Application of RP-18 TLC retention data to prediction of transdermal absorption of drugs

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Objective

The objective of this research was to evaluate the retention parameters (R_M^0, S) obtained *via* RP-18 Thin Layer Chromatography as predictors of the skin permeability of selected drugs (mainly benzodiazepines).

Material and method

The dermal permeability coefficient (log K_p) of 14 drugs (temazepam, alprazolam, bromazepam, elenium, oxazepam, lorazepam, lormetazepam, clotrazepate, ranitidine, methyldopa, piroxicam, amizepine, paracetamol, aspirin) was estimated *in silico* using DERMWIN v. 2.0 software [1] (Table 1). RP-18 thin layer chromatographic retention data were collected using methanol-water mobile phases containing between 50 and 90% (v/v) of methanol. The retention factor (R_f) values were converted to R_M values following the equation: $R_M = \log (1/R_f - 1)$ [2].

R_M values were plotted against the concentration of methanol in the mobile phase (c_{MeOH}) and extrapolated to zero concentration of methanol following the linear equation: $R_M = R_M^0 + S\, c_{MeOH}$. The relationships between the chromatographic parameters R_M^0 (intercept) or S (slope) obtained in this manner and the computed dermal permeability coefficient (log K_p) are presented in Figures 1 and 2.

Results

R_M^0 and S chromatographic parameters were found to be connected with log K_p *via* reversed parabolic relationships explaining over 93% of total variability. The maximum skin permeation was observed for $R_M^0 \approx 2$ and $S \approx -3$, respectively.

Conclusion

RP-18 Thin Layer Chromatography was found to be a suitable tool to estimate the skin permeability of studied drugs.

References

1.EPI Suite™, www.epa.gov

2. Bate-Smith E.C., Westall R.G. *Biochim. Biophys. Acta* **1950**, 4, 427-440

Acknowlegements

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Table 1

	S	R_M^0	log K_p
Temazepam	-3.798	3.050	-3.037
Alprazolam	-3.877	3.254	-3.129
Bromazepam	-3.269	2.496	-3.217
Elenium	-2.551	2.131	-2.866
Oxazepam	-3.752	2.864	-2.924
Lorazepam	-4.037	3.031	-3.019
Lormetazepam	-4.207	3.303	-3.201
Clorazepate	-3.840	3.117	-3.206
Ranitidine	-0.518	-0.073	-4.390
Methyldopa	-0.197	-0.805	-5.180
Piroxicam	-3.193	2.598	-2.631
Amizepine	-3.221	2.484	-2.503
Paracetamol	-1.500	0.459	-3.348
Aspirin	-2.204	1.301	-3.025

Figure 1

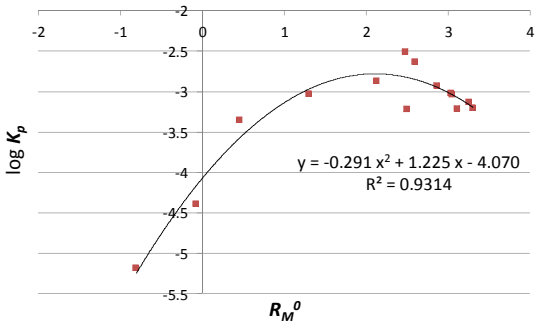

Figure 2