cord, the fetal membranes or fetal lung were subjected to immunoelectrophoresis. We do not know the source of the 2nd α_1-LP component which appears during the 2nd half of pregnancy. It is of course possible that this extra component is also present in serum but in such a low concentration that it cannot be visualized by means of crossed immunoelectrophoresis.

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Developmental control of the orientation of cuticular structures in *Drosophila*[1]

J.V. Toney and J.N. Thompson, Jr[1]

Department of Zoology, University of Oklahoma, Norman (Oklahoma, 73019, USA), 24 September 1979

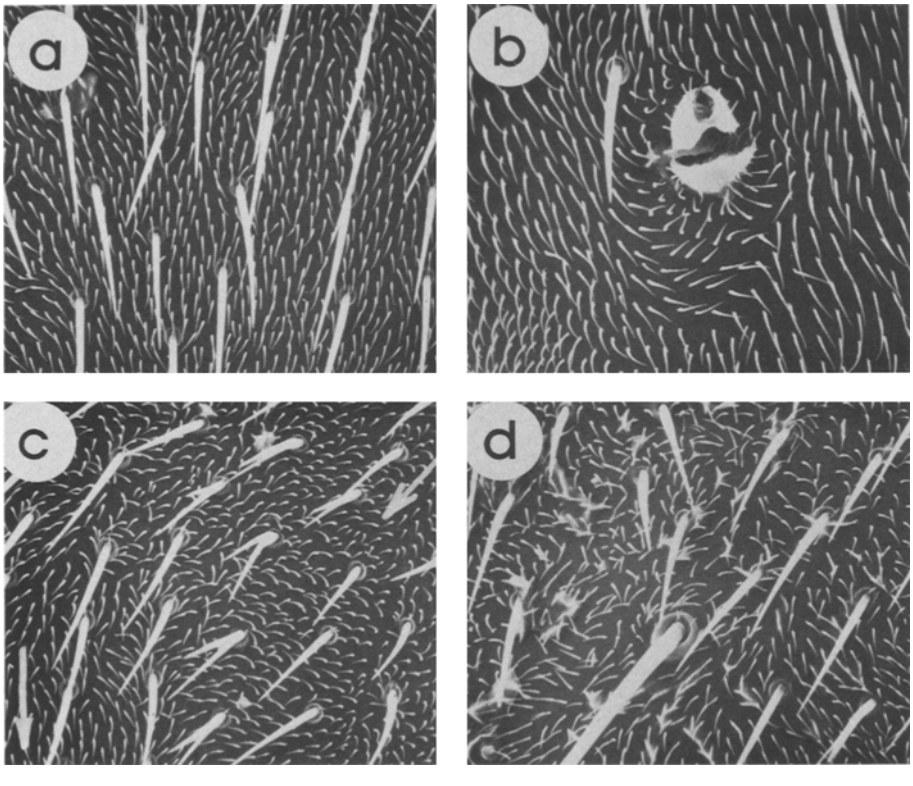
Summary. A scanning electron microscope study of bristle mutations in *Drosophila melanogaster* has shown that the cell hairs (trichomes) can be altered in predictable ways. The trichomes appear to act as markers of a diffusion gradient determining the orientation of cuticular structures in the thorax.

The placement and the orientation of structures result from separate sets of positional information during development. This is clear from a consideration of the large number of mutations in *Drosophila* and other organisms in which orientation and position can be altered independently of each other[3-4]. It is also supported by our studies of trichomes on the thorax of flies carrying bristle mutations.

Our studies began with an electron microscopic analysis of selection lines of the 4th chromosome mutant, shaven-naked (sv^n), in *Drosophila melanogaster.* This mutation converts the bristle-forming cell (trichogen) into a second socket cell (tormogen)[5]. In analyzing the selection line phenotypes, we were struck by localized alterations in the orientation of the trichomes that cover the surface of the thorax. These normally point in a posterior direction and their orientation is fairly uniform (figure, a). On the posterior side of the enlarged sv^n socket, however, their direction shifts gradually towards the midline until some are pointing anteriorly (figure, b). Since the trichomes do not point at random, there must be some form of polarity information determining their orientation. No change in number or spacing of elements was apparent.

The disrupted pattern of trichomes around the enlarged sv^n socket complexes suggests that large structures can obstruct the uniform establishment of the information gradient. These changes in trichome pattern are analogous to the distortions of a gradient caused by interruptions in the intersegmental membranes on the abdomen of *Oncopeltus*[6]. In both instances, the 'flow patterns' are consistent with the hypothesis that an anterior-posterior gradient is the primary determinant of cell polarity.

This view of polarity determination in the thorax of *Drosophila* leads to two predictions. First, we predicted that there would be a positive correlation between the size of the



Scanning electron micrographs of trichomes and microchaetes on the thorax of wild type and mutant *Drosophila melanogaster.* *a* normal area of trichomes oriented posteriorly, ×300. *b* double cell socket complex of sv^n showing shifting in trichome orientation on the posterior side of the socket, ×500. *c* intersection of 2 differently-oriented bristle areas (see arrows) in the mutant inturned, ×300. *d* disoriented trichomes in an area of intersection between patches of normal and redirected bristles in the mutant inturned, ×300.

