

**Summary of Medication Recommendations
Pennsylvania Horse and Harness Racing Commissions**

Updated September 16, 2009

Anabolic & Androgenic Steroids

Glucocorticoids (triamcinolone acetonide, dexamethasone, methylprednisolone acetate)

NSAID (phenylbutazone, flunixin, naproxen, nabumetone)

Methocarbamol

1. Anabolic and androgenic steroids.

As of October 1st, 2008, the **Pennsylvania Horse and Harness Racing Commissions** prohibited the use anabolic and androgenic steroid in all horses competing in the State of Pennsylvania. No anabolic steroids (ABS) will be allowed in horses competing in the state of Pennsylvania. The exceptions are 100 pg/ml of plasma for boldenone, nandrolone, and stanozolol. Testosterone greater than 100 pg/mL plasma is not allowed in the female or gelded male horse. Acceptable plasma concentrations of natural occurring testosterone of 2000 pg/ml and 500 pg/ml nandrolone have been established for the intact male horse.

Elimination from plasma of anabolic and androgenic steroids following a single intramuscular injection can be variable and a period of at least 30 to 60 days should be allowed before entering a horse in an official race (**Figures 1 and 2**). To assure compliance out-of-competition testing for anabolic and androgenic steroids is available in the State of Pennsylvania. Information for submitting an unofficial out-of-competition plasma sample for anabolic or androgenic steroids is available at all Pennsylvania Tracks.

Human Chorionic Gonadotrophin (HCG) provocative test is available to determine if a gelding is truly a gelding and not a monorchid, cryptorchid or has some remaining residual testicular tissue. Contact a Commission Veterinarian or Commission track manager for more information.

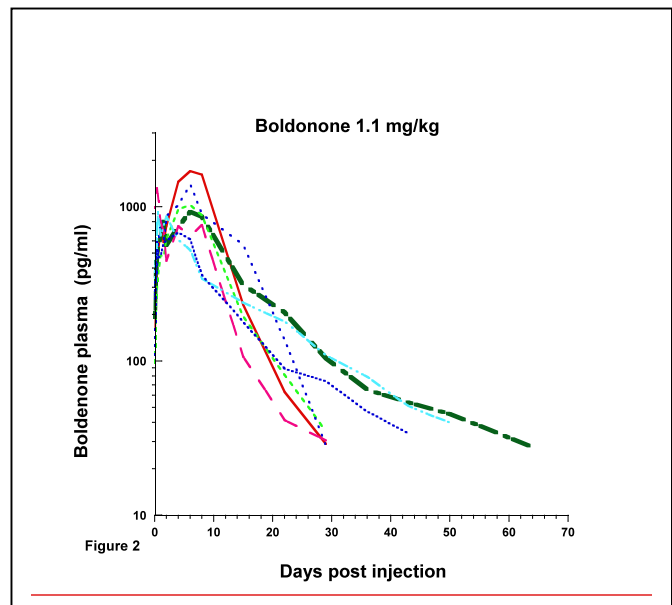
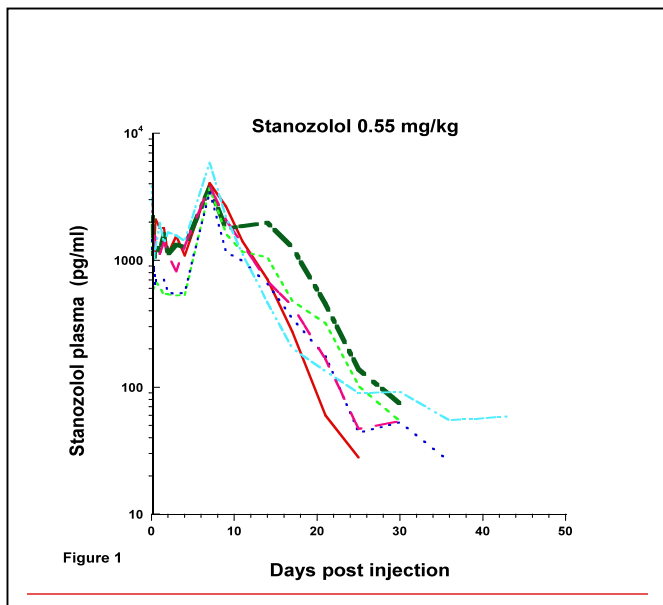


Figure 1 Plasma concentrations of stanozolol following the IM injection of 0.55 mg/kg in 7 horses.

