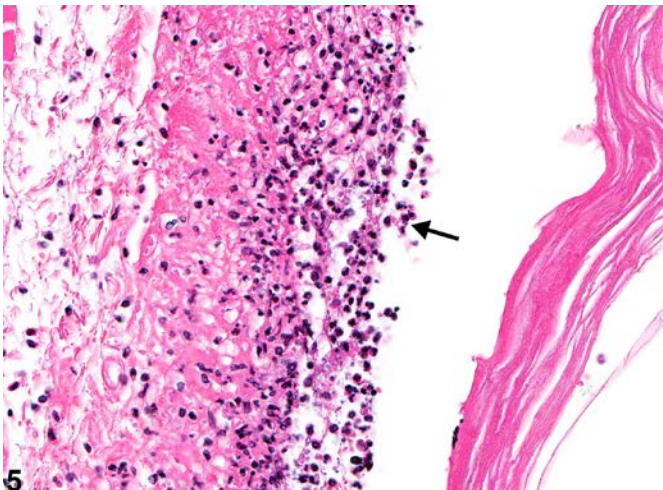
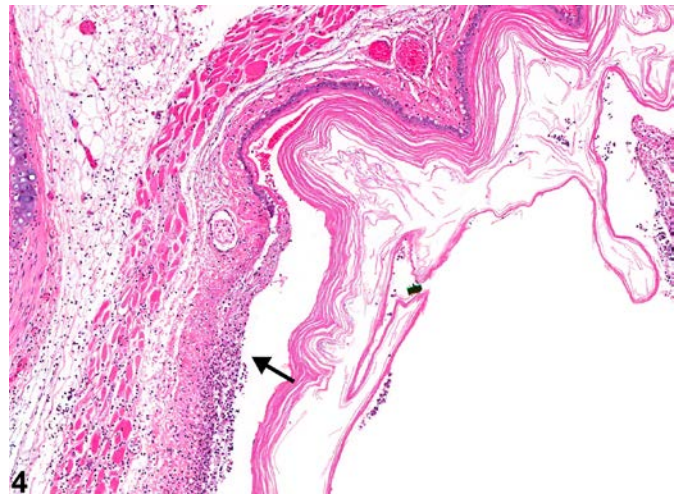
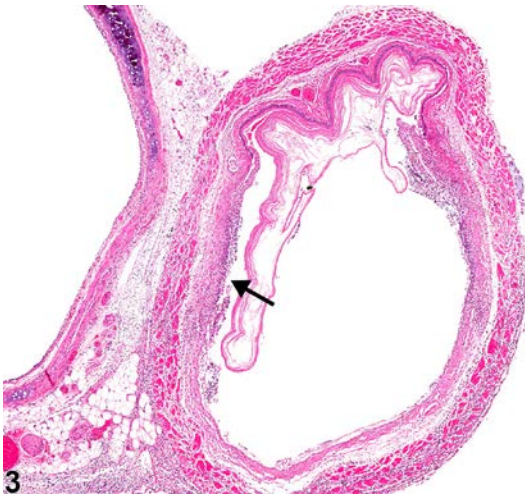
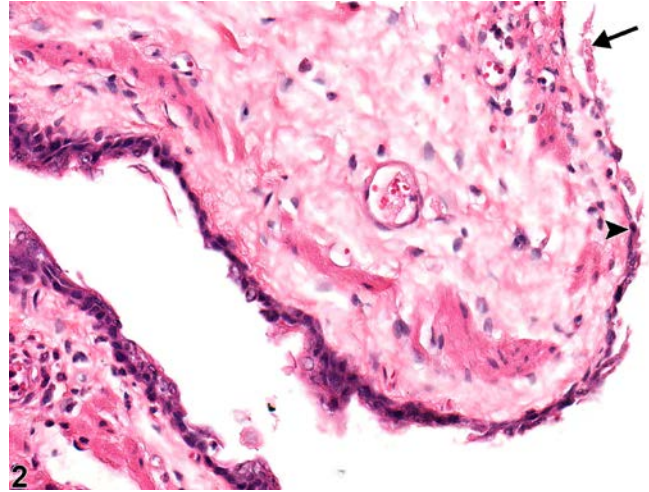
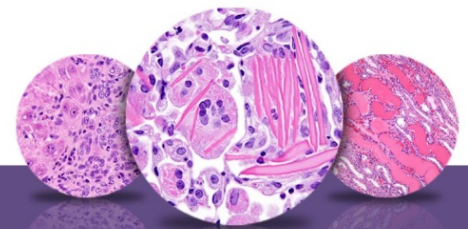


