breeding and fully formed patch phase ovarian weights being 11.5 and 41.9 mg respectively and the mean oviducal weights being 21.95 and 108.55 mg respectively). At the time when estrogen synthesis decreases, the synthesis of testosterone apparently increases in the ovary[13]. In the present context, defeathering and vascularization of the skin of female house sparrows coincided with egg laying. Hence, there is a possibility of the available testosterone being metabolised to a greater extent in the skin. This deduction is based on 17β-HSDH (T) which showed highest activity in the brood patch during that phase. That the avian skin is capable of converting testosterone to estrogen, can be seen from the study on Sebright cocks[14]. The increasing activity of 17β-HSDH (E) from nest building phase to fully formed patch phase indicates that the hormone may be utilised much more in order to bring about defeathering and hypervascularisation[7]. From the foregoing discussion, it seems likely that in the female house sparrows: (i) estrogen at the target site facilitates the patch formation and its maintenance and (ii) testosterone is possibly converted to estrogen to potentiate the formation and maintenance of incubation patch formation during breeding season.

The present work is supported by M. S. University Research Scheme awarded to G. K. Menon. The authors thank Dr R. V. Shah, Professor and Head, Department of Zoology, M. S. University, Baroda, for providing all facilities during the course of this work. Acharya is grateful to Dr V. C. Kotak, Department of Biosciences, S. P. University, V. V. Nagar, for his constant encouragement and useful suggestions during the preparation of manuscript.

15 April 1983; Revised 17 September 1983.

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INDUCTION OF PRECOCITY IN THE OOGONIAL CELLS BY X-IRRADIATION IN THE OVARIES OF THE RED COTTON BUG, *DYSDERCUS KOENIGII* FABR. (HETEROPTERA: PYRRHOCORIDAE)

