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This Week's Citation Classic

Reissig J L, Strominger J L & Leloir L F. A modified colorimetric method for the estimation of *N*-acetylamino sugars. *J. Biol. Chem.* **217**:959-66, 1955.
[Instituto de Investigaciones Bioquimicas, Buenos Aires, Argentina & National Institute of Arthritis & Metabolic Disease, NIH, Bethesda, MD]

The authors describe a modification of the method of Aminoff *et al.*[1] for the estimation of *N*-acetylamino sugars, which is less time-consuming and affords enhanced sensitivity, more stringent specificity, and less susceptibility to factors which might interfere with color development. [The *SCI*® indicates that this paper has been cited over 730 times since 1961.]

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"While doing a 'post-doctoral' in Leloir's laboratory in Buenos Aires I got involved in the study of phosphoacetylglucosamine mutase. At the time, the current method for acetylhexosamine determination was that of Aminoff, Morgan, and Watkins; but it turned out to be unsatisfactory for my enzyme assay because of buffering problems. I checked with 'el Dire' (i.e., the Director, as Leloir is affectionately called by his associates), and he mentioned that he had noticed a definite improvement in the test when substituting borate for carbonate buffer. This was the basis for the modification developed in Buenos Aires. Shortly afterwards Leloir visited Strominger in Bethesda, and found that he too was working on an improved method. It was decided that we should put out a joint paper including the observations gathered in both hemispheres. The more recent popularity of the method has to do with the growing interest in carbohydrate containing cell surface molecules.

"As to having made the 'hit parade' of the 'top 500' most quoted papers, whatever complacency it generates in me is overshadowed by other more pertinent considerations. I like to think that I have made contributions to science of greater originality and import than that one. After all, sooner or later, the method of Aminoff *et al.* would have been improved to reach the required level of reliability. What disturbs me most, however, is the establishment of this kind of scientific hall of fame utilizing a criterion which is only feebly correlated with scientifically significant parameters, but very much a transplant of quantitative marketing techniques from the world of business to that of science. Some of my colleagues feel that this sort of transplant is a price that we must pay for affluence. It is ironic, in this respect, that the research in question was performed during one year (1954-5) in which I worked without a salary. Of course, I welcome the organization of science that permits me now to make a living while pursuing my avocation. But, is there no choice other than the extremes of insolvency, or dancing unquestioningly to the tune of the prevailing business methods? At a time when many are having second thoughts about allowing even the world of economics to run unchecked, guided by the proverbial invisible hand and by management techniques which take for granted that economic expansion can go on forever, scientists should exercise special care about what is happening to their discipline. Unlike economists, they have known for a long time that 'small science is beautiful'; and just as the quest for *Appropriate Technology* has recently captured the imagination of many individuals, let me make the parallel and radical proposal that we should at all times pursue not just the fastest-growing, most-quoted kind of science, but simply an *Appropriate Science.*

"Should you choose to paraphrase, rather than transcribe verbatim, my above comments, I trust that in doing so you will include not only the anecdotal, but also the crux of my argument. If for reasons of space you find the abridgement is necessary, I would like to collaborate in the task, to make sure that the gist of my comments does not suffer in the process." [For obvious reasons, this commentary was published with no editing– E.G.]

1. **Aminoff D, Morgan W I J & Watkins W M.** The action of dilute alkali on the *N*-acetyl hexosamines and the specific blood-group mucoids. *Biochem. J.* **51**:379-89. 1952.