RMTC/RCI Controlled Therapeutic Substances

Reference Chart

Controlled Therapeutic Substance	Reference
Acepromazine	Wieder, M.E., *Identification of acepromazine and its metabolites in horse plasma and urine by LC-MS/MS and accurate mass measurement*, Chromatographia, 75:635-43 (2012). (Methodology); UC Davis data (summary chart available); McGree, J. M., Noble, G., Schneiders, F., Dunstan, A. J., McKinney, A. R., Boston, R. and Sillence, M., *A Bayesian approach for estimating detection times in horses: exploring the pharmacokinetics of a urinary acepromazine metabolite.* Journal of Veterinary Pharmacology and Therapeutics. doi: 10.1111/j.1365-2885.2012.01389.x (2012)
Albuterol	Boehringer Ingelheim VetMedica, Inc ., FOIA Summary, New Animal Drug Application NADA 141-180 Torpex; Wieder, M.E., *Detection and Pharmacokinetics of Salbutamol in Thoroughbred Racehorses Following Inhaled Administration*, J. Vet. Pharmacol. Therap., 38: 47-41 (2014)
Betamethasone	LGC Study – submitted for publication (summary chart available); see also, Knych, H.K., *et al.*, *Pharmacokinetics of Betamethasone in Plasma, Urine and Synovial fluid Following Intra-Articular Administration to Exercised Thoroughbred Horses*, Drug Testing and Analysis, doi: 10.1002/dta.2170 (2017). Luo Y, *et al*., *Resolution, quantification, and confirmation of betamethasone and dexamethasone in equine plasma by liquid chromatography/tandem mass spectrometry*, Rapid Communications in Mass Spectrometry, 19: 825-832 (2005)
Butorphanol	Knych, H., *Pharmacokinetics and pharmacodynamics of butorphanol following intravenous administration to the horse*, J. vet. Pharmacol. Therap. 36(1):21-30 (Feb. 2013)
Cetirizine	Knych, H. K., Stanley, S. D., Arthur, R. M., McKemie, D. S., *Elimination of cetirizine following administration of multiple doses to exercised thoroughbred horses*, J. vet. Pharmacol. Therap. doi: 10.1111/jvp.12318 (2016)
Cimetidine	Knych, H. K., Stanley, S. D., Arthur, R. M., McKemie, D. S., Disposition of the anti-ulcer medications ranitidine, cimetidine, and omeprazole following administration of multiple doses to exercised Thoroughbred horses, J. vet. Pharmacol. Therap. doi: 10.1111/jvp.12328 (April 2016)

Controlled Therapeutic Substance	Reference
Clenbuterol	Knych, H., *Detection, pharmacokinetics and cardiac effects following administration of clenbuterol to exercised horses*, Equine Vet Journal. 46(3):380-85 (May 2014); Read JR, *et al., Effect of prolonged administration of clenbuterol on airway reactivity and sweating in horses with inflammatory airway disease*, Am J Vet Res. 73(1):140-45(Jan. 2012); Soma LR, *et al*., *Pharmacokinetics, disposition and elimination of clenbuterol in the horse*, J. Vet. Pharmacol. & Therap. 27: 71-77 (2004); Soma LR, *et al*., *Tissue distribution of clenbuterol in the horse*, J. Vet. Pharmacol & Therap. 27: 91-98 (2004); Guan F, *et al*., *Quantification of Clenbuterol in Equine Plasma, Urine and Tissue by Liquid Chromatography coupled on-line with Quadrupole Time-of-Flight Mass Spectrometry (LC/QTOF-MS/MS)*, Rapid Commun. in Mass Spectrom. 16: 1642-1651 (2002)
Dantrolene	Knych, H., *Pharmacokinetics and metabolism of dantrolene in horses*, J. vet Pharmacol. Therap., 34: 238-46 (June 2011)
Detomidine	L'ami, J.J., *Sublingual administration of detomidine in horses: Sedative effect, analgesia and detection time*, Vet. Journal. 196(2): 253-9 (May 2013); Knych, H.K. and Stanley, S., *Pharmacokinetics and Pharmacodynamics of Detomidine Following Sublingual Administration to Horses*, AJVR. 72(10): 1378-1385; Grimsrud, K.N., *et al., Pharmacokinetics of Detomidine and its Metabolites Following Intravenous and Intramuscular Administration in Horses*, Equine vet. J. 41: 1-5 (2009); Mama, K.R., *et al., Plasma Concentrations, Behavioural and Physiological Effects Following Intravenous and Intramuscular Detomidine in Horses*, Equine vet. J. 41(8): 772-77 (2009)
Dexamethasone	Soma, L., *Pharmacokinetics of dexamethasone following intra-articular, intravenous, intramuscular, and oral administration in horses and its effects on endogenous hydrocortisone*, Journal of Veterinary Pharmacology and Therapeutics, 36: 181–191 (April 2013); Soma LR, *et al*., *Pharmacokinetics of Dexamethasone in the Horse and a Pharmacokinetic/Pharmacodynamic Model of the Effect of Dexamethasone on Endogenous Hydrocortisone and Cortisone*, Journal of Veterinary Pharmacology & Therapeutics. 28: 71-80 (2005);

