

Passive and Iontophoretic Delivery of Acyclovir Across Hairless Rat Skin,

S.Siddoju¹, R.S.Upasani¹, P.M. Friden² and A.K.Banga¹, ¹Department of Pharmaceutical Sciences, Mercer University, Atlanta, GA 30341; ²Transport Pharmaceuticals, Inc, Framingham, MA 01701.

Purpose: The purpose of this study was to compare passive and iontophoretic delivery of acyclovir across hairless rat skin. **Methods.** *In vitro* permeation studies were performed using freshly excised hairless rat skin mounted on Franz diffusion cells. The effect of pH (3.0, 11.0), current density (0.5, 0.3 and 0.2 mA/cm²), and time of current application (10 min, 2hrs and 4 hrs) on the cathodal and anodal iontophoretic delivery of acyclovir were studied. Silver-Silver Chloride electrodes were used for delivery of current. Samples were collected from the receptor compartment of the Franz cells over a typical period of 8 hrs and analyzed by HPLC. Passive delivery of acyclovir was also studied under these conditions. **Results.** The cumulative amount of drug delivered passively through intact skin at 8 hrs was 54 ± 26.6 $\mu\text{g}/\text{sqcm}$. Cathodal iontophoresis of acyclovir at pH 11 considerably enhanced drug permeation over passive delivery. The cumulative amount of drug delivered at 8 hrs following 10 min of cathodal iontophoresis was 232 ± 76.22 $\mu\text{g}/\text{sqcm}$, which was not significantly different from that delivered by 4 hrs of iontophoresis, suggesting that the duration of current application had no effect on the amount of drug transported across intact skin. Similarly, the cumulative amount delivered after 8 hrs was not significantly different at the current densities tested. Electroosmotic delivery of acyclovir at pH 11 following 2 hrs of anodal iontophoresis delivered 60 ± 15.6 $\mu\text{g}/\text{sqcm}$ at 8 hrs and was not significantly different from passive delivery. **Conclusions.** At high pH (~11), the amount of drug transported across intact skin was greatest with cathodal iontophoresis as compared to anodal iontophoresis and passive delivery. The iontophoretic delivery of the drug into the receiver compartment did not improve with an increase in current density or application time.

Acknowledgement: This study was funded by Transport Pharmaceuticals, INC.
Framingham, MA