

SUBJECT MATTER IN BRIEF

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Insulin and energy balance in rats. It is known that injections of long-acting insulin produce hyperphagia and weight gain in rats. In the present study energy expenditure was shown to be only marginally increased by insulin treatment. It is suggested that the costs of excess tissue deposition account for this change. 437-444

Corticosterone and energy balance. Corticosterone administration caused substantial weight loss in rats. This was accompanied by increased energy expenditure relative to fat-free mass, and a tendency towards higher metabolizable energy intake. Possible causes of these changes are discussed. 445-452

In vitro protein synthesis and respiration. Transport of ions across cell membranes and protein synthesis are major components of cellular energy expenditure, but little is known about the effect of dietary protein concentration on these processes. Energy expenditure on ion transport and protein synthesis in the skeletal muscle of pigs increased with increasing dietary protein concentration. 453-465

Sodium pump and metabolic rate. The contribution of Na pump activity to oxygen consumption was investigated in guinea-pigs. Injection of ouabain caused a reduction in O_2 consumption, and Na pump activity was calculated to contribute about 40% of the O_2 consumption. 467-473

Riboflavin deficiency and metabolic rate. Studies on riboflavin-deficient sucking and weanling rat pups revealed important metabolic differences dependent on age. These findings are also potentially relevant to riboflavin-deficient children. 475-483

Low-protein diet and analbuminaemia. Analbuminaemic and control rats were fed on low (60 g/kg) and control (200 g/kg) protein diets *ad lib.* from weaning. Extracellular fluid volume was not increased. The transcapillary oncotic gradient was maintained. Despite the absence of albumin, the protein-malnourished analbuminaemic rat is no more susceptible to hypoproteinaemia and oedema than its normal counterpart. 485-494

Metabolism in rat pups reared on milk substitutes. Procedures are described to formulate milk substitutes similar in composition to rat's milk. Growth and

metabolic characteristics were measured for rat pups given the milks in an artificial rearing system. The milks are nutritionally adequate and can serve as control diets for studies on the significance of nutrients for development. 495–518

Dietary *trans*-fatty acids and reproduction. Partially hydrogenated oils are widely consumed. Their high content of isomeric fatty acids may affect essential fatty acid (EFA) metabolism, which is of particular importance especially at low EFA levels. Such conditions may lead to impairment of reproductive functions, as demonstrated with the Wistar rat. 519–529

Dietary protein and lipid metabolism. The type of dietary protein influences lipid metabolism, but little is known about this effect in relation to age. A complex interaction of dietary protein, cholesterol and age on the metabolic regulation of cholesterol and polyunsaturated fatty acids was observed in a rat model. 531–543

Bile acid conjugation in rats. Dietary pectin and cholesterol increased glycine-conjugated bile acids in bile and small intestine of rats with a concomitant decrease in taurine-conjugates. Thus, bile acid conjugation in rats appears to be affected by diet. 545–557

Manganese and copper balances in infants. Mn and Cu intakes and retentions were studied in breast-fed and formula-fed infants. Mn content of the formulas studied was ten times higher than that in breast-milk, leading to a higher absolute retention. Cu supplied by the unsupplemented milk formula was only marginal compared with breast-milk. 559–572

Iron deficiency and tungsten supplementation. Fe deficiency in rats resulted in increased ⁵⁹Fe absorption from ferritin but not from low-molecular-weight Fe compounds, haemosiderin or haemoglobin. Dietary W supplementation increased ⁵⁹Fe absorption and gastric retention from all Fe fractions, even though this was associated with a decrease in small intestinal ferroxidase activity of xanthine oxidase. 573–581

Magnesium metabolism in sheep. The time course of mineral concentrations in rumen fluid is best described by a two-compartment model. Unlike other minerals, the rate of release of Mg is affected by diet. The proportion of absorbed Mg appearing in urine was also influenced by diet. 583–594

Serum folates in young dairy heifers. The concentration of serum folates of 2-week-old dairy heifers was approximately half that observed in 4-month-old heifers. Intramuscular injections of pteroylmonoglutamic acid increased serum

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folates in younger heifers but had little effect on the older animals. This may indicate an increased need for pteroylmonoglutamic acid in young heifers. 595–600

