The activity of plant extracts against dermatophytes

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Introduction
Dermatophytosis is one of the most frequent skin diseases in animals and humans and it is distributed worldwide. Few antifungal agents are licensed for veterinary practice. With the emergence of drug resistance, new molecules need to be found. Plants are an important source for discovery of new therapeutic agents. The aim of this study is to find plant extracts or isolated compounds that could be used to combat dermatophytosis in animals.

Material and Methods
Since working with dermatophytes is complex and time-consuming, due to their characteristics, we decided to screen plant extracts for general antifungal activity and use the preliminary results to isolate a compound that will be tested against different species of dermatophytes. For this study, the antifungal, cytotoxic and antioxidant properties of the acetone leaf extracts of 14 South African plants were selected for further evaluations. The antifungal activity against 4 fungal pathogens (Aspergillus fumigatus, Aspergillus niger, Candida albicans and Cryptococcus neoformans) was determined by using a serial microdilution method and Bioautography. The cytotoxicity was established by evaluating the viability of Vero African green monkey kidney cells and Bovine Derma cells in the presence of the plant extracts using the MTT assay. The antioxidant activity was determined by DPPH and ABTS radical scavenging assays.

Results
The antifungal activity of the crude extracts varied between 0.13-2.08 mg/mL. The LCSO and the correlated selectivity index ranged between 0.04-0.03 mg/mL and 0.09-0.67 for Vero Cells and 0.09-0.5 mg/mL and 0.06-0.76 for the Bovine Derma Cells. The IC50 using the DPPH and the ABTS scavenging activity assays varied between 0.10-3.39 mg/mL and 0.22-1.44 mg/mL, respectively. The Bioautography showed several active compounds especially for 2 of the 14 selected plants (Fig. 1).

Conclusions
This study gives preliminary results on antifungal, antioxidant and cytotoxic activity of 14 South African plants. On the basis of these results, Terminalia tomentosa and Leucosidea sericea will be further evaluated for activity against different species of dermatophytes.

Pharmacokinetics/Pharmacodynamics of Buprenorphine Following CRI in Dogs Undergoing Ovariectomy

Introduction
Buprenorphine (BUP) is a semi-synthetic opioid, widely used in veterinary medicine due to its analgesic efficacy and poor side effects. The clinical dose of BUP in dogs is in the range of 10-20 μg/kg administered IV-IM every 6-8 h [3]. Constant rate infusion (CRI) of analgesic agents, including opioids, have proven advantages compared to intermittent bolus administrations [4]. However, no studies have been carried out on CRI of BUP in dogs, which is the aim of this study.

Materials and Methods
Initially, 8 healthy dogs undergoing elective ovariectomy received buprenorphine at a loading dose (IV bolus of 15 μg/kg) followed by CRI (2.5 μg/kg/h). Later, another 3 healthy dogs received a CRI of 3.2 μg/kg/10h (dog A), and 2.0 μg/kg/10h (dogs B and C). Peri-operative analgesia was always guaranteed by carprofen (Rymadil®), Pfizer® 4 mg/kg IV before surgery, and by lidocaine HCl (2%) through a subcutaneous infiltration on the incision line and a spinal on the ovarian pedicle during surgery. Pain and sedation were scored for all animals through the whole study. Blood samples were collected from a jugular catheter at regular intervals, and plasma concentrations of BUP and NBU-P were determined by a validated UPLC-MS/MS after a liquid-liquid extraction. Pharmacokinetic analysis was performed on WinNonlin Prof 6.3 software (Pharsight), using a two-compartment model.

Results
This study is the first to report the plasma concentration profile of BUP administered through CRI in dogs. Following combined IV bolus and CRI administration, the buprenorphine showed a two-compartment kinetic profile. Cmax was 23.9 ± 8.64 ng/mL at 1 min (tmax); elimination half-life was 41.8 ± 17.35 min; AUC was 486.68 ± 125.66 min·ng/mL; CI was 33.61 ± 13.01 min·ng/kg, and Vdss was 1.77 ± 0.50 L/kg. This is the real kinetic CRI profile of BUP, so we decided to change protocol. In all 3 dogs, plasma concentration (Fig.2) was always above 0.6 ng/mL (considered to be the threshold concentration for BUP anesthesic effects starting from 0.40 ng/mL after CRI beginning). The steady state (SS) in dog A was ~ 3.0 ng/mL, which was maintained for 6 h and then decreased (~ 1.5-2.0 ng/mL). Dogs B and C had a SS of ~1.0-2.0 ng/mL during all the study. This data is not yet sufficient for pharmacokinetic analysis.

Conclusions
In both studies, data demonstrates that it is unlikely that NBUP plays a role in analgesia during CRI of BUP in dogs. No adverse/side effects were observed during or after CRI. Loading doses of BUP are needed to facilitate BUP transfer to the central nervous system and then the onset of analgesia. The results suggested that CRI of buprenorphine can be a useful tool for providing analgesia in post-operative patients, considering its poor side effects and the advantages of a CRI compared to frequent boluses.

Survey of Antimicrobial Prescribing Patterns in Small Animal Veterinary Practice in Emilia-Romagna, and Guidelines for Antibiotic Use in Small Animal Medicine

Introduction
Antimicrobial resistance (AMR) is considered a major public health issue and there is an increase in its prevalence in both humans and animals. This marked an interest in focusing on the role of pets in AMR diffusion [5] and underlined the lack of data on prescribing patterns and of guidelines on the correct use of antibiotics in these species. A previous study [6] demonstrated that the adoption of guidelines helped improving prescribing patterns and reducing antimicrobial use. The aim of this study was to gather data on antimicrobial prescribing patterns for pets in Emilia-Romagna Region, in order to help at drawing up useful guidelines for small animal medicine.

Material and Methods
In the context of a regional project on antimicrobial resistance, veterinary clinicians were invited by the Regional Veterinary Professional Association to voluntarily complete online questionnaire. The questionnaire was divided in three sections: the first one regarded personal details of the clinician and of the working area, the second section was aimed to understand the prescribing patterns, while the third section was focused on the biosecurity measurements. The survey was done from January 2016 to December 2016 to the 130 veterinary clinics of Emilia-Romagna Region.

Results
The study population was composed of 106 veterinarians working in small animal practice.

Most commonly prescribed antibiotics

- Penicillins
- (Fluoro)quinolones
- Cephalosporins

Critically important Antimicrobial (CIA)

- in Urinary Tract Infections

Other outcomes

- Knowledge and awareness of the AMR issue
- Antimicrobial prescribing patterns differ among clinicians
- Biosecurity measures are carefully taken into account

Conclusions
This investigation gives for the first time an overview of the prescribing patterns of antibiotic in small animal practice in Emilia Romagna Region and helps understanding the critical aspects that need to be clarified while drawing out guidelines on the correct use of these drugs.