***Measurement of muscle protein turnover by constant intravenous infusion of ^{14}C–glycine.** By P. J. GARLICK (introduced by J. C. WATERLOW), *M.R.C. Tropical Metabolism Research Unit, St. Mary's Hospital, London, W2*

***Degradation of human serum albumin by human pepsins.** By W. J. UNGER, J. WATKINS and I. F. STAMFORD (introduced by C. H. GRAY), *King's College Medical School, London, SE5*

An improved diet for carbohydrate preference studies with rats: some criticisms of experimental diets. By HEATHER GREENFIELD, GEORGE M. BRIGGS, R. H. J. WATSON and JOHN YUDKIN, *Queen Elizabeth College, London, W8*

In the belief that in nutritional research the diet should be designed specifically for the experiment, an improved diet for carbohydrate preference tests with rats was formulated to fulfil the following requirements:

(1) Nutritional adequacy within the sphere of present nutritional knowledge, using the National Research Council (1962) requirements for the rat as a guide.

(2) Ability to support good growth and reproduction.

(3) Presentation of all components in one complete formula.

It is believed that this diet may find application in other areas of nutritional research. It has the following percentage composition: casein 24, arachis oil 10, maize starch or sucrose 60, salt mix 4, vitamin mix 2. The vitamin mix provided in 100 g of diet: vitamin A 1300 i.u., vitamin D_3 122 i.u., vitamin E 7·5 mg (all fed as Rovimixes, Roche Products Ltd), menaphthone 0·1 mg, thiamine hydrochloride 1·0 mg, nicotinic acid 6·0 mg, riboflavine 1·0 mg, calcium-D-pantothenate 4·0 mg, folic acid 0·5 mg, biotin 0·1 mg, pyridoxine hydrochloride 1·0 mg, vitamin B_{12} 5·0 μg, choline bitartrate 180 mg, ascorbic acid (as antioxidant) 7·5 mg, cellulose (as carrier) 1·76 g. The salt mix (Johnson, Bouchard, Tinoco & Lyman, 1967, modified) provided in g/100 g diet (i.e. in 4 g of salt mix): $CaHPO_4$ 1·3, $CaCO_3$ 0·82, KCl 0·82, Na_2HPO_4 0·74, $MgSO_4.H_2O$ 0·28, $MnSO_4.H_2O$ 0·018, $FeC_6H_5O_7.5H_2O$ 0·0174, $ZnCO_3$ 0·003, $CuSO_4$ 0·0015, KIO_3 0·0001.

A survey of purified diets for rats as published in the *British Journal of Nutrition* in 1967 and 1968 was made with special reference to salt mixtures. This revealed that where details were given or a readily traced reference, adequate levels of minerals were usually being fed. In the remaining cases either no details were given or the reference when eventually traced disclosed insufficiencies of minerals such as zinc, manganese, copper and iodine. Thus, in such cases no true evaluation of the results is possible.

We believe that a more critical attitude to traditional methods of diet construction, particularly among junior research workers, is necessary for higher standards in research in nutrition. Furthermore, we recommend that editors insist more strin-

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gently on adequate detail and documentation in publications in which experimental diets are used.

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The effect of restricted intake of a barley diet on rumen fermentation in cattle. By J. MARGARET EADIE, J. HYLDGAARD-JENSEN, S. O. MANN, R. S. REID and F. G. WHITELAW, *Rowett Research Institute, Bucksburn, Aberdeen, AB2 9SB*

All-concentrate diets based on barley are frequently given *ad lib.* to cattle and are known to result in high concentrations of volatile fatty acids (VFA) and high molar proportions of propionic acid in rumen contents. The low pH encountered under these conditions prohibits the establishment of rumen ciliate protozoa (Eadie, Hobson & Mann, 1967). The same diet given in amounts below appetite has now been shown to alter conditions within the rumen and to favour the establishment of ciliates.

Three 8-month-old heifers were changed gradually from a diet of equal parts of hay and barley cubes to one consisting entirely of barley cubes and protein supplement and were maintained on this latter diet for up to 52 weeks. Food intake was restricted and given in three equal feeds. Rumen samples were obtained *per fistulam*. The animals were then given the same diet *ad lib.*

On changing to the restricted barley diet the rumen ciliates initially present in all three heifers after some fluctuation reached very high and fairly stable population levels (up to $3{\cdot}3 \times 10^6$ organisms/ml) which were associated with a higher proportion of butyrate relative to propionate in the rumen VFA than is normally found on all-grain diets. Typical values for ciliate numbers, rumen pH and VFA at the restricted and *ad lib.* levels of intake are shown in Table 1, together with values obtained from one animal at a point on restricted intake when the ciliate population was unusually low.

Table 1. *Rumen ciliate numbers, pH and VFA in three heifers given restricted and* ad lib. *intakes of a barley diet*

Animal no.	Total ciliates ($\times 10^{-3}$/ml)	pH	Volatile fatty acids (molar %)			
			Acetic	Propionic	Butyric	'Higher'
Restricted feed intake (5·1 kg/day)						
794	1773	6·1	64	12	24	—
795	1767	6·4	59	18	23	—
832	2550	5·9	62	15	23	—
	18	5·5	52	41	7	—
Ad lib. feed intake (9·1–9·9 kg/day)						
794	None	5·2	34	46	14	6
795	None	5·0	35	58	6	1
832	None	5·4	34	44	15	7