University of Georgia, USA
60. Robert J. Woods, University of Georgia, USA
61. Ajit Varki, University of California, San Diego, USA
62. Yoshiki Yamaguchi, RIKEN, Japan
63. Kazuo Yamamoto, The University of Tokyo, Japan
64. Heng Yin, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China
65. Joseph Zaia, Boston University, USA

現在11万件以上の糖鎖構造が登録済み

- GlyTouCan Partners やBCSDB, GlycoEpitope などのデータベースを統合化


BCSDB (5428)
 CFG (6374)
 Carbbank(CCSD) (14840)
 GLYCOSCIENCES.de (15905)
 GlyConnect (3219)
 GlycoChemExplorer (8021)
 GlycoEpitope (169)
 GlycoNAVI (91)
 GlycoStore (23)
 Glycibase (199)
 GlycomeDB (39053)
 JCGGDB (22039)
 JCGGDB AIST (7867)
 JMSDB (911)
 KEGG (10134)
 PDB (894)
 PDBe CC (264)
 PDBj CC (264)
 PubChem CID (21356)
 PubChem SID (21356)
 RCSB PDB CC (264)
 SugarBindDB (173)
 UniCarb-DB (865)
 UniCarbKB (171)



Google Custom Search

Glytouncan Schedule

Today	Week	Month	Agenda
Sunday, November 5			
08:00	Maintenance		
Sunday, December 24			
08:00	Maintenance		
Thursday, December 28			
08:00	Maintenance		
Friday, December 29			
20:00	Maintenance		

Events shown in time zone: Tokyo 



What is GlyTouCan?

GlyTouCan is the international glycan structure repository. This repository is a freely available, uncurated registry for glycan structures that assigns globally unique accession numbers to any glycan independent of the level of information provided by the experimental method used to identify the structure(s). Any glycan structure, ranging in resolution from monosaccharide composition to fully defined structures can be registered as long as there are no inconsistencies in the structure.

What you can do

Users can search for glycan structures and motifs that have been registered into this repository. Registered users can additionally register new glycan structures to obtain unique IDs for each structure, which can be used in publications and other databases upon approval.

Acknowledgement

The development of this repository is funded by the Integrated Database Project by MEXT (Ministry of Education, Culture, Sports, Science & Technology) and the Program for Coordination Toward Integration of Related Databases by JST (Japan Science and Technology Agency). Development has also been supported by the GlySpace Project.

Tweets by @glytouncan

 Gly @glytouncan

Please note: GlyTouCan will be under maintenance intermittently for very brief periods from Sat to Sun, JST on October 18th.

Oct 17, 2017

 Gly Retweeted

 Kiyoko Kinoshita @klyokid

Thanks to all supporting investigators! GlyTouCan: an accessible glycan structure repository | Glycobiology | Oxford Academic. academic.oup.com/glycob/article...

Oct 3, 2017

 Gly Retweeted

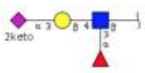
 Ethan Goddard-Borger @ethangoddborger

Embed View on Twitter

GlyTouCan エントリー

Registration Search View All Preferences Sign In Accession Number

G00054MO



Accession number	G00054MO
Calculated Monoisotopic Mass	820.2961
IUPAC Extended	alpha-D-NeupAc-(2->3)-beta-D-Galp-(1->4)(alpha-L-Fucp-
Created Date	Sun, 19 Oct 2014 21:47:31 GMT

Literature

Register your Publication
[9261149](#)

10200296	•	10528219	•	10579420	•	107...
12163379	•	12385579	•	12820228	•	130...
15198731	•	15330211	•	1699667	•	175...
2111348	•	2119368	•	2355463	•	256...
3008996	•	3545444	•	3731100	•	401...
7485559	•	7521878	•	7531823	•	756...
7850810	•	8239497	•	8490832	•	854...
9015359	•	9164959	•	9257857	•	929...
9556613	•	9767440	•	9790285	•	987...

Species

- 210
- Helicobacter pylori
- 8906
- 10080

5. Glycan Motif

6. Computed Descriptors

- a. WURCS
- b. GlycoCT
- c. IUPAC Condensed
- d. IUPAC Extended

Computed Descriptors

WURCS

WURCS=2.0/4,4,3/[a2122h-1b_1-5_2+nCC/3=0][a1221m-1a_1-5][a2112h-1b_1-5][Aad21122h-2a_2-6_5+nCC/3=0]/1-2-3-4/a3-b1_a4-c1_c3-d2

GlycoCT

RES
1b:b-dglc-HEX-1:5
2s:n-acetyl
3b:a-lgal-HEX-1:5|6:d
4b:b-dgal-HEX-1:5
5b:a-dgro-dgal-NON-2:6|1:a|2:keto|3:d
6s:n-acetyl
LIN
1:1d(2+1)2n
2:1o(3+1)3d
3:1o(4+1)4d
4:4o(3+2)5d
5:5d(5+1)6n

