

The use of Lipoderm as a transdermal base in veterinary compounding: A systematic literature review

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Introduction & Objectives



The limitations of the conventional routes of administration, such as the invasive intravenous/subcutaneous injections and the challenging oral medications, may be overcome by the administration of transdermals which allow the percutaneous absorption of drugs into and through the animal's skin¹. The preparation of customized transdermal medications to meet the animal's individual needs (pharmaceutical compounding) is a successful and well referenced practice that is considered a landmark in veterinary pharmacotherapy². A systematic literature review was conducted to evaluate the use of Lipoderm (Fig. 1), a proprietary transdermal base for pharmaceutical compounding¹, in transdermal medications for veterinary patients.



Methods



The systematic literature review was conducted on October 5th and 6th (2017) and consisted of screening 3 electronic biomedical databases - Embase, Pubmed and ScienceDirect - for the keywords 'Lipoderm' and 'Veterinary'. In order to include non-indexed publications, the internet search engine Google Scholar was cross-referenced using both keywords. The inclusion criteria was scientific journal articles written in English, with no date range limits. The exclusion criteria included book chapters, citations, conference proceedings, dissertations and patents; as well as scientific journal articles that referred to human studies, and to other (non-PCCA) Lipoderm products. Two authors independently searched the databases and reviewed the selected studies.



Figure 1. Lipoderm: a proprietary transdermal base by PCCA for pharmaceutical compounding

Results & Discussion



A total of 52 publications were retrieved by the 4 electronic databases combined (Fig. 2). Though Google Scholar retrieved a large number of publications, the majority did not correspond to scientific information which was expected since this database is not controlled and its indexing quality/reliability remains a weakness. Following cross-referencing and exclusions, 12 scientific journal articles were selected for literature review, dating from 2003 to 2017, and were classified as follows: 5 clinical studies discussing the use of Lipoderm transdermal compounded medications in feline patients, 1 *in vitro* study using the inner ear of domestic feline skin, and 6 literature reviews or references to other studies.

Clinical studies: There is evidence to suggest that amlodipine (Helms, 2007), fluoxetine (Eichstadt *et al.*, 2017), mirtazapine (Benson *et al.*, 2017) and phenobarbital (Gasper *et al.*, 2015), when incorporated in Lipoderm, achieve measurable serum concentrations following transdermal administration; ondansetron though was not detected (Zajic *et al.*,

2017). ***In vitro* study:** Bassani *et al.* (2015) compared the *in vitro* percutaneous absorption of two tramadol transdermal compounded medications, when applied to the inner ear of domestic feline skin, and concluded that the tramadol in Lipoderm outperformed the tramadol in PLO (non-proprietary transdermal base).

Literature reviews or references to other studies: Davidson mentioned a conference paper on transdermal diltiazem that achieved measurable serum concentrations following a single dose (2003); and also a stability study on diltiazem (2005). Mealey *et al.* (2008) and Mixon and Helms (2008) both refer to studies on transdermal amlodipine. Marks and Taboada (2003) just briefly mention Lipoderm whereas Haywood and Glass (2011) state that Lipoderm is considered to be easier to apply and is more stable than PLO.

