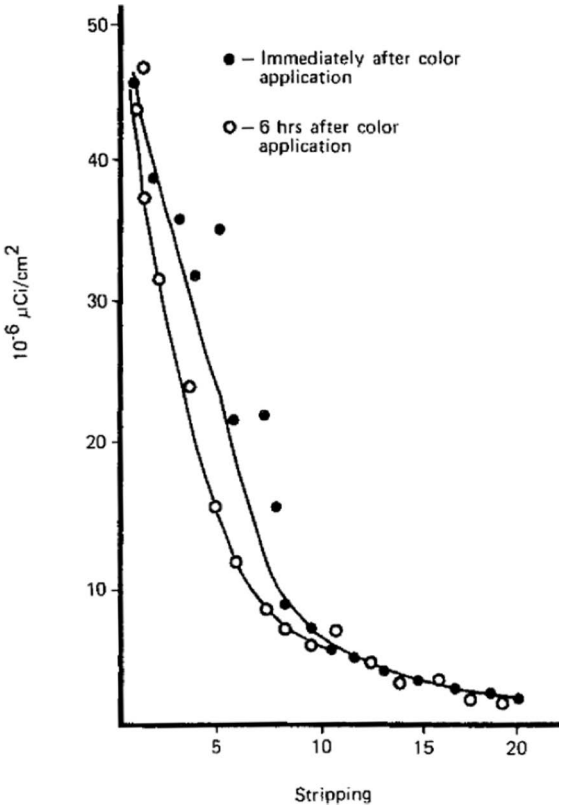

FIGURE 30.3 Distribution of radioactive HC Blue No. 1 in the horny layer.

were the assays of stratum corneum strips harvested right after dyeing (29.7×10^{-4} µCi for HC Blue No. 1, and 30.3×10^{-4} µCi for HC Blue No. 2). Obviously, both dyes were diffusing at comparative rates while the dye lotions were on. The assays of the 6-hour strips revealed, however, that while the activity of the skin dyed with HC Blue No. 1 decreased to 24.5×10^{-4} µCi (16% loss), that of tissue dyed with HC Blue No. 2 remained unchanged. The HC Blue No. 2 is thus obviously bound much more strongly to the stratum corneum than HC Blue No. 1, yet such a conclusion would hardly be arrived at on the basis of its partition coefficient.

There is little doubt that an increase in the tenacity of binding is inversely related to the dye mobility within the horny layer and thus adversely affects the diffusion of the dye into viable epidermis. With the diffusion process markedly slowed down, the natural process of desquamation attains an important role. The bulk of the dye reservoir is located in a few uppermost layers of the stratum corneum, and their loss by desquamation can lead to a rapid and precipitous drop in the quantity of the bioavailable dye, hence in the total extent of skin penetration. It appears from the results presented here that HC Blue No. 2 exemplifies such a behavior.

30.3 ADDITIONAL STUDIES

30.3.1 Study 1

Subsequent to this study, Nohynek et al. (2004) investigated urinary metabolites *in vivo* by applying [14C]-PPD containing oxidative hair dye to human subjects and attempting to correlate their metabolite profile with their respective N-acetyltransferase 2 (NAT2) genotypes (13).