Figure 2 Plasma concentrations of boldenone following the IM injection of 1.1 mg/kg in 6 horses.

References:

Guan F, Uboh CE, Soma LR, Luo Y, Rudy J and Tobin T (2005) Detection, quantification and confirmation of anabolic steroids in equine plasma by liquid chromatography integrated with tandem mass spectrometry *Journal of Chromatography B* **829**:56-68.

Soma LR, Uboh CE, Guan F and McDonnell S (2008) Plasma concentrations of testosterone and 19-nortestosterone (nandrolone) in the non-racing intact male horse by liquid chromatography-mass spectrometry. *Journal of Veterinary Pharmacology & Therapeutics* **31**:587-590.

Soma LR, Uboh CE, Guan F, McDonnell S and Pack J (2007) Pharmacokinetics of Boldenone and Stanozolol and the Results of Quantification of Anabolic and Androgenic Steroids and in Race Horses and Non-Race Horses. *J. Vet. Pharmacol. Therap.* **30**:1-8.

2. Glucocorticoids: As of June 1st, 2009, the **Pennsylvania Horse Racing Commission** is regulating the intra-articular injections of glucocorticoids, to no less than 7 days prior to race-day. This policy dictates that the plasma concentration of all the exogenously administered glucocorticoids must be below the level of quantification.

Plasma concentration of triamcinolone acetonide (Vetalog[®]) (20 mg) and methylprednisolone acetate (Depo-Medrol[®]) (200 mg) administered via the intraarticular route were below the level of quantification at 7 days.

Plasma concentration of the intramuscular administration of triamcinolone acetonide (Vetalog[®]) at a dose of 20 mg was quantified in plasma for up to 14 days. It is recommended that this route of administration for Vetalog[®] and Depo-Medrol[®] be discontinued.

Plasma concentration of the intravenous administration of dexamethasone (Azium solution) (25 mg) was below the level of quantification at 48 hours post injection.

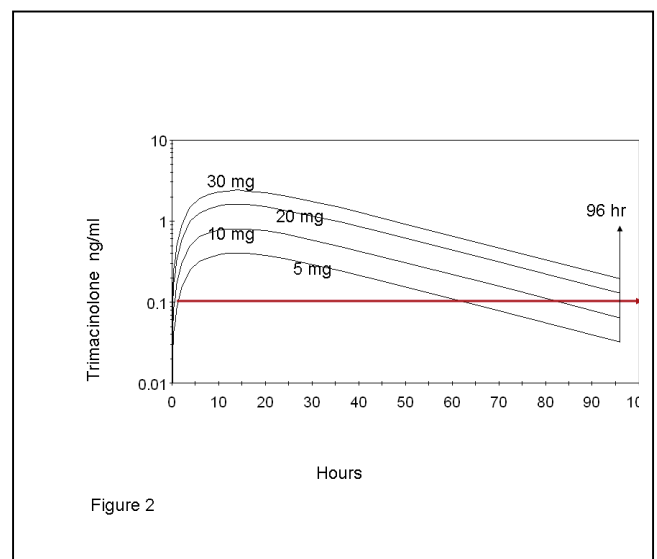
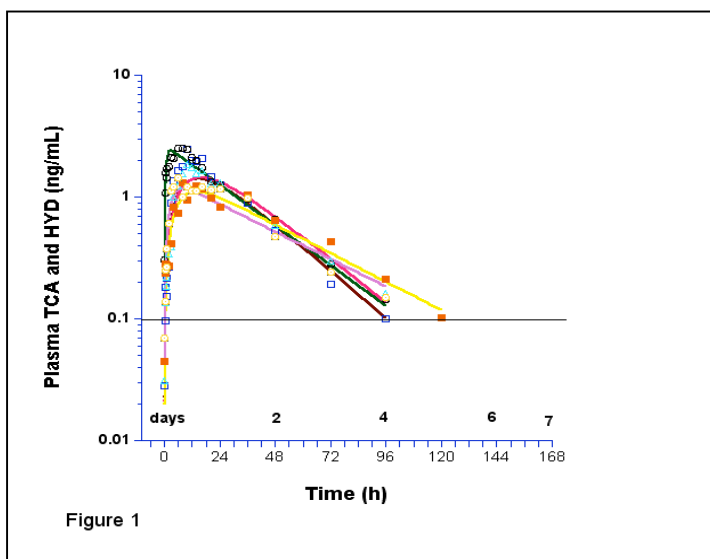
Plasma concentration of the intravenous administration of triamcinolone (20 mg) was below the level of quantification at 48 hours post injection.