Ascorbic acid in human fetal tissues. Ascorbic acid concentration was determined in tissues from fetuses aborted at different stages of gestation and stillborn babies. The concentration in the brain was higher than in the adrenals at all gestational ages. A decline in ascorbic acid concentration was found after 32 weeks of gestation in all tissues. 601–606

Pro-atherogenic effect of a high level of vitamin E. A high dietary level (10000 mg/kg) of vitamin E did not affect re-endothelialization subsequent to balloon-catheterization in cholesterol- (5 g/kg diet) fed rabbits, but significantly increased endothelial loss and plaque formation at aortic sites that were not mechanically damaged, compared with vitamin E-adequate (40 mg/kg diet) controls. 607–617

Steroid hormones and vitamin B₆ deficiency. Vitamin B₆ deficiency increases the uptake of oestradiol into uterus slices and dexamethasone into isolated hepatocytes. Acute repletion or pre-incubation with the vitamin increases uptake further. 619–628

Leucine and tryptophan–niacin metabolism. Dietary excess leucine impairs NAD synthesis from tryptophan in isolated hepatocytes. The effect is not due only to acute effects of leucine and 2-oxo-isocaproate, but seems to involve changes in enzyme activity. Differences between experiments in intact animals and isolated hepatocytes suggest that extra-hepatic metabolism of tryptophan is an important factor 629–640

Metabolic changes during the menstrual cycle. Cyclical weight changes are well recognized but poorly explained. Analysis of colonic function, nitrogen and creatinine excretion to monitor changes in protein metabolism, and substrate balance assessments of possible changes in glycogen storage all failed to explain the observed weight changes. 641–650

Low-fat diet, hormones and erythrocyte phospholipids. Body-weight and body fat declined and serum total cholesterol and luteal-phase oestradiol concentrations decreased in women after 2 months on a low-fat diet. There were small changes in the content and fatty acid composition of the erythrocyte inositol-phospholipids but not the choline-phospholipids. 651–661

Metabolic changes in pregnancy during Ramadan. Metabolic changes in Asian pregnant mothers undergoing Ramadan fast were studied. Compared with

mothers undergoing a physiological fast, none had a completely normal set of biochemical values. We advise postponement of Ramadan fast until after pregnancy.

663–672

Simulation of pig digestion in vitro. Digestion in the pig gastrointestinal tract was simulated with a new in vitro method using three inocula prepared from duodenal digesta, ileal digesta and faeces. The rate of degradation in vitro of dietary components differed with feeds and inocula, but the extent and pattern of degradation were similar within feeds

673–687

Prediction of digestibility in vitro in pigs. An investigation of a new in vitro method established that ileal apparent digestibilities in pigs of readily available nutrients could be predicted in vitro using duodenal digesta inocula. Faecal apparent digestibilities could also be predicted in vitro, using inocula prepared from ileal digesta or faeces.

689–698

Forestomach motility and abomasal outflow. Voluntary intake and abomasal outflow were greater for lucerne than orchard grass hay. Lucerne turnover rate increased without changes in motility of the forestomach or the abomaso-duodenal junction. Hydrodynamic factors like particle size or viscosity rather than motor activity may explain the higher abomasal outflow for lucerne-fed sheep.

699–714

Calcium and phosphate absorption from the rumen. Net absorption of inorganic phosphate (P_i) from the rumen of sheep occurs as the intraruminal P_i concentration increases from 2 to 38 mmol/l. Moderate increase in this concentration leads to increases in absorption of P_i and calcium from the rumen.

715–723

Bacteria in rumen contents of dairy cows. Rumen solid-adherent (SAB) and liquid-associated bacteria were chemically different. The concentration and the extent of extraction of SAB were influenced by feed-particle size. Addition of soya-bean oil increased bacterial lipid content and the concentration of SAB in feed particles, but decreased the efficiency of their removal.

725–740

Sulphur and nitrate reduction. Nitrite formed from ruminal reduction of nitrate is responsible for nitrate–nitrite poisoning in ruminants. Inorganic and organic sulphur compounds were tested in vitro in an attempt to inhibit nitrate reduction by rumen microbial populations. Sulphide and L-cysteine were found to efficiently suppress nitrite formation.

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