

# **Report for the ESF**

## **Workshop "Structural Glycoscience: Methods and Instrumentation"**

**ESRF, Grenoble, 29 june – 1 july 2010**

This workshop took place at the European Synchrotron Radiation Facility (ESRF - Grenoble) from Tuesday 29 June to Thursday 1 July 2010. It was organized in the framework of the Euro- Glycoscience network financed by the European Science Foundation and an EEC Initial Training Network CARMUSYS. The ESF support was used for allocating travelling grants to 21 young researchers. Their accommodation and the cost of speakers were taken on other budgets. They were either doctoral students or post-doc fellows involved in the field of glycoscience either as chemists or as biologists. Both theoretical lectures and practicals were offered to the participants. The practicals dealt with electron microscopy, resonance plasmon, neutron scattering, bio-small angle scattering, pump and probe experiments, macromolecular crystallography and X-ray nano beam lines. A full recognition of the attendance was attested throughout the delivery of European Credit Transfert Systems to the doctoral students.

This workshop was planned to be a School for training young students, mostly from European countries, to the field of structural glycobiology. The School was co-organized by the Structural Glycobiology group (chaired by Anne Imberty) of the ESF Euroglycoscience Network and the Carmusys network of the EEC initial training program (coordinated by Javier Rojo, and locally by Franck Fieschi and Serge Pérez). Our aimed was to gather 40 young researchers but the proposal was very successful and we could accommodate 50 young researchers, 11 speakers and 14 senior participants of the Carmusys network and others.

The ESF grant of 6000 euros that was allocated to this meeting has been used for allowing travelling grants to up to 300 euros to 21 young researchers (list at the end of the document). An international call was sent to the European laboratories related to Glycosciences, and more than 30 applications were received. The selection was performed on the basis of the relevance of the research project with the training proposed. All other expenses for the stay of the young researchers were covered by the CARMUSYS network, as well as the travel and stay of invited speakers and CARMUSYS network members. Due the additional participants from CARMUSYS, a total number of 75 registered participants, coming from 27 different countries, demonstrated the success of the workshop.



The above picture represents the young researchers founded by ESF together with the organisers Serge Pérez (left), Franck Fieschi and Anne Imberty (right). Photo by Chantal Argoud (ESRF).

The Workshop was held at the the European Synchrotron Radiation Facility (ESRF) in Grenoble located on the European Photon and Neutron Scientific Campus which host the the Partnership in Structural Biology.

The event was aimed as training in the field of glycosciences in order for young researchers to find out about this area and to meet some of the leading scientists. The program was therefore organized with pedagogical lectures by international experts in the different fields, and practicals with demonstration and experiments using the different up-to-date methodologies available in the field.

The plenary lectures (see program below) covered most up-to-date approaches for determining the structural and dynamic properties of carbohydrates and the analysis of their interactions with protein receptor. The following fields were covered: 1. Methods for preparing and purifying glycans, 2. Methods for determining 3-D structures of glycans 3. Methods for characterising the molecular interactions of glycan-binding proteins and their carbohydrate ligands.

The organization of the practical sessions was a challenge since only small groups (2-4 persons) could be accommodated on most demonstration. Researchers from IBS and the ESRF kindly accepted to participate to these practicals and to spend few hours demonstrating their techniques. At IBS, the Transmission Electron Microscopy and the Surface Plasmon Resonance demonstrations were very appreciated by the participants. At the ESRF, several beamlines were available for practical, including x-ray diffraction and scattering on biological molecules (biocrystallography and SAXS) and spectroscopy on macromolecular crystals (Cryobench). A visit of ILL demonstrated the several uses of neutron diffraction and scattering.

The social activities included, in addition to lunches and coffee breaks, two dinners in Grenoble where the young researchers could discuss with the invited speakers. The second dinner, that was held at a restaurant reached by cable car, outside of Grenoble, was particularly enjoyed by all participants.

### **Perspectives**

The workshop has been very successful on different aspects. First we had a strong demand for registration (and could not accept all applications) indicating that glycosciences are identified as an important domains by young researchers. Second, the organisation was excellent, especially for the installation of the practicals and demonstration, and the feedbacks from all participants were very positive. The young researchers demonstrated a strong interest in the different techniques and several contacts have been established for future collaboration. Finally, when taking into account the strong demand and the number of groups in Europe with interest in glycosciences, the possibility of setting up such school on regular basis should be envisaged.

# Workshop Program

## Tuesday 29th June 2010

Morning: Arrival of participants. - Registration from 10h to 12h.

