Table 1. Algorithms for calculating the permeability coefficient, K_p. (Adapted from Flynn [1])

	Low molecular weight compounds (< 150 Daltons)	High molecular weight compounds (> 150 Daltons)
Log K_{ow} < 0.5	Log K_p = -3	Log K_p = -5
0.5 =< Log K_{ow} =< 3.0	Log K_p = Log K_{ow} – 3.5	
0.5 =< Log K_{ow} =< 3.5		Log K_p = Log K_{ow} – 5.5
Log K_{ow} > 3.0	Log K_p = -0.5	
Log K_{ow} > 3.5		Log K_p = -1.5

Table 2. Commonly cited algorithms for the calculation of percutaneous absorption.

Name	**Algorithm**	**Citation**
Potts and Guy	$logK_p = 0.71logK_{ow} - 0.0061MW - 6.3$	[2]
Brown and Rossi	$K_p = 0.1\left[\frac{P_{oct}^{0.75}}{120 + P_{oct}^{0.75}}\right]$	[23]
Cleek and Bunge	$k_p^{adj} = \frac{k_p}{1 + \left(1400.k_p.\sqrt{MW}\right)}$	[24]
Cronin et al.	Log K_p = 0.77LogP – 0.0103MW –2.33	[26]
Wilshut et al.	$k_p = \frac{1}{\frac{1}{k_{psc} + k_{pol}} + \frac{1}{k_{aq}}}$	[27]
Barratt	Log K_p = 0.82log P_{oct} – 0.0093MW – 0.039MPt – 2.36	[28]

Where:
log K_p is the permeability coefficient (as cm/s or cm/h); log K_{ow}, P_{oct} and log P represent the octanol-water partition coefficient; MW is the molecular weight; k_{psc} is the permeation coefficient of the lipid fraction of the stratum corneum; k_{pol} is the permeation coefficient of the protein fraction of the stratum corneum; k_{aq} is the permeation coefficient of the aqueous permeation layer; MPt is the melting point.

Table 3. Summary of conclusions from Cronin and Schultz in avoiding the "pitfalls in QSAR" [modified from 44].

Essentials	**Desirables**
A well-defined and measurable toxic endpoint (i.e. for percutaneous absorption this might be the permeability coefficient, k_p, or flux).	Do not extrapolate the model beyond the boundaries of the data contained therein.
A chemically and biologically diverse dataset.	An understanding of the precision of the model and its appropriate use, based on the range and scope of the dataset.
A dataset that has been subdivided into a representative training set and a separate and consistent test set.	A model that covers the whole biological process (i.e. percutaneous absorption) rather than parts of it that may require individual algorithms.
Physicochemical descriptors that are consistent with the endpoint being modelled (i.e. k_p).	Avoid models that are not transparent (i.e. [49]).
The use of an appropriate statistical process to develop statistically valid QSARs.	Correct use of the model – understand its strengths as well as its limitations.
A strong mechanistic basis to the resultant model.	Development of models by a multi-disciplinary groups of experts.