

# IV REUNIÓN de la ASOCIACIÓN de USUARIOS de SINCROTRÓN de ESPAÑA (AUSE)

15-18 de Septiembre de 2009  
Cerdanyola del Vallès (Barcelona)

## Libro de Resúmenes



*Organizan:*



ASOCIACION  
USUARIOS  
SINCROTRON  
ESPAÑA



# **IV REUNIÓN DE LA ASOCIACIÓN DE USUARIOS DE SINCROTRÓN DE ESPAÑA**



**CERDANYOLA DEL VALLÈS. BARCELONA**

**15 - 18 de SEPTIEMBRE de 2009**

## Organizadores:

- Asociación de Usuarios de Sincrotrón de España (AUSE)
- Institut de Ciència de Materials de Barcelona-CSIC

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Institut de Ciència de Materials de Barcelona-CSIC

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**Manel Sabès Xamaní**

Universitat Autònoma de Barcelona

- 16:40 - 1200 A. Labrador (LLS, BM16-Spanish CRG, ESRF, Grenoble)  
*BM16 promoting Spanish synchrotron science*
- 17:00 - 1220 J. Rubio-Zuazo (Spanish CRG SpLine Beamline at ESRF  
-Grenoble- & ICMC, Madrid)  
*Development of a 2D event counting detector for the SpLine HAXPES  
analyzer: towards high resolution and energy XPS*
- 17:20 - 17:40 J. A. Gallastegui (Spanish CRG SpLine Beamline at ESRF  
-Grenoble- & ICMC, Madrid)  
*Multi-elements Si(Li) solid stat x-ray detector for x-ray absorption  
spectroscopy at SpLine*
- 17:40 - 18:20 Conferencia Plenaria:  
**Paul Tafforeau & Carmen Soriano** (ESRF, Grenoble, France) /  
(Universite Rennes 1 – Geosciences, France)  
*X-ray synchrotron imaging: a revolution for paleontology*
- 18:30 - 20:30 **Sesión de Pósters** y Refrigerio (edificio principal de ALBA) /  
Visita guiada a ALBA (1)

## Jueves 17 de Septiembre

Cuarta Sesión

Chairman:

**Miquel Coll**

IBMB-CSIC, Barcelona

- 9:00 - 9:40 Conferencia Plenaria:  
**Maria Solà** (IBMB-CSIC, Barcelona)  
*Aproximaciones a la resolución atómica de un complejo proteína-DNA*
- 9:40 - 10:00 Y. Prezado (ID17, ESRF, Grenoble, France)  
*Radioterapia con radiación sincrotrón*
- 10:00 - 10:20 O. López (IQAC-CSIC, Barcelona)  
*Bicellar systems in skin stratum corneum lipids: SAXS/GISAXS*
- 10:20 - 10:40 L. Campos (ETSEIB-UPC, Barcelona)  
*Structure of the DNA duplex d(CGTTAATTAACG)<sub>2</sub> in the presence of Mn<sup>2+</sup>  
ions*
- 10:40 - 11:00 I. Usón (ICREA at IBMB-CSIC, Barcelona)  
*Experimental and anisotropic data scaling for structure solution with  
SHELXE*
- 11:00 - 11:30 **Pausa Café**

Quinta Sesión

Chairman:

**Pietro Gambardella**

ICREA at ICN-CSIC, Campus UAB, Barcelona

- 11:30 - 12:10 Conferencia Plenaria:  
**Roberto Felici** (ID03, ESRF, Grenoble, France)  
*Understanding reactions at surfaces, latest results at the ID03 surface  
diffraction beamline*
- 12:10 - 12:30 V. Langlais (UAB, Barcelona)  
*C(4x4) induced self-assembly ordering by C60 on (1x2)-Pt(110) surface by  
SXR*
- 12:30 - 12:50 J. Lobo-Checa (CIN2, CSIC-ICN, Barcelona)  
*Band formation from coupled quantum dots formed by a nanoporous  
network on a copper surface*
- 12:50 - 13:10 M. G. Proietti (ICMA, CSIC-UZ, Zaragoza)  
*Strain and composition of semiconductor nanostructures by grazing  
incident diffraction anomalous fine structure spectroscopy*
- 13:10 - 13:50 Conferencia Plenaria:  
**Gary Ellis** (Institute of Polymer Science & Technology, CSIC,  
Madrid)  
*Microspectroscopy and imaging with synchrotron infrared radiation.  
Application areas and recent developments*
- 13:50 - 14:10 A. Segura (MALTA-Consolider Team & ICMUV, Universidad de  
Valencia)  
*Investigation of polar phonons in CuM<sub>III</sub>O<sub>2</sub> (M<sub>III</sub>: Al, Ga, Se) delafossites by  
means of synchrotron FTIR spectroscopy under high pressure*

