ABSTRACTS

1965 #1

A PHYSIOLOGICAL AND HISTOCHEMICAL STUDY OF REGENERATION IN THE NASAL (SALT) GLANDS OF HERRING GULLS

J. H. Abel, Jr. and R. A. Ellis, Brown University, Providence, R. I.

Following the surgical removal of the nasal glands, herring gulls were placed on either salt or fresh water. Birds from both groups were sacrificed postoperatively at 3-day intervals; the regenerating salt glands were removed, weighed, and histochemical tests were applied to tissue sections. In the birds maintained on salt water, regeneration proceeded rapidly and by 40 days all the birds had salt glands that were more than half the weight of those that had been removed. Regeneration of salt glands in the birds maintained on fresh water was much slower, and by 40 days no more than one-fourth of the normal weight had been regained. Oxidative enzymes and phosphorylase activity was restricted primarily to the small peripheral cells in the fresh water gulls; in the birds raised on salt water these enzymes were distributed evenly throughout the secretory lobule. The distribution of other enzymes varied only slightly between the two groups. Nerves, blood vessels reactive for ATPase, and the intralobular connective tissues were all restored as in the normal gland. Regeneration proceeds from the ducts and the central canals; secretory tubules bud and grow radially from the canals forming new lobules. These observations indicate that the rate of regeneration of the avian salt gland is affected by its "physiological load" and that tissue regeneration of the salt gland proceeds in the same manner as its embryonic development.

1965 #2

STUDIES WITH SULFOBROMOPHTHALEIN IN Squalus acanthias

I. M. Arias, L. Gartner, and A. Shanske, Yeshiva University, New York, N. Y.

Sulfobromophthalein sodium (BSP) was infused into the portal vein of adult male dogfish at a rate calculated to exceed the estimated hepatic maximum transfer rate of BSP from blood to bile. Serial samples of plasma, bile, and liver were obtained for estimation of BSP concentration, characterization of BSP conjugates, and subsequent electrophoresis on polyacrylamide gel. As of this date, four experiments have been performed in which BSP was infused in dogfish Ringer's solution, and four experiments in which BSP was infused bound to salt-poor human albumin. The results indicate that BSP is normally transferred rapidly from plasma into the liver, and to a lesser extent into other tissues. Addition of human albumin significantly reduces transfer of infused BSP into liver and other tissues. The hepatic uptake is reduced by approximately 60% compared with uptake observed in experiments which do not employ human albumin as a protein carrier for BSP.

Polyacrylamide gel electrophoresis of dogfish plasma at pH 8.6 reveals four well defined bands, none of which migrate like human or rat albumin. No BSP is bound when electrophoresis is performed at pH 8.6. Electrophoresis at pH 7.6 reveals the same discrete protein bands. Up to plasma BSP concentrations of 50mgm% most of the BSP in plasma at pH 7.6 is bound to a single protein having migratory characteristics of an alpha-globulin. The protein band was eluted from electrophoresis gels and equilibrium dialysis experiments were performed using this protein, human albumin, different concentrations of BSP, and a range of pH. Seven preliminary experiments reveal the following: (1) At pH 8.6 dogfish plasma does not bind BSP, and human albumin binds poorly. (2) At pH 7.6 dogfish plasma (and the isolated protein) bind BSP well (68% of 40mgm% BSP bound/2ml protein in 30cc volume) but not as well as human albumin (92% of 40mgm% BSP bound/2ml protein in 30cc volume).

It is of interest that the hepatic uptake of BSP in these experiments tends to parallel the binding capacity of the fish and human transport proteins in vitro. These observations must be extended, but they tentatively suggest that uptake of BSP by fish liver depends on ionization of BSP; and that direct protein-linked transfer probably does not occur. These suggestions have stimulated the design of further experiments in mammals to test this postulate.

1965 #3

STUDIES ON THE AUTECOLOGY OF THE CILIATE Urceolaria spinicola

C. Beers, University of North Carolina, Chapel Hill, N. C.

In the preceding study of the present series on urchin ciliates (Beers, C. D., 1964. Jour. Protozool., 11: 430-35), Urceolaria spinicola was named and described, and incidental observations were reported on its distribution on the spines and pedicellariae of the sea urchin Strongylocentrotus droebachiensis.

In the present study, quantitative data are being assembled on the following aspects of the urchin-ciliate association: (1) distribution of the ciliate on individual spines; (2) distribution on spines from different regions of the urchin test (circumoral, ambital and aboral; ambulacral and interambulacral); and (3) distribution on urchins of different age-groups (age estimated from diameter of the test).

As of September 1, 1965, there has not been sufficient time for a critical analysis of these data, but preliminary inspection of them seems to permit the following conclusions. (1) The ciliate is uniformly distributed over the surface of the small spines (length, 1.0-2.9 mm); it is restricted to the proximal half of the medium-sized spines (length, 3.0-5.9 mm); and it is extremely scarce or absent on the long spines (length, 6-15 mm). Spine lengths here relate to urchins of the size usually encountered, that is, 2.5-6.0 cm in diameter. (2) Spines from different regions of an individual urchin show fairly uniform intensities of faunation, although intensities vary considerably in different urchins. (3) In general, urchins 2 to 4 years of age (2.5-5.5 cm in diameter) show the highest levels of faunation.

An effort is being made to explain the differential distribution on individual spines, but the factors that account for such distribution are not readily apparent.

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