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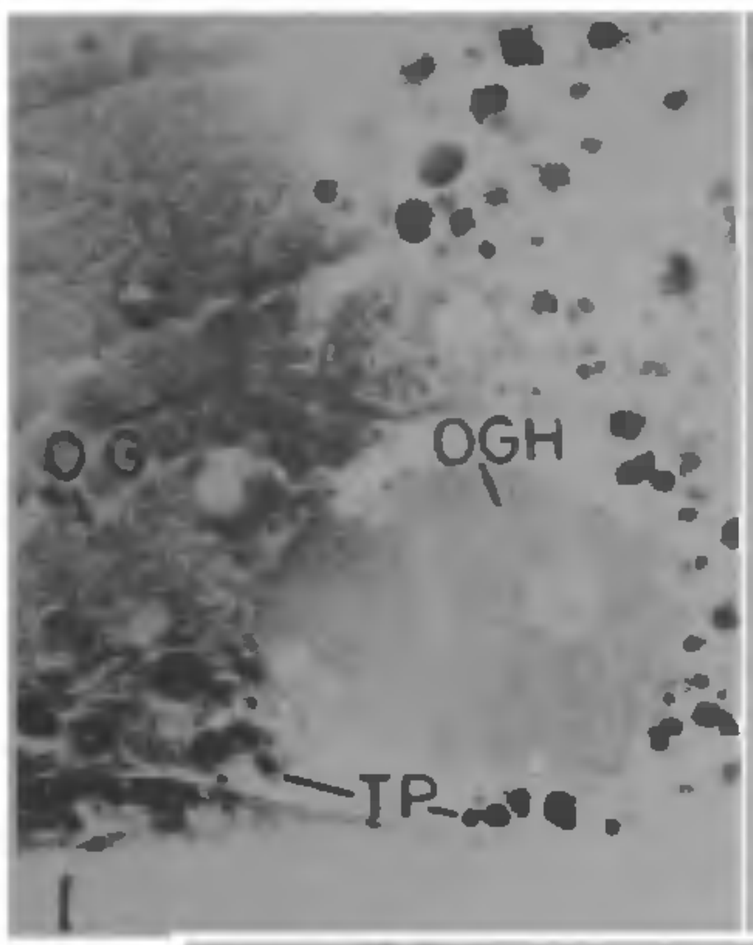
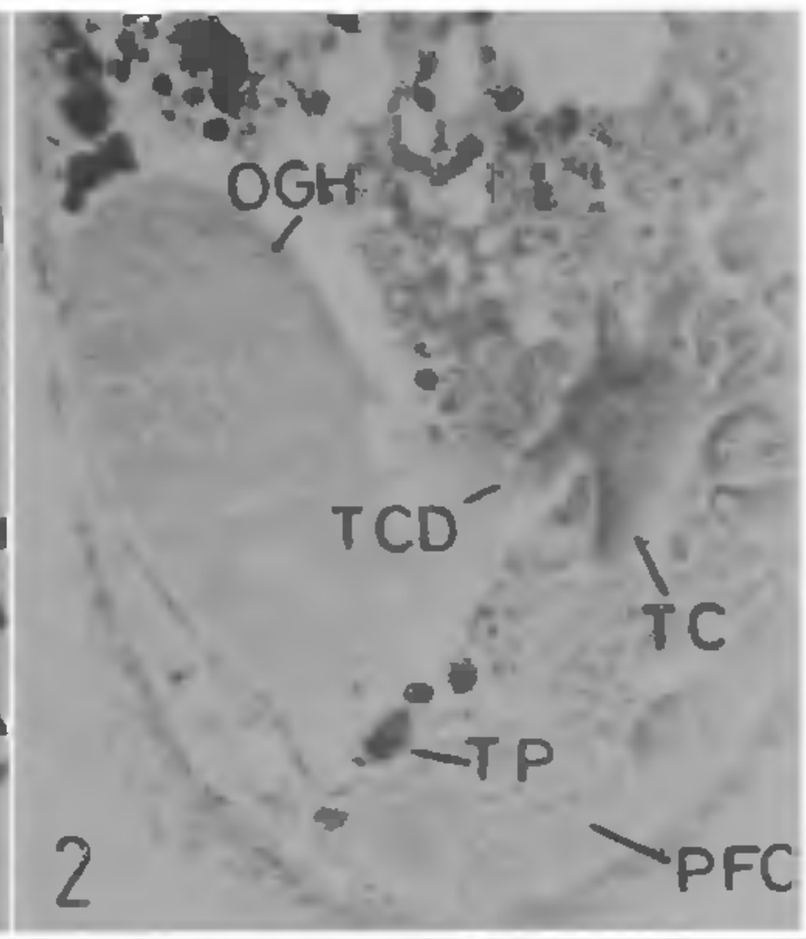
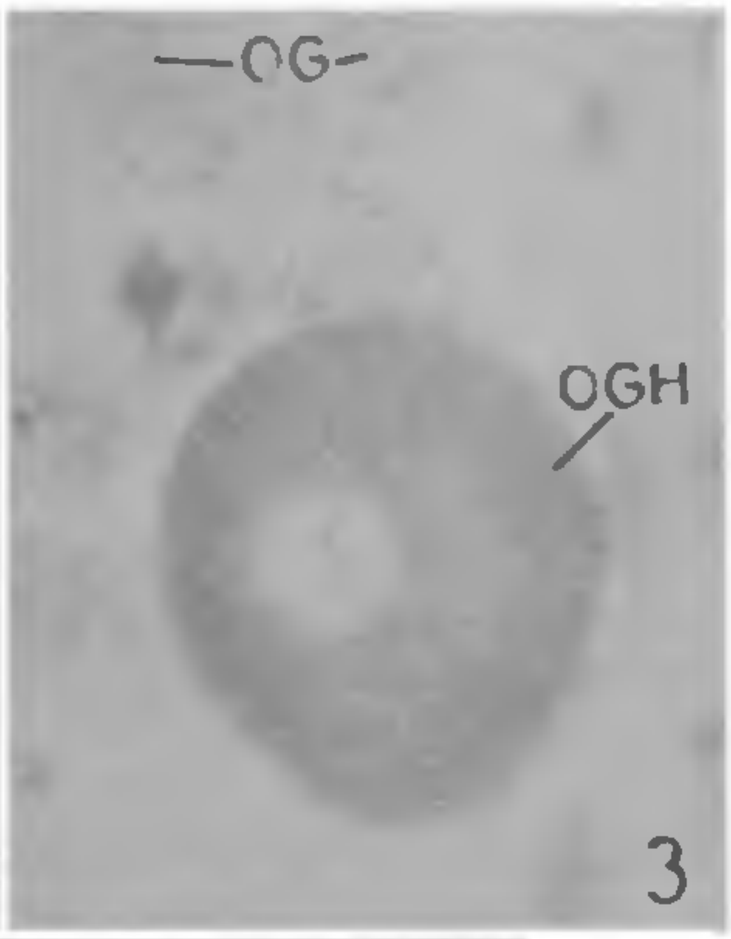
IN the *ovarioles* of an insect ovary, the oogonia transform into oocytes on migration from the germarium into the vitellarium. The morphological and histochemical properties of these two stages of the germ cells are very different. In this note we show that x-irradiation can induce several oocyte features in the oogonia while they are still inside the germarium.

