individuals with B's has a steep rise from 67% to 95%.

In view of these, we feel that some type of "B-chromosome accumulating" mechanism is operating in this system.

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Real, M.D. and J. Ferré. University of Valencia, Spain. Chemical synthesis and the "in vivo" formation of xanthurenic acid 8-0-β-D-glucoside in **Drosophila melanogaster.**

Recently, it has been shown that some eye colour mutants of **Drosophila melanogaster** accumulate a blue fluorescent compound not detected in chromatograms of the wild type. This compound has been identified as xanthurenic acid 8-0-β-D-glucoside (Ferre & Mensua 1983; Ferre et al. 1985). In this work we confirm the above structure by chemical synthesis, and propose a pathway for the biosynthesis of this compound.

The chemical synthesis was carried out following Butenandt et al.'s (1963) procedure for the synthesis of rodhommatin (a xanthommatin glucoside). A solution of xanthurenic acid and α-acetobromoglucose at pH 10.5 was stirred for several hours. The acetilated derivative was hydrolysed in strong alkaline medium to give the free glucoside. The purification of the final product was carried out by ion exchange chromatography.

The synthetic and natural compounds showed identical chromatographic behavior in thin-layer chromatography using different solvents. The UV spectra at different pH values, the excitation and emission fluorescent spectra and the IR spectrum, also showed that both compounds were the same chemical substance.

Table 1. Thin-layer chromatographic (TLC) analysis of head extracts from the vermilion purple mutant raised in differently supplemented media.

Supplemented metabolite	Compound after TLC separation* xanthurenic acid	 xanth. acid 8-glucoside
none	-	-
3-hydroxykynurenine	+	+
xanthurenic acid	+	-

* TLC was carried out on cellulose plates using two-dimensional separation. First solvent: isopropanol/2% ammonium acetate (1:1); second solvent: 3% ammonium chloride.

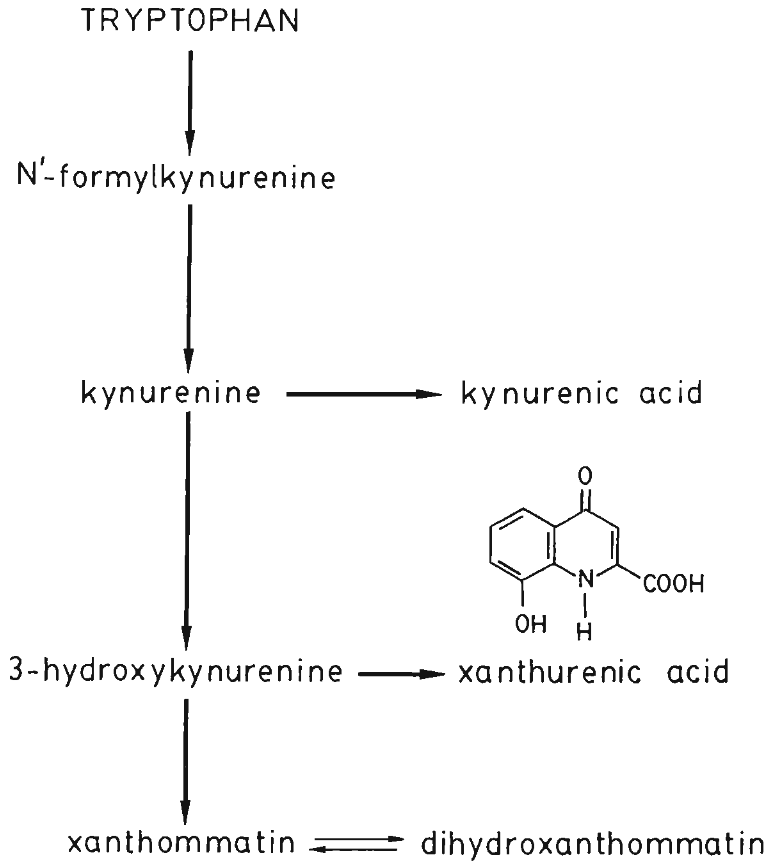

Figure 1. Biosynthesis of "xanthommatins" in **Drosophila melanogaster.**

Because this newly found metabolite is a xanthurenic acid derivative, we looked for possible metabolic relationships with the biosynthetic pathway of xanthommatin (brown pigment of Drosophila eyes), from which xanthurenic acid is a side metabolite (Figure 1).

