

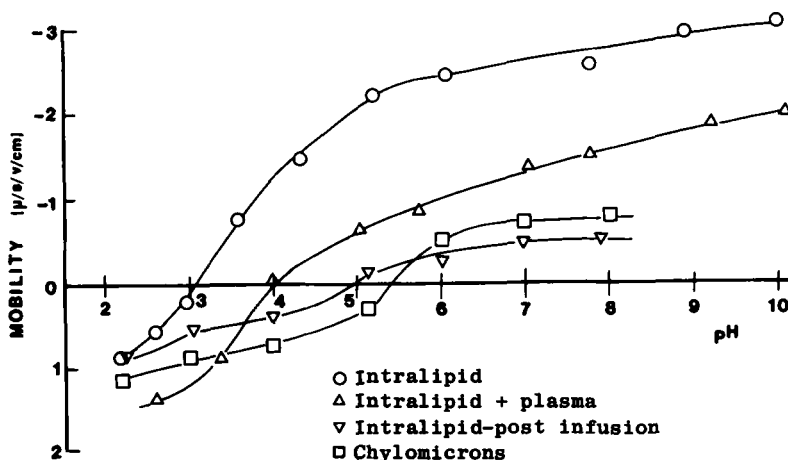
EFFECTS OF BLOOD PLASMA COMPONENTS ON THE PROPERTIES OF AN INTRAVENOUS FAT EMULSION

S.S. Davis, M. Galloway, Department of Pharmacy, University of Nottingham, University Park, Nottingham, NG7 2RD.

Soybean oil emulsions (Intralipid) are used extensively as part of total parenteral nutrition regimens. The emulsion droplets are stabilised by egg lecithin, a complex mixture of phosphatides, and at pH 7 in distilled water they carry a net negative charge of -30 mv. It has been noted by others (Black and Gregoriadis 1976) using similar colloidal systems (eg liposomes and suspensions) that their incubation with plasma leads to the adsorption of blood components (globulins or albumins) which can alter the surface characteristics on the particles and influence their fate in vivo.

We have conducted experiments where Intralipid has been incubated at 37°C with human blood plasma for one hour and the surface charge on the droplets at different pH values determined using cell microelectrophoresis (Rank MK I). Similar mobility-pH relationships were obtained for Intralipid particles recovered from patients infused with fat emulsion as well as for the natural fat particles, the chylomicrons (Figure). The latter were obtained by feeding volunteers a high fat meal and recovering the lipid fraction by centrifugation of the plasma. It can be seen that the shape of the mobility-pH profile is altered by plasma and the Intralipid particles become more like chylomicrons in their behaviour. An in vitro incubation procedure causes a reduction in the surface charge and moves the isoelectric point to higher pH levels. The infused particles demonstrate a more marked effect. This may be due to a larger total contact time with the plasma or the involvement of other factors, such as passage through the liver and the possibility of phospholipid exchange taking place (Zilversmit 1971). It is clear from these results that artificial fat particles are rendered more similar to chylomicrons by their contact with blood plasma, probably due to the adsorption of albumin or lipoprotein (Carlson 1980).

Figure Electrophoretic mobility-pH curves for Intralipid and human chylomicrons.



Black, C.D.V. and Gregoriadis, G. (1976) *Biochem. Soc. Trans.* 4: 253.
 Carlson, L.A. (1980) *Scand. J. Clin. Lab. Invest.* 40: 139.
 Zilversmit, D.B. (1971) *J. Biol. Chem.* 246: 2645.