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California. Alteration of response to a
visual stimulus by a cholinesterase inhibitor.

The behavior mutant, Hk^1 (hyperkinetic),
discovered in our laboratory, jumps and
falls over when presented with a light
stimulus in the form of a burst of strobe
flashes. The sensitivity of these flies
to such a stimulus depends on the intensi-

ty and frequency of the strobe light used. We are currently investigating the effect of
various cholinesterase inhibitors on this response. The present communication provides data
on the effect of eserine.

Flies were starved overnight and fed for three hours on eserine dissolved in a one %
sucrose solution. Control flies were fed sucrose solution only. The mean % response of
 Hk^1 flies fed different concentrations of eserine and tested at three different light in-
tensities is shown in figure 1. Each point on the graph represents a sample of ten flies

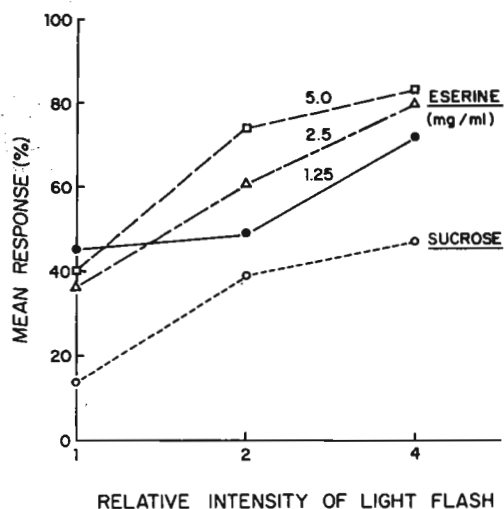


Figure 1

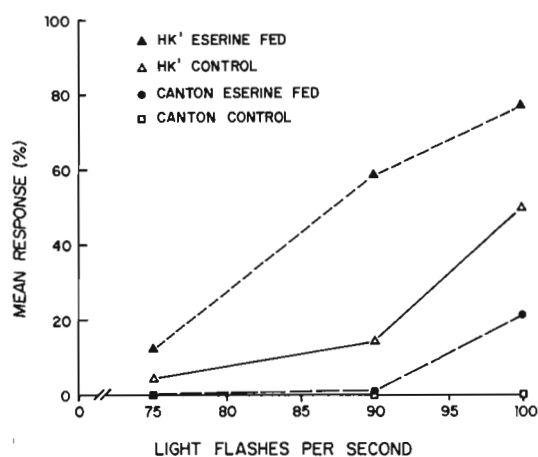


Figure 2

and each fly was tested 30 times. Each stimulus consisted of a burst of 25 light flashes at a frequency of 100 flashes per second. The intensity of the strobe light corresponding to a relative scale of four on the graph is approximately 350,000 candlepower. The eserine fed flies showed an increase in sensitivity to the light stimulus; at the two higher intensities, the mean % response appears to be directly proportional to the concentration of eserine. The increase in sensitivity of eserine-fed Hk^1 flies is also evident when the mean response is measured against frequency of the strobe flashes (figure 2); the strobe was set to give 25 flashes at a relative intensity scale of four.

Even Canton-S (wild type) flies, which do not normally respond to the light stimulus, can be made sensitive by feeding eserine. The type of response appears to be identical to that of Hk^1 , so in this sense eserine produces Hk^1 phenocopies. However, eserine fed flies do not shake their legs while etherized, as does Hk^1 . Thus the change in behavior may be primarily an increased sensitivity of the sensory system rather than the motor system. Dewhurst et al (1970) have suggested that acetylcholine may be a sensory transmitter in *Drosophila*. Therefore eserine, by blocking the degradation of acetylcholine, may increase the sensitivity of the sensory system which when stimulated sufficiently produces a startle response.

Reference: Dewhurst, S.A., McCaman, R.E., and Kaplan, W.D. *Biochemical Genetics* 4: 499-508 (1970).

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