

Mglinetz, V.A. Institute of Medical Genetics, Moscow, USSR. Bristle phenotype of split flies contradicts the hypothesis of quantal mitoses.

elements and only exceptionally more than four elements are involved. These data are in agreement with the suggestion by Lees and Waddington (1942) that the split allele induces one or two additional divisions of tormogenic and trichogenic cells. In all cases the shafts of the

bristles are lacking the bracts are also invariably lacking in spite of the presence of extra socket-cells. But if even a short shaft is present - just protruding above the surface - the bract is also present. Bracts are never observed in the presence of the shaft if the socket cell surrounding the shaft is mounted itself, completely or nearly so, into another socket usually consisting of two cells. Thus, the second socket cell is an obstacle preventing the induction of the bract. It may be suggested that the atypically located bracts are induced in the same way: when the inducing stimulus cannot pass in its usual direction it may spread in some other one, free of the second row of socket cells. As alterations in trichome orientation near the atypical chaetal sets are independent of the bract position it seems plausible that the alteration in bract position is not due to changes in bristle apparatus polarity. The changes in orientation of trichomes become more clear on the tergites of the split mutants as trichomes form more or less parallel rows there (Fig. 2). In the vicinity of anomalous bristle apparatus not only the orientation of single trichomes but of the rows of trichomes is altered. As each row has to correspond to a certain level of intrasegmental gradient, the disorientation of the row may be interpreted either as its mechanical deformation due to excessive growth of the bristle cells or as a result of a decrease in the gradient values around the bristle apparatus. If the former were true the trichome rows might be shifted both forwards and backwards as the enlargement of the bristle cells is rather isotropic. If the second interpretation were true, it is to be suggested that the chaetal cells decrease the gradient level around them, perhaps utilizing the gradient-carrier for their growth. Then the proximo-distal gradients

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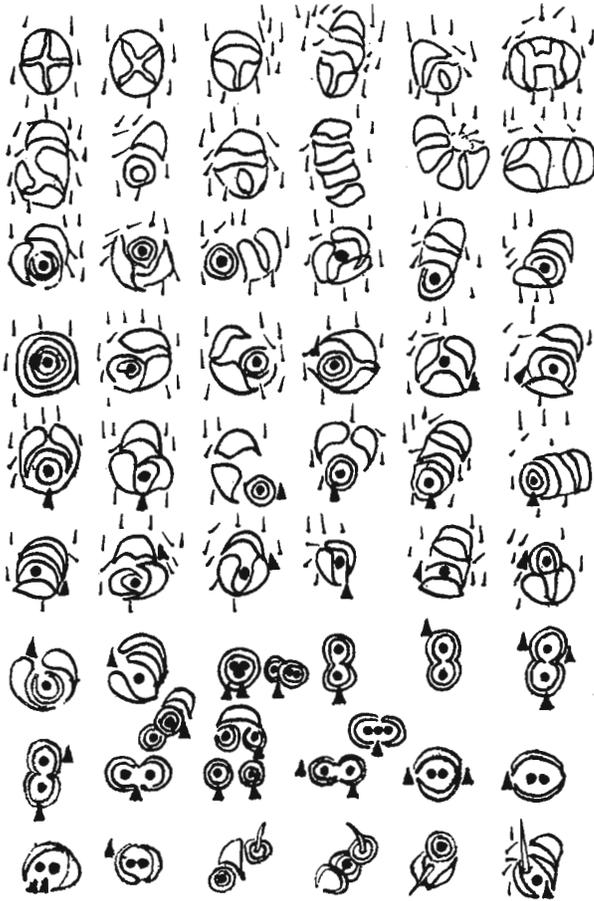


Fig. 1. A scheme of some bristle apparatus types found in the distal part of the femur in spl/spl flies. The position of socket cells is shown; the shafts and the bracts are shown as black circles and triangular, respectively.

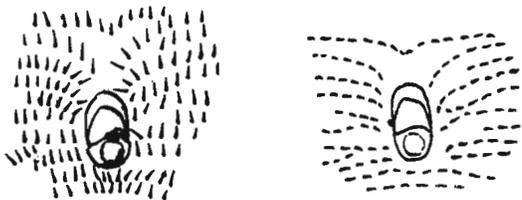


Fig. 2. A scheme of a bristle apparatus having two socket cells and the rows of trichomes on the tergite of spl/spl fly (A). B - a supposed position of gradient levels in the bristle apparatus region.

in the legs and the anterior-posterior gradients in the tergites have logically to be described as concentrational.

