



GLYCOPHARM

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

Newsletter

April 2016 - Issue 10

<http://www.glycopharm.eu>

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Newsletter

April 2016
Issue 10

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EDITORIAL

Welcome

Dear Reader,

Welcome to the tenth issue of the GLYCOPHARM newsletter.

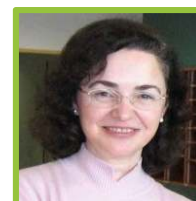
GLYCOPHARM is a Marie Curie ITN offering training to young researchers in the interdisciplinary field of glycosciences. Network-wide training activities have been continuous along the project following the scheduled programme, and were completed during the 7th network meeting held in February at Univerzita Karlova V Praze (CUNI).

As in previous issues, we report on scientific publications by network members. The joint meeting of the Carbohydrate Chemistry and Chemical Biology groups of the Spanish Royal Society of Chemistry (RSEQ), organized by Francisco Javier Cañada (CSICb), Sonsoles Martín-Santamaría (CSICd) and Jesús Jiménez-Barbero (CIC bioGUNE), has been selected as dissemination activity gathering several GLYCOPHARM senior and young researchers. The participation of Rosana Mateu (ESR at CUNI) in a very interesting initiative of the Science Club Barcelona intended to publicize the research work carried out by Catalan young researchers in Prague, is also highlighted.

In this newsletter you will also find information on the final network conference to be held in Madrid, in which all participants and ESR/ERs will have the opportunity to summarize the progress achieved along the research and training programme.

If you want to know more, 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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PUBLICATIONS

New publications

- **Simultaneous blocking of IL-6 and IL-8 is sufficient to fully inhibit CAF-induced human melanoma cell invasiveness.**

Jobe N.P., Rösel D., Dvořánková B., Kodet O. Lacina L., Mateu R., Smetana K. and Brábek J.
Journal Article: 2016 Apr 21 **Epub**
Histochem Cell Biol.

- **Glycomimetics Targeting Glycosyltransferases: Synthetic, Computational and Structural Studies of Less-Polar Conjugates.**

Ghirardello M., de Las Rivas M., Lacetera A., Delso I., Lira-Navarrete E., Tejero T., Martín-Santamaría S., Hurtado-Guerrero R. and Merino P.
Journal Article: 2016 Apr 13 **Epub**
Chemistry. 2016 May 17;22(21):7215-24.

- **Intra- and inter-molecular interactions of human galectin-3: assessment by full-assignment-based NMR**

Ippel H., Miller M.C., Vértesy S., Zhang Y., Cañada F.J., Suylen D., Umemoto K., Romanò C., Hackeng T., Tai G., Leffler H., Kopitz J., André S., Kübler D., Jiménez-Barbero J., Oscarson S., Gabius H.J. and Mayo K.H.
Journal Article: 2016 Feb 23 **Epub**
Glycobiology

- **Glycolipid-based TLR4 modulators and fluorescent probes: rational design, synthesis and biological properties**

Ciamarelli C., Calabrese V., Sestito S.E., Pérez-Regidor L., Klett J., Oblak A., Jerala R., Piazza M., Martín-Santamaría S. and Peri F.
Journal Article: 2016 Feb 19 **Epub**
Chem Biol Drug Des

- **Bioactive cell-like hybrids coassembled from (glyco)dendrimersomes with bacterial membranes**

Xiao Q., Yadavalli S.S., Zhang S., Sherman S.E., Fiorin E., da Silva L., Wilson D.A., Hammer D.A., André S., Gabius H.J., Klein M.L., Goulian M. and Percec V.
Journal Article: 2016 Mar 1
Proc Natl Acad Sci U S A. 113(9): E1134-41

- **Onion-like glycodendrimersomes from sequence-defined Janus glycodendrimers and influence of architecture on reactivity to a lectin**

Xiao Q., Zhang S., Wang Z., Sherman S.E., Moussodia R.O., Peterca M., Muncan A., Williams D.R., Hammer D.A., Vértesy S., André S., Gabius H.J., Klein M.L. and Percec V.
Journal Article: 2016 Feb 2
Proc Natl Acad Sci U S A. 113(5): 1162-7



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PUBLICATIONS

Selected publication

Intra- and inter-molecular interactions of human galectin-3: assessment by full-assignment-based NMR

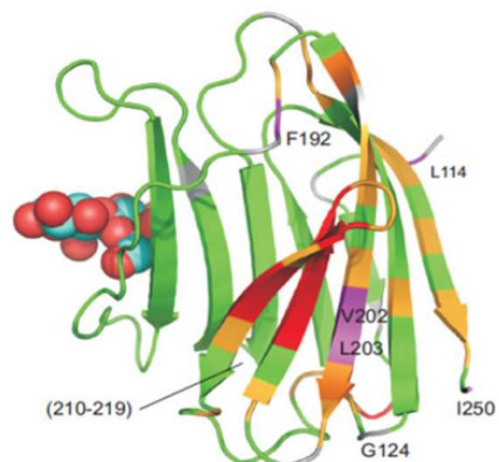
Ippel H., Miller M.C., Vértesy S., Zhang Y., Cañada F.J., Suylen D., Umemoto K., Romanò C., Hackeng T., Tai G., Leffler H., Kopitz J., André S., Kübler D., Jiménez-Barbero J., Oscarson S., Gabius H.J. and Mayo K.H.

