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**SERUM XANTHINE OXIDASE ACTIVITY
IN DOGS WITH ISCHAEMIC DISORDERS**

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the degree of Master of Veterinary Science at Massey University**

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Abstract

This thesis has focused on the measurement of the serum xanthine oxidase activity in dogs with diseases which involve ischaemia-reperfusion injury. The pathophysiology of ischaemia-reperfusion injury, the production of oxygen derived free radicals (ODFRS), their deleterious effects, the endogenous protective mechanisms against ODFRS, and the structure, function, distribution and kinetics of xanthine oxidase, have been reviewed.

Xanthine oxidase activity in blood and tissues can be measured using a variety of assays of uric acid production over time. A spectrophotometric assay was developed for use with canine serum, and studies were undertaken to assess the linearity and reproducibility of the assay. The effect of storage temperature and duration on the activity of bovine milk xanthine oxidase in canine serum, was investigated. The serum xanthine oxidase activity was measured in "healthy" dogs, and in dogs presented to the veterinary clinic with diseases likely to involve ischaemia-reperfusion injury.

Xanthine oxidase activity followed zero order kinetics after a short burst phase. The intra-assay and inter-assay coefficients of variation were less than or equal to 5.5% and 12.8%, respectively. Bovine milk xanthine oxidase was stable in serum stored at -20°C or -80°C for 90 days. A wide range of serum xanthine oxidase activity were measured in clinically "healthy" dogs (0-363 mU/l) and values obtained did not assume a Gaussian distribution. Using nonparametric methods, a reference interval, containing 95% of the xanthine oxidase activities, was determined to be 0-204 mU/l. The serum xanthine oxidase activity was not dependent upon age or sex.

Compared with "healthy" dogs, the sick dogs had significantly higher serum xanthine oxidase activities. The serum xanthine oxidase activity was significantly higher following reperfusion (treatment with intravenous fluids), than prior to treatment. There was a statistically insignificant trend towards higher serum xanthine oxidase activities in dogs with more severe clinical signs relating to the cardiovascular system, but the serum xanthine oxidase activity did

not appear to be useful in predicting patient survival.

Circulating xanthine oxidase may be involved in the development of complications that are seen relatively frequently following ischaemia-reperfusion injury in dogs. Xanthine oxidase may react with purine substrates in the plasma, producing large amounts of ODFRS throughout the body, resulting in widespread capillary endothelial damage, and the attraction of inflammatory cells into organs some distance from the original site of ischaemia and reperfusion.

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Table of Contents

Abstract	ii
Acknowledgements	iv
Table of Contents	v
List of Tables	vii
List of Figures	viii
Chapter 1. The Role of Xanthine Oxidase in Ischaemia-Reperfusion Injury	1-69
Introduction	1
1.1 Pathophysiology of Ischaemia-Reperfusion Injury	2
1.2 Oxygen Derived Free Radicals	12
1.3 Xanthine Oxidase	25
1.4 Ischaemic Disease in Which High Serum Xanthine Oxidase Activity is a Possible Consequence	40
References	51
Chapter 2. Development of a Spectrophotometric Assay for Measuring Xanthine Oxidase Activity in Canine Serum and the Effect of Storage Temperature and Duration on Xanthine Oxidase Activity	70-91
Introduction	70
Materials and Methods	72
Results	76
Discussion	83
References	88

Chapter 3.	Serum Xanthine Oxidase Activity in “Healthy” Dogs and the Estimation of a Reference Interval	92-111
	Introduction	92
	Materials and Methods	94
	Results	96
	Discussion	101
	References	108
Chapter 4.	Serum Xanthine Oxidase in Dogs Undergoing Ischaemia-Reperfusion	
	Injury	112-130
	Introduction	112
	Materials and Methods	115
	Results	117
	Discussion	120
	References	125
Chapter 5.	Conclusions	131-133

List of Tables

Table 1.1	Blood, Serum and Pulmonary Xanthine Oxidase Activity in Various Species	30
Table 1.2	Serum Xanthine Oxidase Activity (mU/l) in the Blood From the Ventricles of 2 Dogs	30
Table 1.3	Xanthine Oxidase Activity of Various Tissues In Dogs	31
Table 1.4	Xanthine Oxidase Activity in the Tissues of Various Species	32
Table 2.1	Measured and Actual Xanthine Oxidase Activities	78
Table 2.2	Intra-assay Variation Data for Specimens Containing High and Moderate Xanthine Oxidase Activity	80
Table 2.3	Inter-assay Variation Data for Specimens Containing High and Moderate Xanthine Oxidase Activity	80
Table 2.4	Mean Xanthine Oxidase Activity \pm Standard Deviation After Storage at +4, -20 and -80°C for up to 90 Days	81
Table 2.5	Optimum pH for Xanthine Oxidase Activity in Various Tissues and in the Presence of Various Buffer Types	83
Table 3.1	Serum Xanthine Oxidase Activity in 39 Clinically Healthy Dogs	97
Table 3.2	Some Potential Factors Influencing Serum Enzyme Activities	103
Table 4.1	Pre-reperfusion and Post-reperfusion Serum Xanthine Oxidase Activity, Severity of Clinical Signs of Cardiovascular Compromise and Outcome in 30 Sick Dogs	119

List of Figures

Figure 1.1	The Haber Weiss Reaction	5
Figure 1.2	The Formation of Hydroxyl Radical by Fenton Chemistry	5
Figure 1.3	The Formation of Superoxide by NADPH Oxidase	7
Figure 1.4	The Production of Hypochlorous Acid by Myeloperoxidase	7
Figure 1.5	The Pathophysiology of Ischaemia-Reperfusion Injury	9
Figure 1.6	The Chain Reaction of Lipid Peroxidation by Oxygen Derived Free Radicals	16
Figure 1.7	The Relationship Between and Interconversion of Xanthine Dehydrogenase, Intermediate Xanthine Dehydrogenase/Oxidase and Xanthine Oxidase	26
Figure 1.8	Formation of Uric Acid from Hypoxanthine, Catalysed by the Xanthine Oxidase System	28
Figure 1.9	The Effect of Temperature of Reaction on Enzyme Activity	35
Figure 1.10	The Effect of Substrate Concentration on Reaction Velocity	36
Figure 1.11	Kinetics of Reactions Catalysed by Enzymes	37
Figure 2.1	Enzyme Kinetics of Bovine Milk Xanthine Oxidase in Canine Serum ..	76
Figure 2.2	The Change in Absorbance (Reaction Rate) at Varying Xanthine Oxidase Activities	77
Figure 2.3	The Effect of Varying Quantities of Canine Serum on the Reaction Rate (Change in Absorbance)	78
Figure 2.4	Reaction Rates, With or Without Oxonate	79
Figure 2.5	The Effect of Storage Temperature and Duration on the Activity of Bovine Milk Xanthine Oxidase Stored in Canine Serum	82
Figure 3.1	Distribution of Serum Xanthine Oxidase Activity in 39 Clinically Healthy Dogs	98
Figure 3.2	Logarithmic Transformation of the Reference Distribution of Serum Xanthine Oxidase Activity in 39 Clinically Healthy Dogs	98
Figure 3.3	Square Root Transformation of the Reference Distribution of Serum Xanthine Oxidase Activity in 39 Clinically Healthy Dogs	99
Figure 3.4	Serum Xanthine Oxidase Activity of 39 Clinically Healthy Dogs of Various Ages	100
Figure 3.5	Cumulative Percentile Plot of Xanthine Oxidase Activity	101