

Fig. 2. Capillary in the gastric mucosa 2 days after truncal vagotomy. The nucleus (N) is swollen and the lumen (L) is extremely constricted. PV, pinocytotic vesicles; SM, swollen mitochondrion; BM, basement membrane. $\times 18,000$.

vagotomy there was a 45% decrease in gastric blood flow. BALLINGER et al.⁵ found that total subdiaphragmatic vagotomy in 10 dogs resulted in an average reduction of 42% in blood flow through the common mesenteric vein as measured with a noncannulating square-wave electromagnetic flowmeter. They concluded that the mucosal atrophy of the small intestine occurring after division of parasympathetic nerves⁶ is due to a reduction in mesenteric blood flow. This ischemic damage results from unopposed sympathetic activity upon the intestinal vasculature. PADULA et al.⁷ determined the blood flow within the villi of the small intestine of dogs after vagotomy. They found a decrease of 40% while the mucosa became pale and the vessels within the villi contracted. Thus the observed decrease in mesenteric blood flow and vascularity of the mucosa of the small intestine after vagotomy may produce mucosal ischemia and thereby cause atrophy of the villi.

Finally, BELL and BATTERSBY⁸ measured the mucosal flow alone by using the clearance of labelled krypton from the gastric mucosa in the dog as an index of flow. They found that vagotomy caused a reduction in mucosal blood flow which varied from 29% to 74% in 10 of the 12 dogs used. Of particular interest was the sudden nature of the reduction in mucosal flow which regularly occurred within 5 min of nerve section. The measurement was carried out for about 2–3 h after nerve section in which time no recovery was apparent. This is well in accordance with our finding that 3 h after vagotomy capillaries appear constricted, as revealed by the electron microscope.

The question as to whether the above-mentioned acute changes in blood flow and vascularity persist over a long period of time was answered by DELANEY⁹. By using the radiorubidium distribution technique he found

no significant change in mucosal flow 4–6 weeks after truncal vagotomy. His results suggest that vagal section has no long-term effect on mucosal flow. This finding has also been confirmed by the electron microscope.

From the above-mentioned results of different investigators and the present morphological findings, it can be concluded that truncal vagotomy causes a transitory ischemia with reduction in gastric blood flow. To what extent the substructure of secretory cells may be affected by ischemia will be reported in a future publication¹⁰.

Zusammenfassung. Der Einfluss der trunkulären Vagotomie wurde an der gastrischen Mukosa von Hunden elektronenmikroskopisch untersucht. Dabei kommt es zu einer sehr deutlichen Verengung der Kapillaren mit Abweichungen der Endothelzelle von der Normalstruktur. Der ischämische Effekt der Vagotomie setzt sofort ein und ist nach 4 Wochen fast vollständig aufgehoben.

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⁵ W. F. BALLINGER, R. T. PADULA and R. C. CAMISHION, *Surgery* 57, 409 (1965).

⁶ W. F. BALLINGER II, J. IIDA and G. E. APONTE, *Surg. Forum* 14, 366 (1963).

⁷ R. T. PADULA, P. H. NOBLE and R. C. CAMISHION, *Surgery Gynec. Obstet.* 127, 41 (1968).

⁸ P. F. BELL and C. BATTERSBY, *Gastroenterology* 54, 1032 (1968).

⁹ J. P. DELANEY, *Surgery* 62, 155 (1967).

¹⁰ A. E. HALARIS, in preparation.

About the Transformation of the Interstitium in the Ovary of Mammals and Women during the Age of Prepuberty

As the result of our histogenetic and histochemical studies of the ovary of the guinea-pig during its post-natal period, we observed a phenomenon which we called isofolliculia. This phenomenon is characterized by the evidence of follicles almost of one size and total enzymic

inactivity in the interstitium. It was observed in 30-day-old animals.

427 ovaries taken from guinea-pigs during their post-natal period and ovaries taken from 5 girls whose ages were between 9½–11 years, were studied. Besides the



Fig. 1. An ovary of guinea-pig – 20 days after birth. I, interstitium with high enzyme activity for lactic dehydrogenase. 8×10 .

classical histochemical methods, the following histo-enzymologic reactions were used: for alkaline phosphatase according to GROGG and PEARSE¹, lactate dehydrogenase, malate-dehydrogenase, iso-citric dehydrogenase, succinic dehydrogenase according to SCARPELLI et al.².

