



GLYCOPHARM

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

Newsletter

December 2013 - Issue 3

<http://www.glycopharm.eu>

Marie Curie Initial Training Network
Duration: Nov 1st 2012–Oct 31st 2016
EU Contribution: 3,005,458.30 €
PITN-GA-2012-317297



Newsletter

December 2013
Issue 3

SUMMARY

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FOR MORE INFORMATION:

Contact

Dolores Solís
d.solis@iqfr.csic.es

Begoña Morales
bmorales@iqfr.csic.es

Website

www.glycopharm.eu

Newsletter designed
by Begoña Morales



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EDITORIAL

Welcome

Dear Reader,

Welcome to the third 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. It will recruit 13 young researchers with the goal of providing them with broad scientific, entrepreneurial and transferable skills. After incorporation of the first five researchers, four more have joined the network, so we have already covered two-thirds of the recruitment process. Network-wide training activities have continued, with the organization of a successful Summer School in collaboration with the ITN DYNANO. This event has been an excellent opportunity to publicize the GLYCOPHARM network and its goals. Partners and recruited researchers have also participated in several outreach events for disseminating the network activities and Marie Curie actions in general, and motivating students to follow a research career. As relevant example, we here highlight the Marie Curie Day organized by the University College Dublin. In addition, the number of GLYCOPHARM publications is steadily increasing. In this issue, we focus on two of them arising from collaborative efforts of network groups. The GLYCOPHARM project is growing day by day!

The newsletter will be published quarterly to keep you updated on GLYCOPHARM's progresses, events and publications. If you want to know more, please visit our website!

Dr. Dolores Solís

Coordinator of GLYCOPHARM



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GLYCOPHARM CONSORTIUM

Partners



CSIC - Spain (Coordinator)

Agencia Estatal Consejo Superior de Investigaciones Científicas
<http://www.csic.es>



USP-CEU - Spain

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

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>



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RECRUITMENT

Newly Recruited Researchers



ER

Enrico Koenig

Toscana Biomarkers Srl

Project: Development of diagnostic/prognostic tests (Supervisor: Claudia Alcaro).
Started on 01/09/13



ESR

Andrea Flores-Ibarra

Agencia Estatal Consejo Superior de Investigaciones Cientificas

Centro de Investigaciones Biológicas

Project: Structural characterization of galectins and galectin-ligand complexes by X-ray crystallography (Supervisor: Antonio Romero).
Started on 16/09/13



ESR

Celia Romanó

University College Dublin, National University of Ireland

School of Chemistry and Chemical Biology

Project: Synthesis and development of lead compounds and multivalent systems (Supervisor: Stefan Oscarson).
Started on 01/10/13



ESR

Malwina Michalak

Universitätsklinikum Heidelberg

Department of Applied Tumour Biology

Project: Bioactivity profile of galectins in normal and tumour tissues and sera (Supervisor: Juergen Kopitz).
Started on 01/10/13



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PUBLICATIONS

New publications

- **Breaking pseudo-symmetry in multiantennary complex N-glycans using lanthanide-binding tags and NMR pseudo-contact shifts**

Canales A., Mallagaray A., Pérez-Castells J., Boos I., Unverzagt C., André S., Gabius H.-J., Cañada F.J. and Jiménez-Barbero J.

Journal Article: 2013 Dec 16. *Angew Chem Int Ed Engl* 52(51):13789-13793

- **Copy-number variation of functional galectin genes: studying animal galectin-7 (p53-induced gene 1 in man) and tandem-repeat-type galectins-4 and -9**

Kaltner H., Raschta A.S., Manning J.C. and Gabius H.-J.

Journal Article: 2013 Oct. *Glycobiology* 23(10):1152-1163

- **Conformational selection in glycomimetics: human galectin-1 only recognizes syn-psi-type conformations of beta-1,3-linked lactose and its C-glycosyl derivative**

Vidal P., Roldós V., Fernández-Alonso M. del C., Vauzeilles B., Bleriot Y., Cañada F.J., André S., Gabius H.-J., Jiménez-Barbero J., Espinosa J.F. and Martín-Santamaría S.

Journal Article: 2013 Oct 18. *Chemistry* 19(43):14581-14590

- **Glycophenotyping of osteoarthritic cartilage and chondrocytes by RT-qPCR, mass spectrometry, histochemistry with plant/human lectins and lectin localization with a glycoprotein**

Toegel S., Bieder D., André S., Altmann F., Walzer S.M., Kaltner H., Hofstaetter J.G., Windhager R. and Gabius H.-J.

Journal Article: 2013 Oct 4. *Arthritis Res Ther* 15(5):R147

- **Fine-tuning of prototype chicken galectins: structure of CG-2 and structure-activity correlations**

Ruiz F.M., Fernández I.S., López-Merino L., Lagartera L., Kaltner H., Menéndez M., André S., Solís D., Gabius H.-J. and Romero A.

