



## Skin signs

By Lisa Hulme-Moir

### Diagnosing feline leprosy in a young cat.

**F**eline cutaneous mycobacteriosis, sometimes termed feline leprosy, is relatively common in New Zealand, particularly in coastal and rural areas of the North Island. It can often be diagnosed on cytology, but is easy to miss if you don't know what you're looking for.

In the past few months there has been a small flurry of cases in the Gribbles Veterinary Hamilton laboratory. The following is one example.

#### Case presentation

A one-and-a-half-year-old female spayed domestic short-haired cat was brought into a veterinary clinic in May after several skin lumps had been noticed between her right eye and ear a few days previously (figure 1). These had continued to increase in size and more lumps had appeared. The cat was otherwise well, eating and drinking normally.

On examination, multiple alopecic swellings, 0.5–1 cm in diameter, were noted over the face, behind the ears and under the chin. All swellings were round with a central scab, and no discharge or pus was evident. Differentials at that time included infected wounds, cutaneous mycobacteriosis and eosinophilic granuloma complex.

**FIGURE 1:** Multiple skin lesions on the head of a young female cat.  
(PHOTO: REBECCA NEWTH)

With concern about possible mycobacteriosis, the cat was admitted for sedation and biopsy of the lesions. Cytology smears and fixed tissue were submitted to the laboratory.

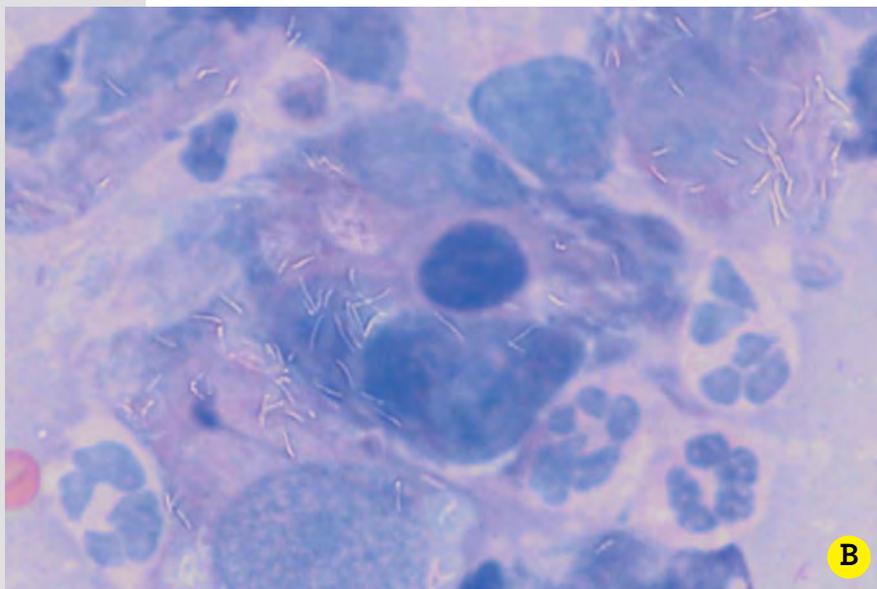
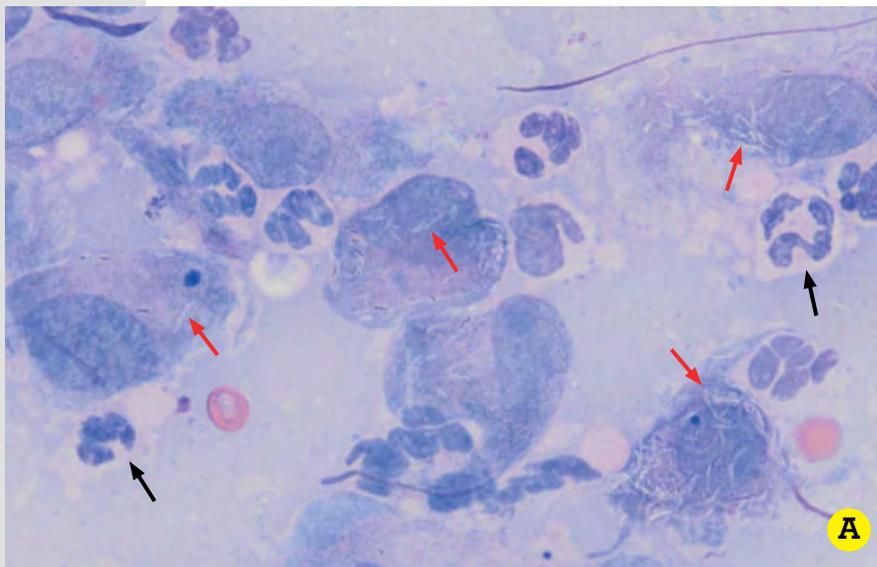
#### Diagnosis