*Lunch at the ESRF restaurant*

13h45 Welcome by local university & research institutes colleagues  
Introduction by the Organisers

14h15 **Dr. Serge Pérez** - Presentation of the scientific site & platforms : The European Photon and Neutron Scientific Campus. Opportunity for structural glycobiology.

15h00 **Prof. Franck Fieschi** - Over-expression & purification of recombinant lectins.

*Tea Break.*

16h15 **Dr. Eric Samain** - Expression and purification of recombinant glycan

17h00 **Prof. Steve Perkins** - Solution studies: Analytical ultracentrifugation, SAXS, SANS.

*Dinner*

## Wednesday 30th June 2010

8h30 **Dr. Matthew Bowler** - High throughput protein crystallography at synchrotron facilities

9h30 **Prof. Jesús Jiménez Barbero** - NMR of oligosaccharide and protein oligosaccharide complexes

*CoffeeBreak*

10h45 **Dr. Nicole Thielens** - Protein-sugar interaction: Surface Plasmon Resonance

11h30 **Dr. Serge Pérez & Dr. Anne Imberty** - Molecular Modeling of Bioactive Oligosaccharides and their Interactions with Proteins.

*Lunch at the ESRF restaurant*

14h00 **Dr. Trevor Forsyth** - Application of neutron diffraction to glycoscience

15h00 **Dr. Anne Imberty (replacing Dr Turnbull)** - Protein-sugar interactions: Isothermal Micro-Calorimetry

*Tea Break*

16h15 **Dr Guy Schoehn** - Application of Transmission Electron Microscopy to virology

17h00 **Dr Hugues Lortat Jacob - Closing Lecture:** HIV-1 entry inhibition by a synthetic CD4-Heparan glycoconjugate

*Banquet*

# Thursday 1th July 2010

## Practicals

(visits and/or demonstration)

Practicals are organized for 40 participants in two parallel sessions : beamlines at the ESRF/ILL, and electron microscopy and surface plasmon resonance at the IBS. Attendees will have to choose 2 activities among the 6 proposed.

### ESRF/ILL:

*Participants will attend a general presentation followed by a visit of one macromolecular beamlines:*

- 1) biocrystallography*
- 2) bio-saxs*
- 3) cryobench*
- 4) neutron scattering*

### IBS:

*Transmission Electron Microscopy*

- 5) Participants will participate in a sample preparation and observation using TEM*

*Surface plasmon resonance*

- 6) Participants will participate in a set of interaction tests by SPR*

8h30 -10h00. Group 1 - ESRF+ILL (Beam Lines) / Group 2 - IBS (TEM & SPR)

*μ*

*Coffee Break / Site Change*

10h30-12h00 : Group 2 - ESRF+ILL (Beam Lines) / Group 1 - IBS (TEM & SPR)

*Lunch at the ESRF restaurant*

14h : Delivering Certificates of attendance + Group photo.

15h : Concluding remarks.

End

## FULL LIST OF PARTICIPANTS

### List of speakers.

BOWLER, Matthew	ESRF (GRENOBLE)	FRANCE
FIESCHI, Franck	IBS-CNRS (GRENOBLE)	FRANCE
FORSYTH, Trevor	ILL (GRENOBLE)	FRANCE
IMBERTY, Anne	CERMAV (GRENOBLE)	FRANCE
JIMÉNEZ BARBERO, Jesús	CIB-CSIC (MADRID)	SPAIN
LORTAT-JACOBS, Hugues	IBS-CNRS (GRENOBLE)	FRANCE
PEREZ, Serge	CERMAV-CNRS-UJF (GRENOBLE)	FRANCE
PERKINS, Steve	UNIVERSITY COLLEGE (LONDON)	UNITED KINGDOM
SAMAIN, Eric	CERMAV (GRENOBLE)	FRANCE
SCHOEHN, Guy	UVHCI (GRENOBLE)	FRANCE
THIELENS, Nicole	IBS-CNRS (GRENOBLE)	FRANCE