IUPAC Condensed

Neu5Ac(a2-3)Gal(b1-4)[Fuc(a1-3)]GlcNAc(b1-




IUPAC Extended

a[alpha-D-NeupAc-(2->3)-beta-D-Galp-(1->4)[alpha-L-Fucp-(1->3)]-beta-D-Glc pNAc(1->

5. Glycan Motif

6. Computed Descriptors

- a. WURCS
- b. GlycoCT
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- d. IUPAC Extended

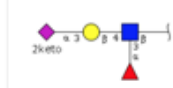
Share   

Menu Terms and Conditions Site Policy Calendar Contact Us

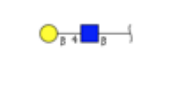
Copyright © 2017 Glytoucan.org v1.2.10-TOCO-SNAPSHOT

Glycan Motif

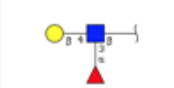
Sialyl Lewis X




Lactosamine motif



Lewis X



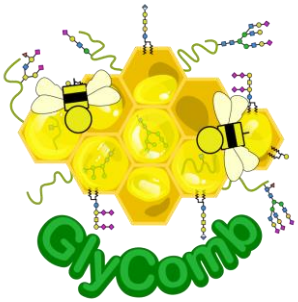
VIM



5. Glycan Motif

6. Computed Descriptors

- a. WURCS
- b. GlycoCT
- c. IUPAC Condensed
- d. IUPAC Extended



- Glycoconjugate Structure Repository

ex) GC00011

Glycoproteins
+Glycolipids+Glycosides+...

Sequence

```
MSALGAVIALLLWGQLFAVDSGNDVTDIADDGCPKPPEIAHGYVEHSVRYQCKNYKLRTEGDGVTLLNDKKQ
WINKAVGDKLPECEADDGCPKPPEIAHGYVEHSVRYQCKNYKLRTEGDGVTLLNNEKQWINKAVGDKLPECEA
VCGKPKNPANPVQRILGGHLDAGSFPWQAKMVSHTLITGATLINEQWLLTAKNLFNLHSENATAKDIAPTL
TLYVGKKQLVEIKVVLHPNYSQVDIGLIKQKVSVNERVMPICLPSKDYAEVGRVGVYSGWGRNANFKFTDHL
KYVMPLPADQDQCIRHYEGSTVPEKTPKSPVGVQPILNEHTFCAGMSKYQEDTCYGDAGSAFVHDEEDTWT
YATGILSFDKSCAVAEGVYVKVTSIQDWVQKTAIEN
```

GlyComb ID
4141ea8e28983831eea82f989
6e7726f0833cba222c4fe16c6e
d6861dffd9e33

UniProt ID
P00738

Glycosylation site & Glycan Structure(s)

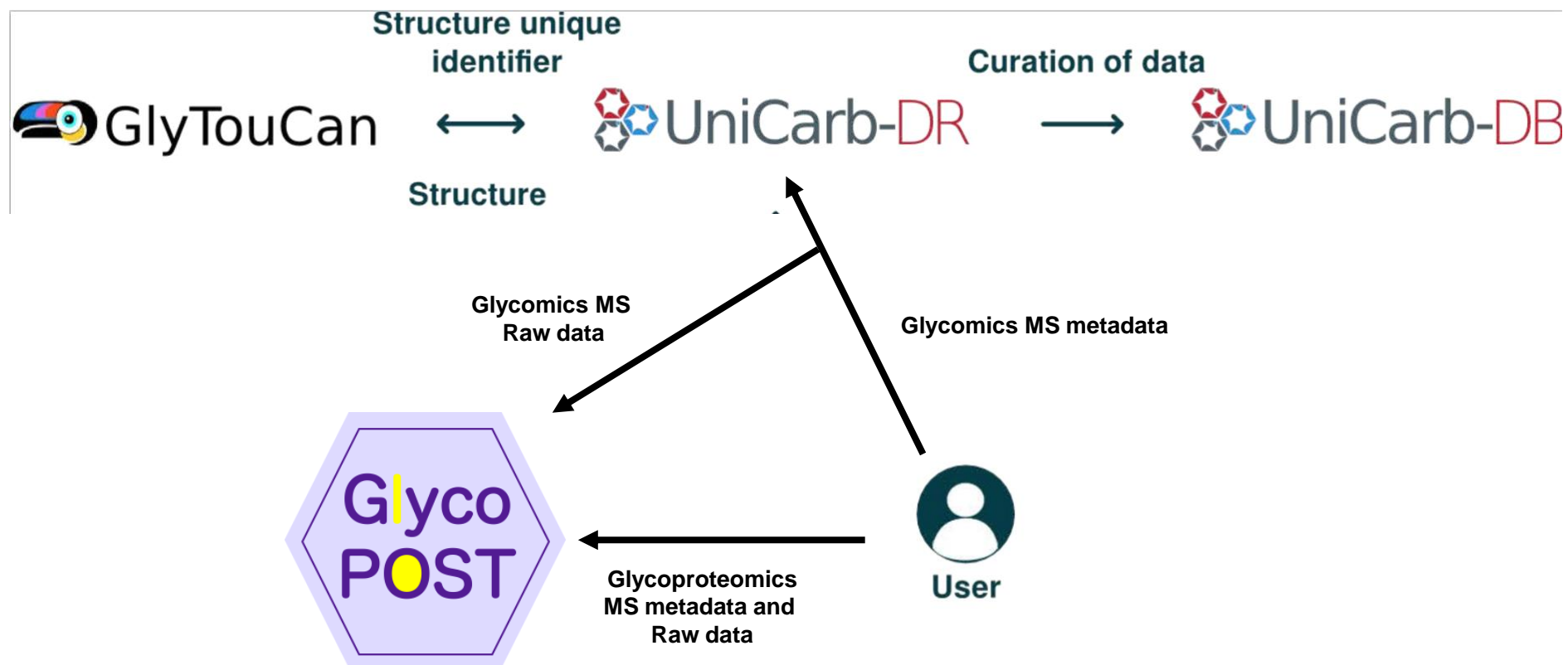
#	Site	GlyYouCan Accession	Image
1	184	G22340YC	
2	184	G74508NJ	
3	184	G73006TR	

