GLYCOPHARM

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

Newsletter

April 2015 - Issue 7

http://www.glycopharm.eu

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MARIE CURIE ACTIONS

Newsletter

April 2015
Issue 7

SUMMARY

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Newsletter designed by Begoña Morales

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EDITORIAL

Welcome

Dear Reader,

Welcome to the seventh 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 network has recently been reinforced by the incorporation of the Centre for Cooperative Research in Biosciences (CIC bioGUNE) as associated partner. The group of Prof. Jesús Jiménez-Barbero, deputy coordinator of GLYCOPHARM and new scientific director of CIC bioGUNE, is actively participating in the research and training activities of the network, including the organization and hosting of the 5th GLYCOPHARM meeting and the satellite workshop on Career Development and Proposal Writing. You will find information on these two successful and constructive events in this issue.

GLYCOPHARM also welcomes María Teresa Blázquez-Sánchez, who has been recruited by UCD-NUID. On the other hand, Enrico Koenig (Toscana Biomarkers) has left the project after completing his contract. We wish Enrico all the best for his scientific career.

As in previous issues, we report on several dissemination and outreach activities carried out by different network members. As "Selected Publications", we have highlighted those co-authored by the GLYCOPHARM young researchers Malwina Michalak, Rosana Mateu and Andrea Flores Ibarra. Great job, congratulations!

Finally, 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

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
Universitätklinikum 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

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/

PUBLICATIONS

New publications

• **Structural significance of galectin design: impairment of homodimer stability by linker insertion and partial reversion by ligand presence**
Vértesy S., Michalak M., Miller M.C., Schnölzer M., André S., Kopitz J., Mayo K.H. and Gabius H.-J.
Journal Article: 2015 Mar 21 **Epub**
Protein Eng Des Sel

• **Comparative lectinology: Delineating glycan-specificity profiles of the chicken galectins using neoglycoconjugates in a cell assay**
Rapoport E.M., Matveeva V.K., Kaltner H., André S., Vokhmyanina O.A., Pazynina G.V., Severov V.V., Ryzhov I.M., Korchagina E.Y., Belyanchikov I.M., Gabius H.-J. and Bovin N.V.
Journal Article: 2015 Feb 13 **Epub**
Glycobiology

• **Elemental biochemical analysis of the polysaccharides in the extracellular matrix of the yeast Saccharomyces cerevisiae**
Faria-Oliveira F., Carvalho J., Belmiro C.L.R., Ramalho G., Pavão M., Lucas C. and Ferreira C.
Journal Article: 2015 Jan 15 **Epub**
J Basic Microbiol

• **Cancer-associated fibroblasts are not formed from cancer cells by epithelial-to-mesenchymal transition in nu/nu mice**
Dvorankova B., Smetana K., Jr., Rihova B., Kucera J., Mateu R. and Szabo P.
Journal Article: 2015 May
Histochem Cell Biol 143(5):463-469

• **Bi- to tetravalent glycoclusters presenting GlcNAc/GalNAc as inhibitors: from plant agglutinins to human macrophage galactose-type lectin (CD301) and galectins**
André S., O'Sullivan S., Koller C., Murphy P.V. and Gabius H.-J.
Journal Article: 2015 Apr 14
Org Biomol Chem 3(14):4190-203

• **A murine monoclonal antibody to glycogen: characterization of epitope-fine specificity by Saturation Transfer Difference (STD) NMR Spectroscopy and its use in mycobacterial capsular alpha-glucan research**
van de Weerd R., Alvaro Berbís M., Sparrius M., Maaskant J.J., Boot M., Paauw N.J., de Vries N., Boon L., Baba O., Cañada F.J., Geurtsen J., Jiménez-Barbero J. and Appelmelk B.J.
Journal Article: 2015 Apr 13
Chembiochem 16(6):977-989

PUBLICATIONS

New publications

• **Emerging role of tissue lectins as microenvironmental effectors in tumors and wounds**
Smetana K., Jr., Szabo P., Gal P., André S., Gabius H.-J., Kodet O. and Dvořánková B.
Journal Article: 2015 Mar
Histol Histopathol 30(3):293-309

