in the lungs of vaccinated hamsters. Passive transfer of serum from vaccinated into normal hamsters (1 ml i.p.) on the day of infection demonstrated that humoral factors are responsible for this response. Although a challenge infection of vaccinated hamsters caused infiltration of inflammatory cells the lung recovery assay showed clearly that destruction of schistosomula had not occurred.

Our interpretation of this evidence is that antibody raised by vaccination of hamsters with crude schistosome material can mediate sequestration of inflammatory cells in the lungs in response to migrating schistosomula but the cells are unable to destroy the schistosomes. Intravascular administration of several foreign antigens however, stimulates sequestration of inflammatory cells in the lungs and apparently also causes some kind of non-specific activation of the cells enabling them to damage schistosomula. This effect could possibly be due to the phagocytosis of antigen which is known to cause enhanced metabolic activity and enzyme synthesis in neutrophils[8] and macrophages[9], the cell types detected in the inflamed lungs.

Zusammenfassung. Bei durch Primärinfektion mit *Schistosoma mansoni* immunisierten Goldhamstern wird die Zerstörung einer Sekundärinfektion nachgewiesen. Intravenöse Injektion diverser Fremdantigene führt bei normalen Hamstern 3 Tage nach der Infektion zu einer unspezifischen Lungenentzündung und verursacht die Vernichtung der meisten Jung-Schistosomen.

M. A. Smith[10,11], J. A. Clegg, J. R. Kusel and G. Webbe

London School of Hygiene and Tropical Medicine, Winches Farm Field Station, St. Albans (Hertshire, England), and National Institute for Medical Research, Mill Hill, London NW7 1AA (England), 9 December 1974.

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[11] Present address: Department of Zoology, Imperial College, London S.W.7 (England), to whom reprint requests have to be addressed.

Cyclic Activity of the Corpus Allatum Related to Gonotrophic Cycles in Adult Female *Periplaneta americana*

Oocyte maturation is dependent on the secretion of the corpora allata in the majority of insect species studied[1,2], including the cockroach *P. americana*. Extirpation of the corpora allata during the latter nymphal instars results in total failure of ovarian growth after metamorphosis[3], and allatectomy of reproductively active adult females leads to a cessation of ootheca formation[4]. Periodic changes in corpus allatum appearance parallel the cycles of ovarian activity in the viviparous cockroaches *Leucophaea maderae* and *Diploptera punctata*, these species have protracted periods of pregnancy during which the corpora allata are believed to be inactive[5–7]. *P. americana* differs in that it is ovoparous and the ovarian cycles overlap to the extent that vitellogenic oocytes are always present in the ovaries of mature females[8,9]. Would one therefore expect to find differences in the activity of the corpora allata in relation to the gonotrophic cycle in this species?

The corpus allatum is the physiological source of juvenile hormone[1], and the recent identification of the hormone of *P. americana* as methyl-10,11-epoxy-3,7,11-trimethyl-*trans*, *trans*-2,6-dodecadienoate ($C_{16}JH$)[10,11], coupled with the results of short-term, radiochemical, in vitro incubation experiments on locust glands[12,13], suggested that similar techniques might provide direct quantitative measurement of the rates at which *P. americana* corpora allata synthesise and release hormone at different times during the gonotrophic cycle.

Materials and methods. Adult female *P. americana* were maintained, in the presence of males, at 27 °C in dim light and fed ad libitum with a ground mixture of oatmeal: dog chow: peanuts: yeast powder (17:10:4:1). Ovarioles and corpora allata were dissected from unanaesthetised animals under citrate-fortified Ringer solution[12]. The lengths of the T and T-1 oocytes were measured; and the patency of the follicular epithelium, an indication of active vitellogenesis, was tested by the Evan's blue method of Pratt and Davey[14].

The biosynthetic activities of the corpora allata from individual animals were calculated from the incorporation of radio-labelled methionine into $C_{16}JH$ present in the glands plus medium following 3 h incubation in vitro. The procedures for separation, identification and quantification of the incubation products by radio-thin layer chromatography and liquid scintillation counting were as described previously[12,13]. In certain experiments corpora allata from pairs of animals, sacrificed at the same time in relation to the deposition of the previous ootheca, were divided between 2 incubation tubes, such that each tube contained 2 glands, one from each animal (split pairs)[15].

