



## Use of Bumetanide in Horses

December 9, 1976

Dear Sir:

In the article "Use of Bumetanide, a Potent Diuretic, to Obtain Urinary Samples for Dope Testing in Horses," (*AJVR*, Nov, 1976), Frey et al, report on the use of a diuretic, bumetanide, to obtain postrace urine samples for equine dope testing. These workers concluded that use of bumetanide "did not interfere with the detection of doping drugs" and that "by enhancing the clearance of drugs used for doping, bumetanide even provides favorable conditions for the detection of such drugs." It is our belief that these statements should be treated with caution.

Inspection of the data provided by Frey et al does indeed show that the concentration of amphetamine in the urine of the 2 horses tested was probably not affected by bumetanide treatment. This is in good agreement with results obtained in our laboratory, which have shown no substantial effects of furosemide treatment on urinary concentrations of procaine or methylphenidate. It thus seems that furosemide or bumetanide, both acidic high-ceiling diuretics, may produce little change in the concentration of basic, highly lipid soluble drugs in equine urine.

The situation with phenobarbital is, however, strikingly different. Frey et al show that bumetanide reduced urinary concentrations of phenobarbital eightfold in one experiment, threefold in another. These limited data suggest a substantial reduction in the urinary concentration of phenobarbital by bumetanide, which will make its routine detection in a sample of limited size much more difficult.

In our hands, furosemide treatment reduced urinary concentrations of phenylbutazone up to 15-fold and rendered it difficult to detect in routine screening tests.<sup>1</sup> These observations, similar to those observed with phenobarbital by the authors, strongly suggest that use of diuretics such as bumetanide and furosemide can substantially reduce the concentration of some drugs in equine urine. This reduction in concentration is very important in routine testing, where the size of the urine sample available to the laboratory is limited.

A number of important doping drugs such as apomorphine are detected in equine urine primarily as highly water-soluble glucuronides, which enter the urine by glomerular filtration and are then concentrated by renal concentrating mechanisms. It is probable that the urinary concentrations of these metabolites will be greatly (15- to 18-fold) reduced by the diuretic effect of drugs such as bumetanide or furosemide and their de-

tection in routine dope testing rendered that much more difficult.

In summary, we believe that the conclusions of the authors concerning the use of bumetanide in dope testing may be misleading when applied to certain drugs in the routine dope testing situation, since both bumetanide and the closely related furosemide can be shown to greatly reduce the urinary concentration of important doping drugs. While these concentration changes may not be critical for work performed in a research laboratory, they can mean the difference between success and failure to detect dope in routine drug testing.

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## Reference

1. Roberts, B. L., Blake, J. W., Tobin, T.: Drug Interactions in the Horse. Effect of Furosemide on Plasma and Urinary Levels of Phenylbutazone. *Res Commun Chem Pathol Pharmacol*, 15, (1976): 257-265.

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