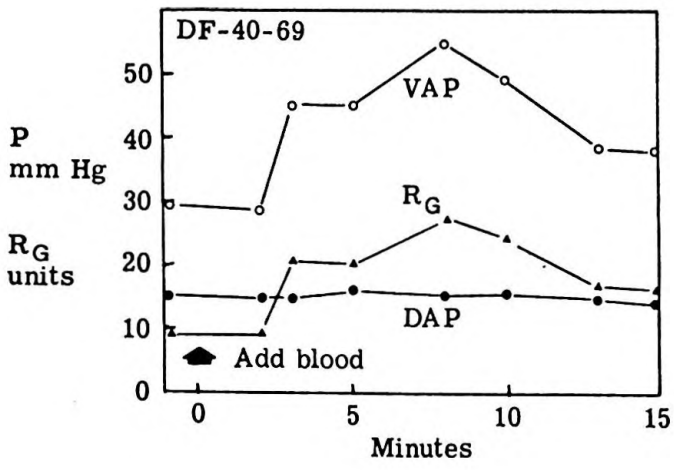

Figure 10.

gill vascular resistance if hypoxia is prolonged or profound. The substance was not epinephrine since epinephrine affects systemic resistance primarily.

6. Gill exchange and metabolism: The gills and systemic organs are in series so that constant flow perfusion of the gills can simplify studies of gill exchange or of whole body metabolism. Paired blood samples taken proximal to the perfusion circuit (mixed venous blood) and distal to the gills (dorsal aortic blood) provide data for blood entering and leaving both the gills and the systemic organs (Table 2). The lung may be bypassed, if its exchange function is not desired, or

Table 2

SOME EXCHANGE VALUES IN A PERFUSED DOGFISH

$\dot{Q}_E$ = 1.2 L/kg/hr

Substance	Venous	Arterial	Exchange/kg/hr
O_2	0.24 vol%	2.41 vol%	23.8 ml
CO_2	6.60 vol%	5.27 vol%	14.6 ml
NCA (Control)	2.1 mEq/L	1.7 mEq/L	0.5 mEq
NCA (3% CO_2)	2.6 mEq/L	0.9 mEq/L	1.7 mEq

utilized to modify the level of O_2 and CO_2. No significant modification of non-volatile materials occurs in the lung.

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1969 #29

PRELIMINARY STUDIES ON THE TOXICOLOGY OF ANTICANCER DRUGS IN S. acanthias

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A quantitative and qualitative comparison of the toxicity of typical antimetabolites and alkylating agents in poikilothermic vertebrates and mammals would be of interest. We report pre-

liminary studies on the toxicity of nitrogen mustard (HN_2) and methotrexate (MTX) to 3 kgm dogfish maintained in a 12 foot diameter plastic swimming pool with running seawater. The study was hampered by widespread eye infections, leading to bleeding and death distributed equally among treated and control fish. Certain observations, however, are of interest.

HN_2 at 1.5 mg/kgm caused a pronounced leukopenia in 3 of 3 fish studied one and two weeks after intravascular injection.

MTX at 0.1 mg/kgm daily for five days to 3 fish did not cause leukopenia. Five daily injections of 0.3 mg/kgm of MTX caused borderline leukopenia in 3 animals. In 2 dogfish, 1.0 mg/kgm MTX x 5 was a leukopenic dose. These observations should provide a background for future studies.

1969 #30

PARTIAL REVERSAL OF CHEMICAL CLEAVAGE INHIBITION BY MICROMANIPULATION

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"Anaesthetic" compounds of the older cytological literature referred to agents that would reversibly block cell division when applied in low concentrations. Many substances are unable to block division if applied after metaphase but later block the subsequent division cycle. E. B. Wilson observed that many of these agents reduce the size of the mitotic apparatus. Since the cleavage mechanism is established at or near the cell surface under the influence of the mitotic apparatus, it seemed worthwhile to explore the possibility that some part of the anaesthetic may be attributed to inability of the reduced mitotic apparatus to affect the cell surface.

Ethyl urethane, 0.52 M, in filtered seawater completely blocks cleavage in sand dollar (Echinarachnius parma) eggs and reduces the size of the living mitotic apparatus. In several experiments the reduced mitotic apparatus of treated eggs were artificially brought closer to the surface. When eggs are constricted by being partially extruded through the fertilization membrane shortly after fertilization, the mitotic apparatus frequently develops straddling the construction. In this circumstance, the distance from the mitotic apparatus to the surface is reduced. In treated, constricted eggs, slowly forming, permanent furrows appear when the mitotic apparatus straddles the construction. Furrows only appear between the asters. They do not appear in spherical eggs in the same medium or in constricted eggs where the mitotic apparatus fails to straddle the constriction. By using the side of a glass needle, the reduced mitotic apparatus was pushed and held closer to the cell surface where it elicited a furrow. Furrows formed in this way, however, were usually slower to form and eventually regressed.

Hexylene glycol enhances the size of the mitotic apparatus (Rebhun & Bernstein, J. Cell Biol. 35:111A, 1967). When sand dollar eggs are treated with 0.52 M urethane plus 0.25% hexylene glycol about half of them form furrows. About half of the furrows are permanent. Hexylene glycol does not appear to increase the distance over which the normal mitotic apparatus can act on the surface. Neither can it convert the normally unilateral furrow of cleaving Hydractinia echinata egg to a symmetrical furrow by increasing the size of the mitotic apparatus.

It would appear that the blocking effect of ethyl urethane can be partially reversed by mea-