



# GLYCOPHARM

**The Sugar Code:**  
from bio(chemical) concept to clinics

# Newsletter

August 2015 - Issue 8

<http://www.glycopharm.eu>

**Marie Curie Initial Training Network**

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**PITN-GA-2012-317297**



# Newsletter

August 2015  
Issue 8

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Newsletter designed  
by Begoña Morales



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## EDITORIAL

### Welcome

Dear Reader,

Welcome to the eighth issue of the GLYCOPHARM newsletter.

GLYCOPHARM is a Marie Curie Initial Training Network devised to offer training to young researchers in the interdisciplinary field of glycosciences.

The consortium welcomes Espikem Srl., a spin-off of the University of Florence specialized in design, synthesis, purification and characterization of peptides and analogues of biomedical interest. Espikem joins GLYCOPHARM as associated partner for providing further secondment opportunities to the young researchers.

As in previous issues, we report on several dissemination and outreach activities carried out by network members. In the first category, the special issue in Trends in Biochemical Sciences titled "The Magic of the Sugar Code" is highlighted. Hans-Joachim Gabius, the scientist-in-charge of GLYCOPHARM at LMU, has participated as Guest Editor and author in this special issue. Regarding outreach activities, please have a look to the video made by Giullia Cazzanelli, the GLYCOPHARM Early Stage Researcher at the University of Minho, where she describes the scientific focus of the GLYCOPHARM network, general aspects of her research project, and scientific and personal opportunities offered by Marie Curie Initial Training Networks. Congratulations Giullia!

In this newsletter you will also find information on GLYCOPHARM upcoming events. And if you want to know more, please visit our website!

*Dr. Dolores Solís*  
Coordinator of GLYCOPHARM



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## GLYCOPHARM CONSORTIUM



**CSIC** - Spain (Coordinator)  
Agencia Estatal Consejo Superior de Investigaciones Científicas  
<http://www.csic.es>



**USP-CEU** - Spain Terminated on 05-06-2014  
Fundación Universitaria San Pablo - CEU  
<http://www.ceu.es>



**NUID-UCD** - Ireland  
National University of Ireland at Dublin - University College Dublin  
<http://www.ucd.ie>



**LMU** - Germany  
Ludwig-Maximilians Universität Muenchen  
<http://www.en.uni-muenchen.de>



**UMINHO** - Portugal  
Universidade do Minho  
<http://www.uminho.pt>



**CUNI** - Czech Republic  
Univerzita Karlova V Praze  
<http://www.cuni.cz>



**UKL-HD** - Germany  
Universitätsklinikum Heidelberg  
<http://www.klinikum.uni-heidelberg.de>



**IAB** - Czech Republic  
Institute of Applied Biotechnologies a.s.  
<http://www.iabio.cz>



**TBM** - Italy Terminated on 01-05-2015  
Toscana Biomarkers Srl  
<http://www.toscanabiomarkers.com/en>



*We Innovate Healthcare*

**ROCHE** - Germany  
Roche Diagnostics GMBH  
<http://www.roche.com>



**HokU** - Japan (Associated partner)  
Hokkaido University  
<http://www.oia.hokudai.ac.jp>



**CIC bioGUNE** - Spain (Associated partner) Added on 02-02-2014  
Centro de Investigación Cooperativa en Biociencias  
<http://www.cicbiogune.es/>



**EspiKem SRL**- Italy (Associated partner) Added on 01-06-2015  
<http://www.espikem.com/en/index.asp>



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## NEWS

### Changes in the consortium

In December 2014, the financial partners of Toscana Biomarkers decided to close the research laboratory and entirely orient the activities of the company to the commercial exploitation of its patent portfolio. As consequence, TBM requested the termination of its participation in the GLYCOPHARM consortium on 30th April 2015, right after completion of the contract of Enrico Koenig, the Experienced Researcher recruited at TBM within the GLYCOPHARM project. Up to that date, TBM has been very actively involved in the network activities, including the organization of the 3rd GLYCOPHARM meeting held on January 2014, in which a visit to the TBM facilities at the bio-incubator of Toscana Life Sciences Foundation in Siena served to learn on start-up companies and business incubator systems.

