TABLE 15.5
Accountability of Applied Dose[a] in Occluded Studies

	Absorbed (%)	Removed from Skin (%)	Total % Dose
Hydrocortisone			
Single dose[b]	4 ± 2	64 ± 5	68 ± 4
First MD[c]	4 ± 1	82 ± 5	85 ± 4
Eighth MD[d]	3 ± 1	78 ± 2	81 ± 3
Estradiol			
Single dose[b]	27 ± 6	60 ± 12	87 ± 13
First MD[c]	38 ± 8	62 ± 6	100 ± 4
Eighth MD[d]	22 ± 7	59 ± 8	81 ± 6
Testosterone			
Single dose[b]	46 ± 15	44 ± 7	90 ± 8
First MD[b]	51 ± 10	48 ± 9	99 ± 4
Eighth MD[d]	50 ± 9	42 ± 9	92 ± 17
Progesterone			
Single dose[b]	33 ± 9	47 ± 10	80 ± 6

Source: Adapted from Reference 43.
Note: Values corrected for incomplete renal elimination, mean ± SD. Occluded with a plastic (Hill Top) chamber.
[a] Single 4-µg/cm^2 dose with a 24-hour exposure prior to soap and water washing.
[b] Single-dose study.
[c] First dose of a 14-day multiple-dose study.
[d] Eighth dose of a 14-day multiple-dose study.

3. Percutaneous absorption increases with increasing $K_{o/W}$ up to testosterone but declines for progesterone under occluded and nonoccluded conditions.
4. The occlusive procedure generally permits excellent dose accountability (Table 15.5).

The percutaneous absorption of these same four steroids under "protected" (i.e., covered but nonocclusive) conditions has also been measured *in vivo* (11, 24) using the same methodology. The data obtained from these later experiments permitted the effect of occlusion to be rigorously assessed (since complete mass balance of the applied dose was possible). With the exception of hydrocortisone (Table 15.6), occlusion significantly increased the percutaneous absorption

TABLE 15.6
Percutaneous Absorption of Steroids in Humans: Single-Dose Application for 24 Hours at 4 µg/cm^2

	Mean % Dose Absorbed (± SD; $N > 5$)	
	Protected[a]	Occluded[b]
Hydrocortisone	4 ± 2	4 ± 2
Estradiol	3 ± 1	27 ± 6
Testosterone	18 ± 9	46 ± 15
Progesterone	13 ± 6	33 ± 9

Source: Data from References 11, 13, and 43.
[a] Dose site covered with a ventilated plastic chamber.
[b] Dose site covered with an occlusive plastic chamber.