

similar tendency of all 3 granule types of the present study and of the NE-containing granules towards the acidic reaction is especially interesting in view of the quite different architectures of these various granule types<sup>24-27</sup> and suggests a non-specific effect of acidic medium on these organelles.

The dissociation constants and the titration curves of the monamines<sup>7,8</sup> suggest that the pH effect in the range of 1-3 is not dependent on the reaction of the terminal amino or ring hydroxyl groups. The electron microscopic observations on the granule pellet showed that in the pH area of 1-3, no identifiable organelles were seen, but only fragments and distended membraneous formations. The absence of highly osmiophilic granules indicates their lysis, apparently preceding the release of 5-HT and DA registered in the same experiments. The mitochondria, lysosomes, osmiophilic particles and various kinds of regular vesicles seen in the pellet at pH 7.0 but not at pH 2.0, suggest a non-specific protein denaturation effect of the low pH. At pH 2.0, the bonds fixing the amine directly to the matrix of specific organelles or the bonds between the intermediate constituent and the granule matrix may be affected. The change of the solubility or

the charge of the intragranular proteins may previously be possible explanations of the amine release at highly acidic pH.

*Zusammenfassung.* 5-Hydroxytryptamin und Dopamin konnten von den Partikeln der enterochromaffinen und dopaminigen Zellen und Blutplättchen in den pH-Werten 1-3 gelöst werden. Gleichzeitig wurde die Auflösung und das Verschwinden der Osmiumaffinität der Partikel festgestellt.

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<sup>24</sup> L. T. POTTER, *Pharmac. Rev.* 18, 439 (1966).

<sup>25</sup> A. C. CHRISTIE, *Q. Jl. microsc. Sci.* 96, 295 (1955).

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<sup>27</sup> F. N. LOW and J. A. FREEMAN, in *Electron Microscopic Atlas of Normal and Leukemic Human Blood* (McGraw-Hill, New York 1958).

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### Chiasmate Type of Meiosis in the Roach *Nauphoeta cinerea* (Oliver) (Fam: Blattidae)

MATTHEY<sup>1</sup> was the first to report the absence of chiasmata in the roach *Pycnoscellus surinamensis*. Even though SUOMALAINEN<sup>2</sup> also could not observe any 'visible' chiasmata in another roach *Blabera*, he did find clear chiasmata in the genera *Lecucophaea* and *Phyllo-dromia*; he also gave convincing, though indirect, proofs regarding their occurrence in *Periplaneta australasiae* and *P. americana*. JOHN and LEWIS<sup>3-5</sup>, however, strongly ruled out the chiasmate meiosis in certain roaches including *P. americana*. Later JOHN et al.<sup>6</sup> mentioned about the occurrence terminal chiasmata, in *P. americana*, but they did not negate the earlier hypothesis of 'non-chiasmate meiosis' proposed by JOHN and LEWIS for these 'out breeding' animals. Independently, meiosis in *P. americana* was studied in India by RAJASEKARASETTY and RAMAMURTHY<sup>7</sup>, and they also reported chiasmata in this roach. In the present article I am describing a case of normal chiasmate-meiosis in another roach *Nauphoeta cinerea* (Oliver).

Males of this roach were sacrificed for their testis squash preparations. Gonial metaphase chromosomes show that some of these are metacentric. The haploid number, *n*, is 19 (18A + 1X). The sex determining mechanism is of XO type. Pairing is intimate during pachytene, and soon the bivalents start opening out and reveal the chiasmata clearly. At diplotene, of the 18 bivalents 9 (rings) show 2 chiasmata each, while the remaining 9

(rods) show 1 each. And at diakinesis some of the rings open out at one end (Figure 1). From observations on 25 cells at diplotene, the chiasmata frequency works out to be 1.5, while the same at diakinesis is reduced to 1.27 suggesting the opening out of some bivalents at one end, thereby reducing the chiasmata number. Terminalization is almost completed at metaphase I (Figure 2). Anaphase I is a reductional division (Figure 3) while anaphase II is equational.

