with a radium^{226} electron capture detector and a 50 mv recorder. Instrumental parameters were as follows:

Column:	3' x 1/4" O.D. glass packed with a 1:1 mixture of 7% QF-1 and 9% OV-17, both on 80/100 mesh Gas-Chrom Q
Injection Temperature:	250° C
Column Temperature:	226° C
Detector Temperature:	244° C
Nitrogen (Carrier) Flow Rate:	120 ml/min
Detector Voltage (DC):	12 v
Sensitivity:	3×10^{-11} amp = full scale response

Identification and quantitation of sample peaks were performed by comparison to retention times and calibration curves obtained by analysis of standard solutions of reference compounds.

1969 #3

EFFECT OF VARIOUS BARBITURATES AND MORPHINE IN THE DOGFISH

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The effects of various barbiturates are being investigated in marine species so that one may choose a suitable anesthetic. Thus far, we have investigated the effects of hexobarbital, thiopental, and pentobarbital in the dogfish (S. acanthias). Various doses were injected i.a. or i.v. to 3-4 fish at each dose and the fish were allowed to swim freely in confined tanks, observed for loss and recovery of righting reflex, period of anesthesia, and respiratory depression as measured by opercular movement. Loss of righting reflex occurred within 1 minute after injection of any of the three barbiturates at all doses studied. The duration of complete anesthesia at doses of 20 mg/kg varied from 15-20 minutes with hexobarbital to 3 hours with pentobarbital. Thus far, these studies (summarized in Table 1) would lead us to recommend a dose of hexobarbital of 20 mg/kg for short procedures and a dose of 20 mg/kg of pentobarbital when a long period of anesthesia is required in the dogfish.

Table 1

EFFECT OF VARIOUS BARBITURATES IN DOGFISH

Barbiturate	Dose mg/kg	Time of complete anesthesia	Time for recovery of righting reflex	Respiratory depression
Hexobarbital	100	Death		
	50	-	6 hrs	yes
	25	-	4 hrs	yes
	20	15-20 min	3 hrs	minimal
Thiopental	20	50 min	3 hrs	yes
Pentobarbital	20	3 hrs	6-8 hrs	yes

Because the centrally acting barbiturates produced an effect in the dogfish and because another centrally acting compound, M-99, had no effect in the dogfish (MDIBL Bulletin 8:6, 1968) we studied the effects of morphine on the overt behavior and respiration of the dogfish (measured by observation of gilling). Doses up to 20 mg/kg i.a. had no effect on the overt behavior or gilling of the dogfish when observed for 6 hours post-injection. This is in sharp contrast to the effects of the drug in mammals where morphine is a primary and continuous depressant of respiration, usually occurring maximally within 7 minutes after i.v. administration.

1969 #4

RELATIONSHIP OF MACROMOLECULAR SYNTHESIS TO MORPHOGENESIS IN Fundulus heteroclitus EMBRYOS

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The results of previous studies led to the tentative conclusion that temporal control over protein synthesis during the first few minutes after fertilization is especially critical for normal development of the teleost Fundulus heteroclitus (Bull. MDIBL 8:13-15, 1968). The investigations reported here confirm and extend this observation.

Pactamycin (20 μg/ml) has been shown to be an effective agent for inhibiting protein synthesis in Fundulus embryos. However, this had not been clearly demonstrated during the immediate post-fertilization period. Experiments were conducted to determine the extent of inhibition of protein synthesis by pactamycin when the inhibitor was added at time periods soon after fertilization (15 seconds, 2, 5, 30, and 60 minutes). Protein synthesis was measured as the extent of incorporation of ^{14}C-labeled amino acids (valine or a mixture) into hot trichloroacetic acid insoluble proteins over a two hour incubation period. Although incorporation rate is very low during the immediate post-fertilization period, it could be determined from the data that pactamycin inhibited about 70%. The 30% of protein synthesis allowed may represent a fraction which is not affected by pactamycin. However, it also may represent a differential rate of penetration of the embryo by the amino acid and the inhibitor. At least it now seems clear that protein synthesis is severely diminished by pactamycin at all stages of Fundulus development.

The ability of early embryos to undergo cell division while incubating in pactamycin was studied. In one series of investigations, several experiments were conducted in which the embryos were placed in pactamycin at various time intervals following fertilization and kept in the inhibitor continuously until termination of the study. Under normal conditions the embryos undergo first cleavage about two hours after fertilization. If the embryos were in pactamycin during the first 30 seconds post-fertilization, no cleavage occurred. When incubated in pactamycin starting any time between 30 seconds and 3 minutes post-fertilization, one cleavage occurred, the number of embryos dividing increasing as the time from fertilization increased. Introducing the inhibitor 3 minutes post-fertilization or later allowed 2 cleavages to occur and if the embryos were spared for 5 minutes or more 3 cleavages occurred. In all cases the cell division lags considerably behind the controls, the embryos are abnormal, and within two days all are dead. What appears to be particularly significant is that during the first ten minutes following fertilization, syntheses, which can be inhibited by pactamycin, are occurring which are