Skin Forum 12th Annual Meeting

March 28th to 29th, 2011
Campus Westend, Goethe Universität Frankfurt, Germany

Penetrating the Stratum Corneum – Measurement, Modulation and Modelling

Skin Forum
international skin science network

A conference organised by
the International Association for Pharmaceutical Technology
in partnership with Skin Forum

APV

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Meeting Venue

Campus Westend
Grüneburgplatz 1
60323 Frankfurt/Main – Germany
Lecture Hall HZ 4

Accommodation

Hotel
Mercure Hotel & Residenz Frankfurt Messe
Voltastr. 29 60486 Frankfurt/Main – Germany
Tel: ++49 69 79260
Fax: ++49 69 79261606
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Please book your room referring to Skin Forum.

Special meeting rate:
Single room, incl. breakfast buffet, 98,- €
Deadline for special meeting rate: January 31st, 2011

The Mercure Hotel & Residenz Frankfurt Messe is located near the Festhalle and exhibition centre and is approx. 20 minutes from the airport. Several prestigious companies such as Deutsche Bank are situated nearby. The main train station is a two-minute drive and the Westbahnhof S-Bahn station just 273 yds (250 m) away. Visit the Palmengarten Gardens and the Alte Oper (Old Opera House) in the nearby city centre and take the opportunity to enjoy a stroll along the Zeil shopping street.

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Registration Fees

	Before January 31st, 2011	After January 31st, 2011
Industry		
APV-Member	570,- €	730,- €
Non-APV-Member	700,- €	860,- €
Academia/Government		
APV-Member	285,- €	385,- €
Non-APV-Member	350,- €	450,- €
Students		
APV-Member	45,- €	65,- €
Non-APV-Member	70,- €	90,- €

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international skin science network

Skin Forum 12th Annual Meeting

Dr. Mercedes Cocera
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Spain

hat am Kurs-Nr. 6364
participated in the course no. 6364

Skin Forum 12th Annual Meeting
Penetrating the Stratum Corneum-
Measurement, Modulation and Modelling

vom 28.03.2011 bis 29.03.2011 im Campus Westend, Frankfurt, Germany teilgenommen.
from 28th to 29th March 2011 at the Campus Westend, Frankfurt, Germany.

J. Breitkreutz
Professor Jörg Breitkreutz
President APV

Professor Adrian Davis
President Skin Forum

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USE OF SYNCHROTRON RADIATION FOR PROBING SKIN STRUCTURES AND THEIR FUNCTION

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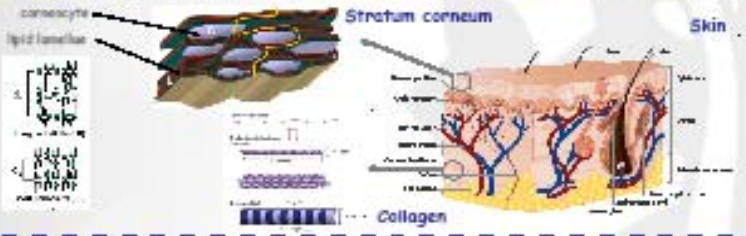
INTRODUCTION

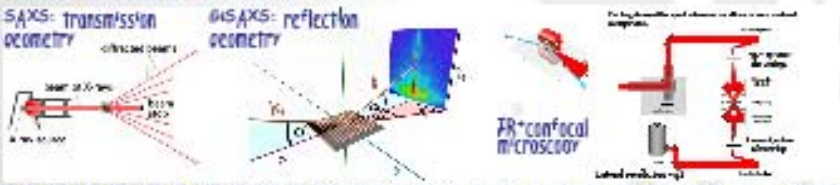
The synchrotron radiation (SR) allows revealing the structure of matter from the subnano-to micrometer levels, as those of biological tissues[1]. Although scattering have been extensively used for this purpose, more and more spectroscopy and microscopy SR-based techniques are being used to study biological matter[2]. The scattering techniques help us to characterize small regions with ordered domains (lipid lamellae) or preferably molecular orientation (collagen) present in the skin; the spectroscopy (IR) and the microscopy are valuable tools for the chemical mapping of samples.