Electronmicroscopic studies were performed. We used material fixed in 1% OsO₄ (MILLONIG³) pH 7,3, dehydrated in alcohol and embedded in Durcupan ACM. It was cut on the ultramicrotome and lead acetate was used for contrast (MILLONIG⁴). We observed high enzyme activity (for all the enzymes studied) in the interstitium of the ovary of the animals from new-born to the age of 28 days (Figure 1). The interstitial cell has a specific structure (developed and agranular ergastoplasmatic reticulum, lipides and changed mitochondria; Figure 2). In guinea-pigs 29 and 30 days after birth the follicles are almost of one size and the interstitium shows enzymic inactivity for all enzymes studied (Figure 3). The substructure of these interstitial cells differs from those of younger and older animals. The interstitial cell of guinea-

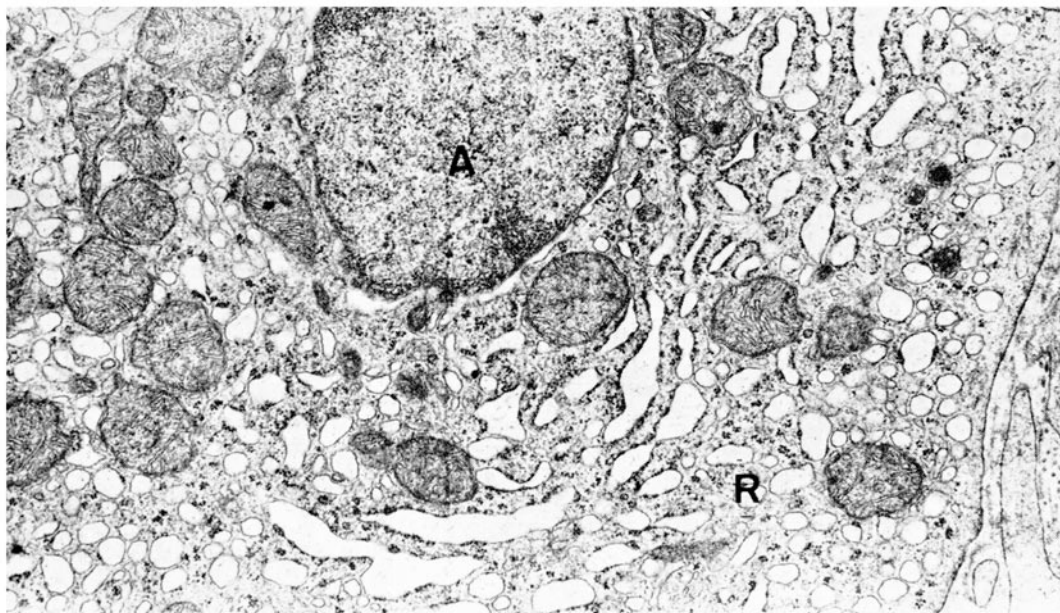


Fig. 2. An ovary of guinea-pig – 20 days after birth. An interstitial cell. A, nucleus; R, developed ergastoplasmatic reticulum. $\times 25,000$.

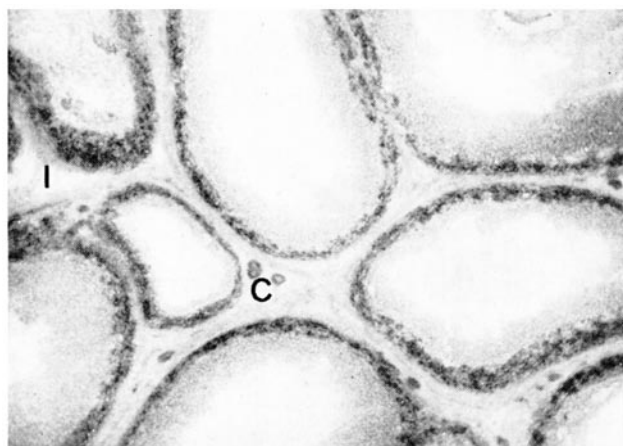


Fig. 3. An ovary of guinea-pig. Lactic dehydrogenase. I, interstitium; C, blood vessel. 8×10 .

pigs 30 days after birth has scarce ergastoplasmatic reticulum, some changed mitochondria and sometimes lipides (Figure 4). All this we observed by studying the ovaries of girls from 9½ to 11 years old. It is evident that during the prepuberty (the puberty of guinea-pig is 40 days after birth and of Bulgarian girls is from 11 to 14 years), the interstitium transforms in cells, which have almost no histoenzymologic activity and have different electro-microscopic characteristics.

¹ E. GROGG and A. G. E. PEARSE, *Nature, Lond.* 84, 170 (1952).

² D. G. SCARPELLI, R. HESS and A. G. E. PEARSE, *J. Biophys. Biochem. Cytol.* 4, 747 (1958).

³ G. MILLONIG, *Vth Int. Congr. Electron Microscopy, Philadelphia* (Academic Press, New York 1962), p. 8.

⁴ G. MILLONIG, *J. Biophys. Biochem. Cytol.* 11, 736 (1961).

