

Evaluation of concurrent plasma, whole blood, and cardiac muscle taurine and carnitine concentrations in a group of purpose-bred mongrel dogs

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Background: Taurine and carnitine are two amino acids important for appropriate cardiac function. Low concentrations of both are associated with the development of dilated cardiomyopathy in dogs, though the relationship between blood and myocardial levels is poorly understood. Whole blood taurine is considered a more accurate representation, as plasma taurine concentrations are more variable and affected by fasting. However, the relationship of whole blood and plasma to myocardial taurine concentrations is unknown. Plasma and myocardial carnitine concentrations are reported to be poorly correlated.

Hypothesis: We hypothesized that fasting whole blood taurine concentrations would most closely correlate to myocardial taurine concentrations. Furthermore, no correlation between plasma and myocardial carnitine was expected.

Materials and Methods: Thirty-six mongrel dogs were fed Purina Dog Chow™ for at least 60 days. Plasma and whole blood samples were obtained after an 18-hour fast and submitted for analysis of taurine and carnitine (total, free, and carnitine esters) concentrations. Right ventricular endomyocardial biopsies were obtained and samples were submitted for analysis of taurine and carnitine concentrations. Data were analyzed using a linear regression model.

Results: Average \pm standard deviation of whole blood, plasma, and myocardial taurine concentrations were 280.7 ± 44.3 nmol/mL, 69.7 ± 21.2 nmol/mL, and 106.1 ± 46.8 nmol/mL (range 27-173), respectively. A linear correlation between whole blood and plasma taurine was statistically significant ($p= 0.001$). No correlation was observed between whole blood and myocardial taurine samples ($p= 0.8$). A trend was appreciated between plasma and myocardial taurine samples ($p= 0.059$), and a significant correlation between myocardial and free carnitine concentrations was also noted ($p = 0.03$).

Conclusions: Surprisingly, the data suggest that *fasted plasma* samples may offer the closest correlation to myocardial taurine and carnitine concentrations. These preliminary results shed light into important clinical diagnostics that may be useful for determining myocardial nutritional deficiencies among certain cohorts.