• **Thio- and selenoglycosides as ligands for biomedically relevant lectins: Valency-activity correlations for benzene-based dithiogalactoside clusters and first assessment for (di)selenodigalactosides**
André S., Kövér K.E., Gabius H.-J. and Szilágyi L.
Journal Article: 2015 Feb
Bioorg Med Chem Lett 25(4):931-935

• **Preliminary X-ray crystallographic analysis of an engineered variant of human chimera-type galectin-3 with a shortened N-terminal domain**
Flores-Ibarra A., Ruiz F.M., Vértesy S., André S., Gabius H.-J. and Romero A.
Journal Article: 2015 Feb
Acta crystallographica. Section F, Structural biology communications 71(Pt 2):184-188

• **Chemistry of lipid A: at the heart of innate immunity**
Molinaro A., Holst O., Di Lorenzo F., Callaghan M., Nurisso A., D'Errico G., Zamyatina A., Peri F., Berisio R., Jerala R., Jiménez-Barbero J., Silipo A. and Martín-Santamaría S.
Journal Article: 2015 Jan
Chemistry 21(2):500-519

• **Defining the potential of aglycone modifications for affinity/selectivity enhancement against medically relevant lectins: Synthesis, activity screening, and HSQC-based NMR analysis**
Rauthu S.R., Shiao T.C., André S., Miller M.C., Madej E., Mayo K.H., Gabius H.-J. and Roy R.
Journal Article: 2015 Jan
Chembiochem 16(1):126-139

• **Lectins: getting familiar with translators of the sugar code**
André S., Kaltner H., Manning J.C., Murphy P.V. and Gabius H.-J.
Journal Article: 2015 Jan 22
Molecules 20(2):1788-1823

Newsletter

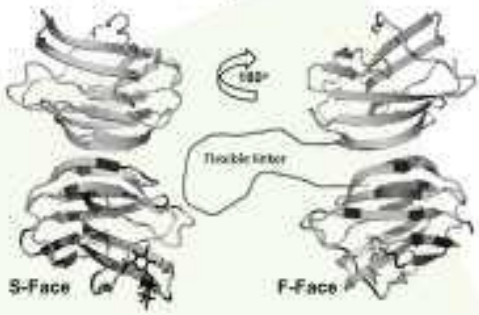
PUBLICATIONS

Selected publications

Structural significance of galectin design: impairment of homodimer stability by linker insertion and partial reversion by ligand presence

Vértesy S., Michalak M., Miller M.C., Schnölzer M., André S., Kopitz J., Mayo K.H. and Gabius H.-J.

Protein Eng Des Sel; **Epub:** 2015 Mar

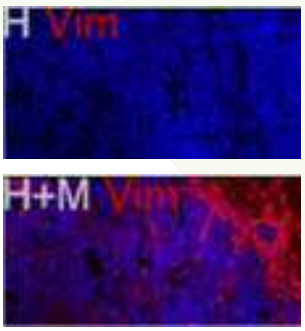


SUMMARY: In this study, the homodimeric human galectin-1 is converted into a tandem-repeat display by introducing the 33-amino-acid linker of galectin-8, with consequences on hemagglutination activity, stability of contacts between domains and inter-domain flexibility. The figure shows the effect of linker presence on Gal-1 resonances in 1H–15N HSQC spectra.

Cancer-associated fibroblasts are not formed from cancer cells by epithelial-to-mesenchymal transition in nu/nu mice

Dvorankova B., Smetana K., Jr., Rihova B., Kucera J., Mateu R. and Szabo P.

Histochem Cell Biol 143(5):463-469; 2015 May



SUMMARY: This study shows that human cancer cells grafted to nu/nu mice induced formation of tumor stroma with the presence of typical cancer-associated fibroblasts (CAFs). These CAFs were not recognized by an antibody specific for human vimentin (*H Vim, red signal*) while they were well recognized by antibody against mouse and human vimentin (*M+H Vim, red signal*). This suggests that stromal CAFs are not formed by epithelial-to-mesenchymal transition from cancer cells because they seem to be of the host origin.