In Drosophila, the vermilion mutant (v) cannot convert tryptophan into N-formylkynurenine; the purple gene (pr) provokes, besides some other effects, the accumulation of xanthurenic acid 8-glucoside. Double mutant (v pr) larvae were fed with a medium supplemented either with 3-hydroxykynurenine or with xanthurenic acid. Adult flies were analysed for the accumulation of fluorescent metabolites and the results are shown in Table 1. The results suggest that 3-hydroxykynurenine is the "in vivo" precursor of both xanthurenic acid and its glucoside, but the former is not a precursor of the latter. It is likely that the biosynthesis of xanthurenic acid 8-glucoside from 3-hydroxykynurenine involves 3-hydroxykynurenine 0-glucoside as an intermediate. This proposed intermediate has never been found in Drosophila. The characterization of this biosynthetic pathway is currently under progress in our laboratory.

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Ricker, J.P. and J. Hirsch. University of Illinois, Urbana-Champaign, Illinois USNA. Evolutionary changes in laboratory populations selected for geotaxis.

Geotaxis (orientation and movement with respect to gravity) is measured in **D.melanogaster** with a multiple-unit maze (Hirsch 1959). Lines described here have experienced divergent selection for geotaxis since 1958 resulting in changes in genetic homeostasis (Lerner 1970). The negative (high) and positive (low) geotaxis lines have been selected in 292 and 294 of 550 generations, respectively, making this one of the longest selection experiments on record.

Selection was started from a line established by mixing three different stocks (Erlenmeyer-Kimling et al. 1962). Two-hundred flies of each sex were tested in the maze and the 60 most negative and most positive flies of each sex were bred for the high and low lines, respectively. After this time, the number tested in each line was usually between 100 and 200 of each sex; and the number selected was usually between 25 and 60 pair. Geotaxis scores range 0-15, the score of a fly indicating the number of up choices in the geotaxis maze.

Figure 1 presents the response to selection of males in the high and low lines. Female results are not presented but are similar to those of males. Selection data from generations 242 through 251 are missing but are presented graphically in Yeatman & Hirsch (1971). Selection response in the first 100 generations is gradual, there being a more rapid response initially in the low line, but then in the high line after generation 15. Excepting occasional losses associated with relaxed selection, gains from selection continue until around generations 90 and 162 in the high and low lines, respectively. The high line reached the upper limit of the measurement scale in generation 90 but the low line became more extreme in later generations, particularly after generation 514.

In several instances before generation 450, relaxed selection resulted in a regression of mean geotactic score indicating its association with reproductive fitness (Dobzhansky & Spassky 1969). The most striking instances of this are in generations 148, 219, 313, and 415 of the high line, and in generations 235, 313, and 415 of the low line. In generation 514, however, we observed that 26 generations of relaxed selection had resulted in no loss of selection gains--in fact, the high line had become more extreme. To test whether this phenotypic stability was due to the lines having become homozygous, reverse selection from the high and low lines was begun in generations 515 and 519, respectively. The high-reverse (HR) and low-reverse (LR) lines respond to reverse selection indicating that both lines are not homozygous.

Figure 2 presents the selection response of LR. When selection was relaxed in LR for 8 generations beginning in generation 25, its mean geotactic score regressed towards that of the first generation of reverse selection: Genetic homeostasis in the low line has changed to such an extent that changes away from an extreme expression of geotaxis are now resisted by effects of natural selection. When selection was relaxed for 8 generations beginning in generation 32, HR showed no change in mean geotactic score: the high line does not resist changes away from extreme expression of geotaxis. However, because the high line does not regress when selection is relaxed, it also shows effects of changes in genetic homeostasis.

The present study shows that long-term selection can result in development of a new genetic equilibrium and that a long period of directional selection with relatively small population sizes does not exhaust additive genetic variance. The lines described here may prove useful in studying the evolution of behavior.

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