In order to keep offering secondment opportunities to the GLYCOPHARM recruited researchers for training in peptide design, synthesis and immunological screening, the consortium has been reinforced with the incorporation of EspiKem Srl as associated partner. EspiKem is a spin-off company of the University of Florence aimed at the development of new bioactive peptides as wound healing agents and/or active components of cosmeceutical interest. EspiKem operates in tight collaboration with the Laboratory of Peptide and Protein Chemistry and Biology of the University of Florence (PeptLab), which is directed by the TBM member Anna Maria Papini.



From left to right, Anna Maria Papini, director of PeptLab and member of TBM, Claudia Alcaro, scientist in charge of TBM at GLYCOPHARM, and Enrico Koenig, Experienced Researcher recruited at TBM.





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## PUBLICATIONS

### New publications

- **Activation of human TLR4/MD-2 by hypoacylated lipopolysaccharide from a clinical isolate of Burkholderia cenocepacia**

Di Lorenzo F., Kubik L., Oblak A., Lore N.I., Cigana C., Lanzetta R., Parrilli M., Hamad M.A., De Soyza A., Silipo A., Jerala R., Bragonzi A., Valvano M.A., Martín-Santamaría S. and Molinaro A.

Journal Article: 2015 Jul 9 **Epub**

J Biol Chem

- **Thermodynamic Switch in Binding of Adhesion/Growth Regulatory Human Galectin-3 to Tumor-Associated TF Antigen (CD176) and MUC1 Glycopeptides**

Rodríguez M.C., Yegorova S., Pitteloud J.P., Chavarroche A.E., André S., Ardá A., Minond D., Jiménez-Barbero J., Gabius H.J. and Cudic M.

Journal Article: 2015 Jul 28

Biochemistry 54(29): 4462-74

- **Studies on Unprocessed and Acid-Treated Arabinogalactan from Larch as an Inhibitor of Glycan Binding of a Plant Toxin and Biomedically Relevant Human Lectins**

André S., Classen B. and Gabius H.J.

Journal Article: 2015 Aug

Planta Med 81(12-13): 1146-53

- **Monitoring Glycan-Protein Interactions by NMR Spectroscopic Analysis: A Simple Chemical Tag That Mimics Natural CH- $\pi$  Interactions**

Calle L.P., Echeverría B., Franconetti A., Serna S., Fernández-Alonso M.C., Diercks T., Cañada F.J., Ardá A., Reichardt N.C. and Jiménez-Barbero J.

Journal Article: 2015 Aug 3

Chemistry 21(32): 11408-11416

- **The magic of the sugar code**

Gabius H.J.

Journal Article: Trends Biochem Sci 40(7) **SPECIAL ISSUE 2015 JUL**



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## PUBLICATIONS

### New publications

- **The glycobiology of the CD system: a dictionary for translating marker designations into glycan/lectin structure and function**

Gabius H.J., Kaltner H., Kopitz J. and André S.

Journal Article: 2015 Jul

Trends Biochem Sci 40(7): 360-376

- **Conformational Plasticity in Glycomimetics: Fluorocarbamethyl-L-idopyranosides Mimic the Intrinsic Dynamic Behaviour of Natural Idose Rings**

Unione L., Xu B., Díaz D., Martín-Santamaría S., Poveda A., Sardinha J., Rauter A.P., Blieriot Y., Zhang Y., Cañada F.J., Sollogoub M. and Jiménez-Barbero J.

Journal Article: 2015 Jul 13

Chemistry 21(29): 10513-10521

- **Unraveling functional significance of natural variations of a human galectin by glycodendrimersomes with programmable glycan surface**

Zhang S., Moussodia R.O., Vertesy S., André S., Klein M.L., Gabius H.J. and Percec V.

