EFFECT OF LIPID VEHICLES ON THE ORAL ABSORPTION OF A MODEL COMPOUND (DDT)

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The absorption of a wide range of drugs has been shown to be affected by their administration in oil and emulsion vehicles. Various physiological and physicochemical explanations have been suggested, including modified gastric residence time (Bates and Sequeira 1975) and absorption via the lymphatic rather than the portal route (De Marco and Levine 1969). The contribution of these suggested mechanisms to the absorption of lipophilic drugs in the presence of selected oils is being investigated.

DDT has been selected as a model compound as it is very lipid soluble and preferentially absorbed via the lymphatic route (Sieber et al 1974). Oral administration to rats of DDT in solution in three oils of different chemical composition was found to yield significantly different plasma-concentration time curves (see Table 1). Emulsification of the oils with 6% v/v Tween 80 had different effects on both the rate and extent of absorption and was dependent upon the nature of the oil. The effect of each oil (1 ml) on the total gut transit time of a co-administered ^{99m}Tc-sulphur colloid (0.5 mCi in 0.5 ml) was investigated. The time taken for 50% of the marker to be excreted was determined from faecal recoveries and whole body gamma scintigraphy. The sulphur colloid was most rapidly cleared in the presence of liquid paraffin, $t_{50\%}$ = 9.8 $\pm$ 3.6 hrs (mean $\pm$ S.D.). There was no significant difference in the total transit times in the presence of Miglyol 812, $t_{50\%}$ = 15.5 $\pm$ 2.0 hrs, and arachis oil, $t_{50\%}$ = 14.1 $\pm$ 1.1 hrs. Therefore the differences in DDT absorption may only be explained in part by the effect of oils on total gut transit time.

Table 1. Pharmacokinetic data following oral administration of DDT (20 mg) to rats (mean $\pm$ S.D.) A = arachis oil, M = Miglyol 812 (fractionated coconut oil), P = Liquid Paraffin.

	AUC ($\mu g\ ml^{-1}\ hr$)			T_{max} (hrs)			CP_{max} ($\mu g/ml$)		
	A	M	P	A	M	P	A	M	P
Oil (1 ml)	118.3 ±6.6	57.9 ±10.2	23.9 ±4.2	7.0 ±2.0	6.0 ±0.0	4.0 ±0.0	11.1 ±1.9	4.7 ±0.7	1.7 ±0.1
Emulsion (2 ml)	105.8 ±12.5	54.5 ±3.4	54.3 ±8.2	4.0 ±0.0	5.5 ±1.0	5.0 ±2.0	9.2 ±2.1	3.6 ±0.6	4.3 ±0.4

(AUC - area under plasma concentration-time curve 0-24 h., T_{max} - time to peak concentration, CP_{max} - plasma concentration at peak).

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