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<p>Quality assurance and the implementation of a quality management system are as important for veterinary in-clinic laboratories as for reference laboratories. Elements of a quality management system include the formulation of a quality plan, establishment of quality goals, a health and safety policy, trained personnel, appropriate and well-maintained facilities and equipment, standard operating procedures, and participation in external quality assurance programs. Quality assurance principles should be applied to preanalytic, analytic, and postanalytic phases of the in-clinic laboratory cycle to ensure that results are accurate and reliable and are released in a timely manner.</p>	
Point-of-Care Instruments	17
Jere K. Stern and Melinda S. Camus	
<p>Point-of-care testing, or testing done near the patient, allows for rapid results that can theoretically improve patient care and client satisfaction. The value of these results relies on high-quality laboratory practices, including an understanding of the technology by users. Herein is a brief review of point-of-care testing for biochemistry, hematology, coagulation, blood gas analysis, glucometers, and urinalysis, along with available technology with a focus on what information these analyzers can and cannot provide.</p>	
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Nina C. Zitzer	
<p>An automated complete blood count (CBC), although quick and relatively effortless, is limited in its diagnostic usefulness because results can be affected by misclassification of cellular and noncellular components and abnormal cellular morphology. Microscopic evaluation of a blood smear allows for quality control of automated CBC results as well as identification of cellular morphology that cannot be detected by automated hematology analyzers, and its importance should not be overlooked, especially in clinically ill patients.</p>	
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<p>A variety of urinary markers of renal disease show promise for the identification of glomerular and tubular damage and monitoring treatment. Most of the markers are currently not widely available, and all could benefit from further study. This review summarizes recent studies on urinary biomarkers of renal disease in dogs and cats.</p>	

Digital Cytology

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Julie Piccione and Kate Baker

Microscopic evaluation of cytologic specimens can provide rapid diagnostic information and aid in formulating diagnostic and treatment plans. The primary benefit of cytologic evaluation is the rapid collection, processing, and evaluation of samples. However, physical transport of glass slides and body fluids to a diagnostic laboratory takes time and can negatively affect patient management. Digital cytology allows specimens to be processed in the clinic and immediately sent to pathologists. With technology becoming more affordable, digital cytology is revolutionizing the field of clinical pathology and patient care.

Flow Cytometry in Veterinary Practice

89

Samantha J.M. Evans

This article summarizes the current applications of flow cytometry in clinical veterinary medicine, which is largely restricted to the diagnosis of hematopoietic neoplasms (lymphomas and leukemias) of domestic dogs, cats, and horses. A brief background on the technique of flow cytometry and fundamentals of data interpretation are included. Major emphasis is placed on clinical indications for flow cytometry, principles of sample collection and submission, and awareness of diagnostic and prognostic utility. Expectations regarding both the benefits and limitations of flow cytometry in a clinical setting, and its complementary nature with other types of testing, are also reviewed.

Diagnosing Multiple Myeloma and Related Disorders

101

A Russell Moore

This review provides current information on myeloma-related disorders, a group of plasma cell or immunoglobulin (Ig) secreting neoplasms including multiple myeloma, extramedullary plasmacytoma (both cutaneous and non-cutaneous variants), solitary osseous plasmacytoma, Waldenström macroglobulinemia/lymphoplasmacytic lymphoma, Ig-secretory B-cell lymphoma, plasma cell leukemia, and monoclonal gammopathy of undetermined significance. The diagnostic procedures commonly used to characterize myeloma-related disorders, including cytopathology, histopathology, polymerase chain reaction for antigen receptor rearrangement, flow cytometry, and electrophoretic techniques are outlined and discussed.

Histiocytic Diseases

121

Peter F. Moore

Canine cutaneous histiocytomas originate from Langerhans cells. Multiple histiocytomas are referred to as cutaneous Langerhans cell histiocytosis. Feline pulmonary Langerhans cell histiocytosis causes respiratory failure owing to extensive lung infiltration. Localized and disseminated histiocytic sarcomas usually arise from interstitial dendritic cells. Primary sites include spleen, lung, skin, brain (meninges), lymph node, bone marrow, and synovial tissues of limbs. An initially indolent form of localized histiocytic sarcomas, progressive histiocytosis, originates in the skin of cats. Hemophagocytic histiocytic sarcomas originates in splenic red pulp macrophages. Canine reactive histiocytoses (systemic histiocytosis and cutaneous histiocytosis) are complex inflammatory diseases with underlying immune dysregulation.

