emphasized the nutritional background as opposed to genetic factors (Bronte-Stewart, Keys & Brock, 1955). There is firm evidence that low-risk groups with respect to myocardial infarction and atherosclerosis have low plasma cholesterol, triglyceride and different lipoprotein characteristics by comparison with high-risk European groups (*Lancet*, 1968). It was thought that 'animal' fats could not be involved in human atherosclerosis, as certain African communities, e.g. Bushmen (Miller, Rubenstein & Astrand, 1968) and Masai (Shaper, Jones & Kyobe, 1961), who use animal products, had a low risk and low atherogenic blood factors. It is now clear that two different fats exist in animals: (1) adipose and (2) structural. Modern intensification of animals has developed a type of adipose fat that is largely non-essential and will exceed ten times the amount supplied by the animal carcass eaten by low-risk groups; the fats eaten by these low-risk groups are rich in essential structural lipids (Crawford, 1968; Crawford, Gale, Woodford & Casperd, 1970).

We previously reported on the plasma amino acids (Crawford, Gale, Somers & Hansen, 1970) in adult African communities using (a) free-living animal products (El Molo and Turkana), (b) mainly vegetable foods (East African Bantu) and compared with (c) samples from a European community at risk to atherosclerosis. The plasma triglyceride and cholesterol concentrations in the adult European group, although within the normal range, were as expected well in excess of the African group (a), in which cholesterol averaged 139 ± 9 mg/100 ml ($n = 27$). As plasma amino acids are known to be distributed in favour of the non-essential amino acids in protein malnutrition (Whitehead, 1964), we studied the plasma fatty acids and found that the Europeans with comparatively high cholesterol concentrations [215 ± 10 mg/100 ml ($n = 18$)] had a high proportion of non-essential fatty acids by comparison with the low-cholesterol group (a). The El Molo were of particular interest because they lived almost entirely on animal products, mostly fish. Their plasma linolenate concentrations were low by comparison with any other group, yet there was a higher proportion of arachidonate, eicosapentaenoate and docosahexaenoate to the C_{16} and C_{18} non-essential saturated and monounsaturated acids than found in the Europeans. We were able to confirm the dominant use of animal products in this group, as little β -carotene was detectable in the plasma by comparison with groups (b) and (c). In the European group palmitate, stearate and oleate were particularly high in relation to arachidonate and docosahexaenoate.

There are clearly some major discrepancies in what is accepted as 'normal' for a European group dependent on an artificial food chain and what is

'normal' for people dependent on a natural food chain. Although Bantu and European children are born with similar blood chemistry Louw & du Plessis (1969) have shown that European children were already separated from Bantu at the age of 7–15 years with regard to the 'atherogenic' blood factors. It is difficult to escape the conclusion that these discrepancies are the product of differences in chemical environment.

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Changes in Fatty Acid Patterns in Bovine Plasma

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Plasma contents of free fatty acids in cattle, determined by the method of Dole & Meinertz (1960), are normally low (0.30 mequiv./l), e.g. in the last month before parturition. These concentrations rise to a sharp peak (0.73 mequiv./l) at calving and to a plateau (1.12–2.60 mequiv./l) during experimental ketosis (Hendriks, Mulder, Elema & Seekles, 1966) early in lactation.

The compositions of the free fatty acid fractions with high and with low free fatty acid contents were compared after gas-chromatographic analysis of the methyl esters. A rather reproducible shift in the pattern was found, going from normal to high concentrations at the peak at calving as well as at the plateau some weeks thereafter. In fatty acid samples from plasma with elevated free fatty acid contents the percentages of palmitic acid and oleic acid are always higher and that of stearic acid is always lower than in samples from normal plasma. The oleic acid/stearic acid ratio, which is normally 0.76, increases to 1.45 at parturition or to 1.18–2.10 in the ketotic condition.

