directed at macrophage-sickle cell interactions might help to explain some of the pathological consequences of sickle cell anaemia.

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1 Hebbel RP, Schwartz RS, Mohandas N. The adhesive sickle erythrocyte: cause and consequence of abnormal interactions with endothelium, monocytes/macrophages and model membranes. *Clin Haematol* 1985;**14**:141-59.

Osteomalacia presenting as pathological fractures during pregnancy in Asian women of high social class

SIR,—We were interested to read the suggestion of Dr V Fonesca and others (16 February, p 555) that secondary hyperparathyroidism persists, despite treatment, in vegetarian Asians with nutritional osteomalacia. It appears that they used the disappearance of symptoms of bony aches and pains as indicators of vitamin D repletion instead of repeated bone biopsies and comparison of patients' vitamin D levels before and after treatment.[1] Although it has been suggested that clinical symptoms are useful in the initial assessment of patients with osteomalacia diagnosed on bone biopsy,[2] we have found them to be unreliable in subjects with vitamin D deficiency (paper in preparation).

In a community based study we collected plasma from 159 healthy adult British Hindu Asians over six weeks in late spring. Over the same period 124 Caucasians matched for age and sex were also sampled. Mean (SD) plasma 25-hydroxycholecalciferol (25-OHD_3) concentrations were 34 (2) nmol/l (13·6 (0·8) ng/ml) in a random selection of the Caucasians (n = 48) compared with a mean of 21·1 (1·2) nmol/l (8·4 (0·5) ng/ml) in the Asians ($p < 0·0001$). Plasma calcium, phosphate, alkaline phosphatase, and albumin concentrations were not significantly different between the two groups, nor was there any difference between the sexes. The data for the Asian group were then further analysed according to 25-OHD_3 values (see table).

There was no difference in clinical chemistry between those Asians with 25-OHD_3 concentrations less than 20 nmol/l (8 ng/ml) and those with values greater than 20 nmol/l. However, at the 10 nmol/l (4 ng/ml) level plasma calcium and phosphate concentrations were significantly different, even though values were within what is normally considered the normal range. Alkaline phosphatase showed a non-parametric distribution with no significant difference when analysed using a Mann-Whitney test. The median plasma calcium value of the subjects of Dr Fonseca and colleagues was similar to the mean in our subjects with 25-OHD_3 values of less than < 10 nmol/l, most of whom were asymptomatic. There is increasing evidence that this group of asymptomatic subjects has a significant disturbance of calcium metabolism. If we believe that this results in reduced bone mineral density then it becomes even more important to ensure that the prophylaxis offered to this community is both adequate and effective.

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1 Dandona P, Mohiuddin J, Weerakoon JW, Freedman DB, Fonseca V, Healey T. Persistence of parathyroid hypersection after Vitamin D treatment in Asian vegetarians. *J Clin Endocrinol Metab* 1984; **59**:535-7.
2 Peach H, Compston JE, Vedi S. Value of the history in diagnosis of histological osteomalacia among Asians presenting to the NHS. *Lancet* 1983;ii: 1347-9.

SIR,—I was surprised that Dr P Dandona and colleagues (16 March, p 837) contend that a state of relative hyperparathyroidism exists during pregnancy. They support their contention with one reference, but this misconception has arisen as a result of two studies[1 2] which reported increased parathyroid hormone levels throughout pregnancy. One study used a C terminal radioimmunoassay,[1] while the characteristics of the antisera used in the other study were not specified.[2] In contrast, our studies,[3] using a parathyroid hormone antiserum mainly directed to the N terminal, and those of several others[4–10] have shown quite clearly that hyperparathyroidism does not occur during normal pregnancy. Although a definitive answer would ideally come from a study of bioassayable parathyroid hormone concentrations, the fact that urinary cyclic adenosine monophosphate excretion remains normal throughout pregnancy[10] is further confirmation. There are sound physiological reasons why parathyroid hormone should remain normal during pregnancy.[11] Indeed, parathyroid hormone secretion would be expected to increase only if maternal vitamin D deficiency led to a decline of the necessary level in intestinal calcium absorption. This was in fact shown in their first case. The demonstration of an increased parathyroid hormone value during pregnancy may serve as a useful pointer to the presence of clinically important vitamin D deficiency, particularly in Asians.