MATERIALS & METHODS

Dermatomed skin, dermis and epidermis removed from pig skin[3]
DPPC/DHPC[4] (q=2, 20% w/v) applied on the skin: bicelles, and bicelles with flufenamic acid (Flu, 1%).
d-DPPC/d-DHPC (q=3.5, 13%) deuterated bicelles on the skin for SR-IR

(SR)-SAXS (BM16) at 1500/5000 mm sample-to-detector distance, λ=0.98 Å; WAXS (BM16), at 300 mm, λ=1.38 Å; GISAXS (BM16), at 2500 mm, λ=1.38 Å; IR (SMIS) in transmission (coupled to confocal microscopy) and reflection geometry (ATR)



RESULTS

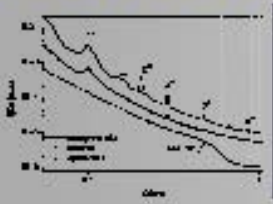


Figure 1: SAXS profile of skin layers

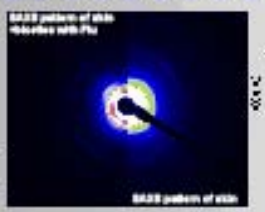


Figure 2: SAXS pattern of skin (right), and skin treated with bicelles containing Flu (left)

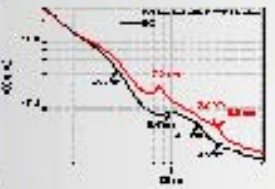


Figure 3: SAXS profile of SC, and SC treated with bicelles

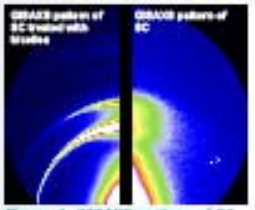


Figure 4: GISAXS pattern of SC (right), and SC treated with bicelles (left)

Scattering profiles of skin and dermis (Fig. 1) are dominated by collagen (d-spacing=63.4 nm); epidermis profile shows the SC lipids (LP~12 nm). Application of bicelles with Flu (Fig. 2): bicelles deliver the drug, and Flu increases the lateral order of collagen. SC profile (Fig. 3) shows bands associated to LP, SP, keratin, and crystalline cholesterol (see arrows).

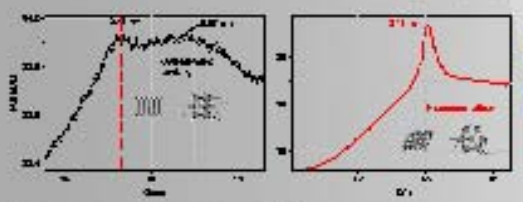


Figure 5: WAXS profile of SC (left), and SC treated with bicelles (right)

Topical application of bicelles modifies the lipid SC organization. GISAXS is more sensible to the surface (Fig. 4) showing the changes induced by bicelles in the SC pattern.

WAXS is sensible to the lateral packing of SC lipids: SC presents an orthorhombic packing of lipids that changes to hexagonal after the treatment with bicelles.

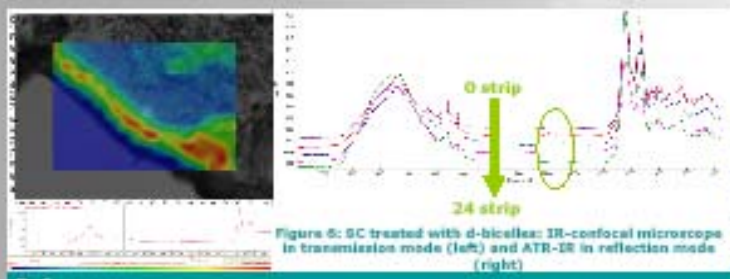


Figure 6: SC treated with d-bicelles: IR-confocal microscope in transmission mode (left) and ATR-IR in reflection mode (right)

IR in transmission mode (left): lipids are distributed mainly in the SC surface; in reflection mode (right): deuterated lipid from bicelles are detected up to the 4th strip.

IN SUMMARY, synchrotron sources are important tools for elucidating the structure of non-crystalline material and for the chemical mapping of biological tissues (even when the % of ordered regions represent a small fraction of the sample). Thus, scattering techniques allow us to characterize the structural modifications induced by topical agents (vehicles with/without drug), and IR allows knowing where and how deep the bicelles penetrate into the skin.

References

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[5] http://www.esrf.eu/computing/scientific/FIT2D

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