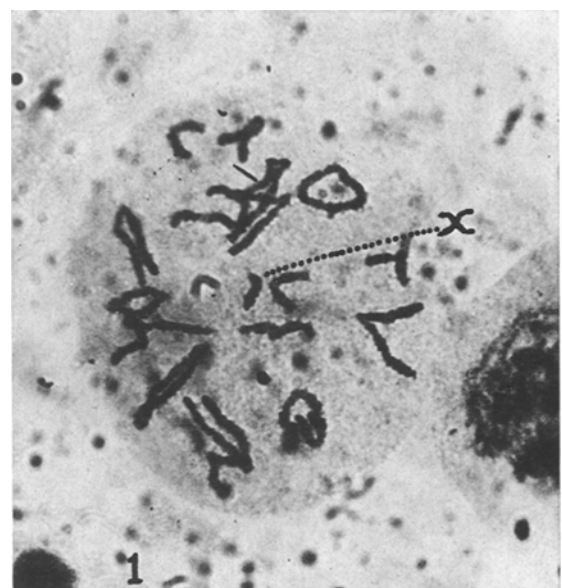


Fig. 1. 18 bivalents and an unpaired sex-chromosome during early diakinesis.  $\times 2000$ .

<sup>1</sup> R. MATTHEY, *Rev. suisse Zool.* 52, 1 (1945b).

<sup>2</sup> E. SUOMALAINEN, *Annls. Acad. Sci. fenn. A. IV*, 8 (1946).

<sup>3</sup> B. JOHN and K. R. LEWIS, *Heredity* 11, 1 (1957).

<sup>4</sup> B. JOHN and K. R. LEWIS, *Heredity* 12, 185 (1958).

<sup>5</sup> B. JOHN and K. R. LEWIS, *Heredity* 15, 47 (1960).

<sup>6</sup> B. JOHN and H. B. QURAISHI, *Heredity* 18, 147 (1963).

<sup>7</sup> M. R. RAJASEKARASETTY and C. V. RAMAMURTHY, *Nature* 197, 1325 (1963).

From the foregoing account it is evident that in *Nauphoeta cinerea* there are intimate pairing and crossing-over segments in the homologues in each bivalent. The phenomenon of crossing-over, interstitial or distal,

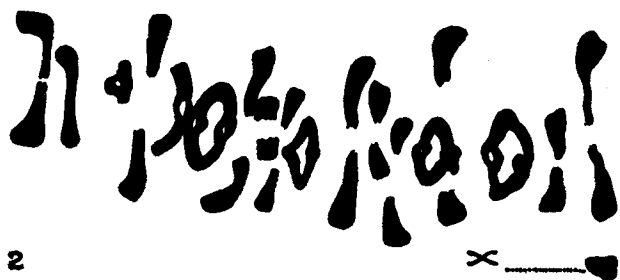


Fig. 2. Metaphase I configuration.  $\times 2000$ .

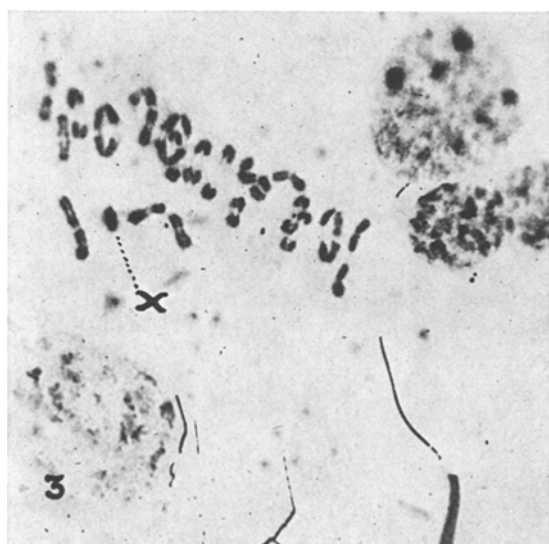


Fig. 3. Early anaphase I.  $\times 2000$ .

