

## SUBJECT MATTER IN BRIEF

*British Journal of Nutrition*, Vol. 60, No. 3, November 1988

### CLINICAL AND HUMAN NUTRITION papers

#### STUDIES IN MAN

**Vitamin A reserve in ethnic groups in Singapore.** Median vitamin A reserve in Singaporeans was found to be about 144 mg/kg liver. Indians had a lower reserve than the Chinese and Malays. About 16% of Singaporeans had a vitamin A reserve less than 40 mg/kg. 407-412

**Trace nutrients in the British diet.** We estimated the amounts of six trace minerals, six vitamins and dietary fibre in the food intakes recorded in the National Food Survey in 1986. The diet met the Canadian recommendations for all nutrients except biotin, but the higher American recommendations were met only for vitamin B<sub>12</sub> and pantothenic acid. 413-424

**Protein intakes and basal metabolic rate (BMR).** Effects of altering the preceding day's protein intake on BMR were studied in young adults. There were no significant differences in BMR following isoenergetic diets differing in protein content between 8.6 and 14.0% of energy. Coefficients of variation of intra- and inter-individual differences in BMR were about 4 and 9% respectively. 425-431

**Energy balance in an Indian village.** The energy balance of sixteen Indian farmers was measured in 1983. Mean intake per kg body mass was equal for both sexes at 210 kJ. Women spent much more time engaged in productive labour than men (11.1 v 8.1 h/d). Individual intake was not related to productive work. 433-439

**Meal composition and satiation.** The time course of satiation after a meal is uncoupled from the time course of metabolism by sodium chloride or calcium carbonate, or with a high-fat meal. An event at the gastrointestinal tract before complete digestion is probably responsible for the satiation response. 441-449

**Nitrogen balance in young Nigerians.** Using the N balance method in a short-term study, the mean daily N requirement of fifteen medical students of the University of Ibadan was determined. Based on the results obtained, the safe level of protein intake of Nigerians was estimated to be 0.75 g protein/kg body-weight. 451-458

**Protein requirement of adult Nigerian men.** The safe level of protein intake for Nigerians determined earlier through short-term studies of N balance was tested in young University men under free-living conditions for a period of 40 d. Results confirm the earlier obtained value of 0.75 g protein/kg body-weight. 459–466

**Fibre degradation and stool output.** When paired results of in vitro faecal incubations with three viscous polysaccharides and their effects on colon function in seven volunteers were compared, reductions in transit time were associated with fermentation, whilst increases in faecal mass were related to retention of physical structure. Partially fermented ispaghula was the best bulking agent. 467–475

#### OTHER STUDIES RELEVANT TO HUMAN NUTRITION

**Iron deficiency and lactational performance.** To date, the effect of iron deficiency on milk composition and consumption has not been evaluated. Results from the present study show that maternal Fe deficiency affects the quality of milk ingested by the neonatal rat. Fe-deficient pups attempt to compensate for poor milk quality by increasing milk intake. 477–485

**Ascorbic acid and iron in guinea-pigs.** Guinea-pig dams were studied for pregnancy outcome, postnatal pup growth, and pups' tissue ascorbate and iron, resulting from maternal diets with excessive ascorbate or Fe. Whereas some deleterious effects occurred perinatally, no long-term increase ('conditioning') of pups ascorbate turnover was detected. Human megadosage is discussed. 487–497

**Zinc and diabetes.** Genetically diabetic mice were given low-Zn or control diets for 28 d. Although Zn status appeared unaffected by reduced Zn intake, blood glucose concentration and fasted liver glycogen content were higher in mice given low-Zn diet. The diabetic condition resulted in increased <sup>65</sup>Zn loss when Zn intake was limited. 499–507

**Influence of proteins on glucose homeostasis.** Rats given a low-protein diet reduced their food consumption. This chronic protein–energy deprivation barely altered glucose homeostasis despite marked lowering of plasma and pancreatic insulin levels. These decreases were not produced by isolated energy deprivation. A high-protein diet had little influence on glucose homeostasis. 509–516

#### GENERAL NUTRITION papers

**Protein synthesis in chickens adapted to intermittent feeding.** Protein synthesis was estimated in vivo by the incorporation of [<sup>14</sup>C]lysine into skeletal muscle and the gastrointestinal tract. On days of refeeding the incorporation rate was higher than that on days of food deprivation and exceeded that associated with *ad lib.* feeding. These differences were higher in adapted than in non-adapted birds. 517–523

