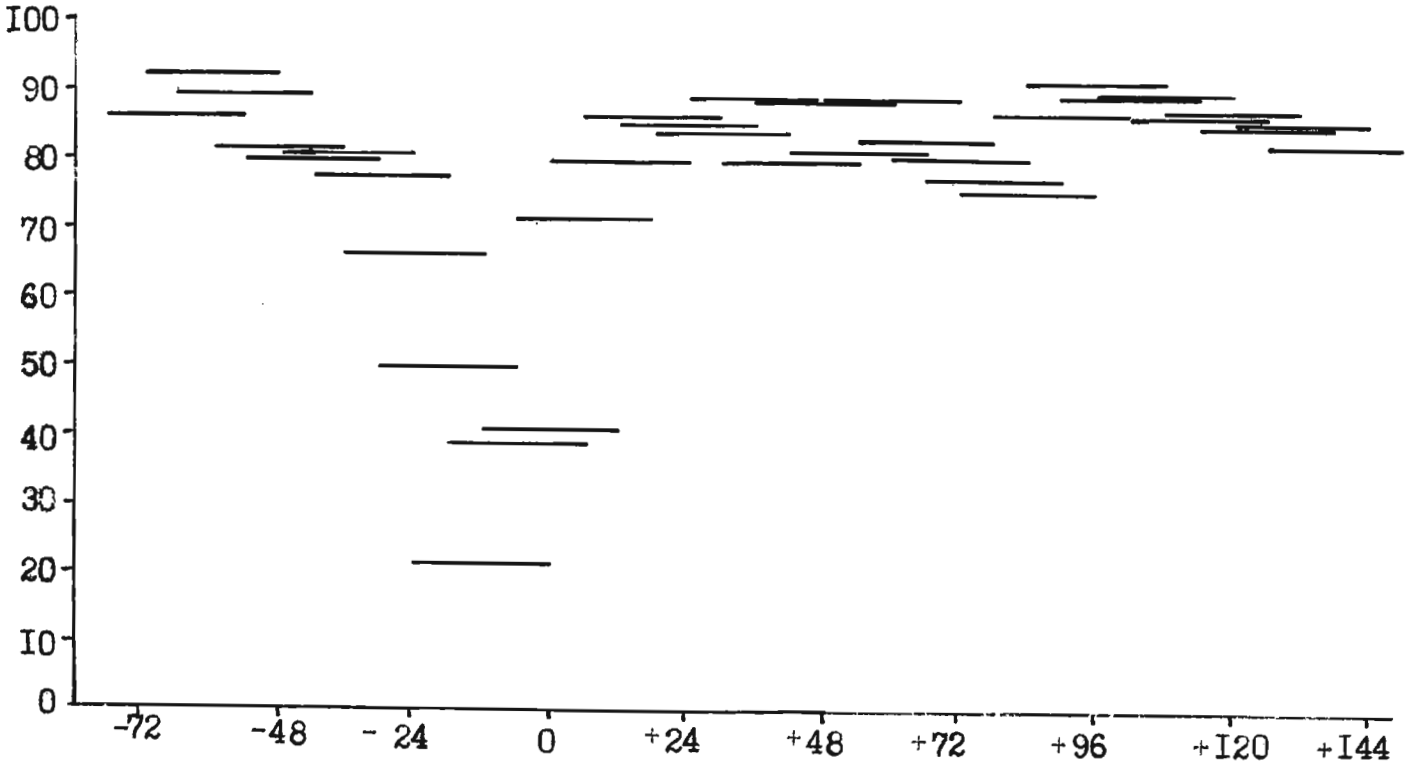

Fig. 1. Egg-to-imago survival of split mutants in D. melanogaster following 24 h heat treatment (29oC) in different periods of development. Percent of survivors, time and duration of heat treatment in each sample is shown by respective horizontal stripe.

References: Foster 1973, Develop. Biol. 32:282; Portin 1977, Hereditas 87:77; Shellenbarger and Mohler 1975, Genetics 81:143.

Michinomae, M., S. Shindo and S. Kaji.
Konan University, Okamoto, Kobe, Japan.
Patterns of acid phosphatase during the development in D. melanogaster.

Many investigations have been made on the acid phosphatase in various Drosophila species. MacIntyre (1966) reported that the adult flies of D. melanogaster and D. simulans contain the acid phosphatase-1, while Esposito and Ulrich (1966) also reported the developmental changes of the acid phosphatase but no details are given. Mulherkar et al. (1972) and Michinomae (1976) pointed out that the acid phosphatase activities are changeable during the development of D. melanogaster. The maximum activity in whole larvae homogenates was observed in the prepupal to pupal stage. However, the maximum activity in the mutant Bar eye-antennal discs was detected in the larvae of 95 hours after hatching. Such a difference between whole larvae and eye-antennal discs may be resulted from the cell death accompanied by the specific degeneration of the mutant imaginal eye discs (Michinomae 1976).

