nitrogen but no uric acid or urea. Ammonical nitrogen accounted for 85-105% of the total nitrogen excreted. Acidification of the inflow fluid produced an increase, and alkalinization produced a decrease of total NH_4^+-NH_3 concentrations in outflow fluid, suggesting that non-ionic diffusion is the final step involved in ammonia excretion. Whether the ammonia is made available for excretion enzymatically is unsettled. These data suggest that: 1) The major end product of nitrogen metabolism in the tunicate is ammonia 2) Uric acid concretions arise as a result of precipitation in the blind renal vesicles because of its presence in "plasma," its relative insolubility and the fact that it is not excreted in significant amount in outflow fluid.

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The Relationship Between Temperature And Plasma pH And CO_2 Tension In The Turtle, Pseudemys Scripta Elegans

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A series of measurements of plasma pH and CO_2 tension in the turtle, Pseudemys scripta elegans, performed in Pittsburgh showed average valves of 7.49 and 41 mmHg respectively. Measurements of these parameters in another group of the same species in Salisbury Cove, Maine showed an average pH of 7.72 and an average CO_2 tension of 20 mmHg. The only obvious difference between the two groups was the ambient temperature which averaged between 26 - 28° in Pittsburgh and 16 - 18° in Salisbury Cove. It seemed of interest to investigate the relationship between temperature and plasma CO_2 tension and pH.

A group of 11 turtles was studied. Each turtle was exposed to temperatures of 10°, 24° and 37° C. The length of exposure to each temperature was approximately 24 hours. The order of exposure was varied so that all three possible orders of exposure were represented. Following each exposure, blood was withdrawn by means of intracardiac puncture and plasma pH, CO_2 tension and bicarbonate concentration measured at the given ambient temperature. An increase in ambient temperature (body temperature) invariably leads to an increase in CO_2 tension (10°: pCO_2 = 19 mmHg; 24°: pCO_2 = 28 mmHg; 37°: pCO_2 = 56 mmHg). Plasma pH tends to fall with increasing temperature (10°: pH = 7.66; 24°: pH = 7.63; 37°: pH = 7.44). Plasma HCO_3^- concentration tends to rise with increasing temperature (10°: HCO_3^- = 30 mM/L; 24°: HCO_3^- = 34 mM/L; 37°: HCO_3^- = 36 mM/L). Turtle blood measured "in vitro" at these three temperatures showed an increase in CO_2 tension, a fall in pH and an unchanged HCO_3^- concentration with increasing temperature.

The obvious mechanism for the changes in CO_2 tension as a function of temperature appears to be related to the effect of temperature on 6 CO_2.

These changes are physiologically significant since the turtle is exposed to similar temperatures during the course of normal existence. If CO_2 tension and pH turn out to be temperature dependent functions in most poikilotherms, it may well be that from the evolutionary standpoint, close regulation of temperature and narrow regulation of pH and CO_2 tension are parallel developments.

Dogfish Coelomic Fluid: I. Chemical Anatomy

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The coelomic cavity of the dogfish, S. acanthias, contains a considerable volume of a generally clear watery fluid. In 1929 Homer Smith defined some of the chemical characteristics of this fluid in a variety of elasmobranchs. It seemed of interest to re-investigate and extend these classical observations. Particular emphasis has been placed on a comparison of the relative composition of coelomic fluid and plasma. Nine fish were obtained relatively fresh from the trawl and approximately simultaneous samples of plasma and coelomic fluid withdrawn. Analyses were performed for the following constituents: total osmolarity, sodium, potassium, calcium, magnesium, pH, bicarbonate, urea, uric acid, total protein, and protein electrophoresis. The results are as follows:

(See Table Of Analyses On Page 70)

These data indicate the following:

1. Dogfish coelomic fluid is significantly more acid than plasma. The distribution of chloride, bicarbonate and sodium ions between plasma and coelomic fluid cannot be explained on a simple Donna basis.
2. Dogfish coelomic fluid contains substantially more Cl^- than does plasma. This anion excess (79 meq/L) is partially but not fully explained by an excess of Na^+ (33 meq/L). If NH_4^+ ion obeys non-ionic diffusion in this fluid, then a substantial part of the cation gap may be related to this ion.
3. The protein concentration of coelomic fluid is low, in this respect resembling other relatively isolated fluid compartments like spinal fluid and aqueous humor.
4. Coelomic fluid is in osmotic equilibrium with plasma.
5. The ratios $\frac{(Ca^{++})\ C.F.}{(Ca^{++})\ P}$ and $\frac{(Mg^{++})\ C.F.}{(Mg^{++})\ P}$ show a reasonably reciprocal relationship.