See illustrations below

Triamcinolone acetonide (Vetalog[®]) - IA administrations.

Figure 1. Data points of the administration of 20 mg IA of triamcinolone acetonide to 6 horses. The solid line is the level of quantification (0.1 ng/ml).

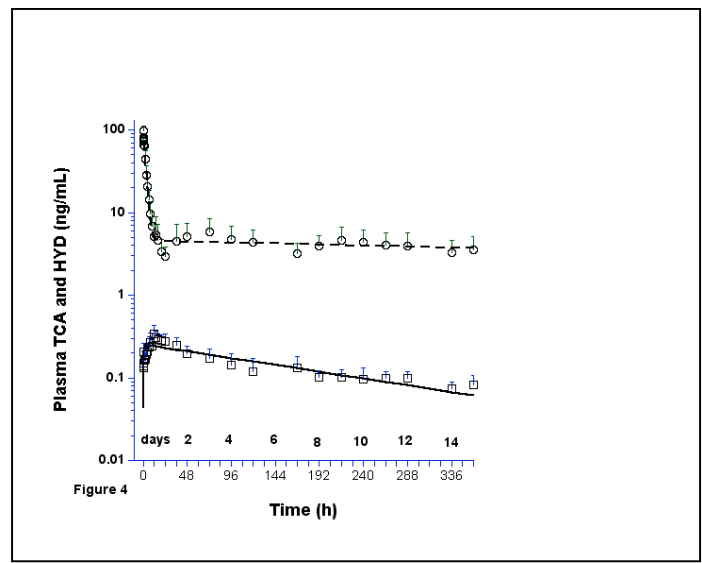
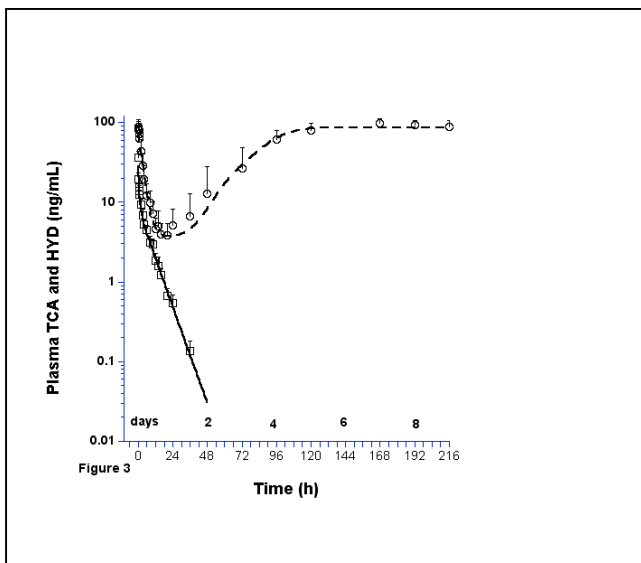
Figure 2. Simulation of plasma concentration of 5, 10, and 30 mg of triamcinolone acetonide base on the 20 mg dose administered IA. The solid line is the level of quantification (0.1 ng/ml).



Triamcinolone acetonide (Vetalog®) - IV and IM

Figure 3. Plasma concentration of triamcinolone acetonide (TA) (—□—) following the IV injection of 0.04 mg/kg and changes in endogenous hydrocortisone (—○—) from baseline (0 hours). Suppression and recovery of plasma hydrocortisone concentration are illustrated relative to the changes in the plasma concentration of TA (Mean and SD).

