19 INTESTINAL CALCIUM BINDING PROTEIN /CaBP/ BEFORE AND AFTER MASSIVE SMALL BOWEL RESECTION IN PIGLETS

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Calcium binding specific activity ^{45}Ca associated with protein to ^{45}Ca associated with resin ratio per mg of protein/ was investigated in 9 piglets. The activity of the CaBP /M.W. 11,500/ was assayed /Hitchman et al: Canad. J. Biochem. 1972, 50, 758/ in mucosa obtained from segments of proximal jejunum, midgut and distal ileum. 3 animals were restudied 3 ms after 90 % resection. Specimens were taken from duodenum and terminal ileum. **Results:** A/ Before resection /n=9/ No CaBP activity was found in the ileum of 4 piglets, mean values for 9 animals were 0.69 ± 0.09 in the proximal jejunum; 0.22 ± 0.04 in midgut; 0.16 ± 0.06 in ileum; B/ Changes after resection /n=3/ CaBP specific activity:

	duodenum	ileum
before	0.57 ± 0.09	0.12 ± 0.12
after	1.95 ± 0.02	2.06 ± 0.35

Summary: In normal piglets CaBP activity decreases along the intestine; 3 ms after massive resection it increases significantly in the duodenum / $p < 0.01$ / and even more / $p < 0.001$ / in the ileum. This latter observation may suggest that CaBP has a role in the adaptive changes in Ca transport of this segment after resection.

20 URINARY EXCRETION OF ADENOSINE 3'5' MONOPHOSPHATE IN VITAMIN D DEFICIENCY

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Urinary 3'5' cyclic AMP excretion has been determined by radioimmunoassay in children with vitamin D deficiency and in control children. Cyclic AMP excretion is strongly increased in rachitic children. The levels of 3'5' cAMP in the urine are not related to subjects age nor to serum calcium and phosphate. Correlation is found between urinary 3'5' cAMP and either parathyroid hormone /PTH/ or alkaline phosphatases. Calcium infusion decreases the amount of 3'5' cAMP excreted in the urine. The data are consistent with the view regulation of serum calcium and phosphate cannot be achieved by parathyroid hormone when suitable substrate is not supplied for 1,25 dihydroxycholecalciferol production. High PTH levels would reflect the decrease of that synthesis at kidney level.

21 CONGENITAL HYPERPARATHYROIDISM /HPT/ AND VITAMIN D DEFICIENCY SECONDARY TO MATERNAL HYPOPARATHYROIDISM /HoPT/.

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A new case of congenital HPT secondary to maternal HoPT is described. Maternal HoPT appeared 4 days after thyroidectomy performed for a cold nodular goiter during the first month of pregnancy: hypocalcemia / < 80 mg/l/ and low serum immunoreactive parathyroid hormone levels /iPTH/ were present. Diagnosis of neonatal HPT was based on elevated iPTH levels and evidence of long bones demineralisation and sub-periosteal resorption of the metaphyses. Plasma Ca ranged from 77 to 88 mg/l and plasma P from 47 to 52 mg/l. IV Ca load /15 mg/kg/ 3h/ lowered the iPTH levels from 27 to 100 pEq/ml / $N < 50$ pEq/ml/. Low plasma levels of 25 OHD / < 4 ng/ml/ were found at the age of 41 days in spite of previous administration of 6000 U of vit. D for 12 days. At the age of 3 months, 15 mg of vit. D were given orally: iPTH levels which remained elevated 3 weeks before /210 pEq/ml/ were found to be normal 8 days after this vit. D load /37 pEq/ml/. It is suggested that in congenital HPT secondary to maternal HoPT, hyperparathyroidism increases the baby needs for vit. D. This results in a state of vit. D deficiency which in turn maintains a parathyroid hyperactivity. Thus high doses of Vit. D appears to be the treatment of choice in this congenital HPT.

22 TREATMENT OF NEONATAL TETANY

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Randomised treatment with calcium gluconate /Ca/ 10 ml 10% solution with each feed /33 infants/, phenobarbitone /Phe/ 7.5 mg six hourly orally /33 infants/ or magnesium sulphate /Mg/ 50% solution /33 infants/ 0.2 ml/kg I.M. on two or three occasions at 12 hour intervals /33 cases/ was given to 99 artificially fed term infants having convulsions associated with hypocalcaemia on the fourth to seventh days of life. Treatment was discontinued after 48 hours in each of the three groups. Pre-treatment plasma calcium concentrations were -2 S.D. below the mean for breast fed infants in all groups but significantly lower in the Ca treated group when compared with both the Mg and Phe treated groups. There were significantly fewer convulsions in the Mg group in the first 48 hours after treatment. Plasma calcium and magnesium concentrations were significantly greater in the Mg treated group after 48 hours therapy. There were no significant differences in the post treatment plasma phosphate concentrations. Treatment of the established case of neonatal hypocalcaemia is more rapid and effective when intramuscular magnesium sulphate is used.

23 ABSORPTION OF CALCIUM FROM SOAPS OF VARIOUS FATTY ACIDS

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The absorption of calcium is thought to be modified by soap formation in the intestinal lumen. This has been investigated in the rat using soaps of individual fatty acids. The soaps were prepared with calcium labelled with ^{47}Ca and emulsified with 0.05 M. Na lauryl sulphate. Emulsions of each compound containing 4 mg calcium were administered to groups of five animals of 60-80 g body weight by means of a duodenal tube. The animals were killed after four hours, the gut removed and calcium absorption measured by means of a whole body counter. The absorption of calcium was found to be related to the solubility of the corresponding soap and to the chain and degree of saturation of the constituent fatty acid. The implications for the substitution of butter fats by vegetable oils in artificial milks are discussed.

24 SEVERE ACUTE CALCIUM DEPLETION IN LACTATING RATS

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Female rats were given a low-Ca diet /0.05% / during the 2nd, 3rd and 4th week of the nursing period. The litter consisted of 8 animals. In the mother rats, the progressive loss of bone tissue was shown by microradiography of undecalcified sections of the femur and by carcass analysis. At the end of the experimental period the cross-sectional area of coracal bone of femoral midshaft had been reduced to 46 % of its original size. Body-Ca was 54 % of normal at that time. Bone resorption occurred mainly at the sites where resorption is normally seen, i.e. at the endosteal surfaces of the bone. The trabecular bone of the metaphysis and epiphysis almost completely disappeared in 3 weeks time. After weaning, the animals were given a normal diet and killed 3 weeks later. In this period of time bone formation occurred rapidly at the endosteal surfaces. Three weeks after weaning, the cortical area of the femoral midshaft was 78 % of normal, whereas body-Ca was 79 % of normal. Interesting features were the low mineral density of the new bone and the formation of osteone-like structures, normally absent in the rat.