Contributor: Ingrid Cornax, DVM, PhD, MS and M. Gerard O’Sullivan MVB, MS, PhD, DACVP, Comparative Pathology Shared Resource, University of Minnesota, USA.

Clinical history: Female, ~16-week-old BALB/c byj background mouse housed in BSL-3 with a pet store mouse. BALB/c mice in this group showed chronic wasting (despite good appetite), perianal soiling, moist and scruffy appearing skin.

Figure 2. Mouse, haired skin. The epidermis is moderately to markedly hyperplastic and hyperkeratotic (variable ortho- and parakeratosis), and is multifocally eroded with serocellular crust formation. The
dermis is mildly expanded by fibrosis. Associated with the epidermal lesions are moderate numbers of arthropods (mites) with a spiny chitinous exoskeleton and striated muscle. Adult female mites contain a large elongate yolk gland filled with eosinophilic yolk material. Hematoxylin and Eosin (H&E), 10X (top) and 40X (bottom) objectives.

Figure 3. Mouse, lung. More than 90% of the pulmonary architecture in section is obliterated by inflammation and the airways are filled with inflammatory exudate. Variably-sized, nodular to coalescing areas of inflammation are surrounded by areas of atelectasis and hemorrhage. Figure 3a highlights the airway inflammation. The bronchus is filled by suppurative inflammation. The bronchial epithelium exhibits a variety of lesions, including: marked hyperplasia, swelling, and hypertrophy with multifocal squamous metaplasia (flattening, loss of ciliation, and increased number of layers), vacuolar degeneration, and rare syncytial cell formation. Surrounding the airway, are thick bands of plasma cells and occasional lymphocytes. The subepithelial muscle is mildly hypertrophic. Figure 3'b' highlights the alveoli, which are filled with foamy macrophages and contain large numbers of cholesterol clefts and
low numbers of infiltrating plasma cells and degenerate neutrophils. H&E, 2X (top) and 10X (bottom) objectives.

**Etiologic diagnoses:** Skin, epidermal acarasis; Lung; mycoplasma/bacterial pneumonia.

**Other affected organs:** Mycoplasma/bacterial lesions also noted in the trachea (Figure 4) and ear canal (Figure 5).

**Differential diagnoses:** Sendai virus, Pneumonia Virus of Mice (PVM), *Pneumocystis murina*, *Pasteurella pneumotropica*, and opportunistic *Klebsiella oxytoca* infection.
**Figure 4.** Mouse, trachea. The trachea is filled with suppurative exudate similar to that of the more distal bronchi and bronchioles. The tracheal epithelium exhibits similar changes to those described in the lung (Figure 3) for the bronchial epithelium. In multifocal regions of the trachea (Figures 4’a’ and 4’b’), there is an abrupt transition from pseudostratified ciliated columnar to stratified squamous epithelium (squamous metaplasia) and focal ulceration (Figure 4’a’). The cilia are covered by rafts of bacteria. H&E, 4X (top) and 20X (bottom) objectives.

**Figure 5.** Mouse, cross section of the head through the ear canal. Severe, bilateral, chronic suppurative otitis media (arrows) with moderate submucosal lymphoplasmacytic inflammation. H&E, 2X objective.

**Discussion:** This laboratory Balb/c strain mouse contracted multiple diseases after being exposed to an asymptomatic pet store mouse. The most severe lesions occurred in the respiratory tract and middle ear. The formation of syncytial cells in the upper respiratory tract (Fig. 3) and the presences of bacterial rafts within the cilia (Fig. 4) are characteristic of *Mycoplasma pulmonis* and CAR-bacillus infection, respectively (Barthold, Griffey, and Percy, 4th ed. 2016. pp. 61 and 63). However, these diagnoses could not be confirmed, since the mouse was submitted in formalin. Likewise, the presence of underlying predisposing factors such as viral infection were not ruled out.
The skin lesions are indicative of acariasis. The lesions in this mouse are relatively mild, and are probably of little clinical significance compared to the ongoing inflammatory process in the respiratory tract. However, fur mite infestations have been linked to severe pruritus and ulcerative lesions, reduced life span, modified immune responsiveness, and secondary amyloidosis, which, aside from being welfare concerns, could significantly affect experimental outcomes (Barthold, Griffey, and Percy. 4th Ed. 2016. pp. 86-87).

*The Diagnostic Exercises are an initiative of the **Latin Comparative Pathology Group (LCPG)**, the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website ([http://www.cldavis.org/diagnostic_exercises.html](http://www.cldavis.org/diagnostic_exercises.html)).

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