Figure 4. Plasma concentration of triamcinolone acetonide (TA) (—□—) following the IM injection of 0.04 mg/kg and changes in endogenous hydrocortisone (—○—) from baseline (time 0 hours). Suppression and no recovery of plasma hydrocortisone concentration are illustrated relative to the changes in the plasma concentration of TA (Mean and SD).



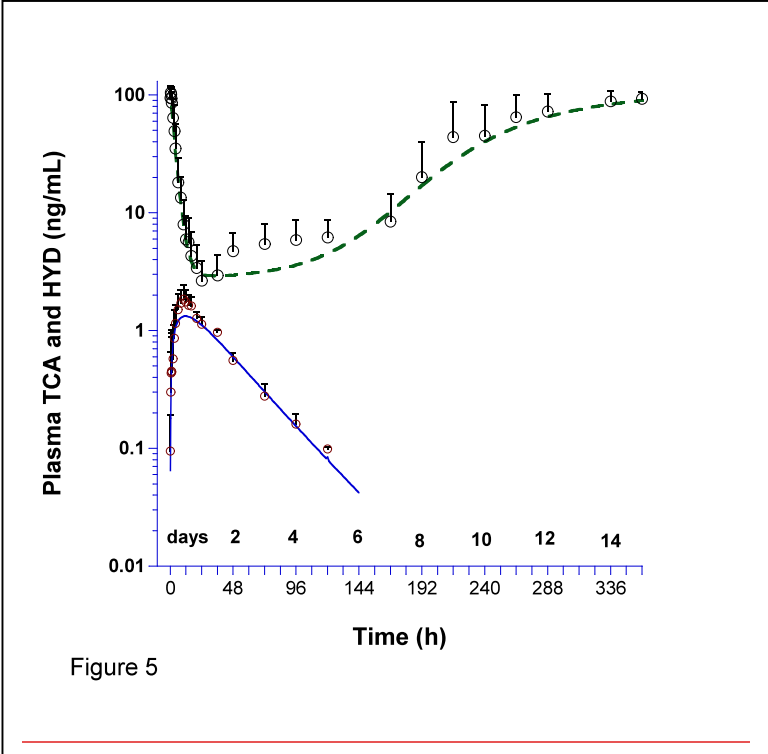
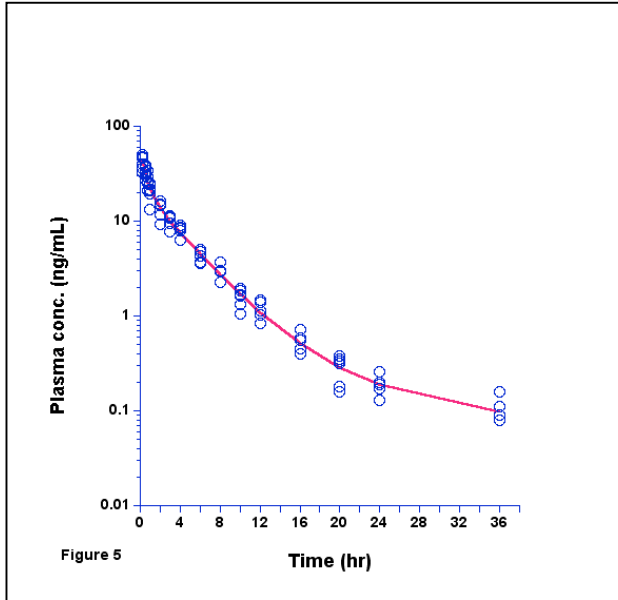


Figure 5. Plasma concentration of triamcinolone acetonide (TA) (—□—) following the IA injection of 0.04 mg/kg and changes of endogenous HYD (—○—) from baseline (0 hours). Suppression and recovery of plasma HYD concentration are illustrated relative to the changes in the plasma concentration of TA. Solid and dashed lines are the best fits for plasma TA and HYD concentrations, respectively. Mean and SD of 6 horses.