On cytology, the smears were highly cellular, with large numbers of neutrophils and large pleomorphic epithelioid macrophages (figure 2). Many slender, non-staining bacilli consistent with *Mycobacterium* sp. were observed free in the background of the smears and within the cytoplasm of the macrophages, consistent with a diagnosis of cutaneous mycobacteriosis.

#### Discussion

Cutaneous mycobacteriosis in cats is most often due to *Mycobacterium lepraemurium*, although it is important to note that multiple other mycobacterial species are also capable of causing this disease. In recent years a novel species, *Candidatus 'Mycobacterium lepraefelis'* (previously termed 'East Coast' species) has been described in Australia and New Zealand, and has a distinct clinical presentation. *Mycobacterium bovis* has also been detected in cats in New Zealand, and 50% of cases can have skin lesions that appear identical to cutaneous mycobacteriosis caused by other mycobacterial species (de Lisle et al., 1990; de Lisle, 1993). Although the zoonotic risk is considered very low, this organism should be considered in areas where tuberculosis is known to occur in wildlife.

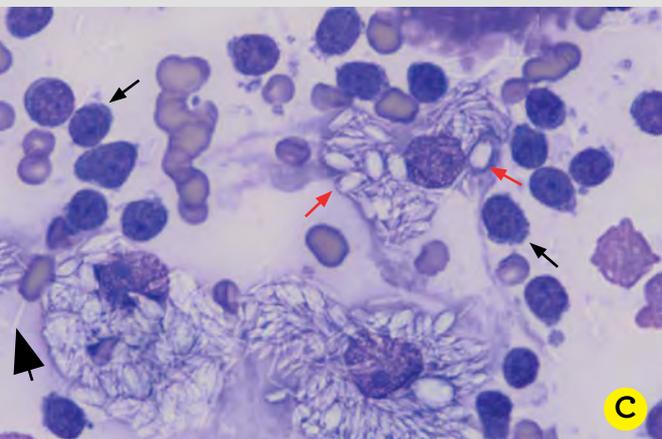
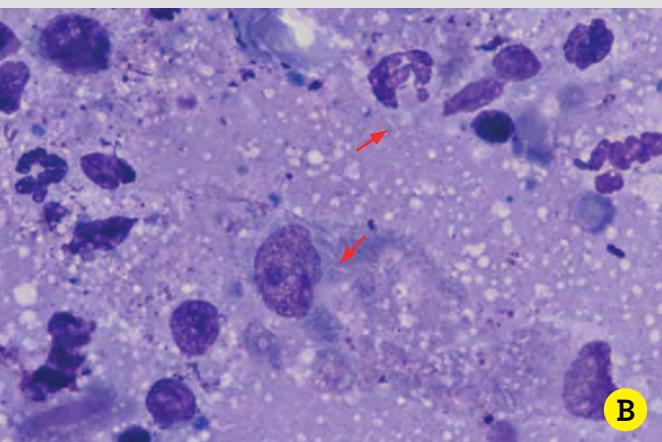
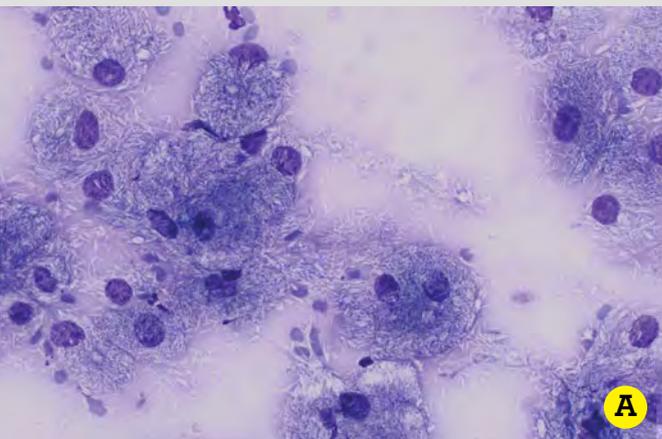
Cats infected with *M. lepraemurium* are typically young, although age can vary widely (Malik et al., 2002; O'Brien et al., 2017a). Male cats are predisposed and infection is thought to predominantly occur via altercations with infected rodents. Lesions tend to be confined to the skin and progress rapidly, often with ulceration. Spontaneous resolution has been reported, but most cases require a combination of surgical excision and prolonged antibiotic therapy to effect cures (Malik et al., 2013).