UniProt UniProt ID

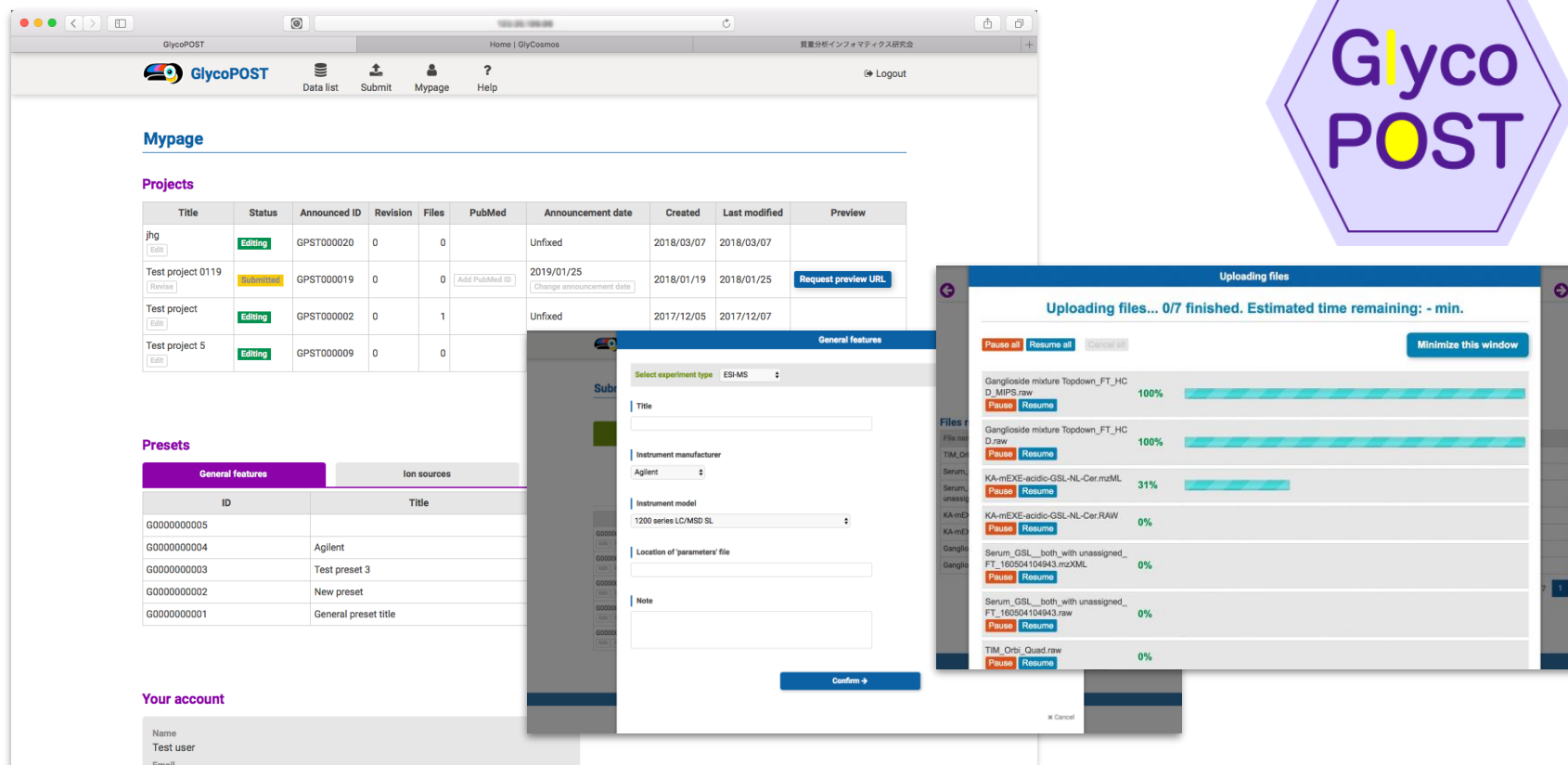
Glycosylation site

Glycosylation site

Glycosylation site



Web application development

The screenshot displays the GlycoPOST web application interface. The main page shows a 'Mypage' section with a 'Projects' table and a 'Presets' table. A modal window for 'General features' is open, showing configuration options for an experiment. An 'Uploading files' window is also visible, showing progress bars for various files.

