

Diminution of xanthine oxidase in goat milk after subcutaneous injection of sodium tungstate ($\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$) By E. C. OWEN and I. DUNDAS, *Biochemistry Department, Hannah Dairy Research Institute, Ayr*

Xanthine oxidase (XO) catalyses the oxidation of purines to uric acid. It occurs in milk and in mammalian liver and has been shown to contain iron, molybdenum and FAD. Tungstate taken by mouth interferes with the production of this enzyme in the milk and liver of the goat without altering the output of riboflavine in the milk (Owen & Proudfoot, 1968). The details of this interference are not known, but it seems to depend on an antagonism in vivo between tungstate and molybdate. Mo and W are known to antagonize each other in other biological systems. The experiment now reported has shown that when a subcutaneous injection of a neutral aqueous solution of sodium tungstate is given to a lactating goat, the amount of XO in the milk is diminished for several days and then increases again. The results of a typical experiment are summarized in Table 1.

Table 1. *The effect of an injection of tungstate ($\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$) solution in the goat on the XO titre of the milk*

Goat no.	Amount of tungstate injected (g)	Mean content* of XO in the milk		
		For 7 or 8 days before injection	For 5 or 6 days immediately after injection	From 6th to 12th day after injection
1	0.5	0.337	0.226	0.494
2	1.0	0.334	0.156	0.236

*Each XO value is the average result of duplicate analyses of the morning and evening milks obtained daily throughout each of the three periods, and is expressed in the units used by Owen & Proudfoot (1968).

REFERENCE

Owen, E. C. & Proudfoot, R. (1968). *Br. J. Nutr.* **22**, 331.

An evaluation of the diagnostic significance of some symptoms and physical signs in chronic iron-deficiency anaemia. By AUDREY A. DAWSON AND D. OGSTON, *Department of Medicine, University of Aberdeen*

A number of symptoms and physical signs are reputed to be common in anaemic patients; some of these are considered to be characteristic of iron-deficiency anaemia. This study was carried out to re-evaluate the symptoms and signs of anaemia in general, and iron-deficiency anaemia in particular.

As part of a larger survey, forty-six patients with chronic iron-deficiency anaemia were studied. The physical signs, but not the symptoms, were compared with those found in 111 non-anaemic hospital patients, admitted over the same period. The symptoms noted included general ones, for example, pallor, fatigue and insomnia, and those referable to the cardiovascular and central nervous systems, and to the gastro-intestinal tract. Only the recent onset of pallor showed a rising incidence with falling haemoglobin. The incidence of painful tongue was no higher than in other

anaemic patients. The low incidence of koilonychia and other nail changes in iron deficiency anaemia was one unexpected finding.

Others results suggest a changing pattern in the symptomatology of iron-deficiency anaemia. This may reflect a decrease in the chronicity and severity of iron deficiency at the present time.

DEMONSTRATION

Techniques used in studies on nitrogen metabolism in ruminants. By F. WHITE, G. WENHAM, A. D. HUGHES, J. MATHIESON and MARGARET I. CHALMERS, *Rowett Research Institute, Bucksburn, Aberdeen*

When urea was directly introduced into the rumen of sheep and rapidly mixed, it disappeared at a constant rate which was not affected by rumen pH or composition of the diet (Chalmers, Hughes and Jaffray). The rise in rumen pH associated with the introduction of urea was controlled by the simultaneous introduction of acetic acid. The use of different molar ratios of acetic acid to ammonia (derived from urea) made it possible to adjust the free ammonia concentration in the rumen and also the incidence and severity of toxicity.

Polythene intravenous cannulas have been inserted under general anaesthesia into (1) the right ruminal vein via a ventral branch then pushed forwards so that the tip of the cannula lies in the right ruminal vein approximately opposite the anterior edge of the rumen, and (2) the intestinal mesenteric vein via a branch, the cannula then pushed forward until the tip lies approximately 4 in. from the portal vein. Both cannulas are inserted through one incision in the right flank, brought to the dorsal end of the incision, then under the skin and exteriorized in the lumbar region. Maintenance consists of injecting heparin-saline 500 units/ml through the cannula at least once per day. It has been possible to do series of experiments on individual sheep over 3-month periods.

Adult sheep had 20 g urea administered directly into the rumen 90 min after the morning feed of concentrates. The following systems were monitored over 6 or 8 h: rumen pH, concentrations of urea, total and free ammonia in rumen fluid, concentrations of ammonia and urea in blood from ruminal, intestinal and jugular veins.

The demonstration will include the techniques and the results obtained.