- Tick-Borne Diseases** 141
- Jane Emily Sykes
- Many tick-borne infections are increasing in geographic range as a result of activities such as reforestation and climate change. A history of outdoor activity in tick-endemic regions, together with consistent clinical signs (such as fever, splenomegaly, polyarthritis, thrombocytopenia), should raise suspicion for tick-borne infectious disease. Diseases with short incubation periods are best diagnosed with organism-detection assays. When the incubation period is long and organism numbers are low, diagnosis often relies on antibody testing, but it may be difficult to associate positive tests with infection. Positive antibody tests in healthy animals should prompt veterinarians to discuss prevention approaches with owners.
- Cytomorphology of Deep Mycoses in Dogs and Cats** 155
- Shannon D. Dehghanpir
- The purpose of this review is to familiarize clinical pathologists and clinicians with the cytomorphologic features associated with deep mycoses in dogs and cats. The goals are to develop a more unified approach to the description and interpretation of fungal cytomorphology and to facilitate the categorization of fungi that do not produce unique morphologic structures in tissue.
- Toxicology Case Presentations** 175
- M. Judith Radin and Maxey L. Wellman
- Owners are often not aware that some common household products, medications, and plants are toxic to dogs and cats. Six cases of toxicoses due to ingestion of xylitol, amatoxin-containing mushrooms, anticoagulant rodenticide, zinc, vitamin D, and lily are presented with typical clinical and laboratory data findings. Changes in the laboratory data are explained in the context of the mechanism of action of the toxin and the organ systems affected.
- Acid-Base** 191
- Kate Hopper
- In clinical medicine, evaluation of acid-base balance can be a valuable diagnostic and monitoring tool. Blood gas machines need very small volumes of blood and provide immediate results, making them ideal for use in the emergency room and intensive care setting. This review outlines the stepwise approach to assessment of acid-base balance in dogs and cats, common causes of acid-base abnormalities, and the general approach to treatment.
- Laboratory Diagnosis of Thyroid and Adrenal Disease** 207
- Patty Lathan
- Diagnosis of thyroid and adrenal disease can be confusing. Whereas the definitive diagnosis of hyperthyroidism and hypoadrenocorticism are relatively straightforward, hypothyroidism and naturally occurring Cushing's syndrome (NOCS) are more complicated. In a patient with compatible clinical signs, a single increased tT_4 is enough to confirm hyperthyroidism, but

a low tT_4 alone is never enough to confirm hypothyroidism. A flatline result (post-stimulation cortisol <2 ug/dL) on an ACTH stimulation test (ACTHst) confirms hypoadrenocorticism, but not all dogs with NOCS have increased ACTHst results. This article explains which diagnostics should be pursued for these endocrinopathies, and how to interpret them.

Laboratory Diagnosis of Pancreatitis

225

Adam J. Rudinsky

Acute pancreatitis is one of the most common diseases in dogs and cats, but diagnosis is challenging. The gold standard for diagnosis of pancreatitis is pancreatic biopsy, which has many limitations. As such, clinical diagnosis of pancreatitis based on a consistent clinical picture (eg, signalment, clinical signs, physical examination findings), supportive laboratory screening diagnostics, pancreatitis-specific laboratory testing, consistent imaging findings, and thorough diagnostic evaluation ruling out alternate differential diagnoses is most often used in clinical patients. Alternate differential diagnoses in patients presenting with clinical findings that might be consistent with pancreatitis may have secondary reactive pancreatitis, which mimics primary pancreatitis.

A Primer for the Evaluation of Bone Marrow

241

Joanne Belle Messick

The traditional role of cytologic and histologic evaluation of bone marrow remains important in understanding diseases and conditions that affect this tissue. It is only through correlation of historical and clinical findings with hematologic, bone marrow, and other ancillary data that an accurate diagnosis can be made. Thus, the clinician is an essential link in helping establish a correct diagnosis. This article is a primer for understanding key features of bone marrow evaluation and provides practical tips for developing the best practices for optimal patient care.

Laboratory Testing in Transfusion Medicine

265

Katherine Jane Wardrop and Elizabeth Brooks Davidow

Canine and feline transfusions are life-saving procedures that have become increasingly common in veterinary medicine. Laboratory testing plays a vital role in transfusion medicine, particularly in the prevention and diagnosis of transfusion reactions. Laboratory tests should be used to screen donors for their general health and for the presence of any blood-borne pathogens. Pretransfusion blood typing and compatibility testing make immunologic reactions less likely, and commercial typing and crossmatching kits are now available. Appropriate diagnostic tests in the face of a potential transfusion reaction are important to tailor effective.