Journal Article: 2015 May 5

Proc Natl Acad Sci U S A 112(18): 5585-5590



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## PUBLICATION

### Selected publication

#### The magic of the sugar code

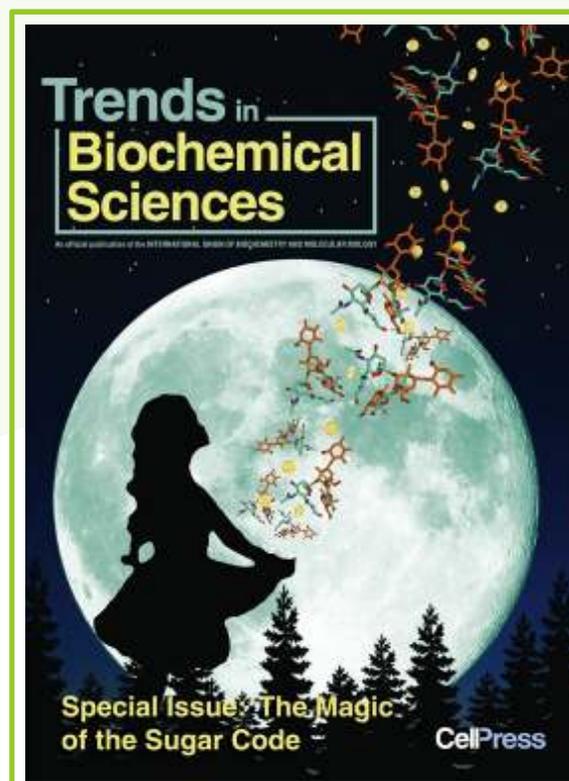
Gabius H.J.

Trends Biochem Sci 40(7) **SPECIAL ISSUE JUL 2015**

A special issue titled "The Magic of the Sugar Code" was published by Trends in Biochemical Sciences in July 2015. The scientist-in-charge of GLYCOPHARM at LMU, Hans-Joachim Gabius, participated as Guest Editor and as author of one of the reviews.

As the title suggests, this special issue gathers reviews that help reveal the 'magic' of the sugar code. It introduces readers to the virtues of coding by sugars and covers recent advances and emerging themes in glycobiology, from glycosylation of bacteria and evolution in eukaryotes to selected examples of its relevance in health and disease, as e.g. in neural development, glycosylation disorders or host-pathogen interactions.

The front cover theme, an illustration based on the fairy tale "The Star Talers" collected by the Grimm Brothers, symbolized how insights into the workings of the sugar code make it seem magical. The GLYCOPHARM Early Stage Researcher at LMU, Gabriel García Caballero, contributed to the design of this beautiful cover.



**EDITORIAL:** Discover your sweet tooth . *Nicole A. Neuman*

**LETTER:** The magic of the sugar code. *Hans-Joachim Gabius*

#### REVIEWS:

- **Sugar coating: bacterial protein glycosylation and host-microbe interactions.** *Felicia Y.Y. Tan, Christoph M. Tang, and Rachel M. Exley*
- **Glycan variation and evolution in the eukaryotes.** *Anthony P. Corfield and Monica Berry*
- **The glycobiology of the CD system: a dictionary for translating marker designations into glycan/lectin structure and function.** *Hans-Joachim Gabius, Herbert Kaltner, Jürgen Kopitz, and Sabine André*
- **Congenital disorders of glycosylation: a concise chart of glycoalyx dysfunction.** *Thierry Hennet and Jürg Cabalzar*
- **Axon glycoprotein routing in nerve polarity, function, and repair.** *José Abad-Rodríguez and Natalia Díez-Revuelta*
- **Gangliosides: glycosphingolipids essential for normal neural development and function.** *Cara-Lynne Schengrund*
- **The multi-tasked life of GM1 ganglioside, a true factotum of nature.** *Robert W. Ledeen and Gusheng Wu*



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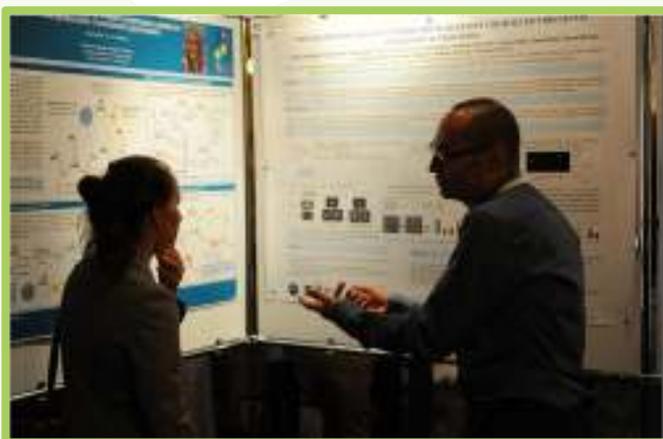
The Sugar Code: from bio(chemical) concept to clinics