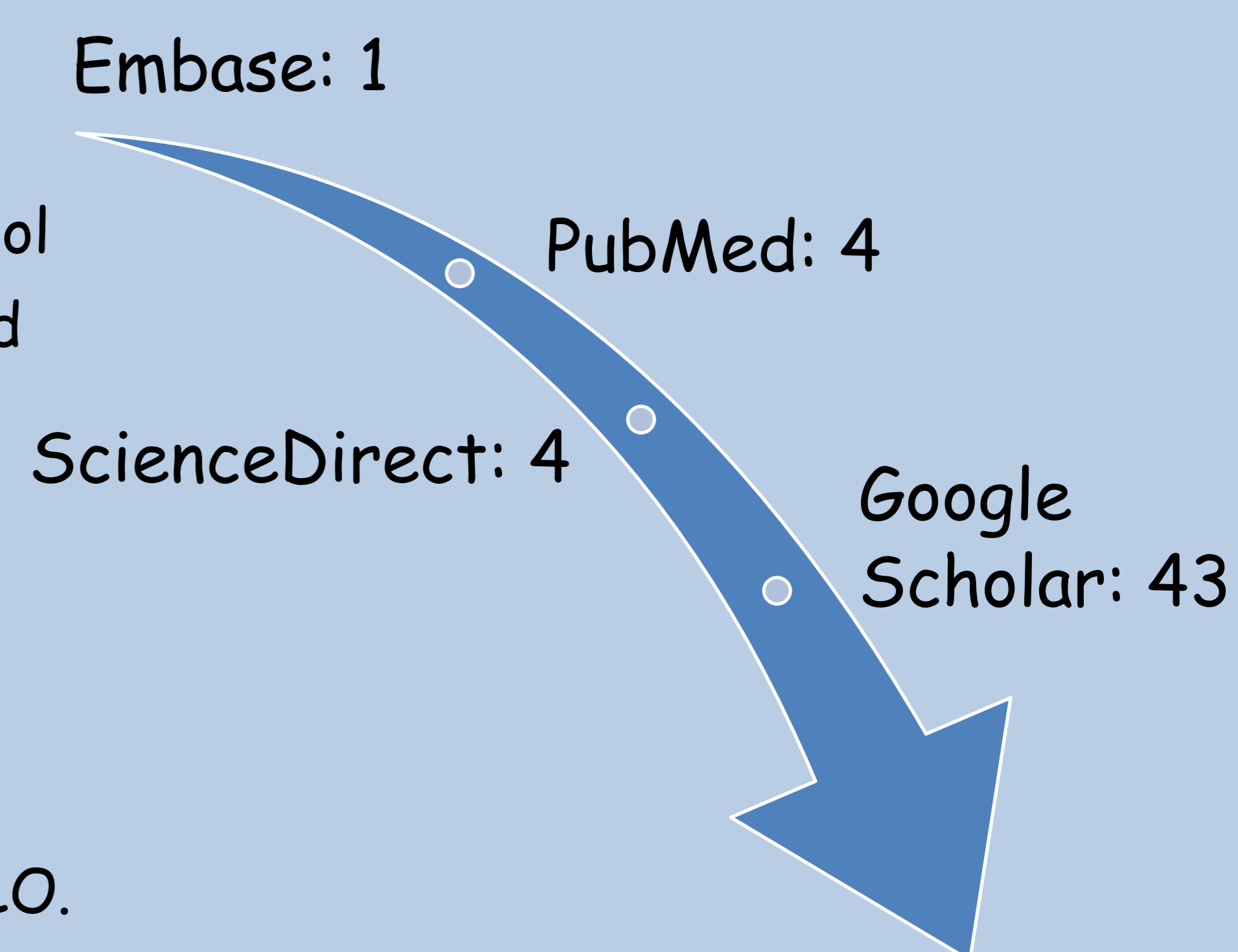


Figure 2. Number of publications retrieved per electronic database and total number of scientific journal articles selected for review

Conclusions



Despite the variability of results and limitations of the published studies, there is evidence to suggest that Lipoderm transdermal compounded medications are a valuable treatment option in veterinary patients, who may benefit from customized formulations to meet their individual needs. Veterinarians and pet owners also benefit from easier to administer medications, when compared to the traditional oral and injectable routes.

References



1. Bassani, A.S., Banov, D., Simmons, C. and Phan, H (2015) 'In vitro characterization of the percutaneous absorption of tramadol into inner ear domestic feline skin using the Franz skin finite dose model', *Veterinary Medicine and Animal Sciences*, 3 (3), doi: 10.7243/2054-3425-3-3.
2. Davidson, G. (2003) 'Veterinary Transdermal Medications: A to Z', *International Journal of Pharmaceutical Compounding*, 7 (2), p.106-113.

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