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## The pattern of endothelial cell boundaries in regenerated aortae

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*Summary.* The pattern of endothelial cell boundaries in the regenerated aorta was shown to differ greatly from that of control specimens as seen in silver stained preparations under the scanning electron microscope.

The use of silver stains to demarcate the intercellular boundaries between adjacent endothelial cells has been a relatively common practice since the description of the technique by Florey et al. in 1959[2]. Endothelial cells were described as being elongated with centrally-located ovoid nuclei. More recently silver stains have been employed in scanning electron microscopy[3]. This study utilized a silver salt which demarcates intercellular boundaries as zigzag lines between each elongated cell whose long axis is parallel to the long axis of the blood vessel. Other studies agree with these findings[4,5]. The present study was undertaken to determine the difference between the appearance of the normal endothelial cell pattern and the appearance of area where an injury caused removal of the endothelial covering and subsequent regeneration of the endothelium.

24 male rats of the Sprague-Dawdley strain, weighing about 200–250 g were used in this study. The rats were opened by a midline abdominal incision and their aortae were exposed. In half of the rats a stainless steel probe previously cooled in liquid nitrogen, was brought into contact with the aorta for 1 min. This had the effect of freezing the entire thickness of the aorta. This site was

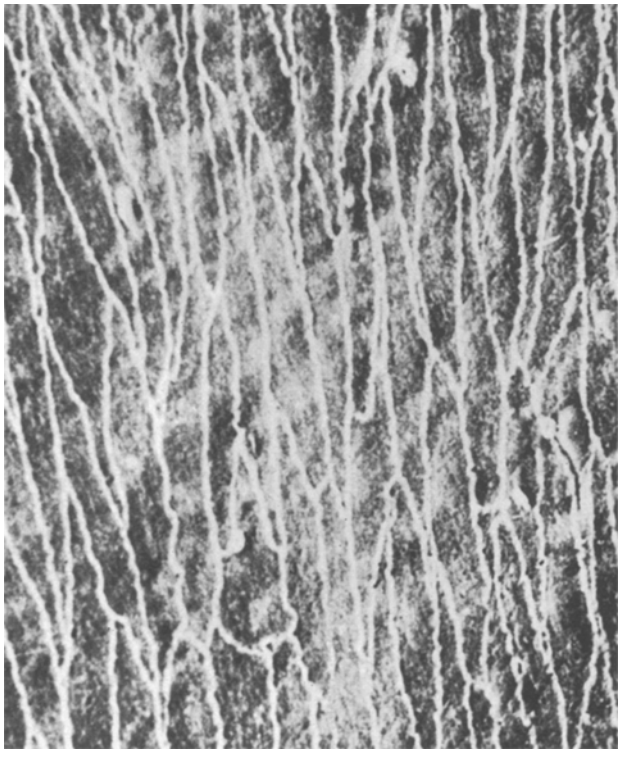

Fig. 1. The pattern of intercellular boundaries in control specimens.

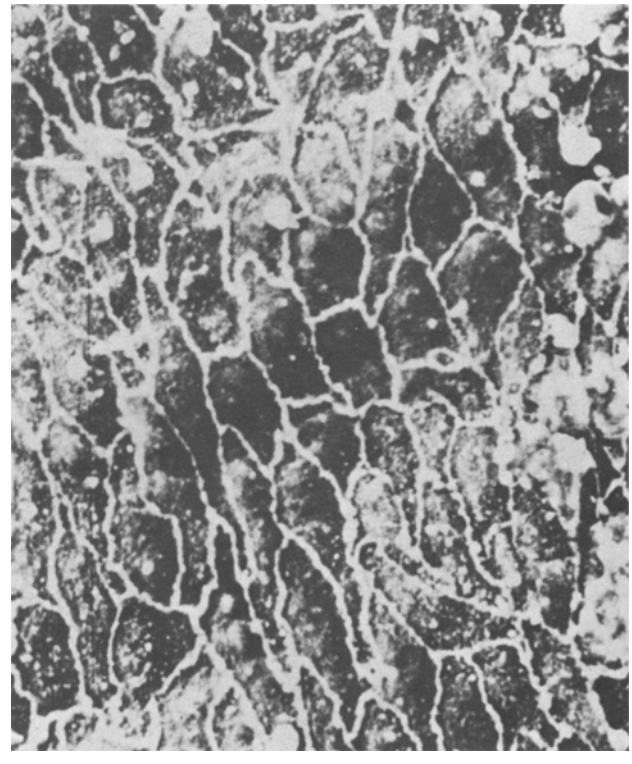

Fig. 2. The irregular pattern of endothelial cells over the regenerated area. × 1300.

