This Week's Citation Classic

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Hirsch J. Studies of adipose tissue in man; a microtechnic for sampling and analysis. *Amer. J. Clin. Nutrit.* **8**:499-511, 1960. (Rockefeller Institute, New York, NY)

A simple method is described for the analysis of the fatty acid composition of stored fat in man. The composition is a close reflection of mean dietary fat composition over years, and changes slowly in relation to dietary changes. [The *SCI*® indicates that this paper has been cited over 235 times since 1961.]

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I am very pleased that this study has been found useful and referred to so often. My colleagues and I had for a number of years wondered what the role of stored fat in man might be in affecting the level of serum triglycerides, fatty acids, and cholesterol. A rapid, accurate chromatographic technique for measuring fatty acid composition, had just become available. Dr. A. T. James, one of the developers of gas-liquid chromatography, put together an accurate instrument to determine the fatty acid composition of human adipose tissue. What was needed was a simple means of obtaining small samples of adipose tissue without the need of surgical intervention. I found that I could put a small needle into any part of the body just beneath the skin and withdraw just a few droplets of oil, enough for a complete fatty acid analysis of adipose tissue triglycerides. One of my colleagues (Edward H. Ahrens) was then in Europe on sabbatical leave and I sent him a chromatogram of my own fat. He had no end of delight in showing our friends abroad just how Hirsch's fat looks.

This method proved useful in evaluating the composition of adipose tissue triglyceride and its relationship to diet. A study of the fat of newborn infants gave some clues as to the metabolic origin of fat in the newborn. As we became bolder we used larger needles and obtained intact tissue samples which have enabled study of the in-vitro metabolism of human adipose tissue and most recently measures of adipocyte size and number.

These studies have led to our interest in that human disorder in which adipose tissue is most grossly disturbed in amount, namely obesity. It remains in doubt to this day whether adipose tissue is a passive organ storing or releasing fat upon demand or whether via its composition, biochemical activity, or cellularity it plays any role in the control of food intake and hence obesity. The beginning of my interest in such studies dates from this paper and my willingness to remove all droplets of fat from my patients and colleagues and subject them to an analysis by gas-liquid chromatography.