

Active Ingredient Summary Table

Transdermal Medications in Cats

Active Pharmaceutical Ingredient	Studied Transdermal Dose	Study Notes	Citations
Amitriptyline HCl	5mg	<p>Number of subjects: 6 cats evaluated</p> <p>Vehicle: Transdermal (PLO gel) and oral route compared</p> <p>Result: Systemic absorption was noted as "poor" compared to oral route</p>	Mealey KL, Peck KE, Bennett BS, Sellon RK, Swinney GR, Melzer K, Gokhale SA, Krone TM. Systemic absorption of amitriptyline and buspirone after oral and transdermal administration to healthy cats. J Vet Intern Med. 2004 Jan-Feb;18(1):43-6. doi: 10.1892/0891-6640(2004)18<43:saoaa b>2.0.co;2.
Amlodipine Besylate	0.625mg to start and adjusted if needed	<p>Number of subjects: 6 cats evaluated</p> <p>Vehicle: Transdermal cream (0.625mg/0.1ml) and oral route compared</p> <p>Result: Patients were given oral amlodipine for 7 days then transdermal amlodipine (same dose), superior reduction in blood pressure was noted with oral use. Study reported transdermal bioavailability as 31% compared to oral use</p>	Helms, Scott. (2007). Treatment of Feline Hypertension With Transdermal Amlodipine: A Pilot Study. Journal of the American Animal Hospital Association. 43. 149-56. 10.5326/0430149.
Atenolol	6.25mg	<p>Number of subjects: 7 cats evaluated</p> <p>Vehicle: Transdermal gel</p> <p>Result: Dose was given orally or transdermally, researchers noted that only 2 of 7 cats reached therapeutic plasma levels of atenolol within 2hrs of administration</p>	Macgregor JM, Rush JE, Rozanski EA, Boothe DM, Belmonte AA, Freeman LM. Comparison of pharmacodynamic variables following oral versus transdermal administration of atenolol to healthy cats. Am J Vet Res. 2008 Jan;69(1):39-44. doi: 10.2460/ajvr.69.1.39.
Buprenorphine	8mg or 20mg	<p>Commercially available extended-release transdermal solution is available</p> <p>Package insert recommends 8mg to cats between 1.2-3kg, and 20mg to cats 3-7.Skg applied once 1-2hr prior to surgery (analgesia provided for 4 days)</p>	<p>See ZORBIUM package insert</p> <p>Freise K, Reinemeyer C, Warren K, Lin T, Clark T. Single-dose pharmacokinetics and bioavailability of a novel extended duration transdermal buprenorphine solution in cats.</p>

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			Journal of Veterinary Pharmacology and Therapeutics. 2022: 45(S1): S31-S39.
Buspirone	2.5mg	<p>Number of subjects: 6 cats evaluated</p> <p>Vehicle: Transdermal (PLO gel) and oral route compared</p> <p>Result: Systemic absorption was noted but as "poor" compared to oral route</p>	<p>Mealey KL, Peck KE, Bennett BS, Sellon RK, Swinney GR, Melzer K, Gokhale SA, Krone TM. Systemic absorption of amitriptyline and buspirone after oral and transdermal administration to healthy cats. J Vet Intern Med. 2004 Jan-Feb;18(1):43-6. doi: 10.1892/0891-6640(2004)18<43:saoaa b>2.0.co;2.</p>
Captopril	No information currently available in cats - but has been studied in other animals such as rabbits	Not studied in cats, a study in rabbits did note reductions in blood pressure associated with transdermal captopril gel, so transdermal application may be reasonable if indicated	<p>Wu PC, Huang YB, Chang JJ, Chang JS, Tsai YS. Evaluation of pharmacokinetics and pharmacodynamics of captopril from transdermal hydrophilic gels in normotensive rabbits and spontaneously hypertensive rats. Int J Pharm. 2000 Nov 19;209(1-2):87-94. doi: 10.1016/s0378-5173(00)00557-3.</p>
Cisapride	No Information Currently Available		
Clopidogrel	No Information Currently Available		
Cyclosporine	5.1-7.4mg/kg q24 hours	<p>Number of subjects: 6 cats evaluated</p> <p>Vehicle: Transdermal (PLO gel) and oral route compared</p> <p>Result: Patients were given oral cyclosporine for 7 days or transdermally for 21 days, concentrations in cats were unantifiable but not considered therapeutic except in one cat</p>	<p>Miller R, Schick AE, Boothe DM, Lewis TP. Absorption of transdermal and oral cyclosporine in six healthy cats. J Am Anim Hosp Assoc. 2014 Jan-Feb;50(1):36-41. doi: 10.5326/JAAHA-MS-5970.</p>
Doxycycline	No Information Currently Available		

