

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 When the ball was withdrawn the margin returned to convexity and then subsequently furrowed if the stimulus period were long enough.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.

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

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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^3 TDR 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.

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