ENTOMOLOGY

An Inhibitory Effect of Allatectomized Males and Females on the Sexual Maturation of Young Male Adults of *Schistocerca gregaria* (Forsk.) (Orthoptera : Acrididae)

As shown by Loher[1], removal of the corpora allata from immature adult males of the desert locust (*Schistocerca gregaria* Forsk.) prevents the onset of sexual maturity and also the production of the pheromone which has an accelerating effect on the maturation of young males.

An investigation has recently been made into the relative effects of allatectomy and of severing the nervous connexions of the corpora allata on sexual behaviour, oocyte development and pheromone production in adult desert locusts[2]. In the course of these experiments it became apparent that allatectomized males not only fail to accelerate maturation but actually retard it.

In one experiment, 19 young males were placed in separate jars within 24 h after fledging. Seven of them were kept each with one allatectomized male. The other twelve were kept each with a normal female of its own age. The allatectomized males were about four weeks old at the beginning of the experiment and had been operated on a few days after fledging—well before sexual maturation. The age at which the young males began to develop the yellow coloration on the abdomen (which is indicative of the onset of maturity[3]) was recorded. As soon as this point was reached, or earlier in the case of the last ones to become mature, the young males were put each with one fully mature female for about 5 h daily during which time they were kept under observation and their ages at first copulation or attempted copulation were noted. Those young males which were being kept with females were left with their own female during this period provided that she was fully mature; otherwise a fully mature female was substituted. At the end of each observation period, the young males were replaced with their usual partners. The males kept with allatectomized males started to become yellow in an average of $24{\cdot}3 \pm 9{\cdot}4$ days and first copulated, or tried to copulate, in an average of $29{\cdot}5 \pm 11{\cdot}4$ days. The males kept with females started to become yellow in an average of $17{\cdot}0 \pm 3{\cdot}7$ days and copulated, or tried to copulate, in an average of $19{\cdot}2 \pm 4{\cdot}7$ days. The difference in ages at copulation was significant ($P < 0{\cdot}02$) and the difference in yellowing-times was also significant ($P < 0{\cdot}05$). Of the males kept with allatectomized males the last one to copulate failed to become yellow and could not therefore be included in the calculation for yellowing-time. This accounts for the greater time elapsing between the average yellowing-time and the average copulation-time in this treatment.

The number of males kept with allatectomized males in the above experiment was small, so a larger experiment was next carried out in which young males were kept in four different ways as follows:

(*A*) Each with one allatectomized male
(*B*) Each with one allatectomized female
} allatectomized locusts operated on as in the previous experiment

(*C*) Each with one normal female of the same age as the young males
(*D*) Each in isolation

The results of this experiment are summarized in Table 1.

It is apparent that allatectomized males and allatectomized females have a similar retarding effect on male maturation and that the normal females are neutral in effect.

In a subsequent experiment the effect of the presence of allatectomized females on oocyte development in young adult females was investigated. Sixteen young females were kept in pairs with each other, another sixteen were kept each with one allatectomized female, and another sixteen were kept each in isolation. When dissected at the age of 3 weeks the average lengths of the first or largest oocyte were respectively 4·4, 4·2 and 4·2 mm. The result was therefore negative, no effect of the allatectomized females being demonstrated.

Table 1. Effect of the Presence of Allatectomized Males, Allatectomized Females and Normal Females on the Maturation-rate of Young Male Adults of *Schistocerca gregaria*

Figures represent average $\pm S.D.$ in days after fledging. (In parentheses, number of young males investigated)

Each young male kept:	First appearance of yellow coloration	First copulation
(*A*) With one allatectomized male	$24{\cdot}1 \pm 6{\cdot}9$ (13)	$27{\cdot}7 \pm 7{\cdot}7$ (13)
(*B*) With one allatectomized female	$25{\cdot}1 \pm 6{\cdot}7$ (12)	$26{\cdot}5 \pm 6{\cdot}3$ (12)
(*C*) With one normal female	$18{\cdot}6 \pm 4{\cdot}0$ (12)	$20{\cdot}9 \pm 4{\cdot}2$ (12)
(*D*) In isolation	$17{\cdot}5 \pm 3{\cdot}8$ (13)	$18{\cdot}7 \pm 3{\cdot}5$ (13)
Significance tests (P)	A/B not sig. $A/C < 0{\cdot}05$ $A/D < 0{\cdot}01$ $B/C < 0{\cdot}01$ $B/D < 0{\cdot}01$ C/D not sig. $A+B/C+D < 0{\cdot}001$	A/B not sig. $A/C < 0{\cdot}02$ $A/D < 0{\cdot}001$ $B/C < 0{\cdot}02$ $B/D < 0{\cdot}001$ C/D not sig. $A+B/C+D < 0{\cdot}001$

It has previously been shown[3,4] that, although the presence of mature males of *Schistocerca* has an accelerating effect on maturation, very young adult locusts within a week of fledging have the reverse effect and retard maturation of young males. The retarding influence of the allatectomized locusts is similar to that of very young locusts and it seems that allatectomy, as well as preventing maturation, prolongs the period during which an inhibitory influence on the maturation of others is exerted.

M. J. Norris
M. P. Pener*

Anti-Locust Research Centre,
Wrights Lane, London, W.8.

* Present address: Laboratory of Entomology, Department of Zoology, Hebrew University, Jerusalem, Israel.

[1] Loher, W., *Proc. Roy. Soc.*, B, **153**, 380 (1960).
[2] Pener, M. P., *J. Zool.*, **147**(2), 119 (1965).
[3] Norris, M. J., *Anti-Locust Bull.*, No. 18 (1954).
[4] Norris, M. J., *Nature*, **203**, 784 (1964).

VIROLOGY

Nuclear Surface *N*-Acetyl Neuraminic Acid Terminating Receptors for Myxovirus Attachment

Insight into the molecular organization of cellular membranes may be gained by defining their molecular components in terms of functional groups which serve as receptors for virus attachment. Thus, the specific attachment of myxovirus to neuraminic acid-terminating glycoprotein groups on the cell surface and the loss of virus binding capacity following exposure of cells to neuraminidase serve to define the neuraminic acid molecule in its role as a functional receptor on the plasma membrane[1]. This report describes the first use of this approach to map the surface of nuclei by comparing the characteristics of myxovirus attachment and elution of whole cells with isolated nuclei. Here we demonstrate that the surface of cytoplasm-free nuclei prepared by treating cells with an anionic detergent contains specific receptors for the attachment of myxovirus, and that in terms of viral adsorption and elution the surface of nuclei isolated from HeLa cells reacts much like that of an erythrocyte, or of a host cell the viral engulfment capacity of which has been destroyed by heat.

Isolated nuclei are prepared by suspending monodisperse HeLa S3 cells to a density of 2×10^6 cells/ml. in a cold 0·01 per cent aqueous solution of purified sodium dodecyl sulphate (SDS)[2]. The cold SDS-cell suspension is pipetted 3–6 times through a 10-ml. pipette or mixed vigorously for about 30 sec on a 'Vortex-Junior' mixer. This brief treatment produces complete dissolution of the