Journal Article: 2016 Feb 23 [Epub](#)

Glycobiology

SUMMARY: Galectin-3 is an adhesion/growth-regulatory protein with a modular design comprising an N-terminal tail (NT, residues 1–111) and the conserved carbohydrate recognition domain (CRD, residues 112–250). The chimera-type galectin interacts with both glycan and peptide motifs. Complete $^{13}\text{C}/^{15}\text{N}$ -assignment of the human protein makes NMR-based analysis of its structure beyond the CRD possible. Using two synthetic NT polypeptides covering residues 1–50 and 51–107, evidence for transient secondary structure was found with helical conformation from residues 5 to 15 as well as proline-mediated, multi-turn structure from residues 18 to 32 and around PGAYP repeats. Intramolecular interactions occur between the CRD F-face (the 5-stranded β -sheet behind the canonical carbohydrate-binding 6-stranded β -sheet of the S-face) and NT in full-length galectin-3, with the sequence P²³GAW²⁶...P³⁷GASYPGAY⁴⁵ defining the primary binding epitope within the NT. Work with designed peptides indicates that the PGAX motif is crucial for self-interactions between NT/CRD. Phosphorylation at position Ser6 (and Ser12) (a physiological modification) and the influence of ligand binding have minimal effect on this interaction. Finally, galectin-3 molecules can interact weakly with each other via the F-faces of their CRDs, an interaction that appears to be assisted by their NTs. Overall, our results add insight to defining binding sites on galectin-3 beyond the canonical contact area for β -galactosides.

^{15}N - ^1H HSQC spectra of ^{15}N -labeled full-length Gal-3 and ^{15}N -labeled Gal-3 CRD were compared and some highly shifted backbone and side chain NH resonances were labeled using assignments previously reported (Ippel et al. 2015). In the figure, $\Delta\delta$ -values are highlighted in the X-ray crystal structure of Gal-3 CRD. Residues that are most highly shifted are coloured in red (2 SD above average), followed by orange (1 SD above average), gray (above the average) and green (below the average). The average value was 0.05 ± 0.04 ppm (SD). A molecule of lactose is shown in space-filling format for orientation.





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DISSEMINATION ACTIVITIES

XII Carbohydrate Symposium / III Chemical Biology Meeting

The joint meeting XII Carbohydrate Symposium / III Chemical Biology Meeting was held at the "Centro de Investigaciones Biológicas" (CIB-CSIC) in Madrid, from 14th -16th March 2016, organized by the specialized groups in Carbohydrate Chemistry (HIC) and Chemical Biology (GEQB) of the Royal Society of Chemistry of Spain (RSEQ).

The Carbohydrate Symposium is a well established biennial meeting of the RSEQ Group of Carbohydrate Chemistry which first edition was held in Granada in 1989 and the biennial meetings of the RSEQ Group of Chemical Biology started in 2012 in Santiago de Compostela and were continued in 2014 in Bilbao.

This joint meeting enabled communication of research embracing the interface between chemistry and biology, with special focus on modern glycosciences, highlighting their relation in fundamental concepts, methodologies and experimental approaches.

In addition to Plenary and Invited lectures delivered by international and Spanish reputed scientists in both fields, the event provided young researchers with the opportunity to personally present their work in the format of either oral, flash or poster communications.



Pictures of the meeting participants and of plenary speakers Markus Aebi (Swiss Federal Institute of Technology), Barbara Imperiali (Massachusetts Institute of Technology), Antoni Planas (Instituto Químico de Sarriá) and Peter Seeberger (MPIKG Max Planck)



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DISSEMINATION ACTIVITIES

XII Carbohydrate Symposium / III Chemical Biology Meeting

Several members of GLYCOPHARM participated at different levels in this fruitful meeting. Francisco Javier Cañada (CSICb) and Sonsoles Martín-Santamaría (CSICd) chaired the Organizing and Scientific Committees, and the Early Stage Researchers of their groups, Silvia Galante and Alessandra Lacetera, were active members of the Local Organizing Committee. Jesús Jiménez-Barbero (CIC bioGUNE) was also involved in the organization as member of the Scientific Committee and Chair of the Spanish Royal Society of Chemistry (RSEQ).

Furthermore, Dolores Solís (CSICa) participated as invited speaker with a lecture describing novel microarray strategies for exploring carbohydrate-mediated host–pathogen interactions, and the GLYCOPHARM young researchers Radoslaw Borowski (CSICa), Silvia Galante (CSICb), Andrea Flores-Ibarra (CSICc), Alessandra Lacetera (CSICd) and María Teresa Blázquez-Sánchez (NUID-UCD) made very interesting poster presentations of their research results.