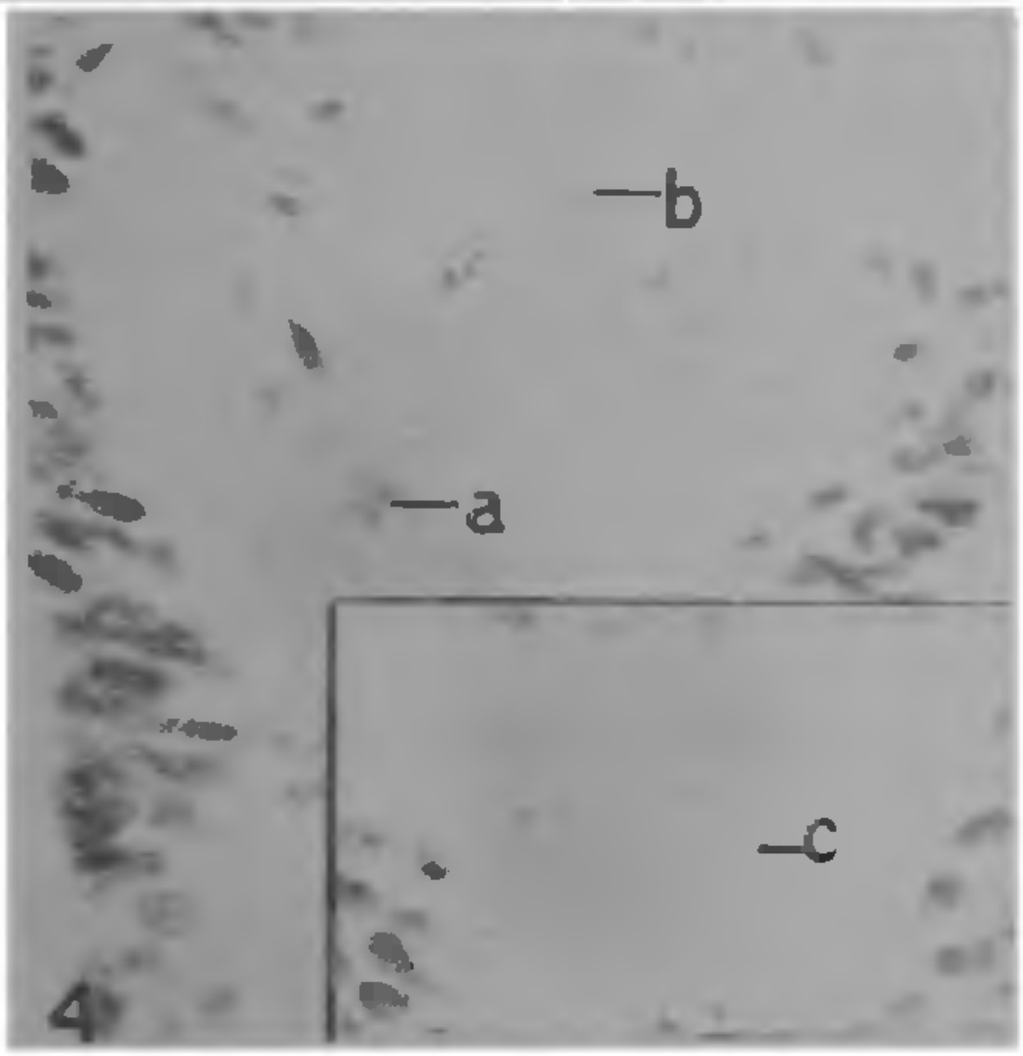
One-day old 5th (ultimate) instar female nymphs of *Dysdercus koenigii* were exposed to 2000 rad of soft x-rays (Picker Inc. Ltd., USA with 1 mm aluminium filter) at a dose rate of 444.44 rad/min (110 kV, 4.5 mA, 10 cm distance). On adult emergence, the ovaries were dissected in insect Ringer[1], fixed in suitable fixatives, sectioned vertically at 7.5 + m and stained with histological and nucleic acid staining techniques[2].