Title	Status	Announced ID	Revision	Files	PubMed	Announcement date	Created	Last modified	Preview
jhg	Editing	GPST000020	0	0		Unfixed	2018/03/07	2018/03/07	
Test project 0119	Submitting	GPST000019	0	0	Add PubMed ID	2019/01/25	2018/01/19	2018/01/25	Request preview URL
Test project	Editing	GPST000002	0	1		Unfixed	2017/12/05	2017/12/07	
Test project 5	Editing	GPST000009	0	0					

ID	Title
G0000000005	
G0000000004	Agilent
G0000000003	Test preset 3
G0000000002	New preset
G0000000001	General preset title

Functionality to reuse input parameters and high-speed file transfer to accumulate useful data while minimizing user effort



Data resources

Genes/Proteins/Lipids

Glycans/Glycoconjugates

Glycomes

Pathways/Diseases

GlyCosmos Portal: glycogenes

Home Overview

SUBMISSIONS
 GlyYouCan
 GlyComb
 GlycoPOST

RESOURCES
Genes/Proteins/Lipids
 o GDDB
 o GDGDB
 o GPDB
 o LTDB
 o GlycoAbun
 o GlyCosmos Proteins
 o GlyCosmos Lipids
Glycans/Glycoconjugate
 o GlyCosmos Glycans
 o GPDB
 o GlycoAbun
 o GlyCosmos Glycoconjugat
Glycomes
 o Total Glycome Database
 o GlycomeAtlas
Pathways/Diseases
 o GlyCosmos Pathways
 o GDGDB
 o PACDB

Welcome to GlyCosmos!


As a foundation for integrating glycoscience research, we have started developing the Glycoscience Portal called GlyCosmos.

[Learn more](#)

Submissions


Glycans

[GlyYouCan](#)
is the international glycan structure repository.



Glycoconjugates

[GlyComb](#)
is the international glycoconjugate repository.



Glycoproteomics Data

[GlycoPOST](#)
GlycoPOST is a data repository of sharing glycoproteomics data.

<https://glycopost.glycosmos.org>

Resources

Databases

[Genes/Proteins/Lipids](#)

Databases

[Glycans/Glycoconjugates](#)

Databases

[Glycomes](#)

Databases

[Pathways/Diseases](#)

News

Tweets by @GlyCosmos

Hmm, an empty timeline. That's weird.

[Check for Tweets](#)

[Embed](#) [View on Twitter](#)

[Follow @GlyCosmos](#)

Other Related Resources

GlyConnect
is a platform integrating sources of information to help characterise the molecular components of protein glycosylation.

jPOST
is a proteomic database to integrate proteome datasets generated from multiple projects and institutions.

PDBj
is part of the Japanese National Project on Protein Structural and Functional Analyses.

PubChem
is an open chemistry database at the National Institutes of Health (NIH).

UniCarbKB
is a knowledge base for curated glycoconjugate information and their annotations.

UniProt
is a freely available, comprehensive resource of high quality protein sequences and functional

Home Overview

SUBMISSIONS
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 o GPDB
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 o GlyCosmos Proteins
 o GlyCosmos Lipids
Glycans/Glycoconjugate
 o GlyCosmos Glycans
 o GPDB
 o GlycoAbun
 o GlyCosmos Glycoconju
Glycomes
 o Total Glycome Database
 o GlycomeAtlas
Pathways/Diseases
 o GlyCosmos Pathways
 o GDGDB
 o PACDB

Genes

ACGG Database

[GlycoGene Database \(GGDB\)](#)
 GGDB is a database which includes genes associated with glycan synthesis such as glycosyltransferase, sugar nucleotide synthases, sugar-nucleotide transporters, and sulfotransferases.
 — ACGG-Database in ACGG
<https://acgg.asia/db/ggdb>

ACGG Database

[Glyco-Disease Genes Database \(GDGDB\)](#)
 GDGDB is a database of glycan-related diseases and their responsible genes.
 — ACGG-Database in ACGG
<https://acgg.asia/db/diseases/gdgdb>

Proteins

ACGG Database

[GlycoProtDB \(GPDB\)](#)
 GPDB is a glycoprotein database providing information of Asn (N)-glycosylated proteins and their glycosylated site(s), which were constructed by employing a bottom-up strategy using actual glycopeptide sequences identified by LC/MS-based glycoproteomic technologies.
 — ACGG-Database in ACGG
<https://acgg.asia/db/gpdb>

ACGG Database

[Lectin Frontier DataBase \(LfDB\)](#)
 LfDB provides quantitative interaction data in terms of the affinity constants (Ka) of a series of lectins toward a panel of pyridylaminated (PA) glycans obtained by an automated frontal affinity chromatography with fluorescence detection (FAC-FD) system.
 — ACGG-Database in ACGG
<https://acgg.asia/db/lfdb>

