collagen, or to transferrin which is the protein which transports plutonium and probably americium in the blood[6–8]. In addition, we have carried out similar studies with the G1 and G2 glycoprotein fractions which suggest that they contain substances which bind plutonium as strongly as BSP and the bone chondroitin sulphate–protein fraction.

The hypothesis that glycoproteins are involved in the localization of plutonium, americium and yttrium at certain sites in bone was based originally on autoradiographic and histological evidence[1], and subsequently supported by an *in vitro* study of the binding of yttrium to BSP (ref. 3). The results reported here provide direct, although qualitative, evidence that *in vitro* plutonium and americium bind strongly to bone glycoproteins. Plutonium appears to be bound more strongly than americium by these glycoproteins and the possible significance of this in relation to the greater carcinogenicity of ^{239}Pu as compared with ^{241}Am has been discussed[12].

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Control of Membrane Permeability to Potassium in Red Blood Cells

Sodium and potassium concentrations in human red cells are controlled by the sodium pump, and if passive leaks exceed rates of active transport cells undergo colloid osmotic haemolysis. Because the sodium pump has a maximum rate[1,2], passive permeability is also involved in regulating ionic composition. Is passive permeability, like active transport, related to the metabolic state of the cell?

Human red cells and ghosts have been incubated with 0·2 mM iodoacetate and 20 mM fluoride to see if leaks of sodium and potassium are affected. Comparisons have been made between energy-rich and energy-poor cells from 3 weeks old blood stored in the cold. Potassium loss with iodoacetate was increased six-fold by adding 0·2 mM calcium to Ringer solution, whereas sodium gain was the same. Values for net losses and unidirectional potassium influx show that calcium markedly raised passive potassium efflux but did not affect potassium influx. Similar changes in ionic content were found with fluoride, when pyruvate prevented potassium loss[3–6]. Pyruvate was, however, ineffective without additional metabolite. Other utilizable energy sources (inosine or adenosine) were needed, which suggests that pyruvate might act through increasing ATP production. Trapping ATP in red cell ghosts prevented potassium loss otherwise found with 0·2 mM calcium and iodoacetate or fluoride. At this calcium concentration, sodium permeability was not raised. Pyruvate had no effect in ghosts.

One explanation is that the inhibitors directly increased membrane permeability[7–9], but it is difficult to explain fully the influence of metabolism. Another view is that an increase in concentration of ionic calcium in cells raised permeability to potassium. There is an implied mechanism for red cells to keep out calcium and an outwardly directed calcium pump has been demonstrated[10]. Failure of this pump in cells metabolically depleted would allow a net entry of calcium. Sodium permeability also seems to be increased both with[9] and without inhibitors (unpublished results of myself and P. J. Romero Ruiz) as the calcium concentration is raised. This suggests a graded response—first of permeability to potassium, then to both potassium and sodium. Metabolism supplies energy for a calcium pump and therefore appears to be indirectly involved in maintaining a low permeability to sodium and potassium, so that passive leaks can be made good by active transport.

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Ultrasonic Irradiation of Reduced Wool releases 1·7*S*, 3·5*S* and 20*S* Protein Fractions

Much information about the configuration of the protein chains, and the mutual position of the components, in muscle[1] and connective tissue[2] has come from physical chemical measurements of dissolved protein components from these tissues. It is essential, if the structure of the intact tissue is to be inferred from the structure of the protein components in solution, that these components

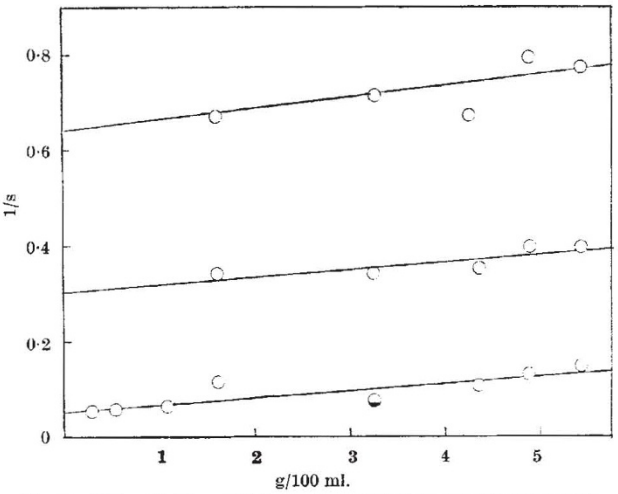

Fig. 1. Determination of S^0_{20} for three fractions produced by ultrasonic irradiation of reduced wool. Top line, $S^0_{20,w} = 1{\cdot}7S$; centre line, $S^0_{20,w} = 3{\cdot}5S$; bottom line, $S^0_{20,w} = 20S$. Concentrations were determined with a Zeiss interferometer assuming $dn/dc = 1{\cdot}86$.