Class experiment with student volunteers illustrating the influence of formulation on absorption of aspirin

D.K. LUSCOMBE & P.J. NICHOLLS

Section of Applied Pharmacology, Welsh School of Pharmacy, UWIST, Cardiff, CF1 3NU.

The influence of formulation on the absorption of drugs is an important aspect of clinical pharmacology. However, such a topic is not readily demonstrated to students since undergraduate practical classes generally operate with constraints such as limited duration of laboratory period, lack of sophisticated equipment and varying technical ability of the students themselves. Nevertheless, we have devised a number of volunteer experiments which can be performed satisfactorily within such constraints and one of these is described below. It is simple to carry out and requires a minimum of practical expertise and equipment. The experiment demonstrates the influence of formulation on the absorption of aspirin using urinary excretion of salicylate over a 2 h period as the index of absorption.

Three different tablet formulations each containing 325 mg aspirin have been employed. Each healthy student volunteer swallows two tablets of one of the formulations with water (150 ml), at least 2 h after a light meal. The bladder is emptied immediately prior to dosing and at 0.5, 1.0, 1.5 and 2.0 hours. The volume of urine at each time is measured and, after alkaline hydrolysis, salicylate content determined colorimetrically using Trinder's reagent (Staff of Department of Pharmacology 1970). Students with a history of gastric disorders, known sensitivity to aspirin or who have not previously taken aspirin, are excluded from the experiment.

With the following fomulations: (A) aspirin with 10% wheat starch (10 s disintegration time, by standard B.P. 1973 test), (B) aspirin with 2% wheat starch (60 min disintegration time) and (C) enteric coated aspirin tablets B.P., typical results (accumulative totals of urinary salicylate, mg mean $\pm$ s.e. at 0.5, 1.0, 1.5 and 2.0 h) for groups of eight students are, for A, 5.2 ± 3.0, 15.6 ± 6.3, 25.5 ± 6.8, 39.1 ± 5.4; for B, 0.7 ± 0.2, 2.6 ± 0.7, 6.5 ± 1.2, 12.1 ± 2.4; for C, zero, zero, 0.8 ± 0.3 and 2.1 ± 0.9.

This basic study may be modified to investigate the influence of a variety of orally administered medicines such as antacids, kaolin, iron preparations and antispasmodics on the absorption of salicylate.

We are grateful to Dr N.A. Armstrong for supplying the aspirin tablets.

Reference

STAFF OF THE DEPARTMENT OF PHARMACOLOGY, UNIVERSITY OF EDINBURGH (1970). Pharmacological experiment on Intact preparations, p. 103, Edinburgh: Livingstone.

Intersubject variability of sulphadimidine acetylation in student volunteers

D.K. LISCOMBE & P.J. NICHOLLS

Section of Applied Pharmacology, Welsh School of Pharmacy, UWIST, Cardiff, CF1 3NU.

An acetylation polymorphism affects the metabolism of several drugs such as isoniazid and sulphadimidine. Rao, Mitchison, Nair, Prema & Tripathy (1970) have proposed that classification of individuals into slow and rapid inactivators of isoniazid may be made on the basis of the degree of acetylation of a test dose of sulphadimidine.

We have modified the procedure of Rao *et al.* (1970) for teaching purposes to illustrate the inter-subject variation in the acetylation of this sulphonamide. The drug is taken by healthy student volunteers at least 2 h after a light meal and urine is collected between 1 and 3 h after dosing for determination of sulphonamide.

The bladder is voided 1 h before the practical class, a sample of the urine (control) being retained for assay. Each volunteer then swallows four tablets of sulphadimidine B.P. (2 g) with water (150 ml). One hour later, at the commencement of the class, the bladder is again voided, the urine being discarded and a further 150 ml water taken. All urine passed between 1 and 3 h after dosing is collected in a combined volume and assayed colorimetrically for free and total sulphonamide by the method of Bratton & Marshall (1939). Using absorbance values (corrected for control readings) only, the proportion of acetylated sulphadimidine in the urine sample is calculated. This makes it unnecessary to measure volume of urine collected or to run standards through the assay procedure. It is important to thoroughly mix the reagents at each step and to use the coupling reagent