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ASSAY OF URINARY ENZYMES IN THE DOG AND CAT

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The purpose of this study was to estimate the usefulness of urinary enzyme assays as a diagnostic indicator or renal diseases in the dog and cat. The activities of γ -GTP, ALP, LAP, NAG, LDH and LDH isozyme were assayed. The results were summarized as follows:

1) Activities of urinary enzymes in single specimens from 29 clinically normal Labrador Retriever dogs were γ -GTP: 1.18 ± 0.34 I. U./mg Cr, ALP: 1.16 ± 0.83 I. U./mg Cr, LAP: 0.33 ± 0.08 I. U./mg Cr, NAG: 0.11 ± 0.06 I. U./mg Cr, LDH: 0.40 ± 0.32 I. U./mg Cr, LDH₁: $53.0 \pm 16.8\%$, LDH₂: $20.5 \pm 6.0\%$, LDH₃: $10.2 \pm 6.8\%$, LDH₄: $4.4 \pm 4.2\%$, LDH₅: $12.6 \pm 7.7\%$. And those of 10 mongrel dogs were γ -GTP: 2.40 ± 1.19 I. U./mg Cr, ALP: 2.51 ± 1.74 I. U./mg Cr, LAP: 0.37 ± 0.22 I. U./mg Cr, NAG: 0.07 ± 0.05 I. U./mg Cr, LDH: 0.58 ± 0.32 I. U./mg Cr, LDH₁: $35.8 \pm 18.6\%$, LDH₂: $22.7 \pm 6.3\%$, LDH₃: $20.4 \pm 7.4\%$, LDH₄: $8.4 \pm 6.0\%$, LDH₅: $12.8 \pm 10.2\%$.

2) Activities of urinary enzymes in single specimens from 13 clinically normal cats were γ -GTP: 1.28 ± 0.50 I. U./mg Cr, ALP: 2.51 ± 1.74 I. U./mg Cr, LAP: 0.24 ± 0.19 I. U./mg Cr, NAG: 0.13 ± 0.13 I. U./mg Cr, LDH: 0.29 ± 0.20 I. U./mg Cr, LDH₁: $67.0 \pm 21.5\%$, LDH₂: $12.8 \pm 7.0\%$, LDH₃: $8.2 \pm 7.2\%$, LDH₄: $6.4 \pm 7.0\%$, LDH₅: $5.6 \pm 5.7\%$.

3) The ranges of diurnal variation and urinary enzyme activities in 4 dogs and 2 cats were relatively wide, and the C. V. of both were about 30% on an average.

4) Renal cortecies of dogs had the highest enzyme activity, particularly in γ -GTP, ALP, LAP of source organs among renal medulla, ureter, urinary bladder, prostate and uterus. Renal cortecies of cats had lower activities than that of dogs.

5) Gentamicin (10mg/kg) was given to a dog every 8 hr for 9 days to produce experimental renal failure. The findings of urinalysis showed increase of urine volume, decrease of urinary specific gravity, proteinuria, glucosuria, celluria and enzymuria. Elevation in the activities of the urinary enzymes preceded rises in levels of Cr and BUN in serum. Histological examination of serial renal biopsy specimens showed granular degeneration of the proximal tubules.

6) Assays of urinary enzymes were not in normal ranges in the clinical cases of renal failure in dogs and cats.

The results of this study suggest that assays of urinary enzymes are more sensitive indicators of renal damage than traditional renal function tests, and that additional diagnostic information can be gained if the assays are used side by side with conventional tests.