further that the permeability of the synovial membrane is altered by its action(8). Ragan has demonstrated that the synovial fluid of arthritic joints occurs in a depolymerized state(2). There has been some controversy as to the cause of this depolymerization, but Bauer(9) as early as 1940 observed the similarity between arthritic joint fluid and "mucin" after the action of "mucinase."

The importance of electrolyte changes in arthritis has been suggested by experimental evidence. The administration of NaCl solution to rats followed by desoxycorticosterone (DOCA) administration resulted in rheumatic lesions in the heart(4). Selye(5) has produced arthritis in rats by DOCA intoxication, and has further shown that DOCA aggravates formalin induced arthritis. It is interesting to note that DOCA has no effect on the action of hyaluronidase(8). Cortisone, along with certain other compounds used in the treatment of arthritis, inhibits hyaluronidase(8,10).

In view of all this evidence it seemed of interest to study the relationship of the electrolytes of the synovial field to the action of hyaluronidase. The experiments performed showed that hyaluronidase, in addition to decreasing the viscosity of synovial fluid, produced a significant increase in the Na and K levels. Since the resultant concentration was significantly greater than that of the blood it may be assumed that the increase is not due to trauma. Furthermore, the controls failed to show any increase. Analyzing the data statistically it was found that the difference between the means was highly significant.

Conclusions. (1) The action of hyaluronidase increases the concentrations of both sodium and potassium in the synovial fluid of the dog. (2) Inactivated hyaluronidase has no action on the sodium and potassium in dog synovial fluid.

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Distribution of Esterase in the Mouse Embryo.* (18972)

ROBERT L. HUNTER. (Introduced by Robert E. Stowell.)

From the Department of Pathology and Oncology, University of Kansas Medical School, Kansas City, Kansas.

The distribution of esterase activity in adult mammalian tissues has been investigated by Gomori and others(1-5). The present study extends these observations to embryonic tissue.

Materials and methods. Strain A mouse embryos measuring 5, 10, 15, and 20 mm in a crown-rump length were used. Serial sections were made of acetone-fixed embryos for each stage. Adjacent sections were stained with hematoxylin and eosin, and with the Gomori esterase technic(4,6), employing the usual controls.

Results. No esterase activity was demonstrated in the 5 and 10 mm embryos. Activity was shown in both the 15 and 20 mm stages, the reaction being somewhat more intense in the larger embryos. Esterase activity was found in the pancreas, liver, lungs and thyroid, but not in the kidneys. In the pan-

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2. ———, *Ibid.*, 1948, v67, 4.

3. ———, *Ibid.*, 1949, v72, 697.

4. ———, *Arch. Path.*, 1946, v41, 121.

5. Montagna, W., and Noback, C. R., *Am. J. Anat.*, 1948, v83, 409.

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creas the acinar cells gave a strong reaction. In the liver the reaction appeared to be restricted to the parenchymal cells, and was more intense in cells adjacent to the central veins. The kidney gave no reaction. In the lungs the pseudostratified columnar epithelium lining the bronchi showed intense activity. In addition, other cells in the lung appeared to give a slight reaction; these may be the septal cells, since Gomori(4) states that septal cells of the adult lung contain esterase. The acinar cells of the thyroid gland gave a marked reaction both in the 15 and 20 mm stages of the mouse embryo and in the adult. Also active in the embryo were the pseudostratified columnar epithelium lining the nasal cavities and the so-called hibernating glands.

Discussion. The occurrence of esterase activity in the pancreas, liver, hibernating glands, and bronchial epithelium is in agreement with previous observations in adult mice and other mammals(4). Esterase activity has not previously been reported in the nasal mucosa; however, this activity might be expected, since the closely related bronchial epithelium contains the enzyme.

The esterase activity of both the embryonic and adult thyroid gland of the mouse is of particular interest since esterase has not been demonstrated in the thyroid glands of other animals previously studied. For example, Gomori(4) reports the absence of a histochemical reaction for esterase in the thyroid glands of man, monkey, dog, rabbit, guinea pig, and rat. Furthermore, Huggins and Moulton(7) who have made chemical studies of esterase activity in various organs of the rat and dog, report that the thyroid glands of these forms do not show a high level of esterase activity.

Quantitative microchemical methods are now being applied to embryonic organs to determine more precisely the rate of increase of esterase activity during development. In addition, because of the greater sensitivity of the chemical methods, esterase activity may be traced in the earlier embryonic stages which do not contain enough enzyme to give a positive histochemical test.

Summary. The 5 and 10 mm stages of mouse embryo do not show any histochemical evidence of esterase activity by the technic of Gomori. The distribution of esterase in the 15 and 20 mm stages of the mouse embryo, as demonstrated by the histochemical technic of Gomori, is essentially the same as that in the adult mouse. The only exception is the kidney, which does not give a positive staining reaction in the embryo. The occurrence of esterase activity in the thyroid gland seems to be peculiar to the mouse; the significance of this observation is not understood.

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Extension of Motile Life Span of Spermatozoa of the Domestic Fowl by Amino Acids and Proteins. (18973)

F. W. LORENZ* AND ALBERT TYLER.

From the Kerckhoff Laboratories of Biology, California Institute of Technology, Pasadena.

Recent experiments(1,2) with sea urchins and other marine animals have shown that the addition of any one of a number of different amino acids and peptides to suspensions of the spermatozoa in sea water prolongs very greatly their functional life span. Both the

* Division of Poultry Husbandry, University of California, Davis. The experimental work was done at the Kerckhoff Laboratories of Biology while the senior author was on sabbatical leave at the California Institute of Technology.

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