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Distribution of Quinine in the Dogfish (*S. acanthias*)

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The distribution of certain weak organic electrolytes between plasma and cerebrospinal fluid in the dog was shown to depend in pKa and lipid solubility of the compound and the pH of the two phases. The presence of acid pericardial fluid in the dogfish prompted an investigation of the distribution of quinine, a lipid soluble weak organic base, between plasma and pericardial fluid, extradural fluid (EDF) and ventricular fluid (VF).

Quinine was determined fluorometrically in a 3% metaphosphoric acid filtrate. In mammalian plasma quinine is 90% bound, however in dogfish plasma about 40% bound. Protein concentrations and paper electrophoretic patterns were obtained for dogfish plasma, EDF and VF. Four samples of plasma contained 2.4-3.4 gm/100ml protein, two samples of EDF contained 1.0-1.7 gm/100 ml. VF was essentially protein-free. The electrophoretic patterns of plasma and EDF were identical, and similar to those previously reported for elasmobranch plasma protein in that albumin was apparently absent.

After quinine injection in dogfish, plasma quinine concentrations were variable and unexpectedly high. Quinine added to blood was quantitatively recovered, but plasma contained only 25% of the blood concentration. Blood was carefully withdrawn from dogfish injected with quinine. It was immediately centrifuged in the cold, and plasma was carefully removed. Blood quinine concentrations were 8-30 times plasma quinine; red cell quinine was 25-40 times plasma quinine; buffy coat quinine was 70-360 times plasma quinine. When 15-60 minutes elapsed before separating cells and plasma, or when the blood was handled so as to cause cell damage or allowed to become warm, the blood/plasma ratio fell to 4, and the cell/plasma ratios fell to 8-12. Plasma quinine concentrations rose 3-6 fold. These observations can account for the high, variable plasma concentrations previously found, and constitute an example of the problems encountered in drug distribution studies. In preliminary, technically satisfactory, experiments quinine was found to be evenly distributed between plasma and VF and EDF, and was concentrated 3-60 times in acid pericardial fluid.

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