Controlled Therapeutic Substance	Reference
	Luo Y, *et al*., *Resolution, quantification, and confirmation of betamethasone and dexamethasone in equine plasma by liquid chromatography/tandem mass spectrometry*, Rapid Communications in Mass Spectrometry, 19: 825-832 (2005)
Diclofenac	Anderson, D., *Urinary and serum concentrations of diclofenac after topical application to horses*, Vet. Ther., 6(1): 57-66 (2005)
DMSO	Blythe, L.L., *Pharmacokinetic disposition of dimethyl sulfoxide administered intravenously to horses*, Am. J. Vet. Res., 47(8): 1739-43 (Aug. 1986)
Firocoxib	Knych, H.K., *Detection and pharmacokinetics of three formulations of firocoxib following multiple administrations to horses*, Equine Vet J., 46(6): 734-8 (Nov 2014); University of Florida – LGC Lexington preparing publication (summary chart available)
Flunixin	Soma, L.R., *Disposition and excretion of flunixin meglumine in horses*, Am. J. Vet. Res., 49(11): 1894-98 (Nov. 1988); See also, Knych, H.K., *et al.*, *Pharmacokinetics and effects on thromboxane B2 production following intravenous administration of flunixin meglumine to exercised thoroughbred horses*, J. vet. Pharmacol. Therap., 38(4): 313-20 (2015); Luo Y, *et al*., *Quantification and Confirmation of Flunixin in Equine Plasma by Liquid Chromatography-Quadrupole Time-Of-Flight Tandem Mass Spectrometry (LC/Q-Tof-MS/MS),* Journal of Chromatography B. 801(2): 173-184 (2004); Soma LR, *et al*., *Plasma concentration of flunixin in the horse: Its relationship to thromboxane B2 production*, J Vet Pharmacol. Ther. 15: 292-300 (1992)
Furosemide	Chay, S., *The pharmacology of furosemide in the horse v. Pharmacokinetics and blood levels of furosemide after intravenous administration*, Drug. Metab. Dispos., 11(3): 226-31 (May/June 1983); Soma LR, *et al*., *The effects of furosemide on racing times of Standardbred Pacers*, Equine Vet Journal. 32(4): 334-340; Soma LR, Uboh CE. *Review of furosemide in horse racing: its effects and regulation,* Vet Pharmacol. Thera. 21: 228-240 (1998); Maxson AD, *et al*., *Effects of furosemide, exercise and atropine on tracheal mucous transport rate of the horse*, Am J Vet Res. 56: 908-912 (1995); Uboh C, *et al*., *Plasma concentrations of furosemide vs. specific gravity of urine in predicting the dose of furosemide in racehorses*, Res Comm Chem Path and Pharm. 201-218 (1992);

