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PROPERTIES OF THE ADENOSINE TRIPHOSPHATASE SYSTEM OF THE CELL MEMBRANES OF RED BLOOD CELLS OF THE DOGFISH SHARK (Squalus acanthias)

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Cell membrane rich fractions of hemolyzed dogfish erythrocytes have been prepared by repeated washing and centrifugation with hypotonic solutions of 100 mM tris buffer and 1 mM EDTA. Nuclei were removed by differential centrifugation. The membrane rich pellet was homogenized in the cold and diluted with tris buffer to a final concentration of 5 mg protein/ml. Some preparations were dialyzed for six hours against a 100 mM tris solution containing 1 mM EDTA. ATPase activity was assayed generally in the presence of 2.5 millimolar concentrations of ATP. Two reactions were used in the assay system. In the initial one, .75 mg of enzyme preparation was incubated in a buffered solution in the presence of ATP for twenty minutes. The reaction was stopped with 20% perchloric acid and neutralized with NaOH. The activity of the enzyme, measured in mmoles of ATP transformed, per hour per mg of protein, was assayed by the amount of ADP generated in the initial reaction. The test system consisted of phosphoenol pyruvate, ADP (the unknown), DPNH and lactic dehydrogenase. The reaction was started by the addition of pyruvate kinase, and the ADP was measured fluorometrically by the disappearance of DPNH. ATPase activity was found to be as much as 1000 times as great as values recorded for mammalian red blood cell systems. Magnesium increased the rate of the reaction by approximately twofold and the reaction was increased by an additional 50% when sodium and potassium were added to the reaction mixture. Oligomycin inhibited the NA + K + magnesium reaction, but it also exhibited some inhibitory effect with magnesium alone. Ouabain also produced some inhibition but this was less than that observed with oligomycin. 2 - 4 Dinitrophenol variously inhibited and stimulated the ATPase activity. Studies are currently in progress to further define the characteristics of the stimulatory effect of cations and of the inhibitory effects of oligomycin and ouabain.

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THE DEVELOPMENT OF NEURAL CONTROL OF ALIMENTARY MOTOR FUNCTION IN THE VERTEBRATES - A COMPARATIVE STUDY

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Representatives of three classes of vertebrates were studied as to their neurophysiological mechanisms that control gastrointestinal motility. Serotonin, acetylcholine, and epinephrine given intravenously (I.V.), intraarterially (I.A.) and intraluminally (I.L.) were used to determine

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