Dexamethasone (Azium®) - IV

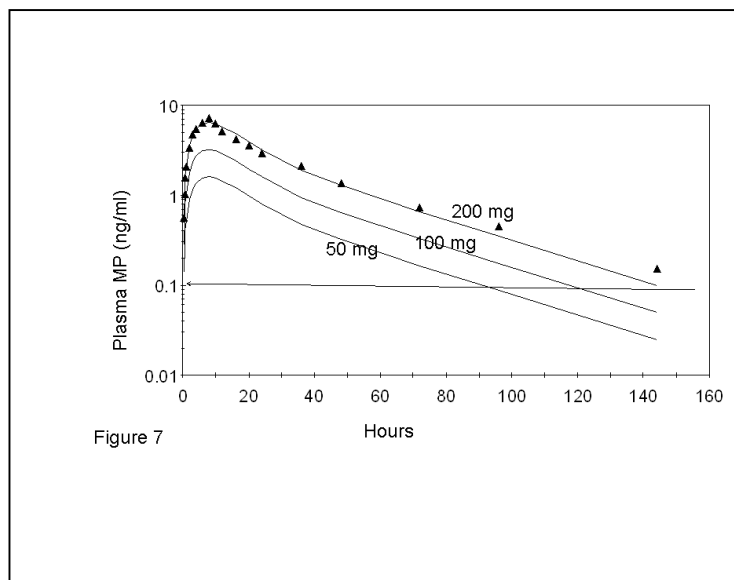
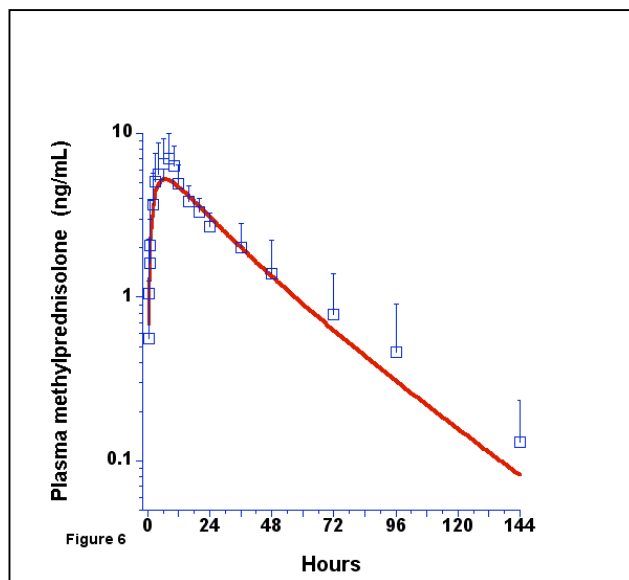
Figure 5a. Plasma concentration of DXM (—) following IV administration of 25 mg (0.05mg/kg). Solid line is the population mean best fit for DXM.



Methylprednisolone acetate (Depo-Medrol®) administered IA

Figure 6. Plasma concentration of MP (—) following IV administration of 200 mg IA. Solid line is the population mean best fit for MP (Mean and SD).

Figure 7. Simulation of plasma concentration of 100 and 50 mg of methylprednisolone acetate base on the 200 mg dose administered IA. The solid line is the level of quantification (0.1ng/ml).



References:

- Luo Y, Uboh CE, Soma LR, Guan FY, Rudy JA and Tsang DS (2005b) Simultaneous analysis of twenty-one glucocorticoids in equine plasma by liquid chromatography/tandem mass spectrometry. *Rapid Communications in Mass Spectrometry* **19**:1245-1256.
- Soma LR, Uboh CE, Luo Y, Guan F, Moate PJ and Boston RC (2005) Pharmacokinetics of dexamethasone with pharmacokinetic/pharmacodynamic model of the effect of dexamethasone on endogenous hydrocortisone and cortisone in the horse. *Journal of Veterinary Pharmacology & Therapeutics* **28**:71-80.
- Soma LR, Uboh CE, Luo Y, Guan F, Moate PJ, Boston RC, Soma LR, Uboh CE, Luo Y, Guan F, Moate PJ and Boston RC (2006) Pharmacokinetics of methylprednisolone acetate after intra-articular administration and its effect on endogenous hydrocortisone and cortisone secretion in horses. *American Journal of Veterinary Research* **67**:654-662.