## DISSEMINATION ACTIVITIES

### 18<sup>th</sup> European Carbohydrate Symposium



Cecilia Romanò, the GLYCOPHARM Early Stage Researcher recruited at the University College Dublin, attended the 18th European Carbohydrate Symposium (EUROCARB 18), held on 2-6 August in Moscow, Russia. Cecilia presented a poster entitled "Synthetic approaches towards the preparation of galectin-1 fluorinated ligands".



Given the prominent role of galectin-1 in tumour formation and progression, the development of novel tools to investigate the interaction of galectin-1 with potential lectin inhibitors is essential. The poster presented by Cecilia described the synthesis of fluorinated galectin-1 ligands for <sup>19</sup>F NMR spectroscopy studies, a novel and powerful technique developed by some GLYCOPHARM partners to monitor the binding event and to evaluate affinity, binding exchange, binding modes and binding epitopes (1,2).

The abstract of the poster can be downloaded from [drive.google.com/file/d/0B1wI1SsyUANPTENZUHV6RmFRcU0/view](https://drive.google.com/file/d/0B1wI1SsyUANPTENZUHV6RmFRcU0/view)



(1) T. Diercks, J. P. Ribeiro, F. J. Cañada, S. André, J. Jiménez-Barbero, H. J. Gabius, *Chem. Eur. J.*, 2009, 15, 5666;

(2) E. Matei, S. André, A. Glinschert, A. S. Infantino, S. Oscarson, H.-J. Gabius, A. M. Gronenborn, *Chem. Eur. J.*, 2013, 19, 5364.



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## OUTREACH ACTIVITIES

### Workshop at Aquina School

Prompted by the success of this activity in previous years, Sonsoles Martín-Santamaría (scientist-in-charge at CSICd) organized a workshop at the Aquinas American School (Madrid, Spain) on June 1st, 2015. The workshop was addressed to primary school students of different ages who participated in an interactive workshop on 3D visualization of different molecules, complexes and simulations.

The GLYCOPHARM young researchers Alessandra Lacetera (ESR at CSICd) and Silvia Galante (ESR at CSICb), as well as Sonsoles Martín Santamaría, participated in this enjoyable activity together with other members of the Computational Chemical Biology group of the Biological Research Centre (CSIC).





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## OUTREACH ACTIVITIES

### 1<sup>st</sup> GLYCOPHARM outreach video

A video made by Giulia Cazzanelli, the GLYCOPHARM Early Stage Researcher at the University of Minho, has been released. In this video, Giulia describes in an easy way the scientific focus of the GLYCOPHARM network and also general aspects of her research project, entitled "Biological screening and elucidation of signalling pathways using yeast models", including main objectives and methodologies used. She also explains the opportunities offered by Marie Curie Initial Training Networks, both at scientific and personal levels.



You can see the video at the following links:

<http://glycopharm.eu/outreach-activities.php>

<https://youtu.be/pukayGvSCHE>



Frames of the video showing the university and some equipments Giulia uses

### #GLYCOPHARM is in Twitter

Andrea Flores Ibarra, Early Stage Researcher at CSICc, posted the first tweet with the hashtag #Glycopharm (also released with the hashtag #MarieCurieActions) on June 15th. You can see the tweet at <https://twitter.com/meandaticket/status/610505035303288832>

The new Glycopharm hashtag will facilitate rapid communication of network news and comment exchanges. Everybody is welcomed to follow it and post tweets!





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## UPCOMING EVENTS

### 6<sup>th</sup> GLYCOPHARM meeting

As announced in our previous Newsletter, the next GLYCOPHARM meeting is being organized by Cândida Lucas (CBMA) and will be hosted by UMINHO at the School of Sciences, on September 21-22.