## BICELLAR SYSTEMS IN SKIN STRATUM CORNEUM LIPIDS: SAXS/GISAXS

Olga López<sup>1</sup>, Gela Rodríguez<sup>1</sup>, Mercedes Cócera<sup>2</sup>, Jaume Caelles<sup>1</sup>, Laia Rubio<sup>1</sup>, Manel Sabés<sup>3</sup>,  
Nuria Bentseny<sup>3</sup>, Josep Cladera<sup>3</sup>, Silvia Gil<sup>3</sup>, Ramon Pons<sup>1</sup>, Alfonso De la Maza<sup>1</sup>

<sup>1</sup>Departament de Tecnologia Química i de Tensioactius, IQAC-CSIC, 08034 Barcelona, Spain

<sup>2</sup>BMI6, ESRF, Grenoble, France.

<sup>3</sup>Centre d'Estudis en Biofísica, Universitat Autònoma de Barcelona, Spain.

The stratum corneum (SC), the outermost layer of mammalian skin, is formed by flat anucleated cells embedded in a lipid matrix organized in lamellae. The specific organization of SC lipids is responsible of the skin barrier function, for this reason methodologies able to report data on skin lipids are required. Small angle X-ray scattering (SAXS) studies provide information about the larger structural units of SC lipids, namely the repeat distance of the lipid lamellar phases<sup>1</sup>. Given the small content of lipids in this tissue, the use of potent X-ray source is essential to obtain reliable data. With grazing incidence small-angle X-ray scattering (GISAXS) the limitations of conventional transmission SAXS with respect to extremely small sample volumes could be overcome.

In this study SAXS using Synchrotron source and GISAXS using a conventional source were applied to determine the structural lipid organization of SC samples in different conditions. In order to perform GISAXS experiments a special setup was adapted to skin samples. SC samples were extensively treated with phospholipids bicellar mixtures containing dipalmitoylphosphatidylcholine (DPPC), dimyristoylphosphatidylcholine (DMPC) or dioleoylphosphatidylcholine (DOPC) as long chain phospholipids and dihexanoylphosphatidylcholine (DHPC) as short chain phospholipid. As in the transmission geometry, SAXS from grazing incidence provided information about the repeat distance (d-spacing) of a lamellar phase<sup>2</sup> that in SC is related with the lamellar lipid structure. GISAXS curves corresponding to SC control showed a broad band that could be the overlap of two reflections consequence of two repeat distances of 45 Å (third order of the large lamellar phase of lipids) and 64 Å (short lamellar phase of lipids). Additionally, SAXS using Synchrotron allowed to detect the reflection consequence of first order the large lamellar phase with periodicity of 125 Å<sup>1</sup>. X-ray scattering spectrum of SC after treatment with DMPC/DHPC and DPPC/DHPC bicellar systems showed three bands corresponding to d-spacing around 45, 60 and 120 Å. Samples treated with DOPC/DHPC systems resulted in the more different diffraction pattern showing additional reflections peaks and bands corresponding to small repeat distances around 20 and 15 Å. These results indicate that the interaction bicelles-SC is different depending on the composition of the systems applied. Our results demonstrate that GISAXS is an appropriate technique to study SC lipids from full thickness skin. This methodology could be specially useful when the material to be analyzed is very sparse.

### Referencias

- [1] M. W. de Jager, G.S. Gooris, M. Ponc, J.A. Bouwstra, *J. Lipid Res.* **46**, 2649 (2005).
- [2] J. Pereira-Lachataignerais, R. Pons, H. Amenitsch, M. Rappolt, B. Sartori, O. López, *Langmuir* **22** 5256 (2006).

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