ELECTROPHORETIC VARIABILITY AT THE ALCOHOL DEHYDROGENASE LOCUS IN *DROSOPHILA MELANOGASTER*

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In order to assess the extent of electrophoretic variation at the alcohol dehydrogenase locus in a natural population of *Drosophila melanogaster* KREITMAN (1980) screened ninety-six isochromosomal lines and two lines carrying "fast" thermostability variants of the enzyme using eight different conditions of acrylamide electrophoresis. Although he found no additional mobility variation within the 50 "slow" and 46 "fast" mobility lines, he did show that the "fast-resistant allele" described by SAMPSELL (1977) (*Adh^{Fr}*) was distinguishable electrophoretically from the standard "fast" allele on 7.5% acrylamide gels at pH 8.5. However KREITMAN (1980) also claimed that using the same conditions of electrophoresis a "heat-sensitive fast allele, 71-K", could not be distinguished from standard fast alleles.

We have two comments that are pertinent to the interpretation of KREITMAN'S (1980) interesting results. Firstly, and most importantly, THÖRIG, SCHOONE and SCHARLOO (1975) first identified the putative allele *Adh^{F71K}* and described the ADH-F71K enzyme as "heat-resistant." We have confirmed this thermostability property of ADH-F71K (GIBSON *et al.* 1980). Secondly, GIBSON *et al.* (1980) have also shown that the enzymes encoded by each of the three alleles *Adh^{F71K}*, *Adh^{Fr}* (SAMPSELL 1977) and *Adh^{FCh.D.}* have the same ADH activity ratios (the ratio of ADH activity with 2-propanol to ADH activity with ethanol as substrate) and "heat-resistant" properties and concluded that they probably represent the same allele. Thus it was expected that ADH-F71K, ADH-Fr and ADH-FCh.D. would each be similarly distinguishable from the standard ADH-F under appropriate electrophoretic conditions. However, of the three "heat-resistant" variants, the amino acid sequence of only ADH-FCh.D. has so far been described (CHAMBERS *et al.* 1981). The description of ADH-F71K as "heat-sensitive" in KREITMAN'S (1980) paper may be a typographical error, but even so the reported dissimilarity in electrophoretic mobility between ADH-F71K and ADH-Fr is interesting.

We briefly describe here two sets of data which, taken together, resolve the ambiguity. GIBSON *et al.* (1980) noted that a sample of the stock containing *Adh^{F71K}* was segregating "heat-sensitive" ADH-F as well as the "heat-resistant" ADH-F71K. We have compared some of the relevant biochemical properties of "heat-resistant" and "heat-sensitive" ADH variants isolated from the 71K stock. The results (Table 1) show that the "heat-resistant" variants have similar

TABLE 1

*Comparison of the activity ratios and thermal-stabilities for single allele strains isolated from the stock 71-K segregating "heat-resistant" and "heat-sensitive" variants**

	Number of single allele lines tested	ADH activity ratio	Activity % remaining after 5 min at	
			40°	44°
"heat-sensitive" isolates from 71-K	5	6.9 (0.07)	36.5 (3.10)	2.98 (1.28)
"heat-resistant" isolates from 71-K	6	4.4 (0.09)	92.3 (1.09)	28.3 (1.96)
ADH-F†	8	6.8 (0.17)	31.1 (3.55)	2.0 (0.27)
ADH-FCh.D.†	8	4.6 (0.11)	92.4 (0.81)	43.2 (3.93)

* Standard errors in parentheses.

† Data from WILKS *et al.* (1980).

properties to ADH-FCh.D. and ADH-Fr while the "heat-sensitive" forms are similar to standard ADH-F.

We have compared the electrophoretic mobilities of "heat resistant" ADH-F71K, ADH-Fr and ADH-FCh.D. on 7.5% acrylamide gels at pH 8.3. These observations will be described in detail elsewhere but they show that all three "heat-resistant" ADH variants have identical mobilities which are slightly slower than the enzyme encoded by our standard *Adh^F* stock. On the other hand, "heat sensitive" variants from the stock 71K are inseparable from ADH-F.

Overall our data underline KREITMAN's (1980) major conclusion that the *Adh* locus does not harbor substantial amounts of "hidden" allelic variability other than the three major variants *Adh^F*, *Adh^s* and *Adh^{FCh.D.}*. As *Adh^{FCh.D.}* has been found in natural populations in Australia at up to 16% the *Adh* polymorphism should be considered as a tri-allelic system (GIBSON, WILKS and CHAMBERS 1982).

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