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Author(s)	MATSUOKA, Shizuo
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DIAGNOSTIC SIGNIFICANCE OF
URINARY ENZYMES IN VETERINARY PRACTICE

Shizuo MATSUOKA
Veterinary Hospital
Faculty of Veterinary Medicine
Hokkaido University, Sapporo 060, Japan

Evaluation of urinary enzyme activities was carried out in normal dogs, cats and cows, in addition to which tissue enzyme activity was analyzed in cows after slaughter. Furthermore, urinary enzyme assays were carried out in clinical cases and in nephrotoxicity experimentally induced by intravenous (i.v.) injection of mercuric chloride (HgCl_2 : 2 mg/kg). The enzymes assayed were ALP, GGT, NAG, and LDH and its isoenzymes.

The results are summarized below:

1. Activities of urinary enzymes in single specimens from 4 clinically normal male dogs were LDH: 13.5 ± 4.7 IU/g u-crea, ALP: 2.7 ± 1.0 IU/g u-crea, GGT: 14.0 ± 5.1 IU/g u-crea, NAG: 2.4 ± 1.4 IU/g u-crea, and M/H: 0.38 ± 0.15 . Those of 9 female dogs were LDH: 8.3 ± 3.0 IU/g u-crea, ALP: 3.9 ± 4.0 IU/g u-crea, GGT: 25.3 ± 9.9 IU/g u-crea, NAG: 4.8 ± 4.0 IU/g u-crea, and M/H: 0.23 ± 0.06 .

2. Activities of urinary enzymes in single specimens from 7 clinically normal male cats were LDH: 7.9 ± 5.1 IU/g u-crea, ALP: 38.8 ± 23.0 IU/g u-crea, GGT: 19.4 ± 10.3 IU/g u-crea, NAG: 4.4 ± 3.5 IU/g u-crea, and M/H: 0.23 ± 0.10 . Those of 3 female cats were LDH: 16.2 ± 9.2 IU/g u-crea, ALP: 15.2 ± 12.3 IU/g u-crea, GGT: 13.9 ± 1.0 IU/g u-crea, NAG: 12.1 ± 9.1 IU/g u-crea, and M/H: 0.19 ± 0.01 .

No significant differences between sexes for each urinary enzyme activity were observed in dogs and cats.

3. Activities of urinary enzymes in single specimens from 60 clinically normal cows were LDH: 14.7 ± 11.9 IU/g u-crea, ALP: 0.99 ± 0.73 IU/g u-crea, GGT: 5.0 ± 3.6 IU/g u-crea, NAG: 0.89 ± 0.75 IU/g u-crea, and M/H: 0.13 ± 0.09 .

4. In the cows, the renal cortices and medullae had high enzyme activities for all enzymes assayed. ALP and GGT were particularly high in the renal cortices. The renal papillae and ureter also had relatively high LDH and NAG activities.

5. Nephrotoxicity in dogs was elevated when the activities of the urinary enzymes experimentally induced preceded rises in the levels of BUN and creatinine on day 1. The extremely high urinary enzyme activities on day 1 dropped rapidly during the days that followed, without returning to the normal range. The urinary LDH₅ and M/H ratios increased along with a rapid rise of total urinary LDH activity.

6. In clinical cases, urinary enzyme activity was high in cats and cows with renal disease. It was further observed that the urinary LDH activity in dogs, cats and

cows was high in cases of urosis even though they had no apparent renal disease. However, the urinary LDH isoenzymes varied with the pathological status of the urinary system. The urinary ALP, GGT and NAG activities in dogs and cats with chronic renal failure were observed to be low.

These results suggest that assays of urinary enzymes, more particularly the urinary LDH isoenzymes which reflect the pathological status, are a more sensitive indicator of urosis than those for BUN and creatinine. Therefore, these methods appear to be useful means for the diagnosis of urosis.