Results and discussion. The animals used in these experiments formed an ootheca every 3–4 days, while dye penetration tests show that each batch of oocytes spent 6–8 days in the state of active vitellogenesis. Shortly after ovulation of the T oocytes the new basal oocytes (previously T-1) are 2.0–2.3 mm in length and already at an advanced stage in vitellogenesis, whereas, the new

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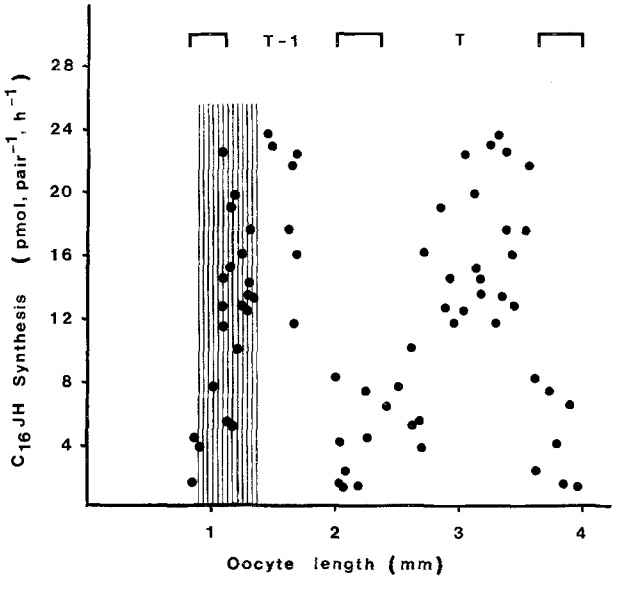
penultimate oocytes (previously T-2) are 0.8–1.0 mm long and are at the point of entry into vitellogenesis. Patency tests showed that T-1 oocytes entered vitellogenesis over the size range 0.9 to 1.3 mm. During the subsequent period the T-1 oocytes grow to a length of 2.0–2.3 mm and the T oocytes develop to a length of 3.7–4.0 mm, at which point the follicular epithelium deposits the chorion. The chorionated T oocytes are ovulated and the sequence is repeated. Vitellogenic oocytes are present at all times during the gonotrophic cycle, and, with the exception of a short period from the onset of chorionation until shortly after ovulation, two oocytes in each ovariole are forming yolk simultaneously. These results substantiate and elaborate previous reports by PRATT[8] and BELL[9], although the latter author found an oviposition cycle length of 5 days, possibly the effect of the use of a different diet.

Freshly excised corpora allata from adult female *P. americana* were found to exhibit a wide range of C_{16}JH biosynthetic ability. The validity of single time-point measurements of C_{16}JH production to estimate the rates of hormone biosynthesis in isolated corpora allata of *P. americana* has already been investigated[16]. These previous investigations also showed that the rate of release of C_{16}JH was strictly proportional to the rate of biosynthesis of the hormone, over a wide range of synthetic activities. The rates of C_{16}JH synthesis and release by individual pairs or split pairs range from 1–25 pmol/pair/h and when glandular activity was plotted against corresponding oocyte lengths a cyclic pattern was evident (Figure). Two cycles of corpus allatum activity occur during the vitellogenic growth of each wave of oocytes. At no time during the ongoing gonotrophic cycles have we found glands which were totally incapable of synthesizing and releasing C_{16}JH. In a significant number of animals (up to 6% of those sampled) the development of the T-1 oocyte was considerably retarded with respect to the T oocyte, and glands from these animals all had low synthetic rates; these data have been omitted from the Figure. These cycles of corpus allatum activity could be related to the development of either the T, T-1, or both T and T-1 oocytes. The close correlation that we find between the rise in corpus allatum activity and the onset of vitellogenesis of the T-1 oocyte, and the report that there are increases in the rates of protein accumulation by both T and T-1 oocytes in mid-cycle[9], suggest that juvenile hormone is necessary for both initiation and maintenance of vitellogenesis in this species[17].



Relationship between oocyte length and rate of synthesis of C_{16} juvenile hormone by single pairs or split pairs of corpora allata from adult female *Periplaneta americana*, as revealed by in vitro incorporation of [methyl-^{14}C]methionine. Brackets represent the stages in the growth of each wave of oocyte which can be related to the onset of ootheca formation in the gonotrophic cycle. Shaded area represents the size range over which oocytes (T-1) begin active vitellogenesis.

Zusammenfassung. Durch Inkorporation von ^{14}C-Methionin in die Corpora allata von *Periplaneta americana* werden während des Eireifungszyklus zwei Aktivitätsmaxima festgestellt und diese als Juvenilhormonsynthese interpretiert.

R. J. WEAVER, G. E. PRATT and J. R. FINNEY

Agricultural Research Council, Unit of Invertebrate Chemistry and Physiology, The University of Sussex, Falmer, Brigton BN1 9QJ (Sussex, England),
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In vivo Effects of Acetylcholine on LH Secretion[1]

It has recently been shown that acetylcholine (Ach) is able to liberate the FSH-Releasing Hormone (FSH-RH) and the LH-Releasing Hormone (LH-RH) from rat hypothalamic fragments incubated in vitro in the presence of anterior pituitary tissue[2,3]. This effect of Ach can be respectively enhanced or depressed by the presence in the incubation medium of prostigmine (an anti-acetylcholinesterase drug, which potentiates the activity of Ach) or of atropine (a blocker of cholinergic receptors). These data have provided additional[4–6] evidence for a role of cholinergic mechanisms in the processes controlling the secretion of pituitary gonadotropins. The present experiments have been planned in order to verify whether cholinergic inputs might participate in the regulation of LH secretion in vivo.

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