## *Esophagus – Hyperplasia*

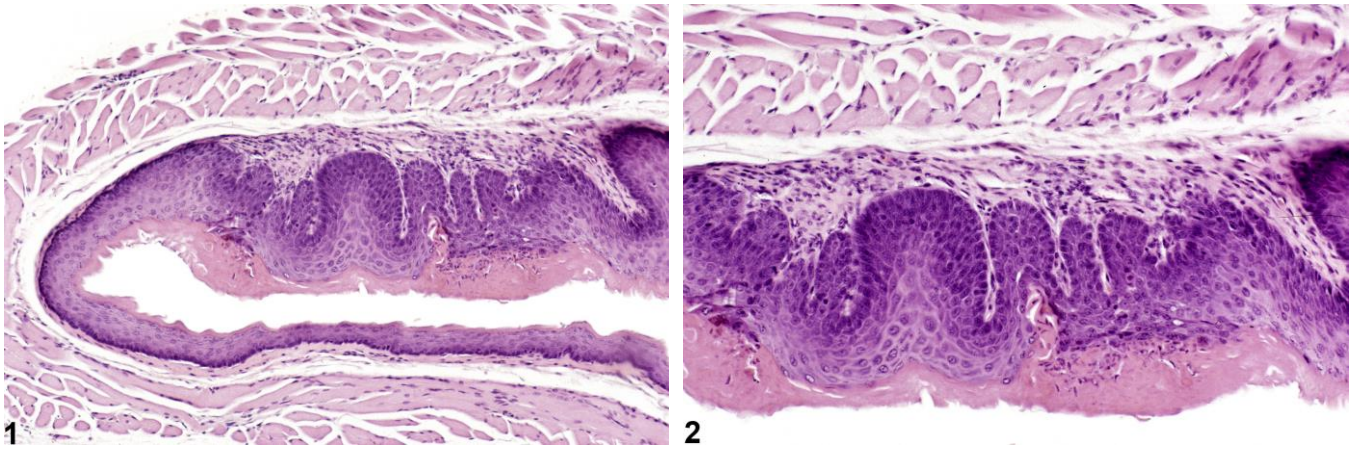
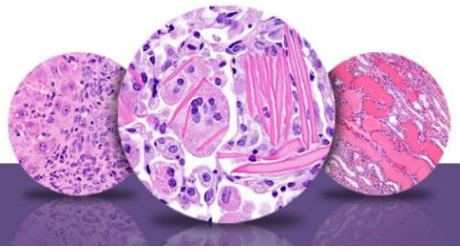



**Figure Legend: Figure 1** Esophagus, Epithelium - Hyperplasia in a female B6C3F1 mouse from a chronic study. There are rete peg-like structures and accompanying hyperkeratosis. **Figure 2** Esophagus, Epithelium - Hyperplasia in a female B6C3F1 mouse from a chronic study (higher magnification of Figure 1). There are rete peg-like structures and accompanying hyperkeratosis.

**Comment:** Hyperplasia of the mucosal epithelium is characterized by an increased number of epithelial cells and the absence of atypia. The epithelial cells may be of one or more epithelial cell types (basal, spinous, or granulosum). In severe cases, rete peg-like structures may extend into the submucosa (Figure 1 and Figure 2). Hyperkeratosis (increased thickness of the stratum corneum) is often seen when hyperplasia of the mucosa is present. Hyperplasia of the squamous mucosa with hyperkeratosis has been reported in the esophagus of the rat following chronic high-dose administration of vehicles such as alcohol.

**Recommendation:** Epithelial hyperplasia should be diagnosed and graded based on the size of the area of esophagus affected and the thickness of the hyperplastic esophageal epithelium. Hyperkeratosis associated with hyperplasia is usually not diagnosed as a separate entity, although it may be mentioned in the narrative. When hyperkeratosis is present in the absence of hyperplasia or when the hyperkeratosis is extreme, it should be diagnosed and graded separately from the hyperplasia (see description of Esophagus - Hyperkeratosis).



## *Esophagus – Hyperplasia*

**References:**

Boorman GA, Hong HL, Jameson CW, Yoshitomi K, Maronpot RR. 1986. Regression of methyl bromide-induced forestomach lesions in the rat. Toxicol Appl Pharmacol 86:131-139.
Abstract: http://www.ncbi.nlm.nih.gov/pubmed/3764933

Breider MA, Bleavins MR, Reindel JF, Gough AW, de la Iglesia FA. 1996. Cellular hyperplasia in rats following continuous intravenous infusion of recombinant human epidermal growth factor. Vet Pathol 33:184-194.
Full-text: http://vet.sagepub.com/content/33/2/184

Hargis AM, Ginn PE. 2007. The integument. In: Pathologic Basis of Veterinary Disease, 4th ed (McGavin MD, Zachary JF, eds). Mosby, St Louis, MO, 1107-1261.

Maraschin R, Bussi R, Conz A, Orlando L, Pirovano R, Nyska A. 1995. Toxicological evaluation of u-hEGF. Toxicol Pathol 23:356-366.
Full-text: http://tpx.sagepub.com/content/23/3/356.full.pdf

Nelson LW, Kelly WA, Weikel JH. 1972. Mesovarial leiomyomas in rats in a chronic toxicity study of musuprine hydrochloride. Toxicol Appl Pharmacol 23:731-737.

Reindel JF, Pilcher GD, Gough AW, Haskins JR, de la Iglesia FA. 1996. Recombinant human epidermal growth factor-1–48-induced structural changes in the digestive tract of cynomolgus monkeys (*Macaca fascicularis*). Toxicol Pathol 24:669-679.
Abstract: http://www.ncbi.nlm.nih.gov/pubmed/9082544

Vinter-Jensen L. 1999. Pharmacological effects of epidermal growth factor (EGF) with focus on the urinary and gastrointestinal tracts. APMIS Suppl 93:40-42.
Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10424202

**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