Armstrong, C.E. Howard University, Washington, D.C. A thermostability study of octanol dehydrogenase isozymes in D. metzii and D. pellewae.

Following the study of octanol dehydrogenase (ODH) of D. melanogaster by Ursprung and Leone (1965) and Courtright, Imberski, and Ursprung (1966), this enzyme has been the object of extensive developmental and genetical analysis in the sibling species D. metzii, D. pellewae (Pipkin 1968, 1969 in press), and D. albirostris (Ogonji, this issue of DIS). To this date little work has been done on the characterization of ODH isozymes. This report describes the first in a series of experiments to characterize the ODH isozymes of D. metzii and D. pellewae.

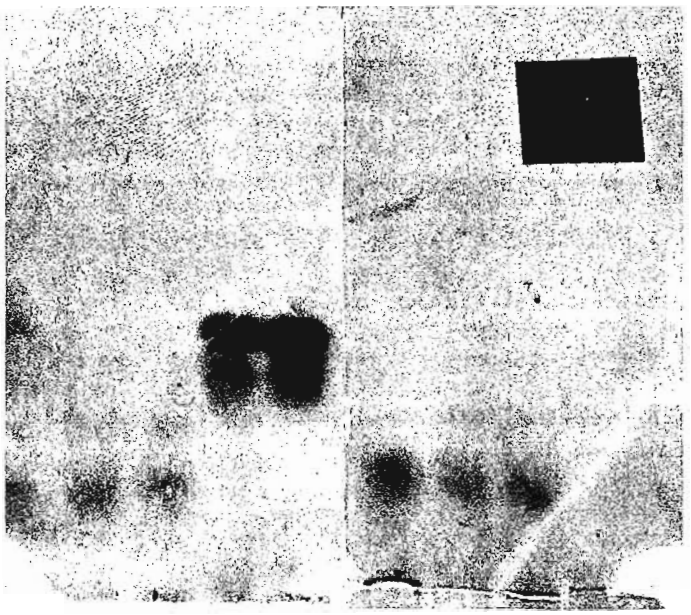

Fig. 1. Left, control ODH isozymes of homogenates of six day old adult females of true breeding D. metzii and D. pellewae strains; right, gel treated with 55°C for 35 minutes shows only the #1 isozyme still enzymatically active.

Differences in the thermostability of certain ODH isozymes separated by agar gel electrophoresis have been found in the crude homogenate obtained from four virgin females aged for six days, derived from eight different strains of D. metzii and D. pellewae. Known isozymic patterns of these experimental strains have been altered by timed exposure to high temperature ranges.

Experimental results have shown that the maximum thermal range of all the ODH isozymes was 55°C with a forty minute exposure time. At the same temperature, however, with a 35 minute exposure time, isozymes located at positions 1 and 2 were found to be heat stable and isozymes located at positions 3,5,6, and 7 were found to be heat labile (Fig. 1). No detectable difference in thermostability of isozymes at positions 3,5,6, and 7 has been observed. It is also noted that the thermal studies on third stage larval isozyme patterns agree with the results found in the adults.

The absence of a difference in the heat stability of isozymes at positions 3,5,6, and 7, and the finding of such a difference between the number 1 and 2 isozymes and all the other isozymes is in agreement with the duplicate gene hypothesis as outlined by Pipkin (1969 and her Fig. 1, this issue DIS).

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References: Courtright et al, 1966, Genetics 54: 1251-1260; Ogonji, G. 1969, DIS (this issue); Pipkin, S.B., 1968, Genetics 60: 81-82; Pipkin, S.B., 1969, Genetics (in press); Ursprung et al, 1965, J. Exptl. Zool. 160: 147-154.

Lim, J.K. Wisconsin State University, Eau Claire, Wisconsin. A selective system for testing reversibility of the sex-linked recessive lethals carried in males.

