competitive inhibition. After 2 - 3 control periods, which included taking quantitative urine collections and blood samples, various salts were given i.v. Administration of sodium thiosulfate depressed sulfate excretion to one-fourth of control values in the two fish examined, and thiosulfate replaced sulfate in the urine. Thiosulfate also markedly depresses the tubular reabsorption of sulfate in the dog (Berglund, unpublished). Thiosulfate and sulfate therefore seem to share the same transport mechanism in the renal tubules, both when sulfate is transported from tubular lumen to blood, as in the dog, or in the opposite direction, as in the goosefish.

Competition between calcium and magnesium was studied in a similar manner. Injection of $MgCl_2$ almost completely inhibited the tubular excretion of calcium. CaC12, however, did not seem to have any effect on magnesium excretion when its plasma concentration was elevated in a few experiments. This is not surprising in view of the fact that magnesium normally is excreted more actively, appearing in 5-10 times as high concentration as calcium in goosefish urine.

Organic basses

Creatine and trimethylamine-oxide occur in considerable concentration in urine of freshly caught goosefish. Under laboratory conditions trimethylamine-oxide excretion rapidly diminishes, whereas creatine excretion remains relatively constant. Injections of glycine or creatinine did not affect the excretion of creatine and trimethylamine-oxide. Injection of tetraethylammonium bromide had no effect on creatine excretion but completely inhibited trimethylamine-oxide excretion.

Trimethylamine-oxide and tetraethylammonium seem to be excreted by a common mechanism distinct from that which transports creatine and creatinine.

Experimental Study of Calcification In Sand Dollar Embryos

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This report deals with an experimental study of the formation of the skeletal system in the embryos of *Echinorachnius parma* with particular reference to the possible role acid polysaccharides may play in the process.

Embryos exhibit metachromasia when treated with methylene blue and toludin blue in the periphally located epithelium of the blastula, gastrula and pluteus larvae. Radio autographs of comparable stages reared in the presence of S-35 shows that S-35 is localized in the epithelium of these embryos exclusively. The combined techniques demonstrate fairly conclusively the presence of a sulphated polysaccharide localized in the surface epithelium of the developing embryo.

The second part of this study was designed to test the effect of toludin blue on the development of the skeleton in this form. In mammals it has been reported that toludin blue inhibits or prevents in vitro calcification when in combination with a polysaccharide by competing for available calcium. Our observations reveal that the dye has an over all inhibiting effect on the growth of the embryo which in no sense can be construed as specific for the skeletal system. A similar effect was observed with a dissimilar dye neutral red and other substances.

In another group of experiments, embryos were reared at reduced temperatures, 2 degrees C. Untreated specimens developed normally but at much reduced rates. When these embryos were subjected to either Toludin blue or protamine at reduced temperatures, embryos developed with a completely invaginated gut yet showing no skeletal elements at all.

The observations reported above show that the embryo is separated from its aqueous environment by a cellular membrane rich in sulphated acid polysaccharides. The combination of Toludin blue with this substance cannot be interpreted as a calcium competing mechanism. Several factors such as reduced ion availability, reduced temperatures, blocking of cell pores, as well as a depolymerizing effect resulting from a modification of the electric charge on the membrane are suggested as the possible mechanisms whereby ionic transfer may be modified.

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Electrophoretic Patterns of Sera From Various Animals As Contrasted With Patterns of Human Sera.

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Paper electrophoretic patterns of sera were prepared from four or more individuals from each of the following species: (1) Squalus acanthias, (2) Lophius piscatorius, (3) Ameriurus melas, (4) Rana pipiens, (5) garter snake (Thamnophis), cormorant (Phalacrocorax), human. Buffers used varied in pH from 5. 4-8.6, potentials 100 - 110 volts, current 6-12 milliamperes; duration 8-20 hours.

In striking contrast to the five protein components of human sera only three or four were observed in the other animals. Linear migrations of protein components of sera from these animals were only approximately in the range of alpha, beta, and gamma globulins and albumen of human sera. The relative proportions were usually very different. Sera from the shark (Squalus acanthias), for example, contained three protein components: (1) a small component (1% - 5%) which migrates to the cathode beyond the range of human gamma globulin; (2) a large component