mosome aberrations induced by X-rays and to establish comparisons with other species[7,8]. Moreover the chromosome action of radiation and chemical compounds has also been evaluated in leukocyte cultures of rabbits[9–11], mouse[7,12], marmoset[7], wallaby[7], Chinese hamster[7], kangaroo-rat[11], crab-eating monkey, beagle dog, cynomolgus monkey, slow loris, squirrel monkey, sheep and goat[8,13]. In rabbits and cows, several experiments were done in order to determine the appearance of the 1st wave of mitosis and the influence of the harvesting time in the yield of dicentrics[10,11]. However, the data from human beings were extrapolated for all the other species, and therefore 40–48 h harvesting times were employed in all these cases.

Our results show that PHA-stimulated pig lymphocytes are able to divide once, twice or even thrice in 40–48 h. Accordingly, to obtain only 1st mitosis, 24 h seems to be the best harvesting time for pig blood cultures. These findings stress the necessity of determining the division kinetics of cultured lymphocytes in all those species to be employed to test the chromosome action of chemical and physical agents. Such a precaution will avoid errors arising by the presence of cells in 2nd and 3rd mitosis in the sample of dividing cells scored.

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Occurrence of a new type of mosaicism in *Apis mellifera*[1]

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Summary. A mixture of tissue with male and female olfactory plates (sensilla placodea) was observed in the antennal segments number 8, 9 and 10 of a gynandromorphic honeybee obtained by radiation from a Co^{60} source.

Many different types of gynandromorphs were described in honeybees, including a specimen with a mixture of male and female tissue in the eye and in the abdomen[2–5]. There is genetic evidence which indicates that gynandromorphic honeybees usually originate from a zygote and one or more accessory sperms[6,7]. By induced increase and decrease of queen's oviposition rate, the gynandromorph production has been raised to 32.5% and lowered to 6.0%[8]. Mosaic females which developed from doubly fertilized binucleate eggs, have also been found[9]. In wasps, patterns of mosaicism in the antennae and legs of *Habrobracon juglandis* were described and abnormal polarity of the sensilla placodea was observed[10]. However, there are no references about tissue mixture in the same antennae or in the same segment of the flagellum in *Apis mellifera*. It is possible that no one has looked carefully for individual antennae in order to detect the phenomenon (Rothenbuhler, personal communication). The gynandromorph production in insects can be provoked by chilling the eggs or heat treat-

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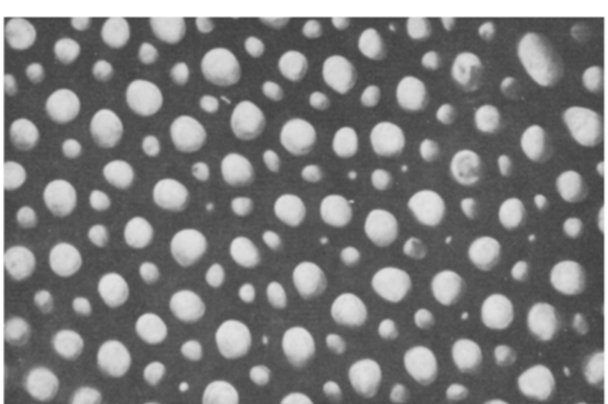

Fig. 1. Photograph of a segment of antennae of normal worker honeybees. Bigger round structures: olfactory plates. Intermediate and smaller round structures: sensorial hairs. ×500.

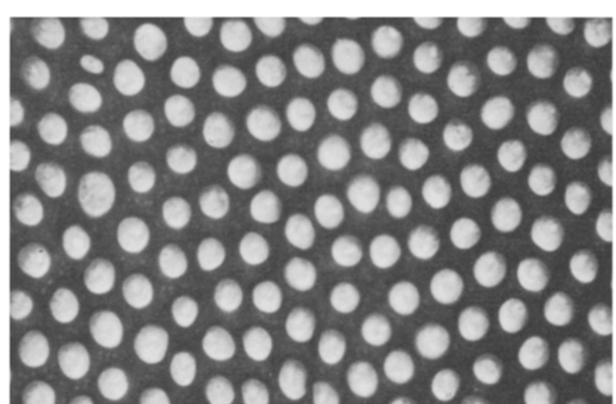

Fig. 2. Photograph of a segment of antennae of normal drone. Round structures: olfactory plates. ×500.

ment, by exposure to mustard gas and by irradiation. One of us (Soares) irradiated a colony of *Apis mellifera* with γ-rays (from a Co^{60} bomb as source). The colony was placed 10 cm distant from the source and received 24 rads per day. One gynandromorph was obtained after 600 rads