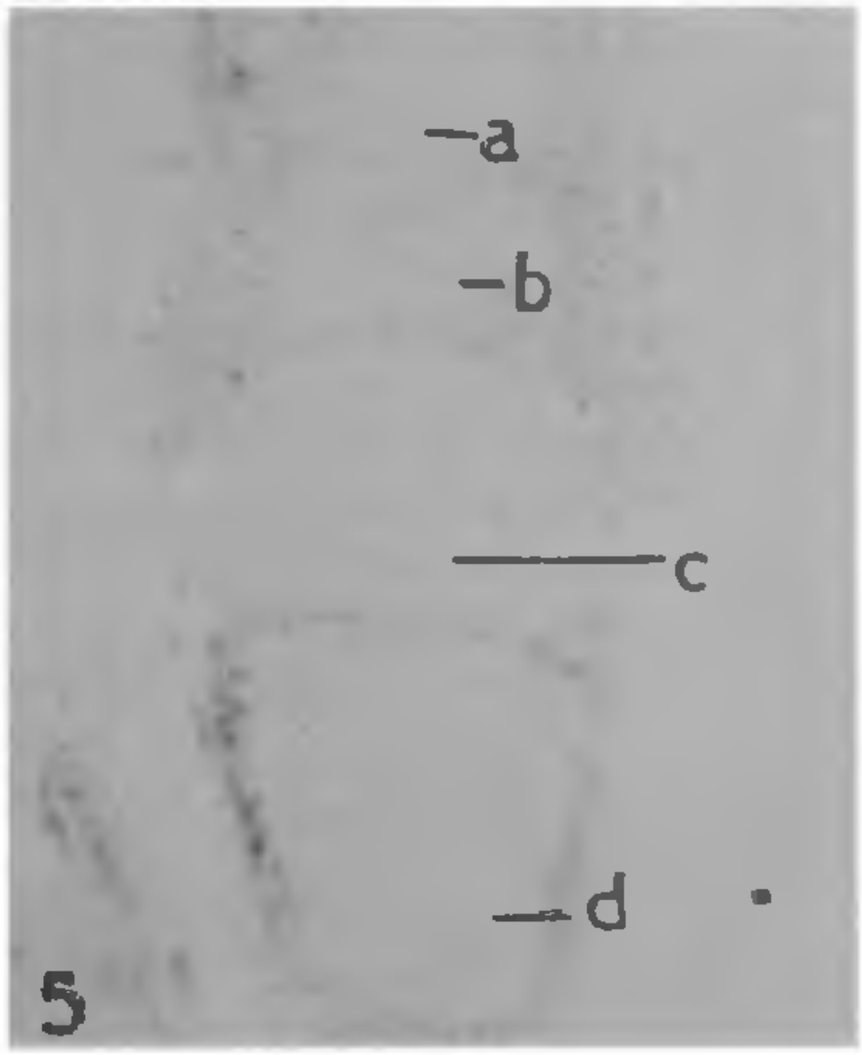
Many of the oogonial cells in the germarium underwent hypertrophy (figure 1), established connections with the trophic core through short trophic cords (figure 2), their cytoplasm picking up strong RNA-positiveness (figure 3) and their nuclei showing histochemical changes of the normal and histopathological types. That these are actually oogonial cells lying within the germarium is indicated by the fact that (i) the somatic cells (trophocytes, prefollicular cells) either surround them or lie at the same level and (ii) unlike oocytes, they are devoid of follicular covering. The normal histochemical changes include a great reduction in DNA-positiveness of the oogonial nuclei











