with those obtained by us by the digestibility method and which showed that adaptation to a given fat influenced its digestibility.

***The fatty acid composition of adipose and muscle tissue in domestic and free-living ruminants.** By M. M. GALE, M. A. CRAWFORD and M. WOODFORD, *Nuffield Institute of Comparative Medicine, The Zoological Society of London, NW1*

A folate–protein complex in cow's milk. By J. E. FORD, D. N. SALTER and K. J. SCOTT, *National Institute for Research in Dairying, Shinfield, Reading*

Folic acid in human blood serum was freely dialysable whereas that in milk was strongly and specifically bound to a minor whey protein. In cow's milk this binding protein was present in excess and the milk had the capacity to bind about 50 μg added folic acid/l. Serum folate levels are relatively very low and the physiological effect of the binding protein is presumably to accumulate folate into the milk against a considerable concentration gradient.

A highly enriched concentrate of the folate-protein (FP) was prepared from rennet whey by ammonium sulphate fractionation. FP precipitated at between 45–60% ammonium sulphate saturation. This fraction was exhaustively dialysed against 0·005 M-phosphate buffer of pH 7·0 containing 0·002 M-2-mercaptoethanol (ME), and chromatographed in a column of DEAE-cellulose. On elution with the 0·005 M-buffer FP was only weakly retarded whereas most of the accompanying protein was retained by the column. Chromatography in DEAE-cellulose was repeated and followed by gel filtration in Sephadex G-150. Sedimentation analysis showed that this preparation was heterogeneous over a narrow molecular weight range around 70 000, with a major component of mol. wt *c.* 73 500. Gel filtration gave a closely similar value, and showed a peak of folate activity at mol. wt 76 000. On starch gel electrophoresis at pH 2·0 in presence of ME and 5 M-urea, FP moved towards the cathode and separated from slower-moving components, probably γ-globulins, and a faster-moving component. At pH 8·6, in absence of urea, a major band containing FP moved slightly towards the anode, and a poorly defined minor band moved towards the cathode. The milk folate was N_5-methyltetrahydrofolate, as judged by paper chromatography and differential microbiological assay. It was entirely protein-bound at pH 6–8·8; at pH 5 free folate was present and at pH 3·6 the complex was wholly dissociated. On restoring the pH to 7·0 the folate and protein recombined. In 8 M-urea the complex was completely dissociated at pH 6·0. Heating for 10 min at 100° caused irreversible dissociation.

With increasing purity the folate-protein in solution has proved unstable during frozen storage, forming insoluble aggregates of high molecular weight. This has

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delayed progress in isolating the material, whose possible identity with similar complexes in milk and blood of other mammalian species is under investigation.

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***Immunoglobulins in sow mammary secretions throughout lactation and their significance as *Escherichia coli* antibodies to the young pig.** By P. PORTER and D. E. NOAKES, *Unilever Research Laboratory, Sharnbrook, Bedford*

***Interactions between the alkaline earth metal ions and purified bovine casein.** By I. R. DICKSON and D. J. PERKINS, *St. George's Hospital Medical School, London, SW1*

Amino acid levels in blood plasma of growing pigs given diets supplemented with lysine. By R. BRAUDE, K. G. MITCHELL, A. W. MYRES, J. W. G. PORTER and A. P. WILLIAMS, *National Institute for Research in Dairying, Shinfield, Reading*

In a study of factors affecting blood amino acid levels in relation to dietary intake, groups of six pigs were given either a basal diet containing 0·54% lysine, made up of 60% barley, 25% weatings, 12% groundnut meal and supplemented with minerals, vitamins and 0·19% DL-methionine, or the basal diet supplemented with 0·12, 0·24 and 0·36% L-lysine. Between 20 and 60 kg live weight, the mean daily weight gains of the pigs on the basal and lysine-supplemented diets were, respectively, 0·55, 0·59, 0·61 and 0·66 kg. After 3, 7 and 9 weeks on the diets the pigs were fasted for 18 h before being given a normal feed, and samples of venous blood were taken by vena cava puncture at 1, 2 and 3 h after feeding. The plasma was separated immediately and deproteinized with sulphosalicylic acid. The protein-free serum was stored at −20° until analysed using an EEL automatic amino acid analyser.

Mean values, with their standard errors, for the concentrations (μmoles/ml blood plasma) of individual acids in fasting blood of pigs receiving the basal diet were as follows: tryptophan, 0·06 ± 0·01; lysine, 0·08 ± 0·015; ornithine, 0·08 ± 0·02; histidine, 0·11 ± 0·02; arginine, 0·13 ± 0·01; aspartic acid, 0·02 ± 0·01; threonine, 0·10 ± 0·02; serine, 0·27 ± 0·06; glutamic acid, 0·26 ± 0·03; proline, 0·27 ± 0·04; glycine, 0·97 ± 0·21; alanine, 0·52 ± 0·04; valine, 0·36 ± 0·03; methionine, 0·03 ± 0·01; isoleucine, 0·13 ± 0·01; leucine, 0·18 ± 0·03; tyrosine, 0·08 ± 0·01; phenylalanine, 0·08 ± 0·01. The levels of amino acids in blood from the fasted animals were unaffected by