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Enalapril	No Information Currently Available		
Fluoxetine HCl	5 or 10mg/kg	<p>Number of subjects: 12 cats evaluated</p> <p>Vehicle: Transdermal (PLO gel) at 15% strength and oral route compared</p> <p>Result: Patients were given transdermal fluoxetine at 5 or 10mg/kg or oral fluoxetine at 1mg/kg, it was determined that relative bioavailability of transdermal vs oral route was 10%</p>	<p>Ciribassi J, Luescher A, Pasloske KS, Robertson-Plouch C, Zimmerman A, Kaloostian-Whittymore L. Comparative bioavailability of fluoxetine after transdermal and oral administration to healthy cats. Am J Vet Res. 2003 Aug;64(8):994-8. doi: 10.2460/ajvr.2003.64.994.</p>
Furosemide	2mg/kg q12hrs	<p>Number of subjects: 6 cats evaluated</p> <p>Vehicle: Not specified</p> <p>Result: compared plasma furosemide concentrations in cats that received one IV 2 mg/kg dose of furosemide, one oral 2 m /k dose of furosemide and 3 da s of 12h dosin with 2 mg/kg furosemide transdermally applied to the ear pinna, found that oral absorption was 50% if IV dose and that transdermal absorption was negligible</p>	<p>Sleeper MM, O'Donnell P, Fitzgerald C, Papich MG. Pharmacokinetics of furosemide after intravenous, oral and transdermal administration to cats. Journal of Feline Medicine and Surgery. 2019;21(10):882-886. doi:10.1177/1098612X18805879</p>
Gabapentin	5-10mg/kg q8hrs	<p>Number of subjects: cadaver skin from 6 cats, 8 young healthy cats (phase 1), 15 client-owned geriatric cats (phase 2)</p> <p>Vehicle: Transdermal cream (10% and 20%)</p> <p>Result: Gabapentin was detected in all cats, though levels were variable, pain scores were improved after day 5 as compared to predose, but not after day 8</p>	<p>Slovak J, Costa A. A pilot study of transdermal gabapentin in cats. Journal of Veterinary Internal Medicine. 2021. https://doi.org/10.1111/jvim.16137</p>
Levetiracetam	60mg/kg every 8 hours	<p>Number of subjects: 6 cats weighing less than or equal to 5kg</p> <p>Vehicle: Transdermal cream (400mg/ml)</p> <p>Result: Three times daily transdermal levetiracetam resulted in median serum concentrations ::::5µg/ml throughout the sampling</p>	<p>Smith C, Heller H, Reif N Hesteren M, Reinhart J. Serum levetiracetam concentrations after transdermal levetiracetam administration, 3 times daily, to healthy cats. Journal of Veterinary Internal Medicine. 2019: https://doi.org/10.1111/jvim.15412</p>

