Ankina, M. A. and I. D. Alexandrov. Research Institute of Medical Radiology, Academy of Medical Sciences of USSR, Obninsk, 249020, USSR. Electron microscopy of "salt-and-pepper" variegation induced by 1,4-bisdiasoacetyl butane in white mutants of D. melanogaster.

Eye mosaics, regularly induced by 1,4-bisdiasoacetyl butane (DAB) in w mutants of D. melanogaster after treatment of larvae with the mutagene in question, have, as a rule, small (from 1-2 to 8-10 facets) and occasionally arising spots showing a maroon-like appearance (Alexandrov 1982). This kind of variegation seems to look like the so-called "salt-and-pepper" type (Becker 1966). EM analysis of mosaic spots was carried out to test the assumption that variegation described may be hemomorphosis of some kind rather than expected phenotypic reflection of rare $w \rightarrow w^+$ reversions induced by DAB in the somatic cells of the eye discs. If the spots are true reversions expected, they must consist of ommatidia pigment cells with restored ommochrome and/or drosopterin granules.

For the electron microscopy, dissected mosaic eyes were fixed in cold Karnovsky's mixture, post-fixed in 2% OsO_4, dehydrated and embedded in Epon. Ultrathin sections were stained with uranyl acetate and lead citrate, and photographed in a JEM-5y electron microscope at 80 kV.

Analysis of electron micrographs of the typical DAB-induced spots showed that instead of the expected ultrastructural signs of reversion and usual EM picture intrinsic to ommatidia of white mutants (Fuge 1967), marked atypical changes in the cornea, pseudoconus and pigment cells in the region of spots were consistently found. In all cases, the laminated structure of the cornea was loosened throughout its thickness (or in the lower part only) and substituted by irregular bundles of fibrils, along which large numbers of lysosome- and/or vacuole-like membrane-coated structures were found (Fig. 1). As a rule, such changed cornea was closely connected with electron-dense granular masses which replace structures of pseudoconus (Fig. 2). The masses were usually surrounded by fibrils which may fill up the rest of the inner pseudoconus space. In such cases, cytoplasmic organelles are lacking, except numerous protein granules, within primary and secondary pigment cells (Fig. 3). Special attention was drawn to the fact that generally neither ommochrome nor drosopterin granules within pigment cells were found in forming spot ommatidia. Thus, DAB-induced spots appear to be eye morphosis with peculiar neoformations and modifications of the cellular structures in single or small groups of neighboring ommatidia.

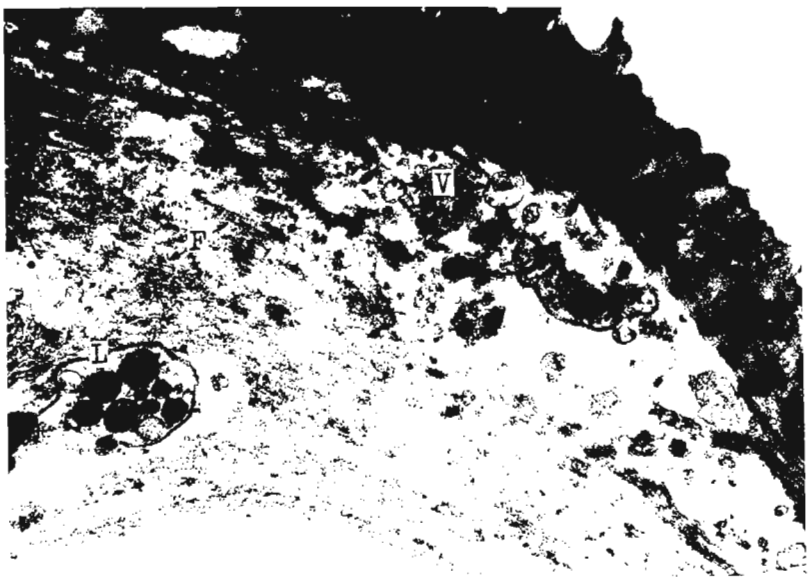

Fig. 1. Electron micrograph of the cornea in the region of spot. Loosened cornea (C), bundles of fibrils (F), and lysosome (L)- or vacuole (V)-like structures may be seen. [X 22,000]

The nature of the electron-dense material described is not now clear, but it may be suggested to have a melanine nature. If so, the DAB-induced malformations may be classified to type of those melanotic tumors which are regularly induced by obvious carcinogenes in Drosophila (Rapoport 1948). The ability of such carcinogenes to induce the "salt-and-pepper" variegation in white mutants of Drosophila is under study now, and first experimental data with EMS and MMS are reported elsewhere in this issue.