Full details on the program can be found at [www.glycopharmbraga.eu](http://www.glycopharmbraga.eu), a website created by Synergy for Science, the company responsible for handling event marketing, registrations and logistics of this meeting and also of the GlycoBiology Summer School on September 23-25 (see page 12). Information on the venue and travel and accommodation suggestions are also available at this site.



## SCHEDULED ACTIVITIES

### SEPTEMBER 21 (Monday)

- ESR/ER presentations
- ESR/ER Meeting
- Supervisory Board Meeting
- Visit to the new building / labs

### SEPTEMBER 22 (Tuesday)

- ESR/ER presentations
- Workshop on Structural Glycobiology, *Antonio Romero et al. (CSICc)*



Pictures of the University of Minho in Braga and the Science School's main auditorium, where the meeting will take place.



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## UPCOMING EVENTS

### GlycoBiology SUMMER SCHOOL

A Summer School organized by Cândida Lucas and Ana Preto (CBMA), will be held on September 23-25 at the School of Sciences of the University of Minho. This school aims to be a joint learning event with participation of lecturers from GLYCOPHARM and from three other ITNs of the glycobiology field, together with several guest invited speakers. In brief, main topics of the Summer School are glycobiology of cancer, carbohydrate immunomodulators, structural glycopharmaceutics and parasite glycobiology. The event will further include a Workshop on managing R&D at enterprise level and on Intellectual Property in a EU funding context. Details on the programme and registration instructions are available at [www.glycopharmbraga.eu](http://www.glycopharmbraga.eu).

#### Information on the participating ITNs

**Gastric Glyco Explorer** (<http://glycogastromics.biomedtrain.eu>) This ITN wishes to establish a platform of glycobiology research in order to use combined efforts to analyze gastric cancer from a glycobiological point of view.

**GLYCOPAR** (<http://www.glycopar.eu>) The main scientific goal of this ITN is the description of novel paradigms and models by which parasite glycoconjugates play a role in the successful colonization of the different hosts.

**IMMUNOSHAPe** (<http://immunoshape.eu>) This ITN seeks to combine state of the art synthesis and screening technology to develop the lead structures for highly selective glycan based multivalent immunotherapeutics for the treatment of cancer, autoimmune diseases and allergy.

#### Lectures

- Keynote Lecture: To be announced. *H.-J. Gabius, Ludwig Maximilians University of Munich, GPh*
- Essentials of lectin-ligand interactions: a galectins' perspective. *D. Solís, Consejo Superior de Investigaciones Científicas, GPh*
- Chemical Glycobiology of N-glycans: Tools and Applications. *Niels Reichardt, Centre for Cooperative Research in Biomaterials, ISh*
- Functions of Galectin-8 in human lymphocytes. *R. Schwartz-Albiez, German Cancer Research Center, ISh*
- Novel Carbohydrate based vaccines. *C. Neupert, Chief Technology Officer at Malcisco AG, GPar*
- Molecular Recognition of tumor-associated MUC1 peptides by their specific receptors: lectins and antibodies. *F. Marcelo, NOVA University of Lisbon, GPh*
- Unveil the role of mutated KRAS signaling in colorectal carcinoma: towards identification of new molecular targets. *A. Preto, University of Minho, GPh*
- Glycosylation in cancer. Molecular functions and clinical applications. *C. Reis, University of Porto, GGE*
- Glycobiology of neglected tropical diseases: new lessons from old problems. *A. Acosta-Serrano, Liverpool School of Tropical Medicine, GPar*
- Glycoside structure of extracellular matrix from yeast. *C. Lucas, University of Minho, GPh*
- Sweet Parasites: Insights from functional glycomics. *J. Rodrigues, University of Lisbon, Gpar*

#### Workshop on Private R&D and Intellectual Property

- Glycopar: a company perspective of a glycobiology ITN. *S. Soares, Chief Executive Officer at Silico-Life, Gpar*
- Monoclonal Antibodies: from the bench to the market. *M. Yegres, Roche Diagnostics GMBH, GPh*
- To be announced. *T. Martins, TecMinho Technology Transfer Office, University of Minho*

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