**INTRODUCTION**

When developing drugs for pediatric use, the animals used in the pre-clinical studies should normally represent a similar stage of development as the human population in respect of the organ systems of interest or relevance (1). Dermally applied products present particular challenges because of the need to prevent interference with the application site. In studies using adult animals these challenges can be addressed by measures such as single housing, application of bandages and use of collars. In juvenile animals some of these measures can also be used, but where the young animals are still housed with their mothers, techniques such as individual housing or wearing of collars are not practically feasible. For non-clinical testing of dermal products, pigs or minipigs are most commonly used as the species of choice because of the similarity of the skin in this species to human skin (2). We have previously performed studies in juvenile minipigs but not in animals before weaning. Therefore we were interested to investigate the possibility of performing dermal dosing studies in this species in the pre-weaning period (up to 4 weeks of age in the minipig, representing age up to 2 years old in the human).

**PROCEDURE**

A single pregnant Göttingen minipig sow was used for this study. This animal gave birth to two viable piglets, however this was deemed to be sufficient for the purposes of this study. The test formulation used in the study was Archiv Creme (Faaborg Leve Produkter, Denmark) which is a commercially available moisturising cream for use on dry and irritated skin, and which was deemed to have good penetrating ability. A dye (red or blue fruit color) was added to the Archiv cream and mixed thoroughly to create a homogenous solution; this was so that it would be easy to see if any cross-contamination had occurred. The daily dose was given by dermal application on an area corresponding to approximately 10 % of the total body surface area according to the most recent body weight data (body surface area = 700 x body weight (kg) 0.75). Treatment was performed daily for 28 days and the treatment duration was between 2-6 hours. The first day of dosing was when the piglets were 14 days old. The untreated skin on the dorsal part of the thighs was used as control for comparison. The dose formulation was spread uniformly over the indicated area, and massaged gently into the skin. The application site was lightly covered with a netlike body stocking attached to a neck collar. If necessary, one turn of Vet-Flex® was wrapped to keep the net in place. The bandage was removed at the end of each exposure period and the application area rinsed with a mild soap (ABENA SKINCARE, Abena A/S, Aabenraa, Denmark) in luke-warm water. Finally, the application area was rinsed with luke-warm water and dried with a paper towel. Twice daily during the period where piglets were covered by the gauze dressing, careful observations of cross-contamination were documented and/or other changed behaviour in relation to the dressing of the piglets.

**RESULTS**

Daily treatment for 28 days did not reveal any unusual findings. The animals were healthy and behaviour was normal. There was no evidence of interference with the dose sites, either from the mother nor between the piglets. Visual inspection of the animals and their environment indicated that the test article remained on the animals where it was applied and was not contaminated, nor was it spread into the environment. The fact that no contamination was observed allowed us to conclude that performing dermal studies on minipigs younger than 4 weeks of age is possible.

**DISCUSSION**

Dermal drugs are used on children from a very early age. The skin changes in nature as an animal grows older and this might have an influence on permeability to drugs (3). Therefore it cannot be concluded that the results of studies in older animals can immediately be extrapolated to younger animals and children. The object of this study was to evaluate whether it could be possible to dose minipigs by the dermal route whilst they were still with their mother, and thus provide a model of human children in the age range of approximately 0 to 2 years. Testing of dermal drugs is commonly performed only in animals after weaning because of an understandable concern that housing the animals both with the mother and with their siblings could lead to interference with the dosing sites and therefore rendering experiments meaningless. Previously in our laboratories, we have shown that it is possible to perform procedures on young, unweaned animals, without any problems. An example is surgical implantation of catheters for intravenous dosing, where the sites of surgery are protected by bandaging which can be done without any evidence of interference by other animals. In this study the objective was to dermally dose the young animals using standard techniques (clipping of hair, massaging the test materials into the skin, protection with a light gauze dressing that protects the site of application whilst allowing it to « breathe », and wash off). Using coloured test materials we would be able to see if the material could be transferred from the skin to the other animals or to the immediate environment. The fact that no contamination was observed indicated that our trial was a success and that it should be possible to use these young animals in toxicology studies.

**CONCLUSION**

This study allows us to conclude that performing dermal studies on minipigs younger than 4 weeks of age is possible.

**REFERENCES**