

in *N. fucata* and green in *N. diversicolor*, contrasting markedly with the colours of the eggs. Further work on the pigments present in the coelomic cells and eggs of these and various other polychaetes is in progress.

J. GREEN
R. PHILLIPS DALES

Zoology Department,
Bedford College,
Regent's Park,
London, N.W.1.

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Effect of Ovariectomy, Oestrogen and Progesterone on the Activity of the Melanocytes in the Skin

THE possible relationship between melanogenesis and the sex hormones has interested pathologists and physiologists for many years¹⁻⁵. The present research is a histochemical investigation into the effect of ovariectomy, oestrogen and progesterone on the activity of the melanocytes in the skin of the guinea pig and is a continuation of the work reported previously on the influence of the male sex hormone on melanogenesis⁶.

Eighteen mature virgin guinea pigs known to have a regular oestrous cycle were divided into three groups. Skin biopsies were taken from each animal of the first group at oestrus; ovariectomy was performed at the same operation. The skin specimens were removed from the ear, the anterior abdominal wall and from the sole of the foot; in addition, the right areola was excised. The animals were left for one month without treatment, after which they were killed, and a further series of skin specimens were removed from areas adjacent to those taken previously, and the left areola was excised. The animals of the second and third groups were also ovariectomized at oestrus, left for one month, and then skin biopsies were taken from the areas described previously. The animals of the second group were given 0.1 mgm. of oestradiol monobenzoate (Organon) intramuscularly once daily for five days a week for a period of four weeks; those of the third group were given 0.4 mgm. of progesterone (Organon) intramuscularly once daily for a similar period of four weeks. Following the hormone treatment the animals were killed and the second series of skin specimens were removed.

All the skin specimens were processed with the dihydroxyphenylalanine reagent after preliminary fixation and then both skin sheets and vertical sections were examined. The hormonal influence on the melanocytes was studied by assessing the number and size of the melanocytes and the amount and position of the melanin within the cells. The length and complexity of the dendritic processes were also noted, and an attempt was made to assess the amount of free melanin present.

Skin of ear, anterior abdominal wall and areola. After ovariectomy many of the melanocytes had a deformed appearance which varied from a slight shrinkage of the cell body with minor irregularity of the cell contour, to an advanced degree of cell-wall collapse with fragmented dendritic processes. In addition, the melanocytes showed varying degrees of lack of melanin. The amount of free melanin in the ear and anterior abdominal wall remained unchanged,

but in the areola of four of the animals a definite reduction occurred. Both the melanin within and outside the melanocytes appeared lighter in colour. The melanocyte counts in the ear and anterior abdominal wall remained unchanged, but in the areola a definite reduction in the count occurred.

In the ovariectomized animals which received oestrogen the most marked effect produced was that the amount and depth of colour of the melanin both within and without the melanocytes was greatly increased. Many of the melanocytes were seen to be distended with melanin which completely obscured their nuclei. However, the gross deformity which occurred in some of the melanocytes as the result of ovariectomy was unaffected by the oestrogen therapy despite the increased amount of intracellular melanin. In the sections of the areola the large amount of free melanin present made the recognition of the individual melanocytes extremely difficult. The vertical sections showed that the increase in melanin occurred in all the layers of the epidermis. The melanocyte counts in the ear and anterior abdominal wall showed no definite changes, but in the areolae of the two animals in which counting was possible the melanocytes were greatly increased in number.

In the ovariectomized animals which received progesterone, the size of the melanocytes and the length and complexity of the dendritic processes remained unchanged. The amount of melanin inside and outside the melanocytes was slightly increased in all areas. The melanocyte counts showed a small rise in the anterior abdominal wall, but the results in the ear and areola were inconsistent.

Sole of foot. Following ovariectomy no significant changes were observed. In the animals which were ovariectomized and received oestrogen a marked increase in amount and depth of colour of melanin occurred in all the layers of the epidermis. In the ovariectomized animals which received progesterone no significant changes resulted.

The above findings show that ovariectomy produces in varying degrees deformity of the melanocytes and inhibition of melanogenic activity. The administration of oestrogen to ovariectomized animals brings about a marked stimulation of melanogenesis, but it fails to restore the deformed melanocytes to their normal appearance. Progesterone was seen to have a similar effect on melanogenesis to that produced by oestrogen, but the changes were much less marked. The results indicate that the female sex hormones have a far more widespread effect on skin pigmentation than has hitherto been accepted. It is possible that this sex-linked control of melanocytes is related to the increase in growth-rate of malignant melanomas which occurs with the onset of puberty and during pregnancy.

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P. G. BISCHITZ
R. S. SNELL

Department of Anatomy,
King's College,
London, W.C.2.
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