Controlled Therapeutic Substance	Reference
	Uboh CE, *et al*., *Characterization of bromhexine and ambroxol in equine urine: Effects of furosemide on identification and confirmation,* J Pharmaceut Biomed Analysis. 9: 33-39 (1991); Sweeney CR, *et al*., *Questions experimental-design is study on effects of furosemide on racing time of thoroughbreds* – Reply So American Journal of Veterinary Research. 51(9): 1505-1506 (Sep. 1990); Sweeney CR, *et al*., *Effects of furosemide on the racing times of Thoroughbred racehorses*, Am J Vet Res. 51: 772-778 (1990) Soma LR, *et al*., *Effects of furosemide on racing times of horses with exercise-induced pulmonary hemorrhage*, Am J Vet Res. 46: 763-768 (1985); Raphel-Sweeney CF, Soma LR. *Exercise-induced pulmonary hemorrhage in Thoroughbred breezing and racing: Response to furosemide or hesperidin citrus bioflavonoids*, J Am Vet Med Assoc. 185: 195-197 (1984); Soma LR, *et al*., *The effects of furosemide on the plasma, urinary concentration and excretion of fentanyl: A model for the study of the interaction of drugs in the horse*, Am J Vet Res. 45: 1743-1749 (1984)
Glycopyrrolate	Rumpler, M., *Pharmacokinetics of glycopyrrolate following intravenous administration in the horse*, J. Vet Pharmacol. Therap. 34(6): 605-8 (Dec 2011)
Guaifenesin	Knych, H. K., *et al*., *Pharmacokinetics of guaifenesin following administration of multiple doses to exercised Thoroughbred horses,* J. vet. Pharmacol. Therap. doi: 10.1111/jvp.12287 (Jan. 2016)
Isoflupredone	Benson, D., *Development of a plasma threshold and withdrawal guidance for isoflupredone administered intra-articularly and subcutaneously*, proceedings of the 20th International Conference of Racing Analysts and Veterinarians. 315-23 (2014); Knych, H.K., *et al.*, *Disposition of isoflupredone acetate in plasma, urine, and synovial fluid following intra-articular administration to exercised thoroughbred horses*, Drug Test. Analysis, E-publication ahead of print, DOI 10.1002/dta.1834 (June 2015)
Ketoprofen	Knych HK, Arthur RM, Steinmetz S, McKemie DS; *Pharmacokinetics of ketoprofen enantiomers following intravenous and oral administration to exercised Thoroughbred horses*, *The Veterinary Journal* 207, 196–198 (2016); Sams, R., *Pharmacokinetics of ketoprofen after multiple intravenous doses to mares*, J. Vet. Pharmacol. Ther., 18(2): 108-16 (1995);
Lidocaine	EHSLC Data, Iowa State (summary available)