GlycoNAVI Database

[GlycoAbun](#)
 GlycoAbun is dataset of abundance ratio for glycans. This is a content of GlycoNAVI.
 — GlycoBio Databases in GlycoNAVI
[link](#)

GlyCosmos Protein Database

[GlyCosmos Proteins](#)
 from ProRep.
[link](#)

Lipids

GlyCosmos Lipid Database

[GlyCosmos Lipids](#)
 from LipRep.
[link](#)

List of GlycoGene

Search

221 List of GlycoGenes

sorted by: GeneSymbol; then by... • grouped as sorted

Family

- 18 (missing this field)
- 13 Fucosyltransferase
- 16 Galactosyltransferase
- 8 Glucosyltransferase
- 6 Glucuronyltransferase
- 5 Glucuronyltransferase N-

PathWay Class

- 13 glycolipid, ganglio series
- 10 glycolipid, globo series
- 27 glycolipid, lacto/neolacto series
- 19 Glycosaminoglycan, chondroitin sulfate
- 24 Glycosaminoglycan, heparan sulfate
- 16 Glycosaminoglycan, keratan sulfate

Keyword

- 80 (missing this field)
- 2 3'-phosphoadenosine 5'-phosphosulfate transporter
- 1 A blood type
- 1 a1,3-N-acetylgalactosaminyltransferase
- 2 alpha1,3-xylosyltransferase
- 1 asialo-GM2 (GA2)

Donor

- 45 (missing this field)
- 1 (not applicable)
- 1 ATP
- 2 CDP-Rbo
- 20 CMP-Neu5Ac
- 3 Dol-P-Glc

Expression

- 73 (missing this field)
- 1 aderenal gland
- 1 adipose
- 1 adrenal cortex
- 1 adrenal gland
- 31 adrenal glands

A(ABO)

Pathway Class	glycolipid, lacto/neolacto series
Keyword	A blood type, Histo-Blood group antigen, a1,3-N-acetylgalactosaminyltransferase
Designation	alpha 1,3-N-acetylgalactosaminyltransferase
Donor	UDP-GalNAc
Modify Date	2017-03-27

A4GALT



Pathway Class	glycolipid, globo series
Keyword	CD77, Gb3, globotriaosylceramide, glycolipid, glycosphingolipid
Designation	alpha 1,4-galactosyltransferase
Donor	UDP-Gal
Modify Date	2017-03-27

A4GNT

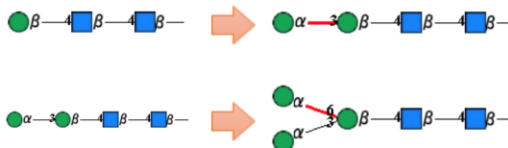
Pathway Class	O-glycan, mucin-type
Keyword	
Designation	alpha-1,4-N-acetylglucosaminyltransferase
Donor	UDP-GlcNAc
Modify Date	

ALG1



Pathway Class	N-glycan
Keyword	congenital disorders of glycosylation, lipid-linked oligosaccharide
Designation	GDP-Mannose:GlcNAc2-PP-dolichol beta-1,4-mannosyltransferase
Donor	GDP-Man
Modify Date	2016-08-10

ALG2



GlyCosmos Portal: glycomes

- Home Overview
- SUBMISSIONS
 - GlyYouCan
 - GlyComb
 - GlycoPOST
- RESOURCES
 - Genes/Proteins/Lipids
 - GGDB
 - GDGDB
 - GPDB
 - LTDB
 - GlycoAbun
 - GlyCosmos Proteins
 - GlyCosmos Lipids
 - Glycans/Glycoconjugate
 - GlyCosmos Glycans
 - GPDB
 - GlycoAbun
 - GlyCosmos Glycoconjugate
 - Glycomes
 - Total Glycome Database
 - GlycomeAtlas
 - Pathways/Diseases
 - GlyCosmos Pathways
 - GDGDB
 - PACDB

Welcome to GlyCosmos!

As a foundation for integrating glycoscience research, we have started developing the Glycoscience Portal called GlyCosmos.

[Learn more](#)

Submissions

<p>Glycans</p> <p>GlyYouCan</p> <p>is the international glycan structure repository.</p>	<p>Glycoconjugates</p> <p>GlyComb</p> <p>is the international glycoconjugate repository.</p>	<p>Glycoproteomics Data</p> <p>GlycoPOST</p> <p>GlycoPOST is a data repository of sharing glycoproteomics data.</p> <p>https://glycopost.glycosmos.org</p>
--	--	--

Resources

Databases	Databases
Genes/Proteins/Lipids	Glycans/Glycoconjugates
Databases	Databases
Glycomes	Pathways/Diseases

Tweets by @GlyCosmos

Hmm, an em...

Check

Embed

Follow

Other Resources

GlyConnect is a platform for information to help molecular biologists understand glycosylation.

jPOST is a proteomic data integration platform for proteomic data generated from various institutions.

