Tsusue, M. Kitasato University, Sagamihara, Japan. Metabolism of eye pigments in mutant sepia of D. melanogaster.

Sepiapterin, yellow pigment of sepia flies, have been supposed to be a precursor of drosopterin, red eye pigment of wild type flies. Four red pigments, namely, drosopterin, isodrosopterin, neodrosopterin and drosopterin-D have been found in the wild type flies, but biosynthesis and chemical structures of these red pigments have not yet been established.

Sepiapterin was decomposed by silkworm deaminase to yield corresponding lumazine of sepiapterin (xanthopterin-B_2)[1]. The enzyme was distributed in many tissues of silkworm (lemon) and high specific activity was found in malpighian tubes and integuments. The enzyme had high substrate specificity and only sepiapterin and isosepiapterin were deaminated as far as examined. The pH optimum of the enzyme was at 8.0, and activity of the enzyme was inhibited competitively by many pteridines, for instance 2-amino-4-hydroxypteridine, biopterin and xanthopterin[2]. The enzymatic reaction was formulated as follows.

$$\text{sepiapterin} + H_2O \longrightarrow \text{xanthopterin-}B_2 + NH_3$$

On the other hand, sepiapterin was reduced by silkworm (fat body) enzyme in the presence of NADPH[3]. The product of the enzyme was dihydrobiopterin as well as mammalian sepiapterin reductase[4]. Dihydrobiopterin was further reduced by dehydrofolate reductase to yield tetrahydrobiopterin which was a cofactor of aromatic amino acid hydroxylation[4]. Although a part of biochemical significance of these pteridines have been clarified, the reason why the pigments accumulate in the eyes of flies remains still unknown.

References: 1. Tsusue, M. 1967, Experientia 116; 2. Tsusue, M. 1971, J. Biochem. (Tokyo) 781; 3. Matsubara, M., M. Tsusue and M. Akino 1963, Nature 909; 4. Nagai, M. 1968, Arch. Biochem. Biophys. 426.

Richmond, R.C. and A.W. Finkel. Indiana University, Bloomington. Selection for thermal preference in D. melanogaster.

The ability of Drosophila flies to select a preferred temperature range has been little investigated. We have designed a temperature gradient apparatus for use with small insects and are subjecting a wild collected stock of D. melanogaster to selection for hot and cold temperature preferences (Cozad et al., 1973). After nine generations of selection in the Hot line and ten generations of selection in the Cold line, a clear response to selection has been obtained. Figure 1 shows the responses for females for both the Hot and Cold lines. Approximately 200 flies of each sex are tested in each generation and 5-10% of these flies are selected as parents

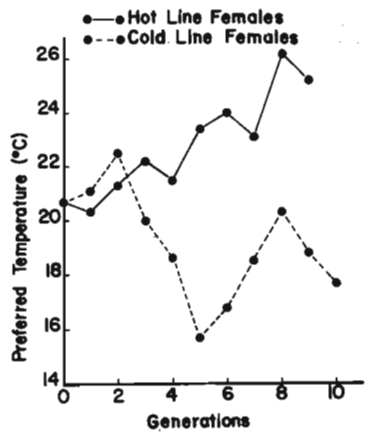

Figure 1. Response to selection for hot and cold temperature preferences in female D. melanogaster.

for the next generation. The regression of mean preferred temperature on generation is highly significant ($p < .001$) for both sexes in the Hot line and borders on statistical significance ($.05 < p < .10$) for both sexes in the Cold line. These behaviors thus appear to have a low but significant heritability and are likely to be of value in studies of the genetics of behavior in Drosophila. Supported by NIH grant ROI-GM 18690.

References: Cozad, S.J., R.C. Richmond and A.W. Finkel 1973, submitted to Ecology.