marked with some powdered carbon. These rats and the other 12 rats which served as controls were closed with sutures. 8 days after operation all animals were sacrificed by decapitation. In a previous study the time interval was determined as a conservative amount of time that endothelium would require to regenerate[7]. In the tissue preparation the aortae were perfused with Hank's solution, excised, cut longitudinally and then pinned to a piece of cork. The silver staining procedure was that of Geissinger[8]. Specimens were dehydrated in a graded series of alcohols and allowed to air-dry. They were then glued to studs coated with a thin layer of gold and viewed in a Hitachi HHS-2R scanning electron microscope.

Endothelial cells in the control specimens appeared as described in normal tissues by others[4,5] (figure 1). The silver lines, denoting intercellular boundaries, appeared as raised structures. This observation was probably due to air-drying of the specimens which caused shrinkage.

Experimental tissues exhibited a considerably different pattern to the silver lines. The shapes of the cells took many forms. Some appeared to be elongated like control cells but most cells were more rounded or polygonal. The pattern of the intercellular boundaries of the regenerated tissues was markedly different as a result of variability in cell shape (figure 2). There was definitely no distinct orientation of the cells as was observed in the control tissues whose cells paralleled the long axis of the blood vessel. The significance of the orientation and shapes of the cells is not known.

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## Sterilization of solanaceous hadda, *Epilachna vigintioctopunctata* F. by irradiating pupae using gamma radiation

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*Summary.* Sterility in males and females was observed in the resulting adults when 3-4-day-old pupae of solanaceous hadda, *Epilachna vigintioctopunctata* F. were exposed to gamma radiation doses of 2000 rad and 2500 rad. However, at 2500 rad longevity of treated insects was adversely affected.

Ionizing radiations have been extensively used for the control of insect pests of stored commodities[2,3]. Knipling[4] has shown sterile male technique to have great potentials in the control of certain insect pests. One of the most important prerequisites in the use of this technique is the determination of the minimum effective dosage of radiation required for the control. The present paper reports sterilization studies made on solanaceous hadda, *E. vigintioctopunctata* F. (Coleoptera; Coccinellidae), a serious pest of solanaceous crops.

*Materials and methods.* Hadda beetles were reared in the controlled conditions of temperature (30 ± 1 °C), photoperiod (17 h light: 7 h dark) and relative humidity (70%). Fresh potato leaves were fed to the beetles. The beetles used in the present study belong to the 5th generation reared in the laboratory. 3-4-day-old pupae were exposed to Co-60 (gamma source) at radiation doses of 0 (control), 1000, 2000 and 2500 rad. The dose rate of Co-60 gamma source was 52 rad/sec. After irradiation, pupae were allowed to eclose. 4 pairing combinations were made at all the doses of treatment viz. a) N (normal) ♂ × N♀, b) I (irradiated) ♂ × N♀, c) I♀ × N♂ and d) I♂ × I♀. Pairs were placed singly in 150-ml plastic jars. At each cross 5 pairs were maintained. Egg laying and egg hatching was recorded daily. Total number of eggs laid and hatching percentage has been considered a parameter of sterility.

*Results and discussion.* Normal females mated to males treated at 1000 and 2000 rad deposited eggs little less than

Total number of eggs laid (by 5 pairs) and the viability of eggs laid by hadda beetle, exposed to gamma radiation in pupal stage

| Mating combination (dosage rad) | Total number of eggs Deposited (by 5 pairs) | Hatched | Hatching % age |
|---|---|---|---|
| a) Normal male × normal female (N♂ × N♀) | 2509 | 2255 | 90 |
| b) Irradiated male × normal female (I♂ × N♀) | | | |
| 1000 | 2400 | 1920 | 80 |
| 2000 | 2090 | 250 | 12 |
| 2500 | 505 | 50 | 10 |
| c) Irradiated female × normal male (I♀ × N♂) | | | |
| 1000 | 2600 | 2210 | 85 |
| 2000 | 723 | 0 | 0 |
| 2500 | 80 | 0 | 0 |
| d) Irradiated male × irradiated female (I♂ × I♀) | | | |
| 1000 | 2325 | 1820 | 78 |
| 2000 | 230 | 0 | 0 |
| 2500 | 75 | 0 | 0 |