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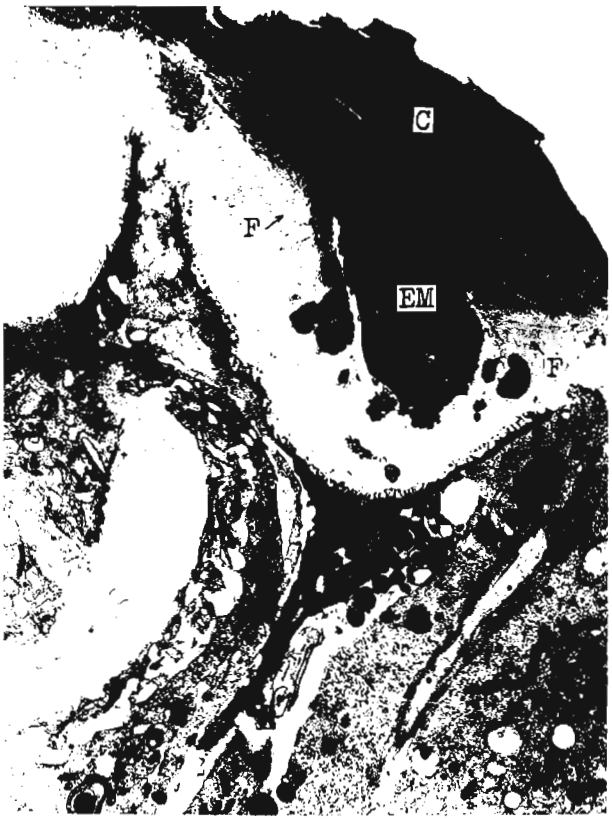

Fig. 2. Electron micrograph of ommatidium with malformations: electron-dense masses (EM) closely connect with cornea (C) and are surrounded by fibrils (F). [X 5,000]

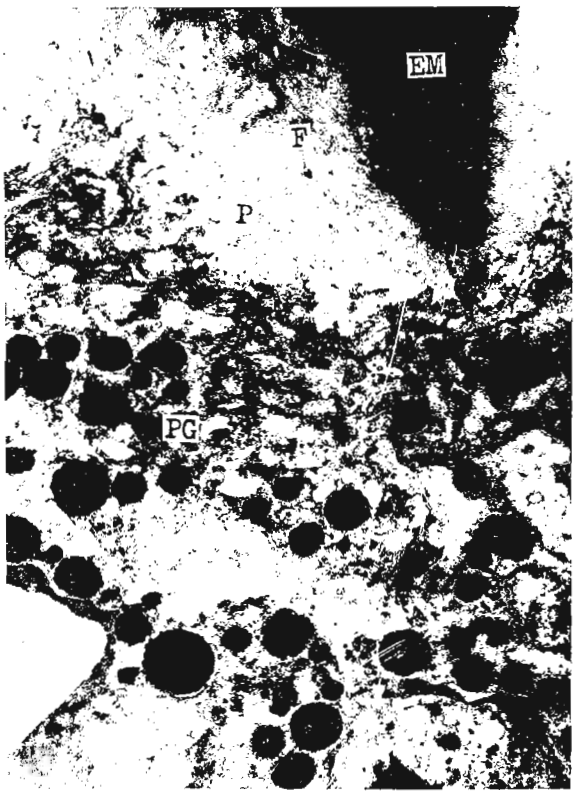

Fig. 3. Electron micrograph of ommatidium fragment with malformations. Space of pseudoconus (P) around electron-dense mass (EM) filled up by fibrils (F). Pigment cells contain protein granules (PG) only. [X 22,000]

References: Alexandrov, I.D. 1982, DIS 58:10-12; Becker, H.J. 1966, Current Topics Developm. Biol. Vol. 1, NY-London, Acad. Press, 155-171; Fuge, H. 1967, Zeitsch. Zell. 83: 468-507; Rapoport, I.A. 1948, Trans. Inst. Cytol., Histol., and Embryol. Vol. 2, Publ. 1: 3-135.

Antoine, M. L., K. A. Itoku and W. S. Stark. University of Missouri, Columbia, Missouri. How developmentally related are photoreceptors and pigment cells in the Drosophila compound eye?

Quite a few studies have addressed the developmental issue of whether all receptors of an ommatidium are descended from one cell (Ready, Hanson and Benzer 1976; Hofbauer and Campos-Ortega 1976; Campos-Ortega and Gateff 1976; Campos-Ortega and Hofbauer 1977; Campos-Ortega, Jürgens and Hofbauer 1978, 1979; Lawrence and Green 1979). The concensus of this literature is that receptors of a facet need not be clonally related, though their probability of relatedness is based on their proximity through development which obviously tends to be higher for mitotically related cells.

Despite this intense interest there are surprisingly few studies discussing relatedness of receptors and other cells in the compound eye. In this study, we made mosaics from heterozygotes of our compound mutant stock bw; ora cd and bw (Stark, Srygley and Greenberg 1981) to analyze relations among the two primary pigment cells and the six R1-6 receptors. Such analyses involve reconstructions from distal and proximal sections and have been undertaken only a few times (Benzer 1973; Ready, Hanson and Benzer 1976; Harris and Stark 1977; Lawrence