

Dogfish Coelomic Fluid: II. Acid-Base Characteristics

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The coelomic fluid of the dogfish, *S. acanthias* is markedly acid as compared with plasma, showing an approximately 60-fold hydrogen ion gradient. The function of this fluid and the mechanism responsible for the steep hydrogen ion gradient are not known. It seemed of interest to investigate the possible function of this fluid as an area of buffering. The relationship between plasma and coelomic fluid composition was investigated after the intravascular injection of the following:

1. 1.5 gm of sucrose (12 fish)
2. 1.0 gm of 5, 5 Dimethyl-2, 4-oxazolidinedione, D.M.O. (6 fish)
3. 40 mM of NaHCO_3 (6 fish)
4. 2 meq of H_2SO_4 (6 fish)

The results are as follows:

1. Sucrose is virtually excluded from coelomic fluid for periods up to 24 hours (10 of 12 fish). From this standpoint, coelomic fluid resembles "intra" and not "extra" cellular fluid.

2. At equilibrium (4-6 hours) the distribution of D.M.O. obeys non-ionic diffusion so that

$$\frac{(\text{H}^+)_{\text{pl}}}{(\text{H}^+)_{\text{CF}}} = \frac{(\text{DMO}^-)_{\text{CF}}}{(\text{DMO}^-)_{\text{pl}}}$$

3. At the end of one hour, a substantial portion of infused HCO_3^- is buffered in coelomic fluid (ΔpH plasma = +0.64; ΔpH C.F. = to .37). The amount of HCO_3^- buffering in this compartment must be considered in computing overall HCO_3^- balance in the dogfish.

4. At the end of one hour, there is no buffering of infused H_2SO_4 in coelomic fluid (ΔpH plasma = -0.17; ΔpH C.F. = +0.15). Whether this represents H^+ exclusion, exclusion of sulfate; a circulatory phenomenon. or some other mechanism remains to be elucidated.

Acid-Base Characteristics Of Perivisceral Fluid Of The Turtle. *Pseudemys Scripta Elegans*

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Homer Smith (1929) demonstrated that the perivisceral fluid of semi-aquatic turtles was unusually alkaline in pH and that its bicarbonate concentration was approximately 2 to 2.5 times the bicarbonate concentration of turtle plasma. It seemed of interest to investigate the changes in acid-base parameters in perivisceral fluid that were produced by modifying plasma pH.

During control conditions plasma values were as follows: pH averaged 7.72 (16 observations); pCO_2 averaged 21 mmHg (15 observations) and plasma bicarbonate concentration averaged 36.6 mM/L (15