Preface
Dawn Merton Boothe

Evidence-Based Decision Making in Small Animal Therapeutics
Deborah T. Kochevar and Virginia Fajt

With a growing number of evidence-based resources being developed for use in veterinary medicine, the time is right for academicians, practitioners, and students to embrace the positive elements of evidence-based veterinary medicine. Clinical pharmacologists, more than most, have all the skills required to use an evidence-based approach effectively for the benefit of patients and the advancement of the profession.

Pharmacogenetics
Katrina L. Mealey

Pharmacogenetics, the study of genetic determinants of response to drug therapy, is likely the ultimate way to establish the right drug and dose for each patient, thereby optimizing efficacy and minimizing toxicity. Despite the fact that this branch of pharmacology is still in its infancy as a science, a number of important discoveries have already contributed to improved pharmacotherapy in human and veterinary patients.

Cytochrome P450 and Its Role in Veterinary Drug Interactions
Lauren A. Trepanier

Cytochrome P450 (CYP) enzymes are common sites of drug interactions in human beings. Drugs may act as inhibitors or inducers of CYPs, leading to altered clearance of a second drug. Clinically relevant drug interactions involving various CYP isoforms in people, including CYP1A2, CYP2C9, CYP2D6, and CYP3A4, have been well documented. Analogous interactions are beginning to be characterized in dogs, for which canine CYPs share many of the same substrate ranges as in human beings.
Antimicrobial Resistance  
Cyril R. Clarke

Development of antimicrobial resistance is an inevitable consequence of exposure of microorganisms to antimicrobial agents. Although emergence of resistance cannot be prevented, it can be retarded by minimizing use of antimicrobial agents and avoiding selection of relatively resistant pathogenic and nonpathogenic strains caused by exposure to tissue concentrations that confer a competitive advantage. Most attention in veterinary medicine has focused on the emergence of resistance in food-borne pathogens, with relatively little attention being devoted to small companion animals, despite the frequent use of antimicrobial agents in these animals, evidence that resistance is emerging, and potential for transfer of resistance between companion animals and people. To retard further emergence of resistance in small companion animals, it is imperative that surveillance programs be instituted to monitor development of resistance.

Principles of Antimicrobial Therapy  
Dawn Merton Boothe

The most compelling reason for practicing judicious antimicrobial use is to facilitate therapeutic success. The definition of therapeutic success has changed in recent years, however; not only does success include eradication of infection, but it must now include avoidance of resistance. If the goal of antimicrobial therapy is to achieve sufficient concentrations at the site of infection such that the infecting organism is killed, therapy should be successful.

Antimicrobial Use in the Surgical Patient  
Lisa M. Howe and Harry W. Boothe, Jr

Antimicrobials are often used in the surgical patient in an effort to prevent infection (prophylactic) or to treat established infection (therapeutic). To be effective, prophylactic antimicrobials at appropriate concentrations must be present in tissues at the surgical site at the time of contamination to prevent bacterial growth and subsequent infection. Therapeutic antimicrobials are used to treat established localized or systemic infection. Selection of antimicrobial agents for prophylactic or therapeutic use should be based on knowledge of expected flora, ability of the antimicrobial to reach the target tissue at appropriate concentrations, bacterial resistance patterns, drug pharmacokinetics, and culture and susceptibility testing results (therapeutic use). Failure of antimicrobial therapy to prevent or treat infection in the surgical patient may result from poor antimicrobial selection, inappropriate dosage or frequency, or inappropriate duration of therapy.
The Clinical Pharmacology of Cyclooxygenase-2-Selective and Dual Inhibitors

Terrence P. Clark

Over the past decade, there have been several nonsteroidal anti-inflammatory drugs (NSAIDs) introduced in veterinary medicine with an increased gastrointestinal safety profile consistent with a cyclooxygenase (COX)-1–sparing effect. More recently, an NSAID with additional 5-lipoxygenase (5-LOX) activity has also been approved for use. Although it is tempting to equate in vitro COX-2/COX-1 and 5-LOX inhibition to overall in vivo safety, the data do not support this approach. The true overall safety for any individual compound is based on its evaluation in laboratory margin-of-safety studies, reproductive safety studies, and blind multicenter field studies in client-owned animals. Therefore, when choosing a COX-2–selective or dual-inhibitor NSAID for clinical use, all in vivo data must be taken into account to understand comparative safety, and continued use must be based on the drug’s performance in the individual being treated. Until head-to-head trials in multicenter blind studies are published, comments on comparative safety and effectiveness must be reserved.

Update on Drugs Used to Treat Endocrine Diseases in Small Animals

Ellen N. Behrend

Drug therapy for the endocrine system is implemented to replace a hormone deficiency or to prevent or reduce the formation or effects of excess hormone. Treatment of endocrine disorders covers diseases of the pituitary, adrenal, parathyroid, and thyroid glands as well as the endocrine pancreas. This article focuses on new therapies currently available for specific diseases. Administration of trilostane for treatment of hyperadrenocorticism and use of insulin glargine, protamine zinc insulin (PZI), and porcine Lente insulin for diabetes mellitus are discussed. In addition, transdermal methimazole therapy for treatment of feline hyperthyroidism and administration of progestins for pituitary dwarfism are considered.

Anticonvulsant Therapy in Dogs and Cats

Curtis W. Dewey

This article reviews anticonvulsant therapies in current use for dogs and cats and briefly describes new modes of anticonvulsant therapy that are being investigated or pending publication. Most of the information contained within the article is based on published information. Some of the information, however, is based on the author’s clinical experience and is identified as such.
The advent and growth of veterinary compounding and the increasing role of the pharmacist in drug dispensing, including compounding, should be embraced by the veterinary profession. For selected patients, extemporaneous compounding of prescriptions is necessary and beneficial for optimal treatment. By its nature, however, compounding is individualized and fraught with risks of failure. Pet owners should be informed of the risks associated with using a compounded product and consent to therapy based on disclosure that the use of the product may be scientifically unproven. As the pharmacy profession increases its efforts to define and ensure its role in veterinary medicine, and as the regulatory agencies consider changes in the regulations that increase the flexibility of animal drug compounding, the veterinary profession must implement actions that protect the patient and the public. It is indeed the responsibility of the veterinarian to ensure the safety and therapy of any prescribed therapeutic intervention, and failure to do otherwise places the patient and pet owner as well as the veterinarian at risk.