

## Research Reports: 1958

### Cleavage Intervals at Different Temperatures in Fertilized Eggs of *Echinarachnius parma*

Alvin F. Rieck and Eve Carol Rudich  
Marquette University School of Medicine

The cleavage interval in fertilized eggs from the sand dollar, *Echinarachnius parma*, are frequently used as experimental end points. In order to have a standard reference, quantitative data on the cleavage interval at various temperatures are necessary. In the present study, the early developmental phases studied were the intervals from fertilization through first cleavage, first cleavage through second cleavage, second cleavage through third cleavage, and the time from fertilization to a spinning blastula still encased in the membrane. These times were determined at 10°, 14°, 16°, 18°, and 20°C. It should be noted that the data for 20°C are of doubtful value since a number of irregular cleavages would occur at this temperature. The time for each interval at the specific temperature is given below in sequence of the developmental events for each temperature as listed above. 10°C - 149 ± 6 min., 74 ± 6 min., 67 ± 13 min., and 1352 ± 30 min.; 14°C - 115 ± 12 min., 45 ± 6 min., 51 ± 8 min., and 955 ± 22 min.; 16°C - 91 ± 3 min., 36 ± 3 min., 40 ± 4 min., and 824 ± 34 min.; 18°C - 92 ± 3 min., 34 ± 3 min., 28 ± 7 min., and 685 ± 31 min.; 20°C - 91 ± 7 min. for fertilization through first cleavage, and 656 ± 25 min. for fertilization to the spinning blastula. It appears that the maximum upper temperature limit for normal early development of eggs from the Salisbury Cove region is about 20°C.

### Acclimation of Oxygen Consumption to Temperature in *Fundulus heteroclitus*

Alvin F. Rieck and Eve Carol Rudich  
Marquette University School of Medicine

Males of *Fundulus heteroclitus* weighting from 1.25 to 2.25 grams were selected and placed in fresh or sea water aquaria which were maintained at 5°, 15° and 25°C. After the fish had been maintained in their experimental environment for a period of two weeks, the respiratory metabolism was determined at 15°C. for each group with the following results. The results are expressed as a mean of mm<sup>3</sup>O<sub>2</sub>/gm/hr wet weight. 5°C — sea water 120.25, fresh water 174.9; 15°C — sea water 102.9, fresh water 168.5; 25°C — sea water 73.4, fresh water 105.7. From the above it will be noted that the O<sub>2</sub> consumption when determined at a common temperature increased as the temperature of acclimation decreased. This occurred if the animals were maintained in fresh or sea water. In all cases, however, the respiratory metabolism of the fish kept in fresh water was higher than those maintained in sea water. The variability among animals was much greater in those kept in fresh water.