Preliminary X-ray crystallographic analysis of an engineered variant of human chimera-type galectin-3 with a shortened N-terminal domain

Flores-Ibarra A., Ruiz F.M., Vértesy S., André S., Gabius H.-J. and Romero A.

Acta Crystallogr F Struct Biol Commun 71(2):184-188; 2015 Feb

SUMMARY: Human galectin-3 (Gal-3), an adhesion/growth-regulatory galectin, is composed of 3 different domains and is thus called a chimera-type protein. To date, crystallization of full-length Gal-3 has not been achieved. With the aim of providing structural insights into its modular organization, a shortened Gal-3 variant was crystallized in this work.

NEWS

New researcher recruited at GLYCOPHARM

The last position available at GLYCOPHARM for an Experienced Researcher has been covered. The new young researcher is María Teresa Blázquez-Sánchez, who holds a PhD in organic chemistry and has also experience in biochemistry and supramolecular chemistry. She has been recruited by UCD-NUID, from March this year up to the end of the project.

María Teresa Blázquez-Sánchez
University College Dublin, National University of Ireland
School of Chemistry and Chemical Biology
Project: (Chemo)enzymatic synthesis of oligosaccharides (Supervisor: Stefan Oscarson).
Started on 05/03/15

The first Experienced Researcher recruited at the network has completed his training

Enrico Koenig, the Experienced Researcher recruited by Toscana Biomarkers, has completed his 20-month Marie Curie contract. Enrico has been very actively involved in all activities of the GLYCOPHARM meetings in Siena, Munich, Madrid and Bilbao, including participation as elected representative of the young researchers at the Supervisory Board meetings in Siena and Madrid. He has also participated in several dissemination and outreach activities, as e.g. hands-on demonstrations for secondary school students, where he briefly explained his research project. This has been focused on the detection of anti-galectin antibodies with diagnostic purposes. Among other significant findings, his studies have revealed the occurrence of anti-galectin antibodies in connection to neurological disorders. A manuscript entitled “Anti-galectin antibodies in neurological conditions” is currently under preparation. In addition, he has coauthored a patent review on novel diagnostic tools and solutions for multiple sclerosis treatment, which is currently in press in the journal *Expert Opinion on Therapeutic Patents*.

Enrico Koenig
Toscana Biomarkers Srl
Project: Development of diagnostic/prognostic tests (Supervisor: Claudia Alcaro).
Started on 01/09/13 – Ended on 30/04/2015

NEWS

CIC bioGUNE: new GLYCOPHARM associated parnter

The Centre for Cooperative Research in Biosciences (CIC bioGUNE) officially joined GLYCOPHARM as Associated Partner on February 2.

CIC bioGUNE is a non-profit biomedical research organization located at the Technology Park of Bizkaia (Spain). Its incorporation as associated partner has been due to the recruitment of Prof. Jesús Jiménez-Barbero, former scientist-in-charge of CSICb and deputy coordinator of GLYCOPHARM, as Scientific Director of this centre.

Jesús Jiménez-Barbero's group at CIC bioGUNE will keep carrying out research and training activities within the GLYCOPHARM project. To start with, CIC bioGUNE hosted the 5th GLYCOPHARM meeting on February 2-4, and the satellite workshop on Career Development and Proposal Writing on February 5-6. You can find information on these two events in pages 12 and 13 of this newsletter.

In addition, CSICb also continues its participation in the network with Prof. Francisco Javier Cañada as new scientist-in-charge.

The pictures on top show the modern building where CIC bioGUNE is located and Jesús Jiménez-Barbero in his new laboratory.
The picture on the left corresponds to Francisco Javier Cañada, the new scientist-in-charge of the GLYCOPHARM CSICb group.

DISSEMINATION ACTIVITIES

10th anniversary of CIC bioGUNE

The Centre for Cooperative Research in Biosciences, CIC bioGUNE, celebrated its 10th anniversary on January 14. Since its inauguration in January 2005, more than 500 researchers have developed in CIC bioGUNE cutting-edge research at the interface between structural, molecular and cellular biology. Particular attention has been paid to the study of the molecular basis of disease, aimed to develop new diagnostic methods and therapies. The centre is equipped with the most modern scientific infrastructures, among which the Structural Biology Unit stands out with the most advanced NMR, electron microscopy and X-ray diffraction equipments.