A genetic selection system for quick detection of apparent reverse mutations of the sex-linked recessive lethals utilizing the special Y-chromosomes and the attached X-chromosome has been tested. The results from a preliminary test indicate that the system works well in practice. Each of the sex-linked recessive lethals located at the proximal end and at the center of the X-chromosome, near the v locus, was made self-maintaining in males as follows:

lethals at the proximal end of the X-chromosome

y f:=/y^+·Y·ma-l^+ and l/y^+·Y·ma-l^+

lethals at the center, near the v locus, of the X-chromosome
y f:=/B^S•v^+•Y•y^+#1 and 1/B^S•v^+•Y•y^+#1

Of the eight lethals maintained in males, l(1)M41 induced by MMS in y w ct f X-chromosome was tested. The lethal was found to be located at 36.0 and the polytene chromosome of the stock appears quite normal. In testing the reversibility of the lethal, a large number of virgin females of the genetic constitution y f:=/y^+•Y•ma-1^+ was obtained from the cross between y f:=/Y and l(1)t2-14a/y^+•Y•ma-1^+ [l(1)t2-14a was induced in the Canton X-chromosome by W.D. Kaplan and was localized by him at 65.0] and were mated to y w ct f l(1)M41/B^S•v^+•Y•y^+#1. Of the 27,827 progeny, from the cross, were the following viable males: 7 w ct f males, 1 y w ct f male, 2 w ct f B males, and 1 fB male. The w ct f males and 1 y w ct f male represent apparent spontaneous revertants. Each of the seven w ct f males mated to y w ct f l(1)M41/FM6 produced y w ct f females indicating either a reversion of l(1)M41 or involvement of suppressor mutation for l(1)M41. The y w ct f male was sterile as expected. The w ct f B males were expected from non-disjunction in the males and the f B male can originate from separation of the y f:=. In addition to the above rare males were 11 f females, 59 y f females, and 1 y f B female. These rare females might have originated from non-disjunction in the females and/or separation of the attached X-chromosome.

A large number of f B virgin females (y f:=/B^S•v^+•Y•y^+#1) from the above cross can be mated to any of the lethals, in the proximal end of the X-chromosome, covered by the ma-1^+ segment of the y^+•Y•ma-1^+. In turn, a large number of f virgin females (y f:=/y^+•Y•ma-1^+) resulting from the above cross can be used to test the reversibility of the recessive lethals near the v locus carried in males with B^S•v^+•Y•y^+#1. Alternately introducing y^+•Y•ma-1^+ and B^S•v^+•Y•y^+#1, in this manner, into the eggs carrying y f:= should enable one to obtain a large number of virgin females, thereby providing an opportunity to test reversibility of sex-linked recessive lethals, covered by the v^+ segment of the B^S•v^+•Y•y^+#1 and those covered by the ma-1^+ segment of the y^+•Y•ma-1^+, carried in the males.

Mather, W.B. University of Queensland, Brisbane, Australia. Chromosomal polymorphism in D. rubida from Wewak and Oriomo River, New Guinea.

Samples of D. rubida from Wewak in the East Sepik and Oriomo River in the Western District of the Territory of Papua and New Guinea were taken in February and May 1968 respectively. The flies were collected from heaps of fermenting banana placed in rain forest. The flies were cytologically analysed by mating males to a standard inversion free laboratory strain and despermed females to males of the standard strain. In each case the giant chromosomes from seven larvae were scored (Mather 1961). The inversions recorded have been previously described: II LA, II RA, C and III A, B (Mather 1961), II RG, H, I (Mather 1966) and III H (Mather 1963). The most notable feature of the collections is the very high frequency of III A B H at Oriomo River.

	Wewak		Oriomo River	
Chromosome	♂%	♀%	♂%	♀%
II LA		13		
II RA	29	22		
C	76	72	50	91
G	6	22		
H	6			
I		6		
III A	18	6	100	100
B	18	6	100	100
H			100	100
Flies scored	18	16	8	11

References: Mather, W.B. 1961, Chromosomal polymorphism in D. rubida, Mather. Genetics Princeton 46: 799-810. Mather, W.B. 1963, Notes on the Inversions of D. rubida. D.I.S. 37: 104. Mather, W.B. 1966, New Inversions in D. rubida. D.I.S. 41: 125-126.