Journal Article: 2013 Sep. *Acta Crystallogr D Biol Crystallogr* 69(Pt 9):1665-1676

- **The growing galectin network in colon cancer and clinical relevance of cytoplasmic galectin-3 reactivity**

Dawson H., André S., Karamitopoulou E., Zlobec I. and Gabius H.-J.

Journal Article: 2013 Aug. *Anticancer Res* 33(8):3053-3059



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PUBLICATIONS

Selected publications

Breaking pseudo-symmetry in multiantennary complex N-glycans using lanthanide-binding tags and NMR pseudo-contact shifts

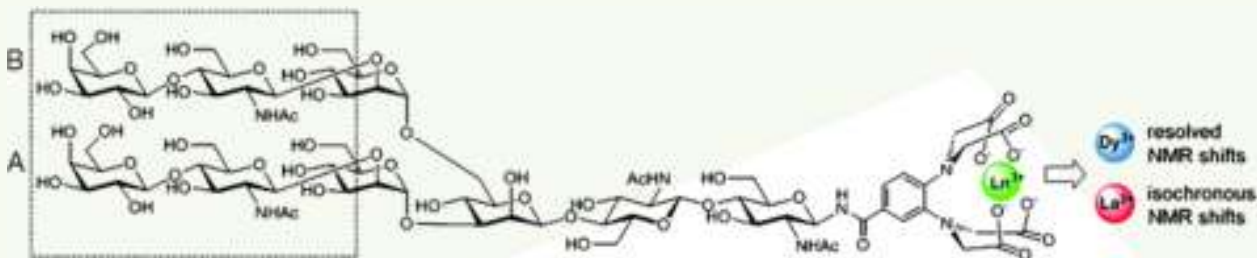
Canales A., Mallagaray A., Pérez-Castells J., Boos I., Unverzagt C., André S., Gabius H.-J., Cañada F.J. and Jiménez-Barbero J.

Journal Article: 2013 Dec 16. Angew Chem Int Ed Engl 52(51):13789-13793

VIP NMR Spectroscopy **Very Important Paper**

ABSTRACT

Controlling NMR shifts by lanthanides tagged to a "symmetrical" N-glycan reveals individual resonances for the residues of the otherwise identical A and B arms. This method provides a global perspective of conformational features and interactions in solution.



Nonasaccharide derivatives studied in this work. The 1–3 and 1–6 arms attached to the β -mannose unit are labelled as A and B arms, respectively.

AUTHOR'S COMMENT

The group at CSIC-CIB has developed a new NMR-based method that strategically employs paramagnetic lanthanide metals to effectively discriminate the conformational properties and interactions with other molecules of different regions of the same molecule, which would be otherwise indistinguishable due to symmetry or duplication reasons.

This work, performed in collaboration with other groups within and outside GLYCOPHARM, has been highlighted by Angewandte Chemie International Edition as Very Important Paper.



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PUBLICATIONS

Selected publications

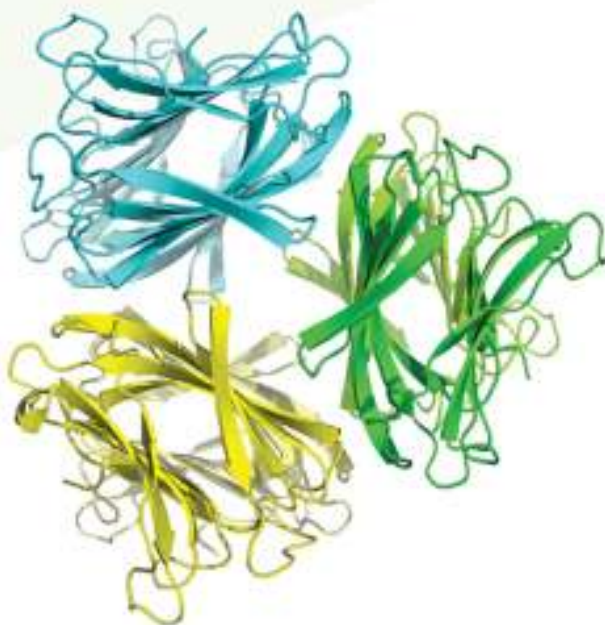
Fine-tuning of prototype chicken galectins: structure of CG-2 and structure-activity correlations

Ruiz F.M., Fernández I.S., López-Merino L., Lagartera L., Kaltner H., Menéndez M., André S., Solís D., Gabius H.-J. and Romero A.