'obstruction' (e.g., the bristle or socket) and the area of reoriented trichomes. This is precisely what was found. The anterior dorso-central bristles were smaller in our strains than the posterior dorso-centrals. As predicted, the affected area around the anterior dorso-centrals was also smaller, in some instances including only the single row of trichomes surrounding the socket. Similarly, the normal bristle and socket set is smaller in basal area than the double socket cell complex in the mutant sv^n. The area of affected trichomes around normal bristles is also smaller.

Our second prediction was that mutations, such as inturned, that alter the orientation of bristles will also have an effect upon the orientation of trichomes. To test this prediction we examined flies which had patches of inturned bristles. Within each patch of normal and inturned bristles, the trichomes were found to point in the same direction as the bristles. Where differently-oriented patches touch, however, the trichome pattern is disrupted. An example of this is shown in the figure, c. The bristles on the left and right of the picture point in different directions, and the trichomes are disoriented in the area where direction changes. This is shown even more dramatically in the large disoriented region in the figure, d. The distortion of trichomes in the area between 2 patches might be due to local diffusion interactions similar to the gradient smoothing inferred from cuticular patterns in other organisms[6].

Finally, an interesting conclusion from the local similarity of bristle and trichome orientation is that both bristles and trichomes seem to be responding to the same information gradient. Thus, trichome patterns may be a useful fine structure marker of the gradients determining orientation of major cuticular structures in *Drosophila*.

1 We are grateful to W.F. Chissoe and M.R. Whitmore for their help with the electron microscopy.
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An electrophoretic polymorphism that mimics a true genetic polymorphism in *Triturus cristatus carnifex* (Amphibia, Urodela)

Rosaria Scozzari, Laura Ulizzi, A. Ferracin and M. Lunadei

Centro di Genetica Evoluzionistica (C.N.R.) and Istituto di Genetica, Università degli Studi di Roma, and Istituto di Biologia e Zoologia Generale, II Cattedra, Policlinico Umberto I, Roma (Italy), 6 August 1979

Summary. Phosphoglucomutase electrophoretic patterns have been studied in 60 tail homogenates of *Triturus cristatus carnifex*. Our results show that the same sample produces a different electrophoretic pattern with homogenate ageing; a new band of intermediate mobility appears, together with the one produced by the fresh preparation. The phenomenon can mimic a true genetic polymorphism when differently stored samples are analyzed.

In the course of a study on the genetic variability of the Italian species of the genus *Triturus* (Amphibia, Urodela)[1], phosphoglucomutase (PGM) has been tested by means of horizontal starch gel electrophoresis. PGM (EC 2.7.5.1) is a phosphotransferase catalyzing the interconversion of glucose-1-phosphate and glucose-6-phosphate. It appears to be polymorphic in a great number of populations of the species considered[2].

Experiments have been carried on *Triturus cristatus carnifex* fresh tail homogenates, prepared according to Brewer[3] and then centrifuged at 13,000 rpm for 15 min to discard organelles and debris. Aliquots of each individual homogenate were immediately stored both at −20 °C and at −80 °C. The results obtained on 60 fresh samples from a natural population electrophoresed following the method of Spencer et al.[4], have shown the same pattern in all the homogenates, consisting of a main band and other 2 fainter bands migrating more rapidly towards the anode. The samples have also been tested by means a different method[5]. Aliquots a) fresh, b) stored at −80 °C, c) stored at −20 °C, frozen and thawed some times before electrophoresis, from each homogenate, have been run in parallel both with the method of Spencer et al.[4] and with that of Hedgecock[5]. Figure 1 shows that the same sample, if treated in different ways, produces a different electrophoretic pattern with the homogenate ageing.

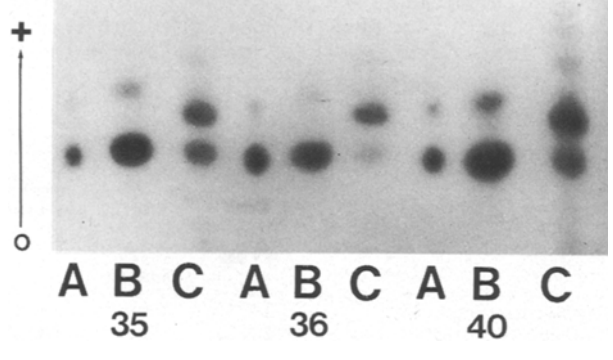

Fig. 1. Phosphoglucomutase electrophoretic pattern of comparison among tail homogenates A) fresh; B) stored at −80 °C; C) stored at −20 °C, frozen and thawed. 3 individuals out of a batch of 60 are examined (Nos 35, 36, 40).

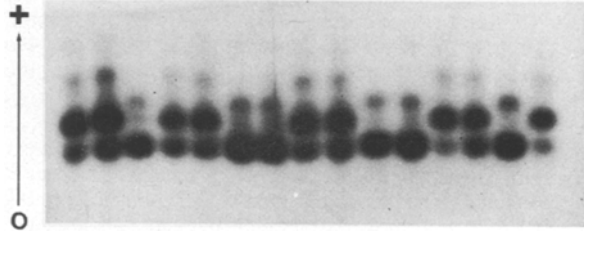

Fig. 2. Comparison among tail homogenates from 15 animals, subjected to different storage conditions and very closely resembling a true genetic polymorphism.