ual tapering off of oxygen consumption.

In the incomplete hydranths of the 1/2 and 3/4 stages, there was a significantly lower oxygen uptake (45 - 60% LESS). This was probably due to the relatively smaller amount of tissue in the developing hydranths as compared to the complete hydranth. No detectable oxygen uptake was observed in the terminal stages of regression. It appears that the aging complete hydranths of positions 1, 2, 3 and 4 continue all their normal feeding activities until the climactic onset of regression. The rate of aerobic respiration changes only after the onset of senility with its dramatic lysis of the hydranth.

1964 #21

In Vivo AND In Vitro STUDIES OF POTENTIAL DIFFERENCE OF THE VENTRICULAR FLUID OF ELASMOBRANCHII

C. S. Patlak, R. H. Adamson, W. W. Oppelt, and D. P. Rall, NIH, Bethesda, Md., and University of Florida, Gainesville, Fla.

An in vitro chamber system (Patlak, Fed. Proc., 1964, 23, 211) has been utilized to explore the fourth ventricle choroid plexus (CP) of the dogfish S. acanthias. The electrical potential difference (pd) in vitro was 2-4 mV, with ventricular fluid (VF) always positive in approximately 80 experiments. However, pd in in vivo experiments with dogfish (also lemon sharks, N. brevirostris and nurse sharks, G. cirratum) was 15-20 mV, VF negative (in agreement with results of Hogben, et al. (Am. J. Physiol., 1960, 199, 124). In vitro experiments with unmounted exposed fourth ventricle gave a VF pd that was negative with the electrode next to the brain (-5 mV) but positive with the electrode next to the CP (+2 mV).

Experiments utilizing the Ussing chamber with addition of 10^{-4} M ouabain to both sides or VF side caused a steady decrease so that the pd was less than 0.5 mV after 30 minutes. In contrast addition of ouabain to the extradural fluid side resulted in little or no change of the pd. Perfusion of ouabain (in from lateral ventricle to fourth ventricle) in an in vivo setup resulted in no change of the VF pd. Preliminary experiments changing pH in vitro resulting in little or no change of the VF pd whereas in vivo pH changes (acidosis 6.95) lowered the VF pd but the pd still remained negative. These experiments are not inconsistent with the hypothesis that the in vivo pd may arise predominantly from neural tissue.

1964 #22

DURATION OF STIMULUS AND LATENT PERIODS PRECEDING CLEAVAGE IN SAND DOLLAR EGGS

R. Rappaport, Union College, Schenectady, N. Y.

It now appears that the mitotic apparatus releases a stimulus that alters the surface so that it produces a furrow. After stimulation, the mitotic apparatus may be removed without affecting cytokinesis. To further characterize the cleavage stimulus I tried to measure the total time required for stimulus and response together and the time required for stimulus and response sepa-

rately. By centrifuging the cleaving egg at 10,000 Xg for 3 minutes the mitotic apparatus was shifted into one prospective blastomere and two furrows cut the egg into three cells. One furrow appeared in no fixed relation to the mitotic apparatus and the second (later) furrow appeared between the asters in their new position. The time between centrifugation and the appearance of the later furrow was about 10 minutes which must then be the time needed for stimulus and response. Because centrifugation imposes extreme physical stress other methods of estimation were devised.

Cells in early furrowing stages were flattened so that the mitotic apparatus was pushed into one incipient blastomere where it elicited an additional furrow. The mitotic apparatus could thus be pushed back and forth between blastomeres and it produced a new furrow in each location. The time from relocation to appearance of the new furrow was 2 minutes which again constitutes total time for stimulus and response.

In other experiments the mitotic apparatus was held in an eccentric position with the side of a needle so that furrowing was unilateral (Rappaport and Conrad, 1963). Then the unstimulated margin farthest from the mitotic apparatus was pushed inward with a glass ball and held close to the mitotic apparatus for different times. When the ball was withdrawn the margin returned to convexity and then subsequently furrowed if the stimulus period were long enough. The total time for stimulus and response by this method proved to be 3-1/2 minutes. The minimum stimulus time for production of a furrow was one minute and the time for response is, by subtraction 2-1/4 minutes.

1964 #23

DARK RECOVERY ACTIVATION BY PHOTORECOVERY IN ULTRAVIOLET IRRADIATED EGGS OF Echinarachnius parma

A. F. Rieck, Marquette University, Milwaukee, Wis.

Cleavage delay produced with ultraviolet radiation of unfertilized eggs can be reduced by photorecovery during both pre- and post-fertilization periods. Irradiated zygotes and zygotes formed from separately exposed gametes exhibit dark recovery. Unfertilized eggs are not capable of dark recovery after radiation up to two hours pre-fertilization. The uptake of H^3TDR is more rapid in zygotes which had the unfertilized egg irradiated than in normal, but the subsequent cleavage is delayed. Various combinations of irradiated gametes were made with normal and irradiated counterparts. These were studied under conditions of photorecovery and dark recovery. A combination of irradiated sperm plus irradiated eggs effects no greater delay than irradiated sperm plus normal eggs when kept in the dark. Both of these combinations respond with the same amount of photorecovery. Irradiated unfertilized eggs subjected to photorecovery before fertilization with radiated sperm and maintained in the dark exhibit a substantially shorter delay than normal eggs fertilized with irradiated sperm and stored in the dark. Thus, it appears that photorecovery of the ultraviolet lesion in unfertilized eggs enhances or activates the dark recovery mechanism which is usually observed during the post-fertilization times when DNA synthetic and cleavage mechanisms are operative.

Supported by Grant GM-10293 from the U.S.P.H.S.