# NTP Nonneoplastic Lesion Atlas

## Esophagus – Ulcer





# NTP Nonneoplastic Lesion Atlas

## *Esophagus – Ulcer*

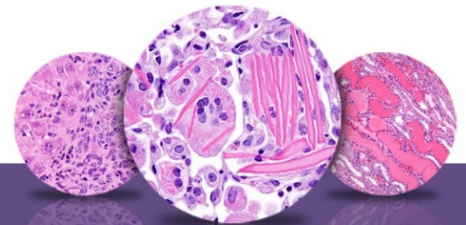
**Figure Legend:** **Figure 1** Esophagus - Ulcer in a female F344/N rat from a chronic study. A portion of the epithelium is missing (arrow). **Figure 2** Esophagus - Ulcer in a female F344/N rat from a chronic study (higher magnification of Figure 1). The ulcerated region (arrow) is flanked by a region with regeneration (arrowhead). **Figure 3** Esophagus - Ulcer in a female F344/N rat from a chronic study. A portion of the epithelium is missing (arrow), and only the overlying keratin remains. **Figure 4** Esophagus - Ulcer in a female F344/N rat from a chronic study (higher magnification of Figure 3). The denuded epithelium is replaced by necrotic debris and inflammatory cells (arrow). **Figure 5** Esophagus - Ulcer in a female F344/N rat from a chronic study (higher magnification of Figure 4). The denuded epithelium is replaced by necrotic debris and inflammatory cells (arrow).

**Comment:** Esophageal erosions, ulcers, and necrosis are frequently the result of gavage accidents. Such trauma can lead to perforation, periesophageal abscesses, and fibrosis. An erosion is defined as loss of the superficial portion (i.e., superficial to the basement membrane) of the tunica mucosa, while an ulcer (Figure 1, Figure 2, Figure 3, Figure 4, and Figure 5, arrows) extends through the basement membrane, exposing the underlying lamina propria. If the overlying epithelium is necrotic but still intact, the lesion is diagnosed as necrosis. Inflammation and regeneration of the epithelium typically accompany ulcerations.

**Recommendation:** Whenever present, ulcers should be diagnosed and graded based on the extent of the lesion and number of areas affected. If the epithelial lesion does not extend to the basement membrane, erosion should be diagnosed. If both erosion and ulcer are present concurrently as part of the same lesion, only ulcer is diagnosed. Mucosal epithelial hyperplasia at the edges of an ulcer and inflammation associated with an ulcer are not ordinarily diagnosed unless they are a prominent component of the lesion. It should be noted in the narrative whether the pathologist considers this lesion due to chemical exposure or a gavage error.

### **References:**

Bertram TA, Markovits JE, Juliana MM. 1996. Non-proliferative lesions of the alimentary canal in rats GI-1. In *Guides for Toxicologic Pathology*. STP/ARP/AFIP, Washington, DC, 1-16.  
Full-text: <https://www.toxpath.org/ssdnc/GINonproliferativeRat.pdf>



# NTP Nonneoplastic Lesion Atlas

## *Esophagus – Ulcer*

### **Authors:**

Linda H. Kooistra, DVM, PhD, DACVP  
Pathologist  
Charles River Laboratories, Inc.  
Research Triangle Park, NC

Abraham Nyska, DVM, Diplomate ECVP, Fellow IATP  
Expert in Toxicologic Pathology  
Visiting Full Professor of Pathology  
Sackler School of Medicine, Tel Aviv University  
Timrat Israel