Gordon Research Conference

The 11th Barrier Function of Mammalian Barrier Function of Mammalian Skin Molecular, Biophysical & Biomechanical Understanding of Skin Barrier Formation, Function & Disease

August 9-14, 2009
Waterville Valley Resort
Waterville Valley, NH

Chairs:
Walter M. Holleran & Neil Kitson
Vice Chairs:
Gopinathan K. Menon & Juergen Lademann

Gordon Research Conference

The 11th Barrier Function of Mammalian Skin Gordon Research Conference is scheduled for August 9-14, 2009 at the Waterville Valley Resort in New Hampshire, USA. This conference represents the primary international research forum on the mammalian barrier, and is focused on the biophysical, biological, and clinical aspects of both normal and diseased barrier formation and function. The organizers have assembled an excellent program, with an outstanding list of speakers and discussion leaders to address the diverse aspects of current barrier research. To further insure that recent novel perspectives are highlighted, a "Hot Topics/Young Investigators" session is again scheduled, wherein six-to-seven presentations will be given by young scientists on their most-recent research.

This popular conference is generally fully- to over-subscribed, which makes it possible to accept an optimal mix of attendees from academics, industry and government, as well as a mix of young and established scientists. Submitted abstracts will be used not only to assist with consideration for conference participation, but also for the selection of presenters for the "Hot Topics/Young Investigators" session. The organizers also are making a concerted effort to recruit speakers and encourage attendees from around the world, particularly from Asia, Eastern Europe, and Former Soviet Union countries.

The 2009 Barrier Gordon Conference promises to provide new insights into the origin, function, maintenance, and repair of the mammalian skin barrier, including the penetration of drugs and exclusion of toxins and pathogens. The resulting exchange will hopefully lead to immediate, practical consequences for patients with skin and other disorders. To accomplish this goal, an array of important topics has been selected, with individual sessions and/or selected presentations devoted to: Molecular regulation and matrix signaling in barrier formation and regeneration; Insights into barrier structure and function from IR, deuterium NMR, & CARS spectroscopy; Membrane lipid transport and ABC transporter proteins in lamellar body formation and skin barrier function; Skin biophysics and biomechanics; Skin as a psycho-sensory barrier organ; Other barriers/other worlds: lessons from lung, GI, and bile barriers; Clinical dimensions of defective barriers in skin disease and repair; Anti-microbial and innate barriers; Protease regulation in stratum corneum structure, function, and disease; and Barrier electrophysiology. To complement these diverse themes, three evening poster sessions are scheduled, with up to 30 presentations each to be organized by topic. The always-entertaining Thursday evening debate returns with the topic: Math vs. Mouse: Percutaneous penetration & modeling.

Contributors

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An-eX Analytical Services
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Unilever
Wyeth Pharmaceuticals

SUNDAY

2:00 pm - 9:00 pm	Arrival and Check-in (Office Closed 6:00 pm - 7:00 pm)
6:00 pm	Dinner
7:30 pm - 7:40 pm	Welcome / Introductory Comments by GRC Site Staff & Conference Chairs
7:40 pm - 9:30 pm	**MEMBRANE BIOPHYSICS & SKIN BIOMECHANICS**
	Discussion Leaders: **Jenifer Thewalt** (Simon Fraser University, Vancouver, Canada) and **Juergen Lademan** (Charite Hospital, Berlin, Germany)
7:40 pm - 8:05 pm	**Evan Evans** (University of British Columbia, Vancouver) "Membrane biophysics and the skin"
8:05 pm - 8:20 pm	Discussion
8:20 pm - 8:45 pm	**Michel Lafleur** (University of Montreal, Quebec) "Organization and phase behavior of stratum corneum lipids"
8:45 pm - 9:00 pm	Discussion

11:05 am - 11:20 am	Discussion
11:20 am - 11:45 am	**Michel Simon** (Toulouse, France) "Trafficking and secretion of lamellar bodies: Lessons from proteomic characterization"
11:45 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	**Sevgi Gungor** (Istanbul University, Turkey) "Transdermal flux predictions for highly lipophilic compounds: Comparison with experimental results"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	**Yoshikazu Uchida** (University of California San Francisco) "Ceramide metabolites in epidermal permeability barrier function and atopic dermatitis"
12:25 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session #2
6:00 pm	Dinner
7:30 pm - 9:30 pm	**SKIN BARRIER AS BIOSENSOR: NEURAL-EPIDERMAL CONNECTIONS** Discussion Leaders: **Steven Hoath** (Cincinnati Children's Hospital Medical Center) and **Des Tobin** (University of Bradford, UK)
7:30 pm - 7:55 pm	**Mitsuhiro Denda** (Shiseido, Yokohama, Japan) "Neuro-effectors of the epidermal barrier"
7:55 pm - 8:10 pm	Discussion
8:10 pm - 8:20 pm	**Hyunjung Kim** (Yonsei University, Seoul, Korea) "Potential role of TRPV5 and 6 in the formation of epidermal calcium gradients and keratinocyte differentiation"
8:20 pm - 8:25 pm	Discussion
8:25 pm - 8:35 pm	**Truus Roelandt** (Ziekenhuis University Brussels, Belgium) "Cannabinoid receptors 1 and 2 regulate epidermal barrier status"
8:35 pm - 8:40 pm	Discussion
8:40 pm - 8:55 pm	**Tarl Prow** (University of Queensland, Australia) "Nanoparticle-biological interactions in the skin"
8:55 pm - 9:05 pm	Discussion
9:05 pm - 9:20 pm	**Ken Feingold** (University of California, San Francisco) "Cytokines in fetal barrier development"
9:20 pm - 9:30 pm	Discussion