### List of attendants

#### *. Young researchers with travelling grants from ESF*

BEULER-MARTÍNEZ, Silvia	ETH (ZÜRICH)	SWITZERLAND
BRANSON, Thomas	UNIVERSITY OF LEEDS (LEEDS)	UNITED KINGDOM
CIGHETTI, Roberto	UNIV. OF MILANO BICOCCA (MILAN)	ITALY
CUESTA SEIJO, José Antonio	CARLSBERG LABORATORY (COPENHAGEN)	DENMARK
D'ORAZIO, Giuseppe	UNIV. OF MILANO BICOCCA (MILAN)	ITALY
DANNE, Reinis	TAMPERE UNIVERSITY (TAMPERE)	FINLAND
FASCIONE, Martin	UNIVERSITY OF LEEDS (LEEDS)	UNITED KINGDOM
GOUVEIA, Ricardo M.	ITQB-UNL (OEIRAS)	PORTUGAL
HYKOLLARI, Alba	UNIV. FUR BODENKULTUR (VIENNA)	AUSTRIA
JORGENSEN, René	CARLSBERG LABORATORY (COPENHAGEN)	DENMARK
KADAM, Rameshwar	UNIVERSITY OF BERN (BERN)	SWITZERLAND
MARTÍNEZ-SEARA MONNE, Héctor	TAMPERE UNIVERSITY (TAMPERE)	FINLAND
NUNES, Mario	UNIVERSITY OF LISBON (LISBON)	PORTUGAL
QIN, Fen	NTNU (TRONDHEIM)	NORWAY
RAMBARUTH, Neela	WESTMINSTER UNIVERSITY (LONDON)	UNITED KINGDOM
SCHILLER, Birgit	UNIV. FUR BODENKULTUR (VIENNA)	AUSTRIA
SHALEV, Moran	TECHNION (HAIFA)	ISRAEL
SHUMANN, Benjamin	TÜBINGEN UNIVERSITÄT (TÜBINGEN)	GERMANY
TRAPERO, Ana	IIQAB (BARCELONA)	SPAIN
VILA REAL, Helder	UNIVERSITY OF LISBON (LISBON)	PORTUGAL
VISNAPUU, Triinu	UNIVERSITY OF TARTU (TARTU)	ESTONIA

# WORKSHOP

## “STRUCTURAL GLYCOSCIENCE: METHODS AND INSTRUMENTATION”

GRENOBLE, 29<sup>th</sup> JUNE and 1<sup>st</sup> JULY 2010

[www.ibs.fr/structural-glycoscience](http://www.ibs.fr/structural-glycoscience) or [www.esrf.eu/events/conferences](http://www.esrf.eu/events/conferences)

Glycoscience is a rapidly expanding and exciting field that is relevant to many areas of chemistry, biology and medicine. Glycans structure is of a direct importance since they are key structural elements in cell and in signalling events on their surface.

The workshop will train young scientists, from a chemistry or biology background, in the most up-to-date approaches for determining the structural and dynamic properties of carbohydrates, glycan binding receptors, analysis of their complexes and notably in the context of immunity and host-pathogen interaction.

This workshop will be validated by 3 ECTS by the EDCSV doctoral school. Some fellowships are available for students.



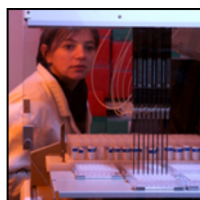
INSTITUT DE BIOLOGIE STRUCTURALE (IBS)



ESRF/ILL



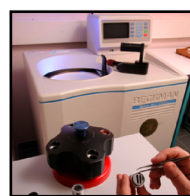
Surface Plasmon Resonance



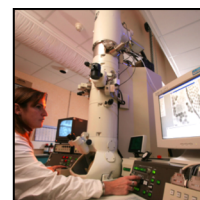
Crystallisation



NMR 800MHz



Analytical Ultracentrifugation



Electron Microscopy

### Confirmed Speakers

Pr. FRANCK FIESCHI *IBS (Grenoble, France)*

Dr. ERIC SAMAIN *CERMAV (Grenoble, France)*

Pr. STEVE PERKINS *University College London (London, UK)*

Dr. MATTHEW BOWLER *ESRF (Grenoble, France)*

Pr. JESÚS JIMÉNEZ BARBERO *CIB (Madrid, Spain)*

Dr. TREVOR FORSYTH *ILL (Grenoble, France)*

Dr. SERGE PEREZ *ESRF (Grenoble, France)*

Dr. BRUCE TURNBULL *University of Leeds (Leeds, UK)*

Dr. ANNE IMBERTY *CERMAV (Grenoble, France)*

Dr. NICOLE THIELENS *IBS (Grenoble, France)*

Dr. GUY SCHOEHN *UVHCI (Grenoble, France)*

Dr. HUGUES LORTAT-JACOB *IBS (Grenoble, France)*

Organizing comitee:  
Franck Fieschi,  
Anne Imberty,  
Serge Perez



[www.carmusys.iiq.csic.es](http://www.carmusys.iiq.csic.es)

“Carbohydrated Multivalent Systems  
as Tools to Study Pathogen  
Interactions with DC-SIGN”



<http://www.egsf.org/>

« ESF EuroGlycoforum  
Research Network program »

Contact and Information:  
Myriam Dhez  
[myriam.dhez@esrf.eu](mailto:myriam.dhez@esrf.eu)