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1 Reitz RE, Daane TA, Woods JR, Weinstein RL. Calcium, magnesium, phosphorus and parathyroid hormone inter-relationships in pregnancy and newborn infants. *Obstet Gynecol* 1977;**50**:701-5.
2 Conforti A, Biale Y, Levi M, Shang S, Shainkin-Kestenbaum R, Berlyne GM. Changes in serum calcitonin, parathyroid hormone and 25-hydroxycholecalciferol levels in pregnancy and labour. *Miner Electrolyte Metabol* 1980;**3**:323-8.
3 Whitehead MI, Lane G, Young O, *et al.* Interrelations of calcium-regulating hormones during normal pregnancy. *Br Med J* 1981;**283**:10-2.
4 Hillman LS, Slatopolsky E, Haddad JG. Perinatal vitamin D metabolism. IV. Maternal and cord serum 24,25 dihydroxyvitamin D concentrations. *J Clin Endocrinol Metab* 1978;**47**:1073-7.
5 Drake TS, Kaplan RA, Lewis TA. The physiologic hyperparathyroidism of pregnancy. Is it primary or secondary? *Obstet Gynecol* 1979;**53**:746-9.
6 Lund B, Selnes A. Plasma 1,25-dihydroxyvitamin D levels in pregnancy and lactation. *Acta Endocrinol* 1979;**92**:330-5.
7 Pitkin RM, Reynolds WA, Williams GA, Hargis GK. Calcium metabolism in normal pregnancy: a longitudinal study. *Am J Obstet Gynecol* 1979; **133**:781-90.
8 Wieland P, Fischer JA, Trechsel U, *et al.* Perinatal parathyroid hormone, vitamin D metabolites, and calcitonin in man. *Am J Physiol* 1980;**239**: E385-90.
9 Steichen JJ, Tsang RC, Gratton TL, Hamstra A, DeLuca HF. Vitamin D homeostasis in the perinatal period. *N Engl J Med* 1980;**302**:315-9.
10 Surian M, Colussi G, Malberti F, Aroldi A, Graziani G, Minetti L. Calcium-phosphate metabolism and parathyroid activity in pregnancy: a longitudinal study. In: Norman AW, Schaefer K, Herrath DV, Grigoleit H-G, eds. *Vitamin D. Chemical, biochemical and clinical endocrinology of calcium metabolism.* Berlin: Walter de Gruyter, 1982: 727-9.
11 Stevenson JC. Mineral needs of the fetus. In: Martini L, James VHT, eds. *Current topics in experimental endocrinology.* Vol 5. *Fetal endocrinology and metabolism.* New York: Academic Press, 1983:178-96.

Plasma chemistry. Values are means (and SD); numbers of subjects in each group are given together with male: female ratio

	Caucasians (n = 124; 61:63)	Asians					
		Comparison at 20 nmol/l 25-OHD_3			Comparison at 10 nmol/l 25-OHD_3		
		≤ 20 nmol/l (n = 90; 49:41)	> 20 nmol/l (n = 69; 37:32)	p	≤ 10 nmol/l (n = 34; 19:15)	> 10 nmol/l (n = 125; 67:58)	p
Calcium (mmol/l)	2·39 (0·01)	2·36 (0·02)	2·35 (0·01)	NS	2·26 (0·03)	2·39 (0·02)	< 0·001
Phosphate (mmol/l)	1·12 (0·02)	1·10 (0·20)	1·13 (0·02)	NS	1·03 (0·04)	1·14 (0·02)	< 0·002
Alkaline phosphatase (IU/l)	38·0 (1·6)	54·2 (4·1)	55·3 (2·9)	NS	65·9 (9·4)	51·6 (2·1)	NS
Albumin (g/l)	44·3 (0·3)	44·9 (0·4)	44·0 (0·50)	NS	43·4 (0·58)	44·8 (0·36)	0·05

Conversion: SI to traditional units—25-OHD_3: 1 nmol/l ≈ 0·4 ng/ml. Calcium: 1 mmol/l ≈ 4 mg/100 ml. Phosphate: 1 mmol/l ≈ 3·1 mg/100 ml.

Cutaneous manifestations of zinc deficiency during treatment with anticonvulsants

SIR,—We would like to make two comments on the interesting report by Dr M S Lewis-Jones and his colleagues (23 February, p 603) of zinc deficiency associated with anticonvulsant therapy.

Firstly, many workers will agree with their reservations about the reliability of plasma zinc concentrations as an index of zinc status. Plasma zinc concentration is subject to acute variations, and in catabolic states resulting from zinc deficiency protein bound zinc may be released into the circulation[1]; stress alone can cause a rapid fall in plasma zinc values.[2] Hair zinc is also an unreliable index as zinc deficiency may itself retard the rate of hair growth and thereby prevent a comparable fall in zinc concentration.[3] Dr Lewis-Jones and others may therefore be interested to consider using the "taste test" for zinc deficiency recently reported by us,[4] which is based on four clearly distinguished categories of taste response to a 0·1% solution of zinc sulphate. This has proved clinically useful in identifying those subjects likely to benefit from zinc supplementation. We would be glad to learn of other workers' experience with this safe and simple test.

Secondly, we question the authors' statement that zinc deficiency is rare. In a government survey the mean zinc content of typical diets in the United Kingdom was found to be about 10·5 mg/day, with less for vegetarians.[5] This compares with the US National Academy of Sciences recommended intakes of 15, 20, and 25 mg for normal adults, pregnant