Flunixin:

Pennsylvania Horse and Harness Racing Commissions dose not consider the finding of flunixin in urine a violation. The corresponding plasma sample is analyzed by LC-MS and is a violation when the plasma concentration is in excess of 20 ng/ml. Flunixin at 1.1 mg/kg administered IV 24 hours prior to race day should not result in a violation.

The IM or SQ administration may result in a violation, due to a slower absorption pattern in the horse. Oral paste formulations should not be used. If oral route of administration is selected and the preparation is fed

in grain, the grain should be removed immediately following consumption to avoid later consumption of small amounts of medication remaining in the feed bucket.

Phenylbutazone

Pennsylvania Horse and Harness Racing Commissions allow a plasma concentration of 5 ug/ml on race day. The 2-gram administration 24 hours prior to race day should be administered IV.

Stacking: Pennsylvania Horse Racing Commission does not allow the presence of 2 non-steroidal anti-inflammatory drugs (NSAID) or “stacking” on race day. If both are used for treatment during training and phenylbutazone is the NSAID of choice on race day flunixin should be withdrawn 48 hours prior to racing. If flunixin is the NSAID of choice on race day phenylbutazone should be withdrawn 72 hours prior to racing.

Naproxen

Naproxen is a nonsteroidal anti-inflammatory drug (NSAID) used for the treatment of myositis and other inflammatory conditions in horses. In horses with experimentally induced myositis, naproxen was considered to be therapeutically more effective than phenylbutazone in providing relief of inflammatory swelling and the associated lameness. The recommended dose is 5 mg/kg IV and 10 mg/kg orally twice daily for 14 days. The reported bioavailability in the horse is 50 %.

Plasma and synovial concentrations of naproxen after IV administration of 5.0 mg/kg (~ 2.5 grams/horse) is shown in **Figure 1**. The highest plasma concentration of naproxen was 55.3 ug/ml at 5 minutes and at 48 hours after its administration the plasma concentration was 0.61 ug/ml.

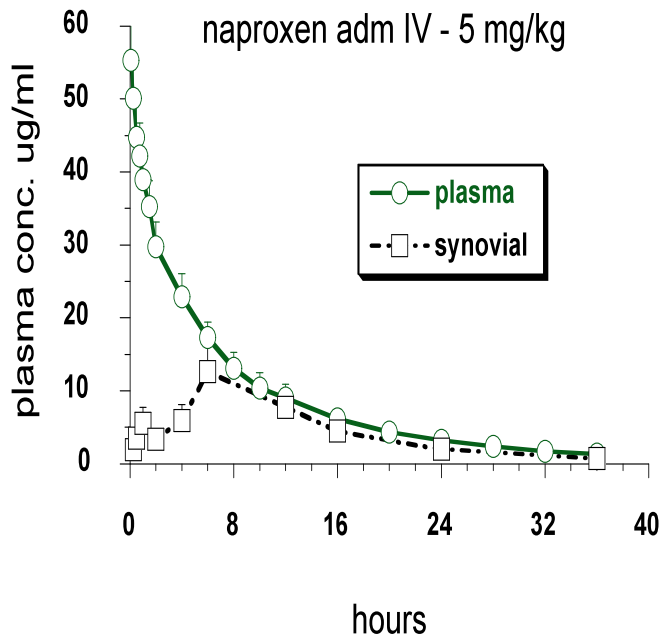


figure 1

Recommendation: At least 48 hours should be allowed following a single IV dose of 5 mg/kg.

References

Soma LR, Uboh CE, Rudy JA, Perkowski SZ. Plasma and synovial fluid kinetics, disposition and urinary excretion of naproxen in the horse. *Am J Vet Res* 56(8):1075-1080, 1995.

Nabumetone

This drug has a similar structure to naproxen and due to the long half life of nabumetone at least 48 hours should be allowed following a single oral dose of 3.7 mg/kg.