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		period, authors concluded that transdermal administration could be considered an option for cats resistant to the oral route	
Maropitant	4mg per cat once daily	<p>Number of subjects: 8 cats more than 6 months old, and experiencing at least 2 episodes of vomiting in the last 72 hours</p> <p>Vehicle: Transdermal cream in Pentravan (wet with propylene glycol)</p> <p>Result: A significant decrease in vomiting frequency was observed in 6 of the 8 enrolled cats. A reduction in nausea, associated with an improvement of appetite, was observed in some cases.</p>	Boukaache Y, Ferret M, Delteil Vet al. Evaluation of efficacy of transdermal administration of maropitant in managing vomiting in cats. Open Veterinary Journal. 2022: 12(5).
Methimazole	5mg q12hrs	<p>Number of subjects: 13 cats newly diagnosed with hyperthyroidism, 10 completed the study</p> <p>Vehicle: Transdermal PLO gel</p> <p>Result: Clinical improvement and significant decrease in T4 was noted in all cats</p>	Lecuyer M, Prini S, Dunn ME, Doucet MY. Clinical efficacy and safety of transdermal methimazole in the treatment of feline hyperthyroidism. Can Vet J. 2006;47(2):131-135. doi:10.4141/cjas67-019
Metronidazole	No Information Currently Available		
Mirtazapine	<p>0.5mg/kg</p> <p>Commercially available as 2%(w/w) ointment applied 2mg per dose</p>	<p>Number of subjects: 8 cats evaluated</p> <p>Vehicle: Transdermal ointment</p> <p>Result: Crossover with patients applying transdermally and then using orally or the reverse. Study concluded that appropriate plasma concentrations were seen with transdermal use</p>	Buhles W, Quimby JM, Labelle D, Williams VS. Single and multiple dose pharmacokinetics of a novel mirtazapine transdermal ointment in cats. J Vet Pharmacol Ther. 2018 Oct;41(5):644-651. doi: 10.1111/jvp.12691.
Ondansetron	4mg/0.1ml (4mg applied)	<p>Number of subjects: 5 cats evaluated</p> <p>Vehicle: Transdermal gel</p> <p>Result: Serum ondansetron was measured after one and after multiple-dose administration, the study failed to find clinically</p>	Zajic LB, Herndon AK, Sieberg LG, Caress AL, Morgan PK, Hansen RJ, Wittenburg LA, Gustafson DL, Quimby JM. Assessment of absorption of transdermal ondansetron in

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		relevant serum levels with transdermal administration	normal research cats. J Feline Med Surg. 2017 Dec;19(12):1245-1248. doi: 10.1177/1098612X16688807.
Phenobarbital	6-6.2mg/kg (3-3.1mg/kg per ear) every 12 hours	<p>Number of subjects: ? cats evaluated</p> <p>Vehicle: Transdermal gel</p> <p>Result: Transdermal application resulted in measurable but subtherapeutic serum concentration, study recommended therapeutic drug monitoring</p>	Krull DP, Thomovsky SA, Chen AV, Mealey KL, Papich MG. Evaluation of Transdermal Administration of Phenobarbital in Healthy Cats. J Am Anim Hosp Assoc. 2019 Jan/Feb;55(1):1-7. doi: 10.5326/JAAHA-MS-6670.
Prazosin	0.25mg/0.1ml (0.5mg once daily)	<p>Number of subjects: case study: 1 subject</p> <p>Vehicle: Transdermal cream</p> <p>Result: Blood pressure was decreased from initial test to two week follow-u after be inninrazosin</p>	Rudner S, Browne P. Case Report: Management of Secondary Hypertension in a Feline with the Use of Transdermal Prazosin. IJPC. 2010; 14(6): 477-491
Theophylline	15mg/kg once daily	<p>Number of subjects: 7 cats, aged 1-10 years</p> <p>Vehicle: Transdermal cream or PLO</p> <p>Result: Cats were evaluated after 22 days, 2 of the 7 cats had therapeutic serum theophylline levels. There was no difference between the Lipoderm and PLO groups</p>	Barnoski J, Lee-Fowler TM, Boothe DM, Behrend EN. Serum theophylline after multiple dosing with transdermal gels in cats. J Feline Med Surg. 2019;21(4):329-334. doi:10.1177/1098612X18776853
Tramadol	2.8mg/kg	<p>Number of subjects: 8 total cats, 1 received oral treatment, 7 received a single dose of transdermal tramadol</p> <p>Vehicle: vehicle was listed as a proprietary gel</p> <p>Result: Levels in cats that received the transdermal product were undetectable or much lower in than the cat that received the oral dose</p>	<p>Aldrich L, Roush J, Kukanich B. Plasma concentrations of tramadol after transdermal application of a single metered dose of a compounded tramadol gel to cats. American Journal of Veterinary Research. 2021: 82(10). DOI: https://doi.org/10.2460/ajvr.82.10.840</p>