

Common Infectious Organisms



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KEYWORDS

• Cytology • Cytopathology • Fungi • Bacteria • Infectious • Canine • Feline

KEY POINTS

- Cytology is a useful tool to identify a variety of lesions, ranging from immune-mediated to degenerate, neoplastic, and inflammatory.
- Careful attention to the cytomorphologic details of the organism in conjunction with lesion location and signalment allows for their identification.
- Rapid diagnosis of an infectious etiology allows for a rapid institution of therapy, thus maximizing prognosis for a given case.

INTRODUCTION

Lesions have many types of etiologies and can affect every tissue in the body. Cytopathology is an extremely useful tool that can be used to identify lesions and their etiologies. Regardless of the method of sample acquisition (ie, fine needle aspiration [FNA], impression, scraping, or body cavity effusion aspiration), obtaining samples for cytologic evaluation generally induces less morbidity compared with obtaining samples for histologic evaluation (ie, incisional biopsy or excisional biopsy). Indeed, some tissues such as body cavity effusions, cerebrospinal fluid, and peripheral blood are not tissues that can be easily examined via histology. In addition to being easier to obtain, cytopathologic evaluation of tissues is much quicker compared with histologic evaluation of tissues. The need for cumbersome and expensive tissue processing and staining makes histology a diagnostic modality relegated to a diagnostic laboratory, whereas the entire process of acquisition, processing, and evaluation of cytology samples can be entirely performed within a practice. All of these features make cytology the ideal tool to quickly and accurately identify infectious agents as the

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etiology of a lesion, providing the practitioner a way to begin treatment essentially immediately.

This article discusses a few common infectious organisms that can be clearly identified cytologically. Several infectious agents can be identified cytologically, but require additional diagnostic techniques (eg, culture) to speciate the organism. Some organisms are not infectious in immunocompetent animals, but have been isolated from lesions in immunosuppressed animals. Examples of organisms reported to cause infection in immunosuppressed dogs are listed in [Table 1](#).

FUNGI

Fungal infections can induce morbidity and mortality in veterinary patients. Culture of fungal agents can take weeks and pose a risk of infection to laboratory personal.¹ Although the discovery of serologic tests has vastly improved the diagnosis of and monitoring of some fungal infections,² cytologic visualization still offers an immediate diagnosis.

Blastomycosis

Blastomycosis is caused by the dimorphic fungus *Blastomyces dermatitidis*. Canine disease is much more likely than feline; however, unlike dogs, who frequently obtain infections from the outside environment, feline cases have been identified in strictly indoor animals.³ Lesions, and thus samples, associated with blastomycosis often are from the lung, skin, or lymph nodes. These can take the form of direct lung aspirates, transtracheal washes (TTWs), or bronchoalveolar lavages (BALs) as well as FNA of nodes and nodules or swabs from draining skin lesions. Less frequently obtained lesions include those from the orbit, bone, and prostate. Less common locations include the testes, bladder, brain, mammary gland, and synovial joints. Suppurative to pyogranulomatous inflammation is commonly associated with infection,^{4–6} frequently with necrotic debris scattered about. Neutrophils are nondegenerate to apoptotic. The round yeast itself is generally not difficult to locate, depending on the tissue examined ([Table 2](#)). They range in size from 10 to 40 μm and have a thick blue wall ([Fig. 1](#)). They can be seen budding in a broad-based fashion, with the daughter cell being nearly as large as the parent ([Fig. 2](#)). Fungal organisms, including *Blastomyces spp* stain positive with periodic acid–Schiff (PAS) stain ([Fig. 3](#)).

Histoplasmosis

This systemic fungal disease is caused by the dimorphic fungus *Histoplasma capsulatum*. Samples that are commonly used to diagnose histoplasmosis include the lungs (BAL, TTW), lymph nodes, spleen, rectum, bone marrow, gastrointestinal (GI) tract, body cavity effusion, and peripheral blood. Cats tend to have more respiratory signs and lesions, whereas dogs show more GI signs.^{7–9} Inflammatory patterns vary; however, the inflammation that is often associated with histoplasmosis lesions is

Table 1
Infectious disease agents reported in immunosuppressed dogs

Protozoal	Bacterial	Viral	Fungal
<i>Acanthamoeba spp</i>	Actinomycetes	Herpesvirus	<i>Cokeromyces recurvatus</i>
<i>Toxoplasma spp</i>	<i>Bartonella spp</i>	Adenovirus	Phaeohyphomycoses
	<i>Mycoplasma spp</i>	Distemper virus	<i>Phialosimplex caninus</i>
	<i>Nocardia spp.</i>	Papillomavirus	<i>Pneumocystis (carinii) jiroveci</i>

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