dividual. Most measurements have been based on direct weights before and after drying. Such studies have lead to estimates by different workers of total body water in the dogfish ranging from 46% to 80%. No studies have been performed using the dilution of appropriate substances which distribute themselves through body water to approximate total body water. There has been no simultaneous measurements of T.B.W. and E.C.F. to approximate intracellular fluid volume (I.C.F.). The substance N-acetyl 4-aminoantipyrine (NAAP) has been shown to distribute itself in tissue in proportion to the water and to be negligibly bound to plasma proteins. It has therefore been used for measurements of T.B.W. in dog and man. In the dogfish following the intravascular injection of 0.50 gms. of NAAP, a relative plateau of plasma concentration is reached in four hours. This plateau is based on the fact that no excretion takes place across the gills and urinary excretion, although present, is quite small and may be ignored from the practical standpoint. Simultaneous measurements of the four-hour sucrose space permit the calculation of I.C.F. as follows:

$$\text{T.B.W.} = \frac{\text{NAAP injected}}{\text{Plasma NAAP concentration} \times 0.93}$$
(time 4 hrs.)

I.C.F. = T.B.W. - E. C. F. (sucrose space)

These measurements were performed in 16 dogfish. T.B.W. averaged 2.28 ± 0.98 L. which amounted to $66.1 \pm 2\%$ of body weight. I.C.F. averaged 1.46 ± 0.72 L. which amounted to $44 \pm 5.5\%$ of body weight.

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Nitrogen Metabolism In The Tunicate, Halicynthia Pyriformis

Gerald P. Rodnan, Eugene D. Robin, and Margaret H. Andrus
University of Pittsburgh Medical School

Tunicates occupy a key position in evolution. The larval form is free swimming and has a definite notochord. The adult form is sessile and without a well-defined central nervous system. It seemed of interest to investigate the pattern of nitrogen metabolism in this animal. "Plasma" was obtained by bronchial puncture through the outflow siphon and measurements of plasma NH_4^+-NH_3, uric acid and urea nitrogen were performed in approximately 20 adults. Mean value for NH_4^+-NH_3 was 183 ± 32 uM/L; plasma uric acid averaged 0.66 ± 0.58 mg.%; blood urea levels were operationally 0 mg%.

Partition of nitrogen excretion was performed as follows: an indwelling polyethylene catheter was placed in the outflow siphon. The organism clamped the orifice tight and quantitative collections of efflux fluid could be performed. Infusions of desired composition could be administered by a similar catheter placed in the inflow siphon. Analysis of outflow fluid revealed the presence of significant quantities of ammonical 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

Eugene D. Robin
University of Pittsburgh Medical School

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.