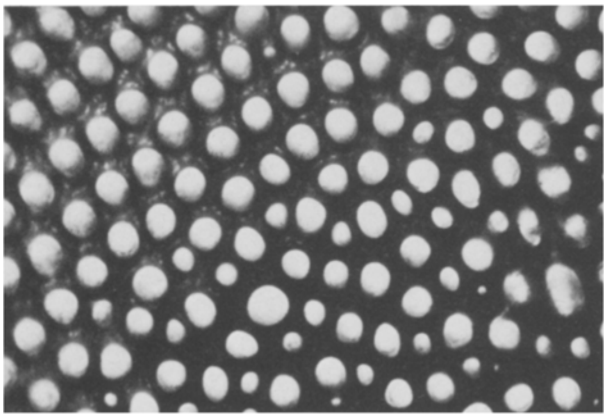

Fig. 3. Photograph of a segment of antennae of a gynandromorph. Male tissue in the left side and female tissue in the right $\times 500$.

and were fixed in Dietrich's solution. Detailed analysis was made in the antennal segments by use of a new method.

Each segment was first separated from the antennae, and, with help of 2 entomological pins, they were opened longitudinally along the back, being distended on a glass. Each segment was covered with Canada balsam and submitted to cover glass pressure. Microscope analysis showed different patterns of mosaicism in the antennae respecting sensorial structures level. Normal honeybee females have 10 segments and normal males have 11 in the flagellum. Females present olfactory plates (sensilla placodea) mixed with sensorial hairs in almost equal proportion (figure 1) whereas the drones have almost only olfactory plates in the segments (figure 2). Normal female segments also show a region without sensorial plates on the back. Nevertheless, drones present all regions of the segments with sensilla placodea. The gynandromorph obtained showed the segments numbers 1–7 typic as in a normal female, and the 8, 9 and 10 with normal male appearance. Microscopical analysis confirmed that the segments 1–7 had the normal female pattern. However, the segments 8–10 presented female and male tissue mixed (figure 3). The back of the segments did not present sensorial plates as occurs with females.

Nucleotide metabolism in the rat liver following whole-body X-irradiation

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Summary. Evidence has been presented to show that, like synthesis of RNA, syntheses of ribonucleotide precursors of RNA in the rat liver were stimulated for 6–18 h following whole-body X-irradiation (1000 R).

Whole-body exposure of mammals to ionizing radiations has been shown to enhance the capacity of liver to synthesize RNA for 4–18 h after irradiation[1–3]. Such stimulated synthesis of RNA may be expected to require increased supply of nucleotide precursors for RNA-polymerization. In this communication, evidence has been presented to show that, like RNA-polymerization, syntheses of liver ribonucleoside phosphates are also stimulated following whole-body X-irradiation of rat. These changes were found to be associated with the increased efficiency of liver high-speed supernatant to catalyze the conversion of orotic acid to pyrimidine nucleotides. The stimulus in synthesis of ribonucleotides was found to be linked to the enhanced rate of RNA-synthesis, since actinomycin D effectively reversed the heightened rate of (^{32}P)-orthophosphate incorporation into nucleotides.

Material and methods. Male albino rats of Wistar strain, each weighing between 150 and 160 g and fed on laboratory stock diet, were used. The animals were exposed (in groups of 4) to whole-body X-irradiation of 1000 R (dose rate 100 R/min) from a Siemens Stabilipan unit operated at 250 kV and 15 mA with a 2-mm Al filter. The dose was administered from a distance of 62.7 cm. The field size was 26.5×26.5 cm^2. Both control and experimental rats were fasted after irradiation until killed at the time intervals indicated in the text. During fasting period, water was made available ad libitum.

Synthesis of RNA and ribonucleotides in the liver were studied by following incorporation of i.p. injected (^{32}P)-orthophosphate (carrier-free, 2 mCi/100 g b. wt in 0.5 ml of 0.15 M saline) for 1 h. Labelled RNA was isolated from the liver by the method of Munro and Fleck[4]. Labelled ribonucleotides were isolated from the liver acid-soluble pool and fractionated into individual nucleotides by the procedure of Hurlbert[5]. The radioactivities of RNA and ribonucleotides were expressed in terms of relative specific activity (see tables 1 and 3). For this purpose, specific activity of (^{32}P)-orthophosphate from liver homogenate was determined by the method of Ernster et al.[6].

The capacity of high speed supernatant ($105{,}000 \times g$) of rat liver to catalyze the conversion of orotic acid to pyrimidine ribonucleotides was assayed using (^{3}H)-orotic acid (1 mCi/mole) essentially by the procedure of Hurlbert and Kammen[7]. The labelled nucleotides (cytidine and uridine mono-, di- and triphosphates) formed after 30-min-incubation of the liver supernatant with (^{3}H)-orotic

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