Chromatographic Separation of Serum Lipoproteins

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The presence in blood serum of different types of lipoproteins has been well established during recent years in particular by means of Cohn-fractionation, electrophoresis and ultracentrifugation.

Chromatographic methods, however, have as yet not been applied to the study of serum lipoproteins. Incidentally it was observed in this laboratory that the serum lipoproteins were adsorbed onto glass beads. Furthermore it was found that they could be eluted from columns of glass beads by means of alkaline buffers. Then the possibility to separate chromatographically the different types of lipoproteins was investigated.

Serum lipoproteins were adsorbed onto columns of glass beads and eluted with a continuous pH-gradient according to the device of Bock and Ling [1]. In this way it has been possible to separate three different groups of lipoproteins in human serum: a) A lipoprotein containing phospholipids but no cholesterol; b) Lipoproteins with a cholesterol-phospholipid ratio below 1; c) Lipoproteins with a cholesterol-phospholipid ratio above 1.

1. Bock, R. M. and Ling, N-S. *Anal. Chem.* **26** (1954) 1543.

Synthesis and Metabolism of 2,2-Dimethylnonadecanoic Acid

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2,2-Dimethyl[1-^{14}C]nonadecanoic acid has been prepared by a Kolbe electrolysis of heptadecanoic acid and 3-methoxy[^{14}C]carbonyl-3-methylbutyric acid. The intestinal absorption and metabolism of this acid has been studied in the rat. The main metabolic end products were 2,2-dimethylglutaric acid and 2,2-dimethylpimelic acid, which were recovered in the urine. These products were identical with corresponding synthetic compounds. The results will be discussed in relation to earlier results on the metabolism of branched chain fatty acids.

The Anticoagulant Effect of Brain Gangliosides

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Anticoagulants of a lipid nature have been described from several animal sources, especially from brains. Most authors have attributed the inhibition to the inositol-phosphatide fraction [1,2]. However, no definite proof of its chemical identity has been presented.

One of us (K. K.-B.) has found that surface active agents even in rather low concentrations give a pronounced inhibitory effect on the first phase of blood coagulation. During his work with brain gangliosides Svennerholm observed that these substances have great surface activity. We therefore started an investigation of their effect on blood coagulation.

Gangliosides were prepared by the cellulose column technique [3]. By this method the gangliosides were separated in two fractions, ganglioside 1 containing 8 % hexosamine (G-1), and ganglioside 2 containing 2 % hexosamine (G-2).

To test the inhibition in the clotting system we used a modified thromboplastin generation method [4]. The lipids to be tested were dissolved in physiological saline and added to a system containing antihaemophilic factors A and B, platelet lipid factor and $CaCl_2$. After incubation for exactly 5 minutes an aliquot of the sample was tested for thromboplastic activity.

	G-1 4 μg	G-2 6 μg	Physiol. saline
Clotting time in sec.	65	35	25

As seen from the results chondrosamine containing ganglioside is a powerfull inhibitor of the first phase of the blood coagulation.

1. Tocantins, L. M. and Carroll, R. T. *Trans. 2nd Conference, Josiah Macy, Jr., Foundation*, 1949, pp. 11—28.
2. Overman, R. S. *Ibid.* pp. 29—50.
3. Svennerholm, L. *Acta Chem. Scand.* **8** (1954) 1108.
4. Biggs, R. *J. Clin. Pathol.* **6** (1953) 23.