PDBj is part of the Japan Proteome Project on Proteome Functional Analysis.

PubChem is an open chemistry database from the National Institutes of Health (NIH).

UniCarbKB is a knowledge base for glycoconjugate annotation.

UniProt is a freely available resource of high-quality protein sequences and functional information.

Glycomes

Glycome Database

Total Glycome Database

Total Glycome Database.

[link](#)

Glycome Database

GlycomeAtlas

Visualization of glycome profiling data on human, mouse and zebrafish tissue samples.

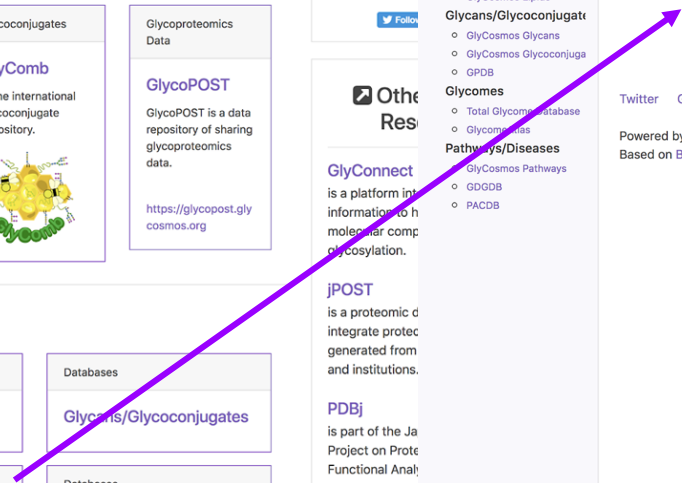
— RINGS Tools in RINGS

[link](#)

Twitter GitHub API

Powered by Ruby on Rails.
Based on Bootstrap. Icons from Font Awesome. Web fonts from Google.

[Back to top](#)

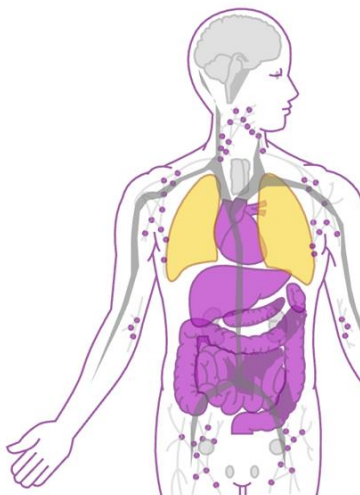


GlycomeAtlasV5

Human Mouse Zebrafish

Human

-
-
-
-
-
-
-

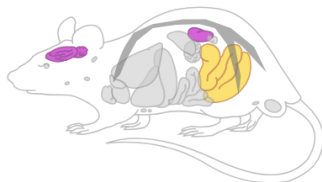


GlycomeAtlasV5

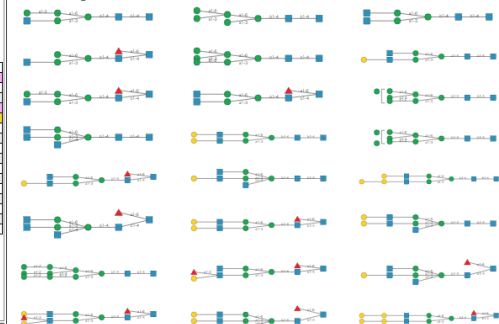
Human Mouse Zebrafish

Mouse

-
-
-
-
-
-
-



Mouse-Large Bowel



GlycomeAtlasV5

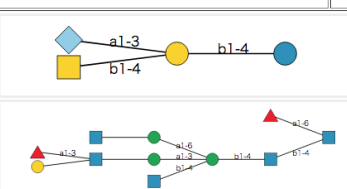
Human Mouse Zebrafish

Zebrafish

-
-
-
-
-
-
-



Zebrafish-Ovary



All Clear

- Konishi and Aoki-Kinoshita, *Bioinformatics*, 2012
- Yamakawa, Aoki-Kinoshita, Guerardel et al., *Nature Communications*, 2018, 9(1), 4647.

GlyCosmos Portal: pathways

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Submissions

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GlyComb

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Glycoproteomics Data

GlycoPOST

GlycoPOST is a data repository of sharing glycoproteomics data.

<https://glycopost.glycosmos.org>

Resources

Databases	Databases
Genes/Proteins/Lipids	Glycans/Glycoconjugates
Databases	Databases
Glycomes	Pathways/Diseases

News

Tweets by @GlyCosmos

Hmm, an empty timeline weird.

[Check for Tweets](#)

[Embed](#) [Via](#)

[Follow @GlyCosmos](#)

Other Related Resource

GlyConnect

is a platform integrating information to help characterize molecular components of glycosylation.

jPOST

is a proteomic database integrate proteome data generated from multiple and institutions.

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Pathways

Pathway Database

GlyCosmos Pathways

GlyCosmos Pathway Database.