The 10th anniversary of CIC bioGUNE served to take stock of the progress achieved as well as to embark on new ambitious projects, especially in the field of health sciences. Thus, the centre will reorganize its scientific areas, focusing on four main topics: cancer, infectious diseases, metabolism and disease, and protein homeostasis. Prof. Jesús Jiménez-Barbero, the new Scientific Director of CIC bioGUNE, current president of the Spanish Royal Society of Chemistry and member of GLYCOPHARM, will lead this task. Among the events held to celebrate the anniversary, Jesús Jiménez-Barbero gave a special lecture on the study of carbohydrate–protein interactions by NMR. The abstract of the lecture is available at http://www.cicbiogune.es/secciones/eventos.

DISSEMINATION ACTIVITIES

25 Years of Partnership Univerzita Karlova V Praze – Universität Heidelberg

The Ruprecht-Karls-Universität Heidelberg, founded in 1386, is the oldest University in Germany, and Charles University in Prague, founded in 1348, is the oldest University in the Czech Republic and the first University founded in Central Europe. The cooperation between these two Universities has a long tradition, and after the fall of the communist regime in Czechoslovakia in 1989 it saw an unprecedented growth.

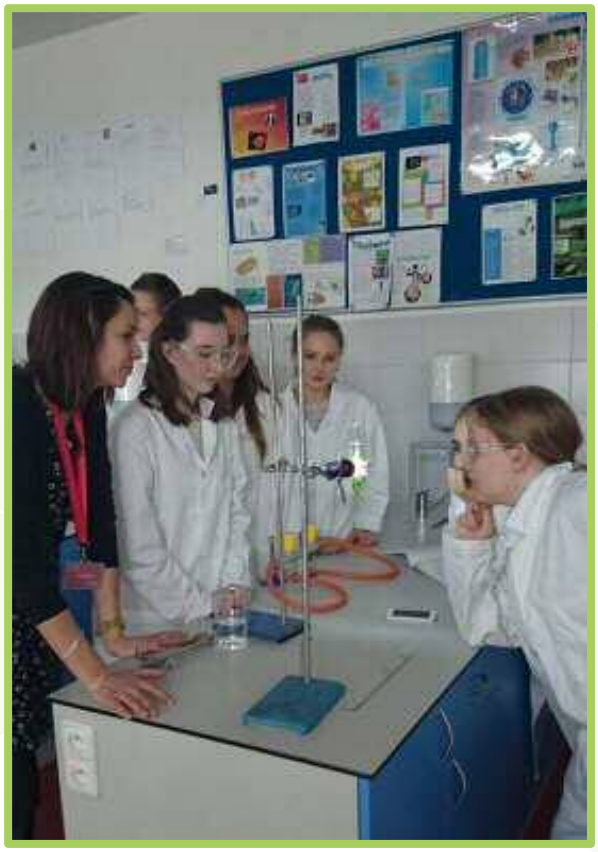
To celebrate the 25 years of the renewed collaboration between both Universities, a joint meeting was held at Charles University on April 27-29. An integral part of the meeting was a colloquium where various teams from both Universities presented their research. The lectures were given by distinguished professors, young researchers whose career has been influenced by the tight cooperation between the Universities, and former and current students of the joint PhD cotutelle study programme.

The GLYCOPHARM members Prof. Karel Smetana, from Charles University, and Prof. Jürgen Kopitz, from Universität Heidelberg, actively participated in this event chairing a panel on glycobiological aspects of cancer. In fact, during this panel Prof. Karel Smetana gave a lecture entitled "How to understand the intercellular crosstalk in cancer" and Prof. Jürgen Kopitz participated with the lecture "Glycans and glycan-binding proteins as functional markers in malignancy".

OUTREACH ACTIVITIES

Scientific day in Prague British School

The Prague British School organized a scientific day on February 11. Rosana Mateu, Early Stage Researcher at Univerzita Karlova V Praze, was invited to participate in this event. During the morning she visited the school, specially the laboratories of Biology and Chemistry, where she supervised the experiments carried out by the students. Afterwards, she delivered a talk about what being a PhD student means and her personal experience, and also gave a short explanation about her research project and the GLYCOPHARM network.