*Subject Matter in Brief*

405

**Nitrogen and energy balance in the lamb.** Tricaproin was added to milk substitutes given to preruminant male lambs. N balance was increased in Limousin lambs whether or not the milk substitutes they received were supplemented with lysine and methionine, but not in Ile de France lambs fed on supplemented milks. Energy retention was not significantly altered. 525–538

**Rumen v. post-rumen net flux in beef steers.** Post-stomach tissues accounted for 42% of blood flow and 51% of oxygen use for portal-drained viscera of beef steers. Changing the diet fed from chopped lucerne (*Medicago sativa*) hay to concentrate (780 g maize/kg) switched post-stomach glucose flux from net use to net absorption and increased net  $\alpha$ -amino nitrogen use by stomach tissues. 539–551

**Rumen v. post-rumen volatile fatty acid (VFA) net flux.** Stomach tissues accounted for 85–100% of net portal-drained visceral VFA and D- $\beta$ -hydroxybutyrate absorption in beef steers fed on chopped lucerne (*Medicago sativa*) hay or concentrate (780 g maize/kg). Overall, stomach tissues accounted for 74% of net portal-drained viscera absorption of L-lactate. 553–562

**Diet and genetic obesity after adrenalectomy.** Development of the obese phenotype was studied in adrenalectomized *fa/fa* rats given diets containing a high or low proportion of fat. Adrenalectomy prevented development of the obese phenotype in rats given either diet. An impaired capacity for *de novo* lipogenesis is unlikely to explain the effects of adrenalectomy on *fa/fa* rats. 563–569

**Compartmental models of digesta flow.** Families of models incorporating age-dependent distribution of residence times were developed and demonstrated to be responsive to nutritional treatments and yield greater confidence in estimates of digesta-flow variables in cattle. 571–595

**Starches and gut flora metabolism.** Indigestible starches (uncooked amylo maize starch, uncooked potato starch) were fed to rats and changes in caecal bacterial variables determined. The starches decreased pH, altered the concentration of ammonia and short-chain fatty acids and modified the activity of a number of microbial biotransformation enzymes. 597–604

**Body tissues for milk synthesis.** An experimental procedure is described, utilizing stable isotopes of carbon ( $^{13}\text{C}$ : $^{12}\text{C}$ ) as body-tissue markers, which demonstrated that significant proportions of casein and lactose in addition to milk fat were derived from endogenous sources in lactating cows. Estimates varied between cows and with stage of lactation. 605–617

**Protein malnutrition and pancreatic hydrolases in the rat.** Radioactive labelling and isoelectric focussing techniques were employed to make comparisons between enzyme outputs in pancreatic juice and pancreas contents. Non-parallel synthesis, storage, transport and secretion of pancreatic digestive enzymes were demonstrated. This non-parallelism was modified by age and the course of protein malnutrition followed by balanced re-feeding. 619–631

**NEFA during chronic undernutrition in goats.** Plasma non-esterified fatty acid (NEFA) concentrations and NEFA entry rate increased during chronic undernutrition in goats. Increases in NEFA entry rate were highly correlated with, and of the same magnitude as, body fat losses, confirming that NEFA kinetics do quantitatively reflect lipid mobilization. 633–644

**Calpain activity in muscle from lambs.** Protein accretion in sheep longissimus dorsi was modified by diet or by inclusion of clenbuterol in the diet and the activities of the calpain proteases (*EC* 3.4.22.17) and their inhibitor calpastatin were measured. This proteolytic system did not respond to diet, but striking changes in activities were associated with  $\beta$ -agonist treatment. 645–652

**Digesta flow in grazing ewes.** Flows of abomasal digesta, throughout the day, were estimated in grazing ewes in late lactation. Fourier analysis identified significant circadian variation in the flow of digesta and its components in both unsupplemented and supplemented ewes, and in the proportion of digesta flowing as the particulate phase in supplemented ewes. 653–668

**Protein and carbohydrate digestion in the rumen.** The degradabilities of different protein sources have been examined and the different protein sources were shown to facilitate fibre digestion in the rumen to different extents. The differences in fibre digestion were not related to differences in ammonia release or differences in protein degradability. 669–682

**Particle passage and specific gravity (SG).** Relation between SG of indigestible particles and rate of passage through the gastrointestinal tract was investigated in sheep and goats. Passage of particles of SG 1.38 was slower in sheep than goats, while particles of SG 0.92 passed at the same rate for both species but slower than those of higher SG. 683–687