The enzyme lactate dehydrogenase (LDH: E.C. 1.1.1.27) catalyzes the conversion of pyruvate to lactate. In quaternary structure, LDH is tetramer made of four subunits, of which there are at least two varieties, A and B, in all vertebrates. These two varieties, or subunits, are encoded by different genes (1-4). Non-expression of one or more of the five possible LDH isozymes (heterotetramer restriction) has been used in phyletic studies of fishes (5-6). In fishes, the advanced state of LDH isozyme expression is one in which all heterotetramers are not expressed; from decreased activity to eventual loss of both asymmetrical heterotetrameric isozymes (Ldh-A,B, and Ldh-A,B), a five-banded pattern becomes three, and subsequently two-banded with the disappearance of the symmetrical heterotetramer (Ldh-A2B2). These evolutionary advancements in gene expression of fishes parallel phylogenetic advancements (5-7). Evolutionary divergence between the subunits is probably responsible for restriction of the A and B polypeptide assembly, although genetic regulatory mechanisms cannot be ruled out (5).

In reptiles, three-band LDH isozyme patterns—absence of both the A3B1 and A1B3 asymmetrical isozymes—have been previously reported in turtles (8), lizards (9), and possibly snakes (10). Furthermore, it was suggested that this character state may serve as a biochemical definition of the family Lacertidae (9). Unlike reported for fishes, however, a four-banded LDH pattern is frequently observed in reptiles. In snakes and most lizards, it is not unusual to find reduced activity or total absence of the asymmetrical Ldh-A3B1 heterotetramer (11).

Recent investigations into phylogenetic relationships within the lizard genus Eumeces (12) uncovered an unusual LDH isozyme pattern—one previously unreported for reptiles; a total restriction of the Ldh-A1B3 asymmetrical heterotetrameric isozyme was observed upon separating the isozymes via horizontal starch gel electrophoresis using the "Poulik" buffer combination (13). Additional investigation showed the same pattern in the genus Mabuya, which belongs in a different subfamily within the family Scincidae. Owing to its uniqueness, this pattern of restriction of the Ldh-A1B3 isozyme may eventually serve as a simple, biochemical definition for the lizard family Scincidae for it has not been observed in other lizard families investigated to date (including the Gekkonidae, Iguanidae, Xantusidae, Teiidae, Lacertidae, and Anguidae).

11. Murphy, R.W. Unpublished observations.