

PERFLUOROOCTANOIC ACID INTERACTIONS WITH HUMAN SERUM ALBUMIN

By GORDON L. NORDBY* AND J. MURRAY LUCK

(From the Department of Chemistry, Stanford University, Stanford, California)

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For several years perfluorooctanoic acid (1) ($\text{CF}_3 \cdot (\text{CF}_2)_6 \cdot \text{COOH}$) has been used in this laboratory as a protein precipitant (2). Qualitatively it has been observed to bind so completely to proteins that little of the precipitant remains in the filtrate; this is an obvious advantage in chromatography and in various analytical procedures.

The purpose of the present study is to define the conditions under which perfluorooctanoic acid will effect a precipitation of human serum albumin and to describe in detail the interaction between these two reactants. Human serum albumin was used because of its unusual properties in binding a variety of ions.

Materials

A solution of human serum albumin (decanol procedure) was electro-dialyzed at 40 volts per cm. against conductivity water and clarified by pressure filtration through a sterilizing filter pad. The product was lyophilized and stored at 3°; appropriate amounts of the powder were removed as needed for the preparation of albumin solutions.

Sodium perfluorooctanoate (PF8) solutions were prepared by carefully neutralizing a 0.5 per cent aqueous solution of the acid with a minimal volume of sodium hydroxide.

Procedure

Precipitation—A number of buffered 0.3 per cent solutions of serum albumin in PF8 were prepared. Each solution was distinctive with respect either to its PF8 concentration or to its pH, the latter being determined by 0.1 M McIlvaine buffers (3). The pH of each solution was between 4.25 and 5.25. The PF8 concentration of each solution was such that the mole ratio (PF8 to albumin) ranged between 0 and 200.¹ The solutions were thoroughly mixed, allowed to stand for 15 minutes, and centrifuged in a clinical centrifuge at room temperature for 20 minutes. For conditions under which the protein in a given solution was only partially precipitated, opaque supernatant solutions were sometimes formed; in all other cases the

* Public Health Service Research Fellow of the National Heart Institute.

¹ A value of 61,500 was used for the molecular weight of human serum albumin (4).