WEDNESDAY

Bicellar systems as vehicles for percutaneous absorption of flufenamic acid

CSIC IQAC
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Introduction

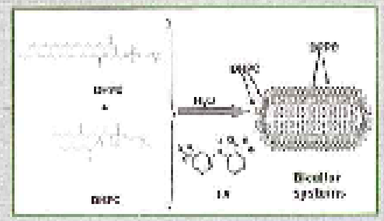
Bicellar systems are discoidal bilayered aggregates formed by phospholipids [1]. Their use as vehicle may be interesting due their nanodimensions and lipid composition. We are used dipalmitoylphosphocholine (DPPC) and dihexanoylphosphocholine (DHPC) as phospholipids. Flufenamic acid (FA) is a non steroidal anti-inflammatory drug of the anthranilic acid group with potent anti-inflammatory and analgesic effects. This drug is insoluble in water and, organic solvents that are able to solubilise this drug could impair the skin. Because of this, we think that the use of bicellar systems as carriers of FA may be a good alternative vehicle.

Aim

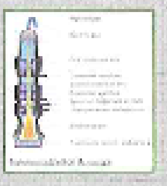
The aim of this work was to evaluate the potential use of bicellar systems as vehicles in the topical administration of FA. With this purpose, several characterization techniques based on microscopy were used and in vitro percutaneous absorption studies of FA using porcine skin [2] were carried out.

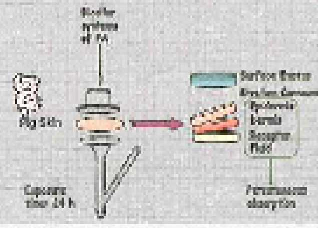
Experimental

Inclusion of FA in DPPC/DHPC bicellar systems → Characterization of bicellar systems → Percutaneous absorption → Skin visualization



- Cryogenic Transmission Electron Microscopy (Cryo-TEM)
- Freeze-Fracture Transmission Electron Microscopy (FFEM)





- Freeze Substitution applied to Transmission Electron Microscopy (FSTEM)

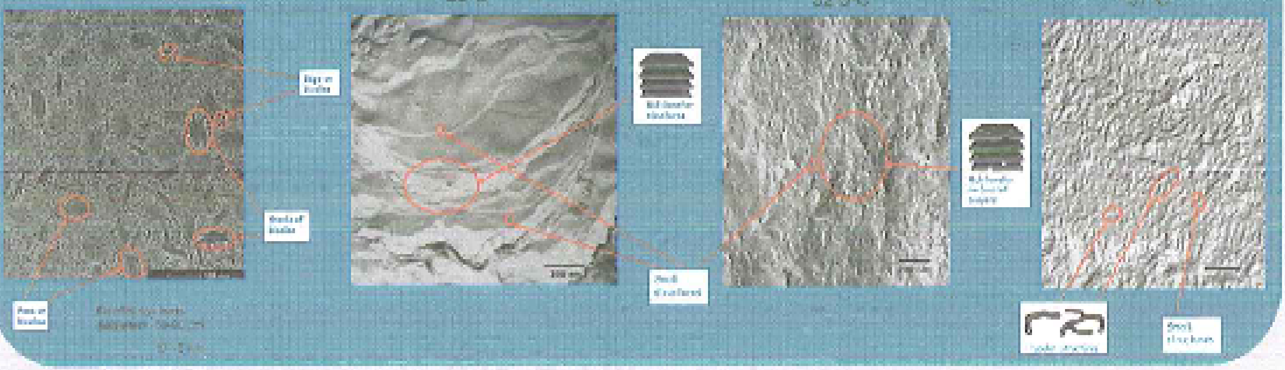
Results

Results from this study demonstrated that dimensions of the bicellar systems containing FA depends on the temperature.

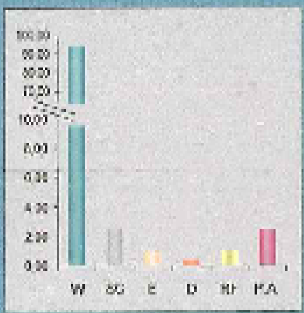
Cryo-TEM at 32.5ºC

FFEM

FFEM images exhibited multiple structures at different temperature

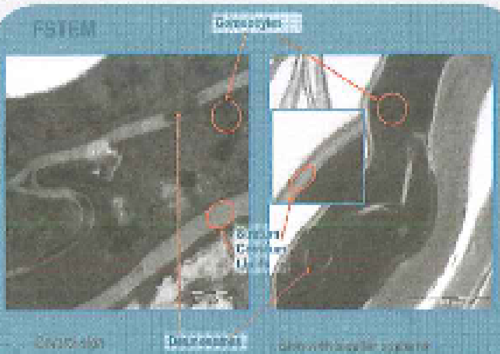


Percutaneous absorption



The percutaneous absorption study demonstrated that [illegible]% of FA remained in the stratum corneum (SC) whereas [illegible]% of the drug was percutaneously absorbed (epidermis-dermis-receptor fluid).

FSTEM



Bicellar systems did not affect the microstructure of the skin.

Conclusions

- Bicellar systems are able to include FA.
- FA bicellar systems have different structures at different temperature.
- These bicelles are able to reach the fluid receptor.
- These systems do not change the microstructure of the skin.

References
[1] I. Visscher, M. C. Stuart, J. B. Engberts, The influence of phenyl and phenoxy modification in the hydrophobic tails of di-n-alkyl phosphate amphiphiles on aggregate morphology, Org Biomol Chem. 4(4) (2006) 707-712.
[2] OECD Skin absorption: In vitro method, Guideline for the testing of chemicals 428, 2004.