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Evidence for the existence of 2 types of α_1-lipoprotein in amniotic fluid from pregnancies older than 20 weeks

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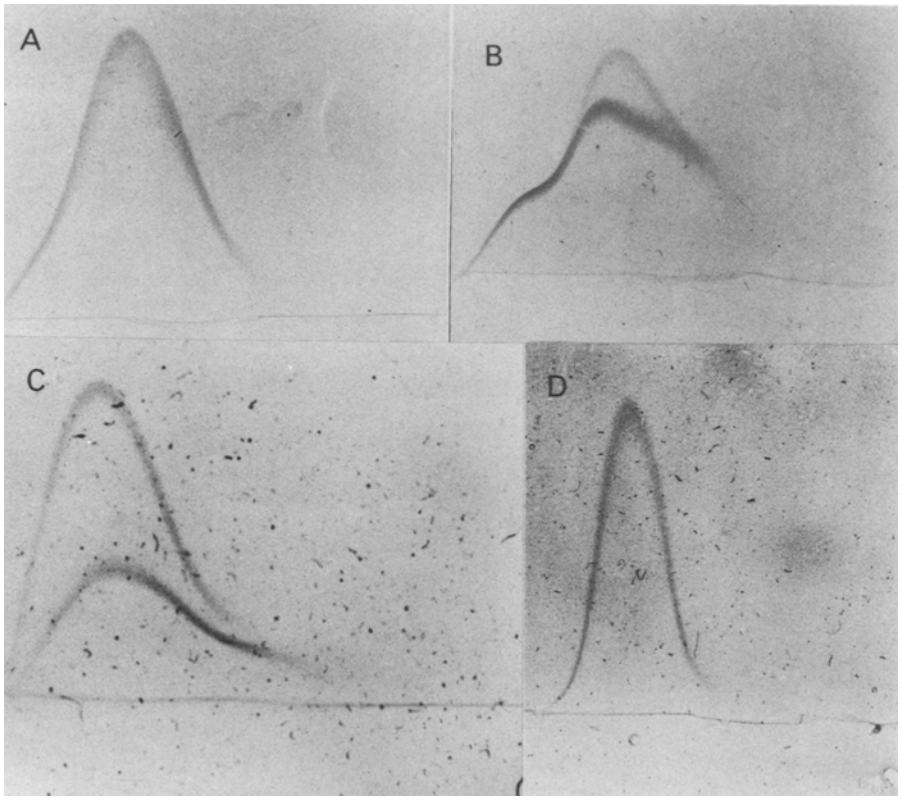
Summary. We have found by means of crossed immunoelectrophoresis that amniotic fluid contains 2 types of α_1-lipoprotein after the 20th week of pregnancy. Before that period the α_1-lipoprotein profile of amniotic fluid resembles that of serum and migrates as one type only.

Various authors[1,2] have suggested that the α_1-lipoprotein (α_1-LP) of serum does not consist of a single macromolecular complex but represents a mixture of several discrete lipoprotein families. There is, however, little evidence for such a hypothesis and it is well known that serum α_1-LP migrates as a single band when subjected to (immuno)electrophoresis. We wish to report that the α_1-LP of amniotic fluid can be separated into 2 components if it is derived from pregnancies older than about 20 weeks.

In our study we have made use of the technique of crossed immunoelectrophoresis in plates containing an antiserum against α_1-LP. The antiserum, which was obtained from Behring AG, Marburg (FRG) was prepared in rabbits immunized against high density lipoprotein (HDL_3). All amniotic fluid samples were concentrated 100 times in an Amicon B-15 concentrator and were then processed as described previously [3]. In the figure the α_1-LP profile of amniotic fluid from a 16-week (A), a 33-week (B) and a 42-week (C) pregnancy and of serum (D) is shown. It is of interest that on addition of a small amount of serum to amniotic fluid with a double peak such as in C, the 2 components combine to form a single α_1-LP peak. The α_1-LP profile of the 16-week amniotic fluid (single peak, A) is similar to that of serum (D), an observation which lends support to the view[4] that in early pregnancy amniotic fluid is a transudate of serum. Single α_1-LP peaks were also found if saline extracts of homogenated placenta, umbilical



The α_1-lipoprotein profile on crossed immunoelectrophoresis of amniotic fluid from *A* a 16-week, *B* a 33-week and *C* a 42-week pregnancy. In *D* the α_1-lipoprotein profile of serum is shown.

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]

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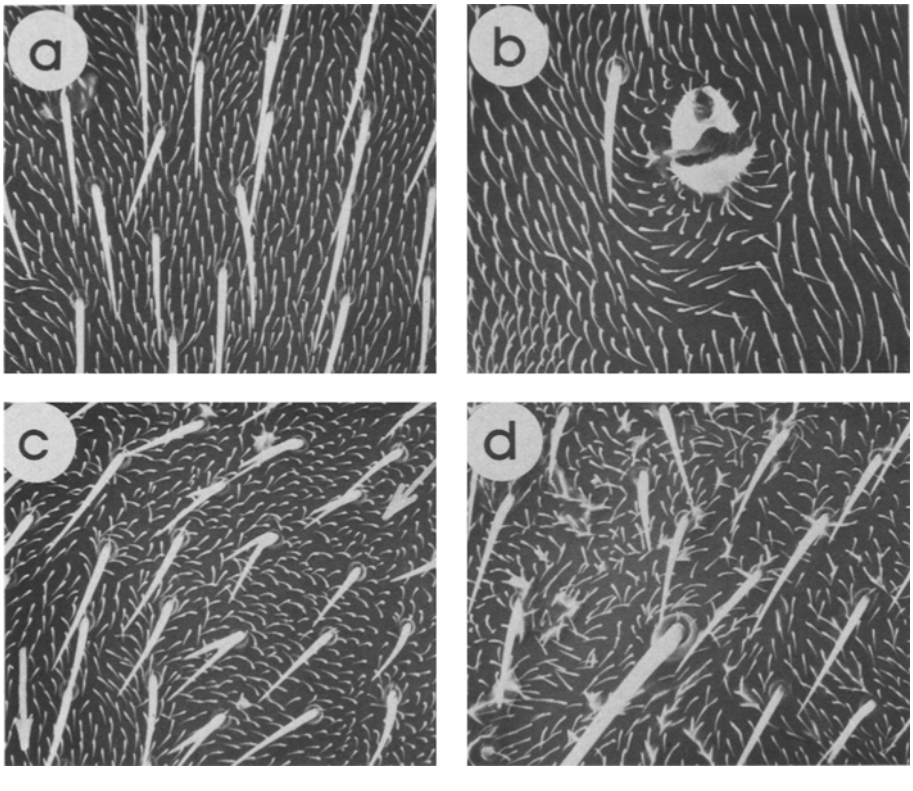
Summary. A scanning electron microscope study of bristle mutations in *Drosophila melanogaster* has shown that the cell hairs (trichomes) can be altered in predictable ways. The trichomes appear to act as markers of a diffusion gradient determining the orientation of cuticular structures in the thorax.

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.