GLYCOPHARM members at the joint XII Carbohydrate Symposium / III Chemical Biology Meeting. S. Martín-Santamaría, J. Jiménez-Barbero and F.J. Cañada chairing the meeting (top-left). D. Solís during her lecture (top-right). GLYCOPHARM ER and ESRs participating in the event (bottom-left). A. Lacetera and S. Galante with other young researchers collaborating in the organisation (bottom-right).



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OUTREACH ACTIVITIES

SC Barcelona: The Catalan team of young scientists working in the Czech Republic

The Czech edition of the magazine “Newsweek” and the Catalan newspaper “Ara.cat” published in April an article about the SC (Science Club) Barcelona. The team is composed by eleven young Catalans who live in Prague, where they moved to work in research.

Rosana Mateu Sanz, the Early Stage Researcher of GLYCOPHARM at Univerzita Karlova V Praze (CUNI), was one of the young researchers interviewed. Rosana explained that she went to Prague for the first time as Erasmus student and she loved the city. Afterwards, she found the opportunity to return to this city and start a scientific career thanks to the GLYCOPHARM project.





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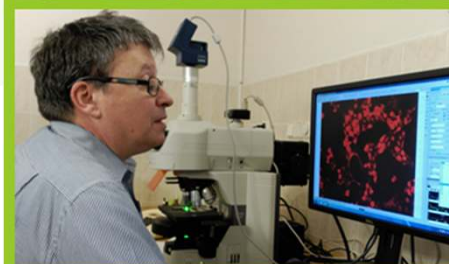
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PAST EVENTS

7th GLYCOPHARM meeting

The 7th GLYCOPHARM network meeting took place in Prague on February 15-17. It was organized by Prof. Karel Smetana and hosted by Univerzita Karlova V Praze (CUNI).

As in previous meetings, the ESRs and ERs presented the most important advances of their research projects. As part of the network course on Entrepreneurship and Company Management, the program included a lecture by Oscar Millet (CIC bioGUNE), who explained the steps followed and problems found in the development of the start-up company *ATLAS Molecular Pharma*. In the final session of this course, chaired by Milan Press (IAB), the ESRs and ERs presented proposals of spin-off companies and products, considering also their role in the company, potential stakeholders, and marketing. The V and VI modules of the course in Chemical Glycobiology & Biomedicine were also completed during the meeting, with the participation of network and external experts. A workshop on immunocyto and glycohistochemistry, including theoretical principles and an intensive hands-on session, was also organized by the CUNI team. The meeting finished with an interesting debate on research management and policy.



Pictures of the GLYCOPHARM researchers during the workshop and of Karel Smetana analysing the results.

Left, group photo of the meeting attendees.





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UPCOMING EVENTS

Final Conference

The Final Conference of the GLYCOPHARM project will take place at the Institute of Physical Chemistry Rocasolano (IQFR, CSICa) from Wednesday 27 to Friday 29, July 2016, in Madrid.

The main objective of this conference is that all partners and ESRs/ERs present the progress achieved along the project. The conference will be also open to external participants.

Detailed information on the program will be available very soon.



CONFIRMED PARTICIPANTS

Dolores Solís. Instituto de Química-Física Rocasolano, Consejo Superior de Investigaciones Científicas.

Radoslaw Borowski. Instituto de Química-Física Rocasolano, Consejo Superior de Investigaciones Científicas.

Francisco Javier Cañada. Centro de Investigaciones Biológicas, Consejo Superior de Investigaciones Científicas.

Antonio Romero. Centro de Investigaciones Biológicas, Consejo Superior de Investigaciones Científicas.

Andrea Flores Ibarra. Centro de Investigaciones Biológicas, Consejo Superior de Investigaciones Científicas.

Sonsoles Martín-Santamaría. Centro de Investigaciones Biológicas, Consejo Superior de Investigaciones Científicas.

Alessandra Lacetera. Centro de Investigaciones Biológicas, Consejo Superior de Investigaciones Científicas.

Stefan Oscarson. School of Chemistry and Chemical Biology, University College Dublin, National University of Ireland.

M. Teresa Blázquez-Sánchez. School of Chemistry and Chemical Biology, University College Dublin, National University of Ireland.

Cecilia Romanò. School of Chemistry and Chemical Biology, University College Dublin, National University of Ireland.

Cândida Lucas. Centro de Biologia Molecular e Ambiental, Universidade do Minho.

Giulia Cazzanelli. Centro de Biologia Molecular e Ambiental, Universidade do Minho.

Karel Smetana. Anatomický ústav, Univerzita Karlova V Praze.

Barbora Dvořánková. Anatomický ústav, Univerzita Karlova V Praze.

Rosana Mateu. Anatomický ústav, Univerzita Karlova V Praze.

Petr Broz. Institute of Applied Biotechnologies a.s.

Jesús Jiménez-Barbero. Chemical Glycobiology Lab, Centro de Investigación Cooperativa en Biociencias.

Shin-Ichiro Nishimura. Graduate School of Life Science, Hokkaido University.

Invited Speakers

Julie Bouckaert. Structural and Functional Glycobiology Unit, Université des Sciences et Technologies de Lille 1.

Manuel Martín-Lomas. Glycotechnology Research Group, Centro de Investigación Cooperativa en Materiales

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