Rosana with the students in the lab and during her presentation.

PAST EVENTS

5th GLYCOPHARM meeting

The 5th GLYCOPHARM meeting was held on February 2-4 at the Technology Park of Bizkaia in Bilbao, hosted by the new associated partner CIC bioGUNE.

As in previous meetings, the ESRs and ERs presented the progress of their research projects. The scheduled training activities, including Module III of the course in Chemical Glycobiology & Biomedicine and a workshop on Molecular Recognition, were taught by senior researchers of the network, with the collaboration of Oscar Millet (CIC bioGUNE) as invited speaker. A series of seminars on scientific writing covered key points to keep in mind when writing a scientific paper. As special event, Niels Reichardt (CIC biomaGUNE), the coordinator of the ETN IMMUNOSHAPE, made a presentation of this network and its scientific and training goals.

In addition, the young researchers had the opportunity to thoroughly discuss about their research projects, and a meeting of senior researchers served to review the scientific progress of the network.

Finally, the 5th Supervisory Board meeting was held on February 3. Andrea Flores Ibarra (ESR at CSICc) and Michelle Yegres (ER at Roche) attended the meeting as new elected representatives of the young researchers.

PAST EVENTS

Intensive Workshop on Career Development plan and Proposal Writing Workshop

An intensive workshop on career development and proposal writing was organized for the ESRs and ERs on February 5-6, as satellite event of the 5th GLYCOPHARM meeting. The workshop was hosted by CIC bioGUNE, and it was mainly imparted by the private company INNARIMA Consulting S.L., with several invited speakers also providing different perspectives.

Dr. Beatriz Navarro, director of INNARIMA Consulting, taught an introduction lecture on funding opportunities and key features on proposal writing. After that, she focused on application procedures of H2020, highlighting especially the Marie Skłodowska-Curie actions. Furthermore, she also talked about many other international funding programs and dedicated a special session to the European Research Council grants.

On the other hand, Prof. Jesús Jiménez-Barbero shared with the participants his experience and perspective as ERC evaluator, and Dr. Arkaitz Carracedo, a young researcher of CIC bioGUNE recently awarded with an ERC Starting Grant, provided an exciting lecture entitled “A career in research: Pitfalls, drawbacks and perspectives". In addition, Dr. José María Sánchez-Puelles, a CSIC senior researcher that has worked both in academic institutions as in private companies as Merck, Sharp & Dohme, SmithKline Beecham and PharmaMar (12 years as director of R&D in the area of Drug Discovery), gave an interesting lecture on Molecular Pharmacology in the private sector.

Finally, Dr. Beatriz Navarro also provided an informal talk about project management based on her experience.

The pictures shows GLYCOPHARM ESRs and ERs taking notes during the workshop and Dr. Beatriz Navarro talking about different funding programs.

GLYCOPHARM

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UPCOMING EVENTS

6th GLYCOPHARM meeting

The next GLYCOPHARM meeting will be hosted by the University of Minho at the School of Sciences in Braga, Portugal, on September 21-22 .

The program will include a workshop on Structural Glycobiology, organized by Prof. Antonio Romero (CSICc), ample time for presentations of the ESRs and ERs on the progress of their research projects, sessions for open discussions and meeting of the young researchers, a guided visit to the centre facilities, and the Supervisory Board meeting.

GlycoBiology SUMMER SCHOOL

A Summer School organized by Prof. Candida Lucas and Ass. Prof. Ana Preto (UMINHO) will be held on September 23-25 at the School of Sciences of University of Minho right after the GLYCOPHARM meeting. The school will count with the participation of three other ITNs of the glycobiology field: IMMUNOSHAPE, Gastric Glyco Explorer, and GlycoPar. The scientific program is currently being elaborated but it is planned that it will include lectures delivered by members of the four networks, including the respective coordinators. The school promises to be a great networking and training event. We will be very pleased to welcome all of you!

GlycoBiology SUMMER SCHOOL

GLYCOPHARM Gastric Glyco Explorer GlycoPar IMMUNOSHAPE

Details on these two events will be given in the next issue

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