While the hepatic lesions dominate the picture, less conspicuous degenerative changes are present in other organs, particularly the gonads and the spleen. Transmission experiments conducted with axolotls brought from other laboratories indicate that the disease is infectious.

The authors would appreciate hearing from any one who has encountered similar disease in axolotls or related cold-blooded forms.

CRANFORD HUTCHINSON
THE WISTAR INSTITUTE
BALDUIN LUCKÉ
UNIVERSITY OF PENNSYLVANIA

SPECIAL ARTICLES

SOME OXIDATIVE PROPERTIES OF ISOLATED AMPHIBIAN GERMINAL VESICLES

THE classical opinion which considers the nucleus as a center of respiratory metabolism has been recently questioned by several investigators. The rH measurements of Rapkine and Wurmser[1] and of Chambers[2] and his collaborators failed to indicate any considerable oxidizing or reducing ability in the nucleus; likewise, experiments in which the metabolic rate of non-nucleated and nucleated fragments of Arbacia eggs (obtained by ultracentrifugation) was compared show no particular respiratory activity in the nucleus (Shapiro,[3] Navez and E. B. Harvey[4]).

In view of these divergent opinions, it was of interest to study the respiration of isolated amphibian germinal vesicles; the removal of the nucleus in full-grown oocytes is a rather easy task (Duryee[5]) and a sufficient amount of material can be obtained in a short time.

Some preliminary tests carried out on *Rana fusca* isolated germinal vesicles indicated that the nuclear sap and the nucleoli are able to reduce methylene blue; leuco-methylene blue is specially oxidized by the nucleoli. On the other hand, chemical tests for indophenoloxidase, peroxidase and glutathione were entirely negative.

In order to get quantitative data, the CO_2 elimination of *Rana fusca* germinal vesicles was measured by a microtitrimetric method and the oxygen consumption of Triturus pyrrhogaster isolated nuclei was followed in a modified Gerard-Hartline microrespirometer, kindly placed at my disposal by Dr. Herbert Shapiro. The metabolism of full-grown oocytes deprived of their follicular epithelium was estimated at the same time. The Qo_2 (mm^3 O_2 per gr wet weight per hour) of the isolated nuclei was found to be about 13, while the Qo_2 of the oocyte is around 37. In both cases, the metabolism remained constant during several hours. If the respiration of one single nucleus is compared to the metabolism of one oocyte, it is found, both for oxygen consumption and for carbon dioxide elimination, that the gas exchange of the nucleus represents from 1 to 1.5 per cent. of the metabolism of the whole intact cell. It is often possible in *Rana fusca* to remove the nucleus from the oocyte without much loss of cytoplasm; if this enucleated egg-cell is allowed to heal and CO_2 elimination is measured, it is found that the loss of the nucleus does not induce any considerable drop of the metabolism during many hours.

In order to check the possibility that the low respiration of the isolated nuclei might result from an insufficient amount of oxidizable substrate, either glucose or cytoplasm removed from an oocyte by means of a micropipette was added to the germinal vesicles; no definite increase in the metabolic rate could be detected in such conditions.

The influence of calcium on the physical properties of the chromosomes in isolated germinal vesicles has been demonstrated by Duryee; but the presence or absence of Ca ions did not affect significantly the oxygen consumption or the carbon dioxide elimination in these experiments.

These observations indicate that the nucleus is probably not a center of high metabolism in the growing oocyte, although the importance of the germinal vesicle in other respects must not be overlooked.

JEAN BRACHET
DEPARTMENT OF BIOLOGY
PRINCETON UNIVERSITY, AND THE
EMBRYOLOGICAL LABORATORY
MEDICAL SCHOOL
UNIVERSITY OF BRUSSELS

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COBALT AS AN ESSENTIAL ELEMENT IN ANIMAL NUTRITION

NATURAL conditions have been encountered in west Australia, New Zealand and Florida (the latter probably extending over the coastal plains of the Gulf and Atlantic coasts) in which cobalt must be supplied for the well-being of sheep and cattle. General observations indicate that the effects of the deficiency may affect other animals and even people on a "live-at-home" diet.

Filmer and Underwood[1] reported in 1934 the preparation of an iron-free filtrate from a limonite effective

[1] J. F. Filmer and E. J. Underwood, *Australian Vet. Jour.*, 10: 83–92, 1934.