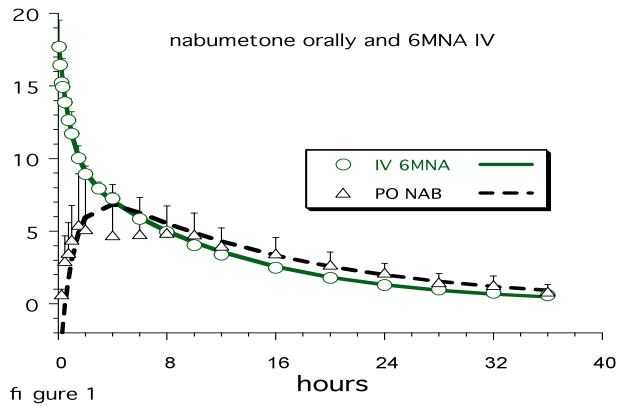


figure 1

Following the oral administration of nabumetone, **(Figure 1)** the drug is absorbed from the gastrointestinal tract and is metabolized to 6MNA. The plasma concentration of 6MNA after oral administration of 3.7 mg/kg of nabumetone peaked at ~2 to 3 hours, with concentrations of ~5.4 ug/ml. The absorption half-life ranged from 0.42 to 2.48 hours. Elimination half-life of the metabolite 6MNA was 11 hours with a range of 9.3 to 12.7 hours. The elimination half-life was slightly longer than that of naproxen.

References

Soma LR, Uboh C, Rudy J, Smith M. Disposition and excretion of 6MNA in the Horse: The Active Metabolite of Nabumetone. *Am J Vet Res* 57(4) 517-521, 1995.

Methocarbamol

Pennsylvania Horse and Harness Racing Commissions do not allow the administration of any drug within 24 hours of the post-time of the first race. The figure below shows the plasma concentration vs time curves of the administration of 2.2 mg/kg (100 mg/100 lbs of body wt) to 6 horses. The formulation of methocarbamol was from a compounding pharmacy with a labeled concentration of 100 mg/ml. The solution in which the drug was dissolved was not indicated on the label.

The range of total doses administered in the study was 1111 to 1265 mg by IV. Methocarbamol is rapidly eliminated with a mean terminal elimination half-life of 1.6 h (range 1.4 to 2.0 h). The Limit of Quantification (LOQ) is 1 ng/ml and the plasma concentration at 24 hours must be below the LOQ. In the administration of methocarbamol, a number of factors must be taken into consideration; the administration must be performed outside the 24-hour period, the variable weights of the horses being medicated and the knowledge that the solution being administered is not from an FDA approved company with consistent quality control standards.

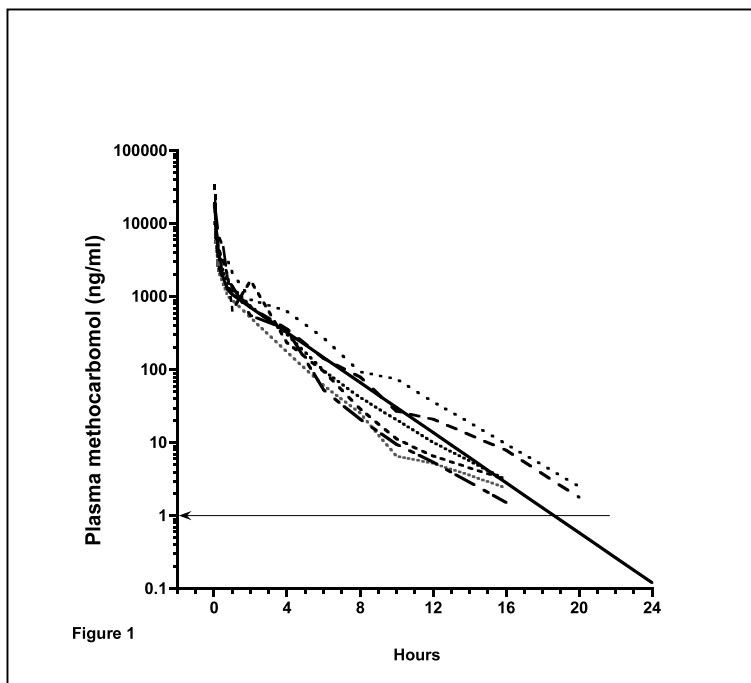


Figure 1. The plasma concentration vs time curves of the administration of 2.2 mg/kg (100 mg/100 lbs of body wt) to 6 horses. The solid line is the line of best fit of the 6 horses. The limit of quantification of the method is 1 ng/ml.