generally does bring about recombination of characters; but how conspicuous this phenomenon is, depends upon how much the segments involved are genetically active. JOHN and LEWIS have attached rather excessive importance to restriction of recombinations in *P. americana* and have taken it as strong evidence to rule out the phenomenon of crossing-over and hence the chiasmate meiosis in this and certain other roaches. But now having been convinced about the occurrence of chiasmata even in *P. americana*, the 'non-chiasmate meiosis' hypothesis of JOHN and LEWIS for *P. americana* and 'certain other roaches' has to be given up. In addition to *Nauphoeta cinerea*, I have material on hand to show that clear chiasmata do occur in some more genera of *Blattidae* like *Periplaneta*, *Blatta*, etc. However, before totally rejecting the 'non-chiasmate meiosis' hypothesis in roaches, it is necessary to study meiosis in many more genera and species of this insect group.

*Résumé.* *Nauphoeta cinerea* est un des Cafards chez lesquels le chiasma de la méiose a été nettement observé. Ce cas vient à l'appui de l'assertion de SUOMALAINEN<sup>2</sup> selon laquelle des chiasmases se présenteraient sous une forme soit «cachée» soit «visible» chez tous les Cafards. La «méiose sans chiasma» que JOHN et LEWIS<sup>3-5</sup> supposent exister au moins chez *P. americana* n'est pas non plus confirmée par nos recherches.

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### The Local Protective Effect of Potassium Chloride on the Depilatory Action of X-Rays in Young Mice

The depilatory action of X-rays in young mice a few days old is a suitable method for testing the local radioprotective effects. Various substances were found to exert local radioprotection on the pilary system of 8-day-old C57 black mice. Among them cysteamine and vasoactive substances, like histamine, tryptamine and 5-hydroxytryptamine, were successfully tested<sup>1-3</sup>. Local radioprotective effects were demonstrated by the various polysaccharide compounds<sup>4,5</sup>. Furthermore, local traumatism, induced for example by an intracutaneous injection of distilled water, may increase the radio-resistance of the pilary system<sup>6,7</sup>. During our experiments the local radioprotective effect of s.c. injection of isotonic potassium chloride solution was observed.

Eight-day-old mice of the C57 black strain, irradiated with a single whole-body exposure of 550 R (TUR apparatus, 180 kV, 15 mA, filtration 0.5 mm Cu and 0.5 mm Al, dose rate 79 R/min) were used. Under these conditions a complete depilation on the 8th day after irradiation is observed in control mice. The experimental mice were injected s.c. (a thin needle used) into the

lumbo-sacral region with 0.07 ml of isotonic solutions (291 mOsm/l) of sodium chloride or potassium chloride in deionized water. Before being injected, the solutions were warmed to 37°C. The pH values of the solutions varied between 6.4 and 6.7 with a slightly higher value for potassium chloride. As demonstrated in preliminary experiments, these small pH differences were not responsible for the radioprotective effects achieved. The solutions were injected either shortly before irradiation (up

<sup>1</sup> D. RADIVOJEVITCH, Z. M. BACQ and M. L. BEAUMARIAGE, J. Physiol., Paris 52, 205 (1960).

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<sup>3</sup> P. VAN CANEGHEM, Strahlentherapie 137, 231 (1969).

<sup>4</sup> Z. M. BACQ, Arch. int. Pharmacodyn. 139, 85 (1962).

<sup>5</sup> P. VAN CANEGHEM, Int. J. Radiat. Biol. 8, 541 (1965).

<sup>6</sup> Z. M. BACQ, Laval méd. 34, 80 (1963).

<sup>7</sup> P. VAN CANEGHEM, M. L. BEAUMARIAGE and J. M. LACHAPPELLE, J. Physiol., Paris 57, 376 (1965).