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Hubrecht Laboratory, Utrecht, Netherlands. Determination and regulation in the haltere disc.

To study the organ map of the haltere disc, mature discs were fragmented and transplanted into mature larvae. The analysis of the metamorphosed implants showed that the prospective metathorax is located in the anterior part of the disc, including many "adventitious bristles"

(appearing only in implants) and two newly discovered metathoracic papillae. The knob in the posterior part of the disc is the anlage of the capitellum; this is concentrically surrounded by theanlagen of the pedicel and the scabellum, both carrying characteristic groups of sensilla campaniformia, which were also localized. The haltereanlagen are surrounded by those parts of the prospective metathorax which will be located at the base of the haltere in the imago, including the "metathoracic bristle group" and the metathoracic spiracle. This organ map is homologous with that of the wing disc (Murphy¹).

To investigate regulative effects in disc fragments (cf. Schubiger² and Bryant³ for the leg disc), anterior and posterior fragments of mature discs were cultured in the abdomina of adult hosts, where they usually underwent cell proliferation from the wound surfaces. After the culturing period (8 to 23 days) they were transplanted back into mature larvae. Analysis of the metamorphosed implants showed that 3/4 anterior (proximal) fragments formed blastemas from which posterior (distal) structures arose by regeneration. Some structures were regenerated in duplicate. It seems that the metathorax anlage is able to regenerate a complete haltere; this has to be confirmed, however, by transection at more proximal levels. (Transplantation experiments with different anterior-posterior transection levels and with medial and lateral fragments are in progress.)

On the other hand, 1/4 posterior disc fragments formed blastemas in which the distal structures normally produced by these fragments were duplicated in mirror image. This led to the formation of bilaterally symmetrical transplants. The posteriormostanlagen were duplicated most frequently, i.e., those of the metathoracic bristle group, the capitellum, and the ventral pedicellar and scabellar sensillae groups. The strictly symmetrical structure of the transplants suggests two important, preliminary conclusions which have already been anticipated theoretically⁴: (1) if proliferation is limited, a small blastema is formed; nevertheless the fragment and blastema together seem to "split up" symmetrically ("homonomous arealization") and to produce only the most posterioranlagen in duplicate, while the more anterioranlagen originally present in the fragment drop out altogether; this would imply a partial "repaterning" within the original disc fragment. (2) If proliferation is very extensive, a blastema is formed that is larger than the original fragment; here also the fragment and blastema together seem to "split up" symmetrically, and now produce not only all the structures typical for the original fragment in duplicate, but also more proximal structures for which noanlagen were present in the original fragment. This leads us to a concept of "duplicative regeneration" which is at variance with the hypothesis of Bryant³.

References: 1. Murphy, C. 1972, *J. exp. Zool.* 179:51-62; 2. Schubiger, G. 1971, *Devel. Biol.* 26:277-295; 3. Bryant, P.J. 1971, *Devel. Biol.* 26:606-615; 4. Ouweneel, W.J. 1972, *Acta Biotheor.* 21:115-131.

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mined by different ratios of the number of X-chromosomes to autosome sets. Therefore the comparison of SA of the 6PGD and G6PD in triploids (3X3A) and intersexes (2X3A) was undertaken. Table 2 shows that the SA of the two dehydrogenases are higher in intersexes than in triploids. The calculation of the level of enzymatic activity per X-chromosome showed the two-fold increase of the activity of these genes in intersexes as compared to the diploid females. Thus the similar (low) levels of the activity of X-chromosome are characteristic for the normal, hyperploid and triplo-X females. In contrast, males and intersexes (the latter in our experiments had male phenotype) have a two-times higher level of activity of X-chromosome. It is possible to suggest that the low level of X-chromosome activity is determined by the X:A ratio more or equal to 1.0 while the high level of the X-chromosome activity is expressed when X:A is less than 1.0.

References: 1. Muller, H.J. 1950, *Harvey Lect.* 43:165-229; 2. Muller, H.J. and W.D. Kaplan 1966, *Genet. Res.* 8:41-59.