Figures 1–5. 1. Part of the germarium showing normal (OG) and hypertrophied oogonia (OGH) and nuclei of degenerating trophocytes (TP). Heidenhain's haematoxylin-eosin, × 315. **2.** Part of the germarium showing hypertrophied oogonia (OGH) connected to trophic core (TC) through trophic cord (TCD), prefollicular cells (PFC) and trophocytes (TP) displaced due to oogonial hypertrophy. Heidenhain's haematoxylin-eosin, × 315. **3.** Part of the germarium showing RNA-positive cytoplasm of hypertrophied oogonium. Methyl green/Pyronin-G., × 450. **4, 5.** Part of the germarium showing oogonial nuclei undergoing reduction in DNA-positiveness captured in declining order of a, b, c, (figure 4, inset c taken from another section). Compare these changes with those occurring in the normal oocyte during conversion of its nucleus into a DNA-negative germinal vesicle in the vitellarium (d, figure 5). Feulgen, × 450.

(figure 4) as it normally occurs during transformation of the oocyte nucleus into a germinal vesicle (figure 5) and the histopathological ones, pycnosis, karyorrhexis, fragmentation and karyolysis which are usually induced by ionizing radiations as histopathological symptoms[3].

The hypertrophied oogonia measure 145.8 ± 11.86 × 118.2 ± 9.11 μm, about 150 times larger than the normal cells and approximating the size of the stage II oocyte of this insect[4]. This enormous increase in the oogonial size, although by variable causative factors[5,6] could be regarded as an oocyte feature when viewed collectively with other features. The cytoplasm of normal oogonia in this

insect was RNA-negative while the cytoplasm of the oocyte was reported to be RNA-positive[4,7]. As such, the RNA-positiveness of the cytoplasm in the hypertrophied (irradiated) oogonia is also an indication of an oocyte feature. This feature may have been induced by x-irradiation or may be due to RNA synthesised by the trophocytes and transported to the hypertrophied oogonia through the tropic cords as is reported in the normally developing oocyte of this[4] and other insects[8-11]. Acquisition of trophic cord by the hypertrophied oogonia is certainly an oocyte feature never encountered in the normal oogonial cells. Of all the foregoing (oocyte) features, by far the most characteristic one is that of the great reduction in the DNA-positiveness of the nuclei of the hypertrophied oogonia. Such a reduction normally occurs during transformation of an oocyte nucleus into a germinal vesicle[12]. In the present case, even though the nucleus of the hypertrophied oogonium is never totally DNA-negative as is the case with the germinal vesicle, the decline in DNA-stainability is nonetheless perceptible enough to entitle the oogonial nucleus to be regarded as a partially transformed germinal vesicle.

Based on the above facts, the conclusion becomes inevitable that x-irradiation induces properties in the oogonia that compare favourably with those of oocytes which can be attributed to a precocious differentiation of these cells. Such a precocity has been earlier shown in the testicular cells of the orthopteran, *Chorthippus longicornis*[13].

DJD is thankful to the CSIR, New Delhi, for awarding a fellowship.

14 March 1983; Revised 18 June 1983

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ANNOUNCEMENT

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Physical Sciences—Prof. Girish Saran Agarwal, University of Hyderabad, Hyderabad and Prof. T. V. Ramakrishnan, Indian Institute of Science, Bangalore.
Chemical Sciences—Prof. C. L. Khetrapal, Raman Research Institute, Bangalore and Prof. G. S. R. Subba Rao, Indian Institute of Science, Bangalore.
Earth Sciences—Dr Kunchithapadam Gopalan, Physical Research Laboratory, Ahmedabad.
Engineering Sciences—Dr Raghunath Anant Mashelker, National Chemical Laboratory, Pune.
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