

## THE INFLUENCE OF DIFFERENT STRAINS AND AGE ON RAT SKIN PERMEABILITY

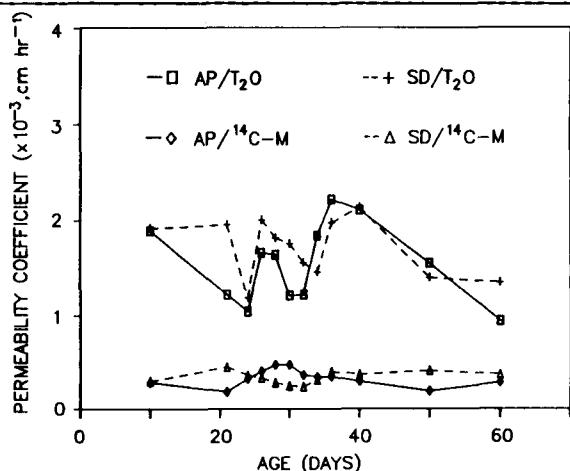
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During the development of topical products or in the assessment of dermal toxicity it is often necessary to measure the percutaneous absorption of chemicals. Many absorption studies are now done *in vitro* using animal skin (Scott et al 1987). The protocols used may vary and the age and strain of animals can change between studies and laboratories. We have investigated the effect of the strain (Alderley Park (AP) and Sprague-Dawley (SD)) and age of rats on the *in vitro* percutaneous absorption of two hydrophilic test molecules, tritiated water ( $T_2O$ ) and [ $^{14}C$ ] mannitol ( $^{14}C-M$ ).

Whole skin (epidermis and dermis) was excised from rats aged 10-120 days and mounted in glass diffusion cells. The absorption of  $T_2O$  was determined on Day 1 and that of  $^{14}C-M$  from Day 2. Permeability coefficients ( $K_p$ , units  $cm\ hr^{-1}$ ) were calculated from the steady state absorption rate data and are presented in the Table.

Table: Mean  $K_p$  values for all ages  $\pm$  SEM, (number of determinations).

Strain	$T_2O$ ( $K_p \times 10^{-3}$ )	Mannitol ( $K_p \times 10^{-4}$ )
AP	$1.51 \pm 0.70$ (136)	$3.36 \pm 2.40$ (136)
SD	$1.72 \pm 0.76$ (102)	$3.36 \pm 1.90$ (102)



There were no interstrain differences in the overall mean  $K_p$  values ie for all ages determined with each penetrant. A plot of the mean  $K_p$  values determined for each age is shown in the Figure, for both penetrants and both strains. There were no differences between the mean  $K_p$  value for each penetrant at each age and the overall mean  $K_p$  for the penetrant over the age range (Table).

To investigate interstrain differences in permeability to lipophilic molecules, it was necessary to develop a technique to produce intact epidermal membranes. We have used a sodium bromide soaking technique (Scott et al 1986) to prepare these membranes using rats of 24-32 days of age from both strains. No differences were detected in the permeability of these membranes compared with the whole skin values. This indicated that the membranes were intact and, therefore, the separation technique was considered successful.

The available data suggest that over the age range examined for these two strains, any variations in skin permeability to hydrophilic penetrants are small. Whether this is the case for lipophilic molecules, or indeed other strains of rats, must be explored.

Scott, R.C. et al (1986) *J. Soc. Cosmet. Chem.* 37: 35-41

Scott, R.C. et al (1987) *Environ. Health Persp.* 76: 223-228