[link](#)

Diseases

ACGG Database

Glyco-Disease Genes Database (GDGDB)

GDGDB is a database of glycan-related diseases and their responsible genes.

— ACGG-Database in ACGG

<https://acgg.asia/db/diseases/gd gdb>

ACGG Database

Pathogen Adherence to Carbohydrate Database (PACDB)

PACDB provides the information on pathogens (e.g. bacteria, fungus, toxin and virus) adhering to carbohydrates expressed on the cell surface of host animals or plants.

— ACGG-Database in ACGG

<https://acgg.asia/db/diseases/pacdb>

GlyCosmos Pathways

- Retrieved data from Reactome (Ver. 63)
Extracted 33,134 glycoproteins from UniProt, and used these to obtain 7,151 pathways in RDF format

SUBMISSIONS

- GlyYouCan
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RESOURCES

Genes/Proteins/Lipids

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- GDGDB - glycogene diseases
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Glycomes

- Total Glycome Database
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Ontologies

- GlycoRDF
- PacOnto
- GGDOnto
- GlycoCoO

Notations

- WURCS
- GlycoCT
- SNFG

GlyCosmos Pathways

select the species

- ✓
- Arabidopsis thaliana
- Bos taurus
- Caenorhabditis elegans
- Canis familiaris
- Danio rerio
- Dictyostelium discoideum
- Drosophila melanogaster
- Gallus gallus
- Homo sapiens**
- Mus musculus
- Mycobacterium tuberculosis
- Oryza sativa
- Plasmodium falciparum
- Rattus norvegicus
- Saccharomyces cerevisiae
- Schizosaccharomyces pombe
- Sus scrofa
- Taeniopygia guttata
- Xenopus tropicalis

enter the keyword

e.g. Cell Cycle

Font Awesome. Web fonts from Google.



GlyCosmos Pathways

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- GlycoPOST

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Glycomes

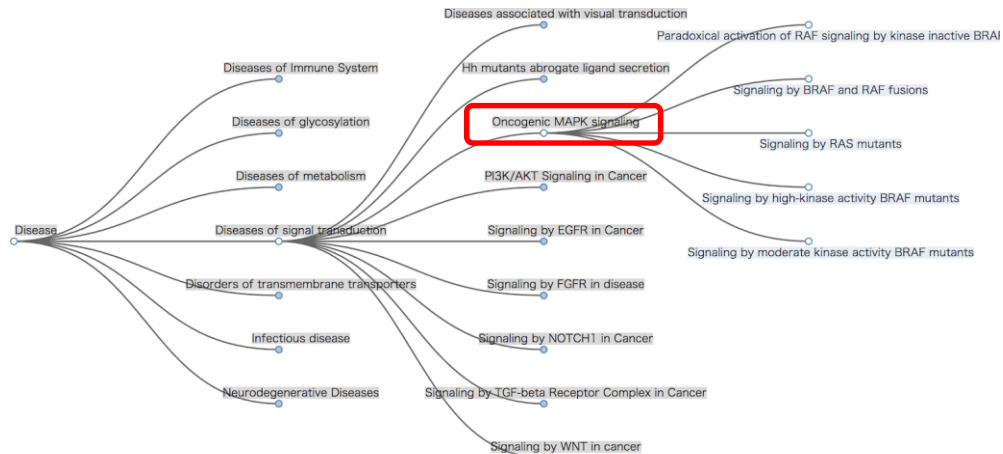
- Total Glycome Database
- GlycomeAtlas

Pathways/Diseases

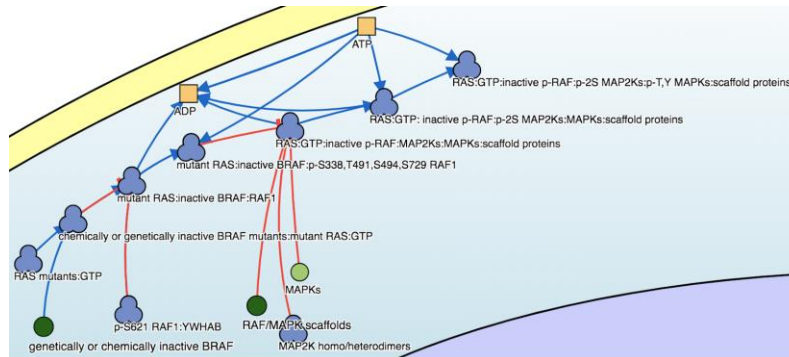
- GlyCosmos Pathways
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- Ontologies
- GlycoRDF
 - PacOnto
 - GGDOnto
 - GlycoCoO
- Notations
- WURCS
 - GlycoCT
 - SNFG

Selected species : Homo sapiens

- Cell Cycle
- Cell-Cell communication
- Cellular responses to external stimuli
- Chromatin organization
- Circadian Clock
- DNA Repair
- DNA Replication
- Developmental Biology
- Digestion and absorption
- Disease
- Extracellular matrix organization
- Gene expression (Transcription)
- Hemostasis
- Immune System
- Metabolism
- Metabolism of RNA
- Metabolism of proteins
- Muscle contraction
- Neuronal System
- Organelle biogenesis and maintenance
- Programmed Cell Death
- Reproduction
- Signaling Pathways
- Transport of small molecules
- Vesicle-mediated transport