Journal Article: 2013 Sep. Acta Crystallogr D Biol Crystallogr 69(Pt 9):1665-1676

ABSTRACT

The comparatively small number of members of the family of adhesion/growth-regulatory galectins in chicken predestines this system as an attractive model to study the divergence of these lectins after gene duplication. Expression profiling of the three homodimeric (prototype) chicken galectins (CG-1A, CG-1B and CG-2) has raised evidence of distinct functionalities, explaining the interest in a detailed crystallographic analysis of CG-2. As revealed here, marked differences are found in the ligand-binding site and in the contact pattern within the homodimer interface, underlying a characteristic orientation of the two subunits. Notably, a distinctive trimer of dimers that is unique in all galectin crystal structures reported to date forms the core unit of the crystallographic assembly. Combination with spectroscopic and thermodynamic measurements, and comparisons with CG-1A and CG-1B, identify differential changes in the circular-dichroism spectra in the presence of lactose, reflecting the far-reaching impact of the ligand on hydrodynamic behaviour, and inter-galectin differences in both the entropy and the enthalpy of binding. This structural information is a salient step to complete the analysis of the full set of galectins from this model organism.



Overall structure of CG-2.

View of the asymmetric unit containing a total of six CG-2 monomers arranged as three dimers. The two subunits of each dimer (coloured yellow, cyan and green) are related by a noncrystallographic twofold axis.



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PAST EVENTS

DYNANO-GLYCOPHARM Summer-School

The joint DYNANO-GLYCOPHARM Summer School was organized at the Biological Research Centre of CSIC. It was focused on nanosystems of application in glycosciences. The School included a presentation of the two ITNs by the respective coordinators and a series of lectures by scientists from both networks and by recognized invited speakers, covering a range of methodologies and approaches of application in biomedicine and (bio)technology, with focus on nanosystems. Among other activities, a special session was devoted to Women in Science, with one lecture analysing the progress of women in the scientific career, and a second lecture giving an inspiring example on the potential impact of science on society. The summer school also included a visit to several CIB labs, with explanations of the fundamentals and applications of the techniques used therein, and a very constructive open discussion session with Prof. Jean-Marie Lehn, right after his closing lecture.

In addition, the young researchers participated in a very fruitful networking session, which included several activities entirely organized by the early stage researchers recruited at the two networks by CSIC and USP-CEU.



Pictures taken during the networking session of the young researchers and other activities of the Summer School, as lectures and visit to CIB labs.



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PAST EVENTS

Marie Curie Day @ UCD

The University College Dublin (UCD) organised the "Marie Curie Day @ UCD" on Thursday 21st November. The main objective of the event was to highlight the support that Marie Curie Research Schemes offer to researchers across all disciplines and at all career stages. In fact, it was a great opportunity for the UCD community, from PhD student to Professor, to explore the opportunities available through Marie Curie funding from the perspectives of career development, intersectoral and international collaboration, and expertise & leadership. During this event, Celia Romanò, the GLYCOPHARM Early Stage Researcher recruited at UCD, presented a poster about our network.



Celia Romanò
GLYCOPHARM ESR

ACTIVITIES

Marie Curie Funded Researchers Poster Exhibition

Marie Curie for Careers: Exploring the Marie Curie Fellowship experience and what Marie Curie Fellowships can do for your career

Meet the Fellows – Poster Display: Coffee in the foyer area and a chance to meet the fellows behind the posters!

Marie Curie for Collaboration: Exploring the benefits of being involved in Marie Curie international exchange and intersectoral schemes and how to identify and approach the right partners

Marie Curie for Expertise & Leadership: Exploring where involvement in Marie Curie Schemes can lead in terms of capacity building, network building and future funding opportunities

MARIE CURIE FOR SOCIETY: Public Lecture "*Highlighting the Humanities: The Quest for Musical Knowledge*". Dr Nicole Grimes, Marie Curie Fellow, UCD School of Music & University of California, Irvine



Pictures of the Poster Exhibition and Meet the Fellows Session.



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UPCOMING EVENTS

2nd GLYCOPHARM meeting



The 2nd GLYCOPHARM's Network Meeting will be held on January 27-29 2014 in Siena, Italy. Toscana Biomarkers (TBM) will host the meeting at Scuola Superiore Santa Chiara, Università degli Studi di Siena.

The scheduled programme is shown below.

AGENDA

JANUARY 27

Presentations of the recruited researchers
ESRs and ERs, GLYCOPHARM

Course: Entrepreneurship and Company Management. Part I
Milan Press, IAB

JANUARY 28

Course on Chemical Glycobiology & Biomedicine. Module II: Glycans: Structure & (bio)synthesis

- **Glycoproteins and glycolipids**
Dr. Ana Ardá, CSICb
- **Proteoglycans and glycosaminoglycans**
Dr. Angeles Canales, Madrid Complutense University
- **Conformation and dynamic behaviour of glycans**
Jesús Jiménez-Barbero, CSICb

- **Chemical and enzymatic synthesis of glycans and glycoconjugates**
María José Hernáiz, Madrid Complutense University

Visit to Toscana Biomarkers laboratories

Workshop: Organic Synthesis
Stefan Oscarson, NUID-UCD

JANUARY 29

3rd Supervisory Board Meeting

Course: Entrepreneurship and Company Management. Part II
Milan Press, IAB

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