Controlled Therapeutic Substance	Reference
	See also, Sillence, M., *The pharmacokinetics of equine medications*, RIRDC publication. (Jan. 2012)
Mepivacaine	EHSLC Data *See also,* Sillence, M., *The pharmacokinetics of equine medications*, RIRDC publication (Jan. 2012)
Methocarbamol	Rumpler, M., *et al*., *The pharmacokinetics of methocarbamol and guaifenesin after single intravenous and multiple-dose oral administration of methocarbamol in the horse*, J. Vet. Pharmacol. Therap., 37(1): 25-34 (Feb. 2014); Knych, H.K. et al., *Pharmacokinetics of Methocarbamol and Phenylbutazone in Exercised Thoroughbred Horses*, J. Vet. Pharmacol. Therap., E-publication ahead of print: DOI: 10.1111/jvp.12298 (2016).
Methylprednisolone	Soma, L. R., *Pharmacokinetics of methylprednisolone acetate after intra-articular administration and its effect on endogenous hydrocortisone and cortisone secretion in horses*, Am. J. Vet. Res. 67(4): 108-16 (Apr. 2006); Knych, H., *et al.*, *Disposition of methylprednisolone acetate in plasma, urine, and synovial fluid following intra-articular administration to exercised thoroughbred horses*, J Vet Pharmacol Ther. 37(2): 125-32 (Apr. 2014)
Omeprazole	Knych, H. K., Stanley, S. D., Arthur, R. M., McKemie, D. S., Disposition of the anti-ulcer medications ranitidine, cimetidine, and omeprazole following administration of multiple doses to exercised Thoroughbred horses, J. vet. Pharmacol. Therap. doi: 10.1111/jvp.12328 (April 2016)
Phenylbutazone	Chay, S., *Population distributions of phenylbutazone and oxyphenbutazone after oral and i.v. dosing in horses*, Am. J. Vet. Res., 67(4): 654-62 (Dec. 1984); Soma LR. *Et al*., *The use of phenylbutazone in the horse,* [Review] Journal of Veterinary Pharmacology & Therapeutics. 35(1): 1-12 (Feb 2012); [Journal Article. Research Support, Non-U.S. Gov't. Review] You Y, *et al*., *Screening, quantification, and confirmation of phenylbutazone and oxyphenbutazone in equine plasma by liquid chromatography-tandem mass spectrometry*, J Anal Toxicol. 33(1): 41-50 (Jan.-Feb. 2009); Soma LR, *et al*., *Plasma and serum concentrations of phenylbutazone and oxyphenbutazone in racing Thoroughbreds 24 hours after various dosage Regimens*, Am J Vet Res. 46: 932-938 (1985); Chay, S., *et al.*, *Ti population-distributions of phenylbutazone and oxyphenbutazone after oral and IV dosing in horses,* Journal of Vet. Pharmacol. and Therapeutics 7(4): 265-76 (1984)*;* Soma LR, *et al*., *Phenylbutazone kinetics and metabolite concentrations in the*

Controlled Therapeutic Substance	Reference
	horse following five days of administration, Am J Vet Res. 44: 2104-2109 (1983); Gunson D, Soma LR, R*enal papillary necrosis in horses after phenylbutazone and water deprivation,* Vet Path. 20: 603-610 (1983)
Prednisolone	Peroni, D.L., *et al.*, *Prednisone per os is likely to have limited efficacy in horses,* Equine Vet J. 34(3): 283-7 (May 2002).
Procaine Penicillin	Kuchembuck, N.L, *Plasma Concentration and Local Anesthetic Activity of Procaine Hydrochloride Following Subcutaneous Administration to Horses,* American Journal of Veterinary Research. 68(5): 495-500 (2007); Uboh CE, *et al*., *Comparison of Pharmacokinetics of Procaine Penicillin-G with Procaine Hydrochloride and Penicillin-G Administration in the Horse*. Am. J. Vet. Res. 61(7): 811-815 (2000)
Ranitidine	Knych, H. K., Stanley, S. D., Arthur, R. M., McKemie, D. S., Disposition of the anti-ulcer medications ranitidine, cimetidine, and omeprazole following administration of multiple doses to exercised Thoroughbred horses, J. vet. Pharmacol. Therap. doi: 10.1111/jvp.12328 (April 2016)
Triamcinolone acetonide	Knych, H., *Pharmacokinetics of triamcinolone acetonide following intramuscular and intra-articular administration to exercised Thoroughbred horses*, Equine Vet J., Nov;45(6):715-20 (2013); Soma, L.R., *Pharmacokinetics of intra-articular, intravenous, and intramuscular administration of triamcinolone acetonide and its effect on endogenous plasma hydrocortisone and cortisone concentrations in horses*, Am J Vet Res., 72(9): 1234-42 (2011); Mangal, D., *et al., Inhibitory effect of triamcinolone acetonide on synthesis of inflammatory mediators in the equine*. European Journal of Pharmacology, 736: 1-9 (2014); Knych, H. K., Vidal, M. A., Chouicha, N., Mitchell, M. and Kass, P. H., *Cytokine, catabolic enzyme and structural matrix gene expression in synovial fluid following intra-articular administration of triamcinolone acetonide in exercised horses.* Equine Veterinary Journal. doi: 10.1111/evj.12531 (2016)
Xylazine	Knych, H.K., *et al., Pharmacokinetic and Pharmacodynamics of Xylazine Administered to Exercised Thoroughbred Horses*, Drug Testing and Analysis, doi: 10.1002/dta.2047 (2016).