Oncogenic MAPK signaling - Paradoxical activation of RAF signaling by kinase inactive BRAF

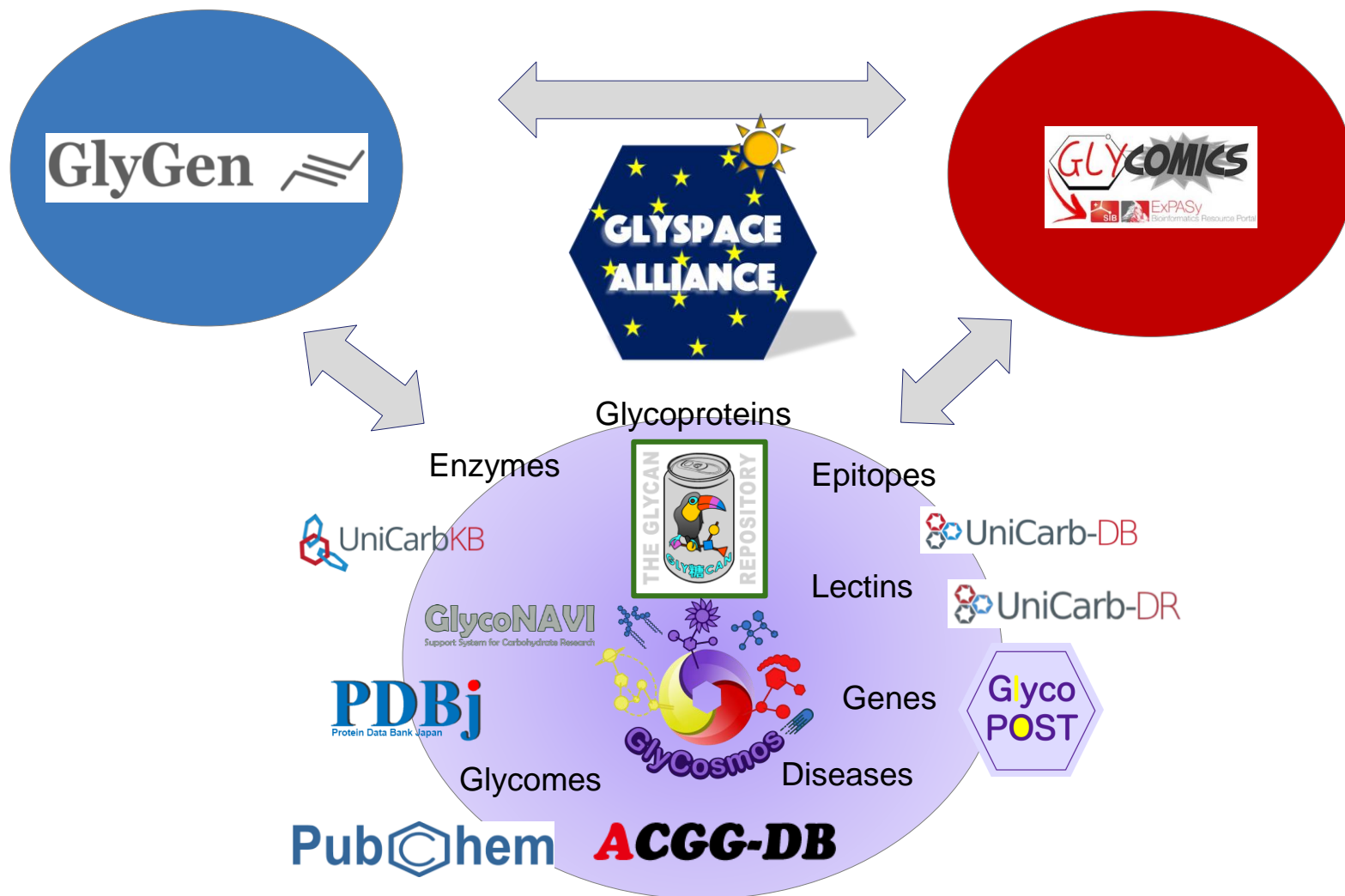


SYMBOL	DESCRIPTION
	Stimulus
	Phenotype
	External protein (viral)
	Protein
	Protein Family
	Protein Complex
	Chemical / Drug
	Small Molecule

GlyCosmos Summary

- A foundational infrastructure for data generated by the glycoscience community to promote glycoscience research
- A user-friendly Web portal where beginners from a wide variety of fields can browse glycoscientific data
- By using Semantic Web technologies, all data will be made available by a SPARQL endpoint in RDF format and linked easily with many data resources
- Beta version has been released today (October 5, 2018 JST)
 - <https://glycosmos.org>
 - @GlyCosmos

GlySpace Alliance



Established August, 2018 @ Warren Workshop

Acknowledgements

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and Technology Agency
(JST) and National
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