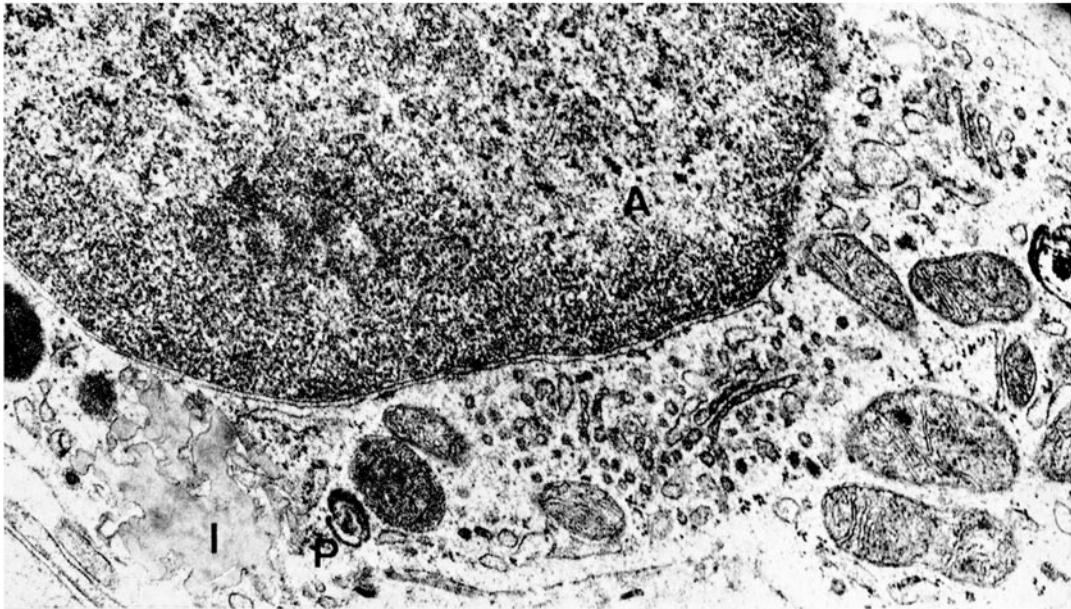


Fig. 4. An ovary of guinea-pig, 30 days after birth. An interstitial cell. A, nucleus; J, lipide drop; P, figure myelinic. $\times 30,000$.

It is known (ECKSTEIN and PASTER⁵, STANFIELD et al.⁶) that gonadotropic hormones increase the activity of some enzymes connected with the metabolism of carbohydrates and proteins (succinic dehydrogenase, isocitric dehydrogenase).

We think the high histoenzymologic activity of the interstitium is due to the gonadotropic hormones, especially to FSH. This is proved by the rapid growth of the follicles and the presence of the described iso-follicula. The enzyme inactivity of the interstitium and its morphological transformation probably shows that, in a short period of time, the increment of gonadotropic hormones is held up. It may be this phenomenon has a more complicated hormonal correlative mechanism, but it is interesting for it may be a general rule for the puberty of mammalia.

Résumé. Ont été examinés 427 ovaires de cobayes et de jeunes filles. L'ovaire, chez le cobaye de 30 jours de la vie postnatale et chez la jeune fille âgée de 10 ans, est caractérisé par des follicules en croissance de grandeur presque égale (isofolliculie) et par la disparition presque complète de l'activité enzymatique de l'interstitium.

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Sofia 31 (Bulgaria), 24 March 1970.*

⁵ B. ECKSTEIN and Z. PASTER, *Acta Endocr.* 18, 1274 (1958).

⁶ D. A. STANFIELD and Y. W. ROBINSON, *Endocrinology* 76, 390 (1965).

Effect of Temperature on Survival of γ -Irradiated Seeds of *Arabidopsis thaliana*

In the study of the biological effects of radiation, considerable effort has been devoted to modification of the response of seeds by varying the pre- or post-radiation environment. This report deals with the question of how irradiation of dry seeds and post-treatment growing temperatures may interact to influence the response of plants of *Arabidopsis thaliana* (L.) Heynh. The investigation grew out of observations made in the course of radiobiological studies with this organism in which there was a marked difference in the number of surviving individuals, depending upon post-radiation conditions¹. Evidence is presented for temperature sensitivity of radiation injury in seeds which is unrelated to induced free radicals.

Materials and methods. Seeds of the race 'Estland' of *A. thaliana* from a stock supplied by Dr. J. LANGRIDGE of Canberra were equilibrated with dry calcium chloride at room temperature prior to exposure. Radiation exposures of 150 kR were made using a cobalt-60 γ source.

Seeds were immediately hydrated in distilled water for a minimum of 1 h and then transferred aseptically to nutrient agar². All cultures were placed at 5°C for the first 24 h to overcome possible dormancy before being transferred to growth chambers. Post-irradiation treatment of 1 h in distilled water followed by 24 h on agar at 5°C should eliminate any free radicals formed due to irradiation. Thus any differential effects observed following exposure to different temperature regimes would not be attributable to interactions of radicals and temperature.

Results. The survival to flowering is less in irradiated populations than in the non-irradiated ones, as would be expected at this dosage (Table I). With respect to

¹ O. SHIFRIS, personal communication.

² J. LANGRIDGE, *Aust. J. biol. Sci.* 10, 243 (1957).