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The influence of proteins on the diffusibility of calcium.

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It was demonstrated last year[1] that when blood serum is dialysed against large amounts of *physiological salt solution,* the calcium of the serum is entirely diffusible at a pH of 7.4. When serum is dialyzed against *distilled water* brought to a pH of 7.4, part of the calcium is non-diffusible. When serum is dialysed against distilled water brought to a pH of 3 with HCl, calcium is again completely diffusible. It was suggested that the proteins, probably the globulins, were responsible for these variations in diffusibility.

In an attempt to prove this idea we have this year started to study the effect of pure solutions of euglobulin, pseudoglobulin and albumin on the diffusibility of calcium. The proteins were isolated from the ascitic fluid of a patient with cardiac insufficiency.

The work has not yet been completed because of experimental difficulties encountered in keeping solutions between pH 6 and pH 8 constant without large amounts of buffer. However, we have found that between these limits of pH, Ca is less diffusible the lower the hydrogen ion concentration in solutions of euglobulin and pseudoglobulin. Furthermore, we have found that the greater the concentration of these proteins the greater the amount of calcium which does not diffuse through the collodion membrane. To prove that the effect is not one of occlusion of the membrane by calcium or protein, a membrane was soaked one night in pseudoglobulin solution, and calcium chloride at a pH of about 10 was placed inside of the membrane and the solution was dialysed. The calcium, the initial concentration of which was 10 mg. per 100 cc., was completely diffusible.

Thus we see that euglobulin, pseudoglobulin and possibly serum albumin appear to alter the diffusibility of calcium through collodion membranes when dialyzed against water at a pH of 6 to 8. This is probably the result of the formation of Ca proteinate.

[1] Loeb, Robert F., *J. Genl. Physiol.,* 1924, vi, 453.