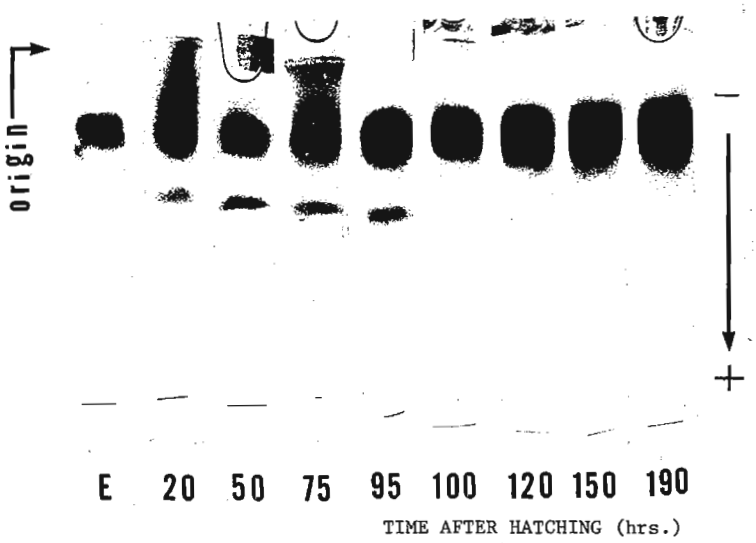

Fig. 1. Zymograms of the relative positions of acid phosphatase of nine developmental stages. E = egg stage, 20-95 = larval stages, 100 = prepupal stage, 120-190 = pupal stages.

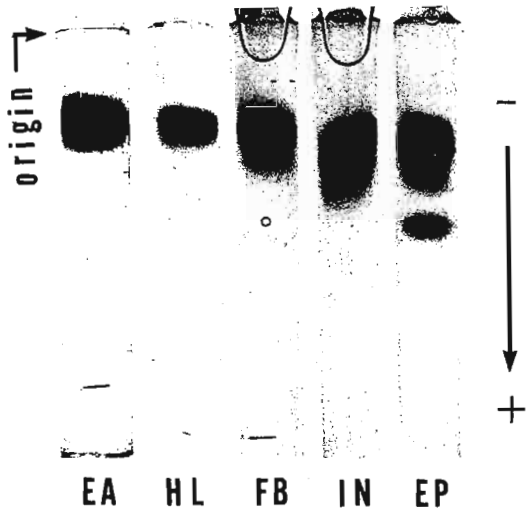

Fig. 2. Zymograms of acid phosphatase in five different larval tissues. IN = intestine, FB = fat body, HA = haemolymph, EA = eye-antennal disc, EP = epithelium.

The properties of acid phosphatase were examined, mainly from the viewpoints of the developmental changes and the cell death, in the wild type (Oregon-R) and Bar eye mutant of D. melanogaster, by the use of polyacrylamide disc electrophoresis. Disc electrophoresis was carried out according to the method described by MacIntyre (1971), with the use of 7% polyacrylamide gel and Canalco buffer system. The samples of electrophoresis were obtained by homogenizing of eggs, larvae and pupae, which were applied on each original point of the gel columns. Electrophoresis was conducted in 5 cm gels for 4 hours at 2.5 mA/column. The enzyme activity was detected with α-naphtyle phosphate and Fast Red-ITR.

The types of acid phosphatase were investigated on nine stages during the development. In the wild type, two types of acid phosphatase were detected, and the slowly moving band (major band) has the highest activity, while the faster moving band (minor band) has lower activity than the highest one. The major band was detected throughout the egg, larval and pupal stages, but the minor band was not detected at the egg and pupal stages. Only at the larval stage could the minor band enzyme be detected (Fig. 1). Therefore, the localization of this enzyme was examined in each of the larval tissues or organs: epithelium, fat body, haemolymph, intestine, eye antennal disc. The major enzyme band was also detected in each of the tissues or organs, while only in the epithelium both the major and minor bands were so detected that the minor band enzyme may be represented in the epithelium of larvae (Fig. 2).

In the Bar eye mutant, these developmental changes of zymograms were as the same as the wild type. Two fundamental types of acid phosphatase were found in the various developmental stages. One enzyme was detected only in the epithelium of the larvae as a minor band. The other, major band enzyme was common to all stages whether it is larvae or not.

From these results, the changes show that the acid phosphatase activity in the Bar eye-antennal discs, with its characteristic degeneration by the cell death, may be due to one enzyme, detected as the major band enzyme.

References: Esposito, V.M. and V. Ulrich 1966, Genetics 54:334; MacIntyre, R.J. 1966, Genetics 53:461-474; MacIntyre, R.J. 1971, Biochem. Genet. 5:45-56; Michinomae, M. 1976, Japan. J. Genetics 51:315-326; Mulherkar, L., R.M. Kothari and V.G. Vaidya 1972, Wilhelm Roux Archiv 171:195-199.