LETTER TO THE EDITOR

Abnormal Mobility of Serum Lactate Dehydrogenase Isoenzymes During Electrophoresis

ANTHONY J. GIRGENTI, Ph.D.,* MARCUS T. BROWN, M.S.*
and JACK G. WEINBAUM, M.D.†

*Department of Laboratories, St. Joseph's Hospital,
Tampa, FL 33607
and
†Terre Haute Medical Laboratory, Inc.,
Terre Haute, IN 47808

To The Editor:

An unusual electrophoretic pattern for the isoenzymes of serum lactate dehydrogenase (LD; EC 1.1.1.27) was observed. Two diffuse bands of LD activity were seen in the region of the electropherogram in which LD-4 and LD-5 normally migrate, when this serum was fractionated by cellulose acetate electrophoresis (figure 1-A). One of the bands appeared to have the same mobility as LD-4 with the second band more cathodic, but less so than normal LD-5. Those bands normally seen as the most anodic, LD-1, LD-2 and LD-3, were not visible.

A mixture of equal volumes of the serum with the unusual pattern and another serum with LD isoenzymes of normal mobility (although apparently elevated LD-5; figure 1-C) yielded an LD pattern which was of abnormal mobility (figure 1-B). Further study revealed that even when the mixture consisted of 10 percent by volume of the unusual serum, a significant alteration of the normal mobility was observed. The ability of the serum to produce this effect was not eliminated by prior heat-treatment (53°C, 60 min).

The procedure for electrophoresis was essentially that provided in the Helena Laboratories Instruction Manual.*

Total serum LD activity was only slightly elevated or normal in specimens yielding this pattern. The immunoelectrophoretic pattern did not appear different from a normal control when determined with polyvalent, IgA, IgG, IgM, kappa and lambda antisera by conventional means. Levels of IgG, IgM and IgA, determined by radial immunodiffusion, were within the normal range.

The serum was from a 51-year old female who, when examined in 1971, presented with hypertension, overweight, slightly enlarged heart and some aortic sclerosis. Her serum LD was slightly elevated, but fractionation was within normal limits.

At the time the specimen with the unusual pattern was drawn (approximately * Pro 611/73 Helena Laboratories, Beaumont, TX.
December, 1976), her hypertension was controlled by medication and she was otherwise asymptomatic and feeling well.

A review of the literature revealed several reports of variants of serum LD isoenzymes but none seemed to be exactly like the case reported here. Additional bands of LD activity between LD-1 and LD-2 and between LD-2 and LD-3 were observed in a patient with secondary carcinoma of the liver. Another variant was attributed to interaction of the isoenzymes with an immunoglobulin-A-type component. In the latter reports, most of the patterns observed were different from the one observed in this laboratory except one case in which that pattern was similar but total LD was greatly increased. Attempts to find an association between LD activity and an immunoglobulin were unsuccessful in this laboratory.

Another report concerned patients with severe liver disease. An extra band of activity, band “T”, was observed between LD-4 and LD-5. However, the mobility of the other isoenzymes appeared normal. Furthermore, these patients generally had elevated serum LD and total bilirubin.

An interesting variant was found in serum from an apparently healthy young woman. The pattern consisted of a single zone of LD activity with the same mobility as, but more diffuse than, normal LD-4. This variant was transient, however, disappearing six weeks after it was first observed. The pattern for the case studied in this laboratory was again observed seven months after the first observation. In addition, IgM was elevated in the former.

References