The observations on the position of socket cells in the bristle apparatus clearly show that the additional divisions in chaetal mother cells may take place in any plane, independently in each cell. A scheme of the chaetal phenotypes which are to arise depending on the division plane and suggesting that the cells of the upper layer are as usually tormogenic, and the underlying ones trichogenic, is shown in Fig. 3. Practically all the actual types

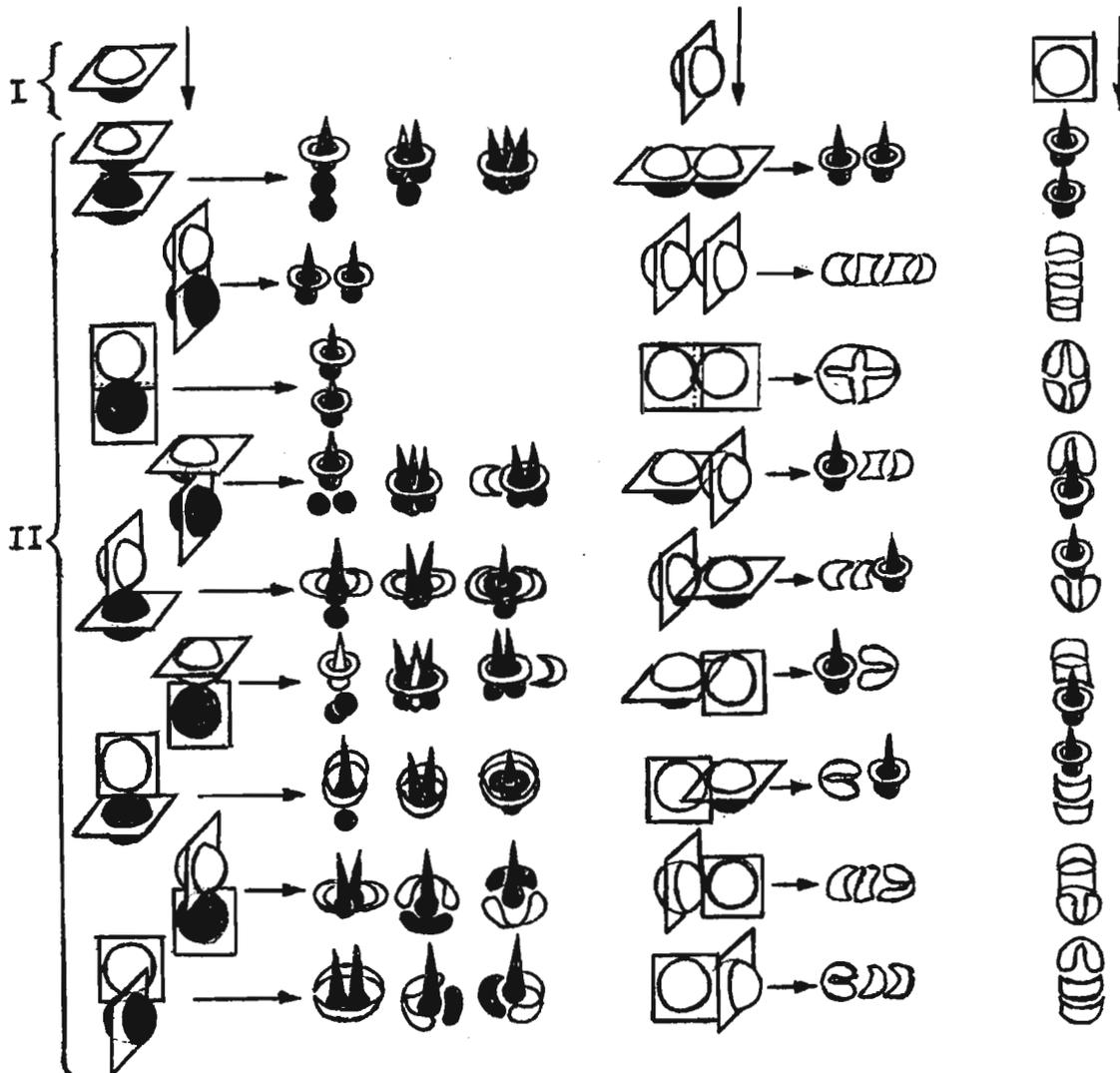


Fig. 3. A scheme of division of the bristle mother cells in *spl/spl* flies. I - three diverse division planes of the bristle mother cells. II - possible division planes during additional divisions and supposed relations between the division descendants (black = trichogenic cells; white = tormogenic ones).

of anomalous *spl* chaete may be foreseen in this way, which proves our above suggestion to be true. All the division descendants occurring in the surface cuticular layer differentiate into socket cells. It seems that the conditions in the upper and lower layer do qualitatively differ, thus causing the differences between the trichogenic and the tormogenic cells. Thus the hypothesis of the quantal mitoses (Holtzer et al. 1972) seems to be inapplicable to chaeta development in *Drosophila* as the type of the cell is determined not by the cell division per se, but rather by the environmental conditions. The data obtained also allow for a suggestion that the split allele changes the division plane.

References: Holtzer et al. 1972, *Cur. Top. Develop. Biol.* 17:229; Lees and Waddington 1942, *Proc. R. Soc. B.* 131:87.