transdermal drug delivery technology

OBJ LIMITED

PRESS RELEASE

Monday 16th May 2005
FOR IMMEDIATE RELEASE

PRESENTATION TO THE AUSTRALASIAN COLLEGE OF DERMATOLOGISTS

OBJ Limited (OBJ) is pleased to announce that recent research into its "electronic drug-patch" drug delivery system, known as Dermaportation, will be presented at the Australasian College of Dermatologists' annual scientific meeting to be held in Perth, between May 15th and 18th 2005.

The presentation will be delivered by Dr Heather Benson of the Drug Development Department, Curtin University.

Dr Benson has been asked to present on two separate occasions.
Firstly to the Australian Society of Dermatology Research on the 15th May and again as a podium presentation to the Australasian College of Dermatologists on Wednesday 18th.

A copy of the poster presentation by Curtin University is attached.

END:

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Background to the Announcement

OBJ Limited is a drug delivery company, developing electronic "drug patch" technologies that allow drugs, therapeutic agents and cosmetic compounds to be delivered more effectively and more efficiently through-the-skin.

The company had previously announced a 600% increase in the rate of delivery of the drug caffeine and a 70% reduction in the through-the-skin delivery times for the anaesthetic drugs lignocaine and prilocaine hydrochloride. More recently, it had demonstrated precise control over drug delivery rates and recent finding added an additional time-based control mechanism previously not seen in the drug delivery sector.

OBJ maintains a continuous development and discovery program that currently includes a number of commercially significant anti-inflammatory, anti-pain, anti-oxidant and anti-cancer drugs, as well as a number of cosmetic compounds.
The company anticipates the commencement of in vivo animal studies into "through-the-skin" administration of vaccine and anti-body agents before the end of July 2005.

Independence of Results

OBJ contracts its drug and technology testing programs to independent and respected organisations, such as Western Australian Biomedical Research Institute or WABRI and Universities.

WABRI is a government owned and funded drug development and testing facility operated by Curtin University. The high level of independence and international accreditation means that the results by OBJ can be published and presented at major medical and scientific conferences and forums.

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Introduction: Dermaportation is a modified inductive energy technology to enhance skin penetration of drugs. The proposed mechanism of action is bio-induction caused by the generation of an electric effect in the stratum corneum. This reduces the barrier effect of the bilayer lipids to increase skin penetration of a concurrently applied solute. Inductive medicine has been investigated for enhancing healing of venous ulcers [1], bone fractures [2] and has been shown to affect a range of cellular functions [3].

Objective: The aim of the study was to investigate the effect of Dermaportation cycles (waveforms) on epidermal penetration of a small model solute (caffeine).

Methods: *In vitro* diffusion across excised human epidermis was determined using Franz type diffusion cells (Fig. 1) maintained at 37°C. The donor compartment consisted of 100 μg of caffeine in 1 mL phosphate buffered saline (PBS). The receptor compartment was filled with PBS and stirred throughout. Aliquots (500 μL) were taken from the receptor at 0, 0.5, 1, 1.5, 2, 3 and 4 h and immediately replaced with an equal volume of PBS. An aliquot was also taken from donor phase at 4 h. Dermaportation was applied for 30 min from time 0.5 to 1 h after application of the donor solution. Four different Dermaportation waveforms were compared with passive diffusion. Caffeine content in all samples was assayed by HPLC. Experiments were conducted in triplicate.

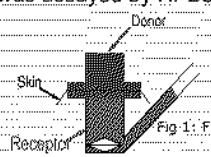

Fig 1: Franz cell

Results: Cycles 2 and 3 waveforms caused a greatest increase in epidermal penetration of caffeine immediately after Dermaportation (0.5 – 1 h). The enhancement effect of Cycle 4 was less pronounced. Cycle 1 waveform, which is similar to that which has been used previously to induce bone cell proliferation, showed minimal enhancement of caffeine penetration across human epidermis.

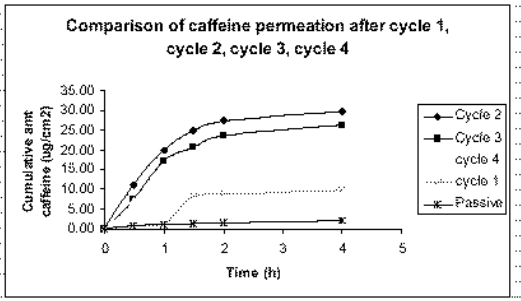

Fig 2: Cumulative amount of caffeine penetrated human epidermis to receptor phase on passive diffusion and with Dermaportation (n=3, ± s.d.)

Table 1: Flux of caffeine across human epidermis during (0.75 h timepoint) and after application of Dermaportation or passive diffusion

Time (h)	Flux (μg/cm²)				
	Passive	Cycle 1	Cycle 2	Cycle 3	Cycle 4
0	0	0	0	0	0
0.75	0.55	0.62	17.62	19.24	3.5
1.25	0.40	1.89	9.9	0.9	6.7
1.75	0.63	0.84	5.81	0.0	4.7
3.5	0.14	0.39	1	1.33	0.82

Conclusions: Marked enhancement ratios (ratio of flux Dermaportation to passive) of 35 and 32 were obtained during Dermaportation application with cycle 3 and cycle 2 waveforms respectively. The Dermaportation technology is being further investigated to determine energy waveform characteristics that will provide optimal skin penetration enhancement with a range of therapeutically relevant solutes.

References

[1] Stiller M.J. et al. A portable pulsed electromagnetic field (PEMF) device to enhance healing of recalcitrant venous ulcers: a double-blind, placebo-controlled clinical trial Br J Dermatol 127: 147-154 (1992)

[2] Mooney, V. A randomized double-blind prospective study of the efficacy of pulsed electromagnetic fields for interbody lumbar fusions. Spine 15: 708-712 (1990)

[3] Simko, M., Mattsson, M. O. Extremely low frequency electromagnetic fields as effectors of cellular responses in vitro: possible immune cell activation. J Cell Biochem 93: 83-92 (2004)