The patterns of the total fatty acids, i.e. the sum of the esterified and the free fatty acids, were also analysed by means of gas chromatography of the methyl esters after extraction and alkaline hydrolysis of the plasma lipids. When the linolenic acid percentage of the feed fat is increased from 24.1 to 51.1, the linolenic acid content in the total plasma fatty acid sample rises from 6.0 to 12.1%, whereas the free fatty acid fraction does not change significantly. Only massive amounts of unsaturated fat added to the diet could alter the free fatty acid pattern (Goosen & Mulder, 1970). This observation, and the fact that the diet had not yet been changed at parturition, rules out the possibility that the diet could have caused the change in free fatty acid composition. Probably the stimulated lipolysis is responsible for this change.

Bovine depot fat is very variable in fatty acid composition. The oleic acid/stearic acid ratio varies from 18.1 for ventral subcutaneous fat to 0.76 for pericardial fat (Mulder & Metz, 1970). It is possible, therefore, that the cow preferentially hydrolyses subcutaneous fats during periods with increased metabolic needs for fatty acids. A second possibility is that a preferential hydrolysis occurs of fat molecules which contain oleic acid. These possibilities are under investigation.

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The Effect of Adrenaline and of α - and β -Adrenergic Blocking Agents on ^{32}P Incorporation into Fat-Cell Phospholipids

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The effect of adrenaline on the incorporation of ^{32}P into the phospholipids of fat-cells has been studied. Fat-cells, prepared from rat epididymal fat-pad by the method of Rodbell (1964) were incubated in glucose-free Krebs bicarbonate buffer (1.3 mM- Ca^{2+}) containing $\text{KH}_2^{32}\text{PO}_4$ (10 $\mu\text{Ci/ml}$) P . Incubation with adrenaline (1 $\mu\text{g/ml}$) caused a significant increase in incorporation of ^{32}P into phospholipid. When adrenaline (1 $\mu\text{g/ml}$) was incubated together with the α -adrenergic blocking agent phentolamine (10 $\mu\text{g/ml}$) lipolysis was not impaired, and the increased uptake of ^{32}P into phospholipid promoted by adrenaline was similarly not impaired. When fat-cells were incubated with adrenaline (1 $\mu\text{g/ml}$)

together with the β -adrenergic blocking agent propranolol (10 $\mu\text{g/ml}$) the lipolytic response to adrenaline was abolished, but the increased incorporation of ^{32}P into phospholipid was not diminished. The work of Butcher, Ho, Meng & Sutherland (1965) and of Butcher & Sutherland (1967) has shown that β -adrenergic blocking agents, when incubated together with adrenaline, abolish the rise in 3':5'-cyclic AMP concentrations in rat fat-pad that would be elicited by incubation with adrenaline alone. Our results, in conjunction with this observation, indicate that the stimulation of uptake of ^{32}P into fat-cell phospholipids produced by adrenaline can be dissociated from the response of the adenylate cyclase system to adrenaline, and therefore does not appear to be effected through the β -receptors. The role of the α -receptors in this effect is not clear, since the α -adrenergic blocker phentolamine itself stimulated ^{32}P incorporation into the fat-cell phospholipids in the absence of adrenaline.

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The Distribution of C_{17} Fatty Acids in the Liver of a Child with Propionicacidaemia

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The accumulation of $\text{C}_{17:0}$ and $\text{C}_{17:1}$ fatty acids in the tissues of children suffering from a defective propionyl-CoA carboxylase activity is a characteristic feature of this condition (Gompertz, Storrs, Bau, Peters & Hughes, 1970). The presence of approximately equal quantities of the $\text{C}_{17:0}$ and $\text{C}_{17:1}$ acids in the total liver lipids suggests that investigation of the distribution of these two acids between the various lipid classes and also between the acylation positions on individual lipids would help to demonstrate the effects of a single double bond on esterification patterns of fatty acids. Studies *in vitro* of the effect of chain length on desaturation and esterification have included odd-numbered fatty acids (Howling, Morris & James, 1968; Sanchez de Jimenez & Cleland, 1969; Abou-Issa & Cleland, 1969; Paulsrud, Stewart, Graff & Holman, 1970); however, the esterification of odd-numbered acids *in vivo* has not been investigated previously. In this study we have investigated the distribution of $\text{C}_{17:0}$ and $\text{C}_{17:1}$