**FIGURE 2:** Cytology smears from a young cat with skin lesions on the head. (A) Marked pyogranulomatous inflammation is present with many neutrophils (black arrows) and large epithelioid macrophages. The macrophages contain many slender, non-staining rods within their cytoplasm (red arrows). Mycobacteria have large amounts of lipid in their cell walls, which means routine stains cannot penetrate and stain them. The bacteria can sometimes appear refractile when the slide is taken slightly out of focus (B). This refractility can sometimes be visible when performing an initial scan at low power and can be a useful feature for identifying mycobacteria. Smears from cutaneous mycobacteriosis provide good examples of how pleomorphic reactive macrophages may appear, with features that can overlap with both spindle cells and epithelial cells. They can display multiple criteria of malignancy and they reinforce the caution that should be taken in interpreting atypical cells when inflammation is present.

In contrast, cats infected with *Candidatus* 'M. lepraefelis' are typically older and may have other underlying diseases causing immunosuppression (O'Brien et al., 2017b). The disease in these cats tends to be slowly progressive, often with generalised skin lesions and sometimes systemic spread. Less is understood about the epidemiology of this mycobacterial species and how cats become infected, but host factors such as impaired cell-mediated immunity are thought to play a role. The prognosis is generally poor, with clinical resolution achieved much less frequently than with *M. lepraemurium*.

Similar to human leprosy, feline cutaneous mycobacteriosis can present in two main patterns on histopathology: tuberculoid and lepromatous. The tuberculoid pattern is associated with necrotic foci surrounded by pyogranulomatous inflammation (as seen in this case, figure 2). Organisms tend to be few in number, but this can vary. In the lepromatous pattern, large, pale, foamy macrophages predominate with numerous organisms. Interestingly, these patterns can be appreciated cytologically (figure 3) and it is good to know the variation that can occur when examining aspirates from lesions. In humans, the lepromatous/organism-rich form is associated with impaired cell-mediated immunity, while a strong immune



**FIGURE 3:** Cytological features of feline cutaneous mycobacteriosis. Mirroring the different reaction patterns seen on histopathology, cytology smears can vary from florid pyogranulomatous inflammation, as seen in figure 2, to a more macrophage-dominant reaction with enumerable organisms, seen in A. Some lesions can have areas of caseous necrosis and this may be noted cytologically, as in B. Smears from necrotic tissue have a vacuolated proteinaceous background containing large amounts of cellular debris and condensed pyknotic nuclei lacking fine detail. Compare this to the relatively clear background in the other images. Mycobacteria can be few in number in necrotic smears (red arrows) and may require careful searching to find. Spread to regional lymph nodes also occurs in some cases of cutaneous mycobacteriosis. In C, large numbers of lymphocytes (black arrows) indicate this is a lymph node. Macrophages containing numerous mycobacteria are also present. Mycobacteria when numerous can line up parallel to each other, forming apple-seed-shaped structures called globi (red arrows). Mycobacteria are also often observable extracellularly (arrowhead) and may be more readily visualised than those within cells. Paying careful attention to the backgrounds of smears as well as searching within macrophages is therefore important in these cases.

response is associated with few organisms and the tuberculoid pattern. In cats, histologic patterns are not specifically associated with a particular mycobacterial species; however, the tuberculoid form is more common with *M. lepraemurium*, and most *Candidatus* 'M. lepraefelis' have a lepromatous pattern with large numbers of organisms present. <sup>19</sup>

*Special thanks to Rebecca Newth and the team at Vetora Taupo for this great case.*

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