Letter to the Editor: Serum Salivary Amylase in Cystic Fibrosis

ROBERT O. WOLF AND LYNN TAUSSIG

National Institute of Dental Research, National Institutes of Health, Bethesda, MD and Arizona Health Sciences Center, Tucson, AZ, USA

Davidson *et al.* (1) in the recent article in your journal indicate that in our study we found that patients with cystic fibrosis (CF) had a low total serum amylase activity and that we were unable to "... demonstrate an increase in the salivary amylase component." Unfortunately, the authors confuse absolute numbers with percent and the significance of the mean in their interpretation of our data. As reported in our paper (4), we found that CF patients with pancreatic insufficiency (PI) had a statistically lower total serum amylase level than normal subjects, but all values were still within the normal range. Although we found that the *absolute* amount of salivary amylase, in the serum of patients with CF and PI, was the same as that for normal subjects, the *percent* of contribution was considerably higher. We found that the pancreas contributed approximately 23% of the total serum amylase in CF patients with PI, a value very similar to the 34% amount found by Kamaryt *et al.* (3). We also found, as did Davidson *et al.* (1) that CF patients without PI had higher total serum amylase values than did the normal subjects. Again, most of these values were still within the normal range, but separated out on a statistical basis. Subsequent followup data have shown that the total serum amylases were high normal or above for the pancreatic sufficient CF patients and that the elevation can be attributed to the pancreatic isoamylase fraction (2). Thus, we feel that Davidson *et al.* (1) have misinterpreted the results of our previous study and, in fact, we feel that Davison *et al.* (1) have essentially confirmed our previous work by suggesting that CF patients with pancreatic insufficiency have an increased salivary amylase for reasons yet unknown.

This report without quantitative data, which could have been estimated from the isoelectrofocusing (IEF) patterns, supports, but does not prove the conclusion, that increased serum salivary amylase isoenzymes occur in CF patients with PI. This is not the equivalent of: "... results are compatible with an increased serum salivary amylase isoenzyme activity in patients with CF regardless of the state of their pancreatic function." The authors recognized and stated the need for a "... confirmation of the increased salivary isoamylase activity in CF patients. ..." Without quantitative data, an increased total serum amylase may be due to either or both pancreas and/or salivary gland contributions. Our experience has shown that, indeed, the pancreatic portion is first increased and then decreases as the patient with CF and apparent normal pancreatic function progresses, with time, toward pancreatic insufficiency. A close examination of the representative IEF patterns (Figs. 1 a and b, Ref. 1) shows a greater area under the salivary portion of the normal (a) as compared to the pancreatic sufficient CF patient (b) which is consistent with our findings. However, the authors imply equality of Figs. 1 a and b

by stating that "... the isoenzyme profiles were not different from the normal controls (Fig. 1 b)."

It is important to realize that our study was a compilation of experiences reported as a mean; both ratios and absolute values. Variations in serum salivary isoamylase values (absolute values) are not significantly different from the normal. The absolute serum salivary isoamylase values may be lower among patients with CF, but not significantly so and regardless of the condition of the pancreas. However, the changes in serum amylase values in patients with CF are on the average due to changes in the pancreatic contribution to the serum and as expressed as a mean was highly significantly different for both normal and abnormal pancreatic function (4). The second important point of our paper was that this mean variation occurred in serum samples from patients with CF that had total amylase values within the normal test range. This is not to say that individual samples will not vary from this generalization.

The serum salivary isoamylase in both normals and patients with CF and PI had a higher serum salivary percent. The authors cannot explain our being "... unable to demonstrate an increase in the salivary amylase component" by differences in fasting and nonfasting sampling as they suggest when their own pre- and postprandial data for CF does not show a significant difference. We found the mean serum pancreatic isoamylase activity equal to 39% of the control values for patients with CF and PI, not 30% as indicated by the authors. Further, all amylase activity was accounted for rather than 50% unaccounted as indicated by the authors.

We strongly suggest and hope that the authors examine and analyze the IEF zymograms for the area included within their curves in conjunction with the proper controls so that we can compare possible methodologic differences and arrive at an accurate understanding of amylase dynamics in CF.

REFERENCES AND NOTES

1. Davidson, G. P., Koheil, A., and Forstner, G. G.: Salivary amylase in cystic fibrosis: A marker of disordered autonomic function. *Pediatr. Res.* 12: 967, 1978
2. Hubbard, V. S., di Sant 'Agnese, P. A. and Wolf, R. O.: Pancreatitis in Children (Letter to the Editor) *J. Pediatr.* 92: 685, 1978
3. Kamaryt, J., Brunecky, A. and Laxova, R.: Amylasemia, amylase heterogeneity in blood serum, and activity of amylolytic enzyme in sweat in members of families afflicted with cystic fibrosis. *Cesk. Pediatr.* 25: 78, 1970
4. Wolf, R. O., Taussig, L. M., Ross, M. E., and Wood, R. E.: Quantitative evaluation of serum pancreatic isoamylases in cystic fibrosis. *J. Lab. Clin. Med.* 87: 164, 1976
5. Received for publication February 7, 1979.
6. Accepted for publication April 20, 1979.