serosa respectively. Assuming that these fluxes are passive, since 1 uEq.hr^{-1} approximates 1 millimho partial conductance, Na and Cl account for about 80% of the total conductance.

In 3 of 6 preliminary experiments (without prior stimulation) not reported here, the sum of the Na and Cl fluxes were substantially less than the total conductance. A difficulty encountered in mounting the gland as a flat sheet was a tendency of the thick gland wall to crack when compressed between the flux chambers.

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THE EFFECTS OF ANTIMETABOLITES ON THE SAND-DOLLAR EMBRYO (Echinarachnius parma)

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During the summer of 1963, we have continued our investigations on the effects of various drugs on the developing sand-dollar embryo.

(1) The analysis of the halogenated pyrimidines, 5-fluorodeoxyuridine (FUDR), and the 5-bromo-, iodo-, and chlorodeoxyuridines, and the trifluoromethyl analogues of thymidine has been completed. These drugs all have separate, definite, and consistent effects on the embryo. The protective effects of thymidine specifically, as well as non-specific protection of the purine and pyrimidine ribosides against 5-B-I-Cl CF_3-UDR, have been analyzed. They were found to protect for up to 30 minutes after the halogenated pyrimidines were added to the fertilized eggs at the time of fertilization.

(2) Studies on purine analogues which inhibit cleavage. Adenine inhibited cleavage and more than 100 adenine analogues were examined for this activity. Of a series of related purines, made available by Burroughs Wellcome Company, (a) 8-mercapto-2-piperidino-6-aminopurine proved to be an extraordinarily effective inhibitor of cleavage and was active in a concentration of 0.6 micrograms/10cc of sea-water, (b) a 6-hydroxy analogue of the above drug was not active, and (c) the simplest analogue, 6-mercapto-2-dimethylamino-6-aminopurine, was as active as the piperidino-analogues. Certain analogues with other substitutions in the 2-position wer ineffective, and the CH_3S analogue caused a marked decrease in activity. The mechanism of action of these cleavage inhibitors is under investigation. Some of our data suggest that the active compounds do not inhibit fertilization or thymidine incorporation into the pronuclei, but prevent fusion of pronuclei.

(3) Cytosine arabinoside, a pyrimidine analogue, was found to delay the first cleavage about 30 minutes, and then the second cleavage occurred at the usual interval and the embryo recovered. Microscopic sections of the embryos showed that the pronuclei fused on schedule, but the appearance of the metaphase was delayed. The embryos were exposed to pulses of tritiated thymidine and it is now being determined if the delay was associated with a disturbance in thymidine uptake.