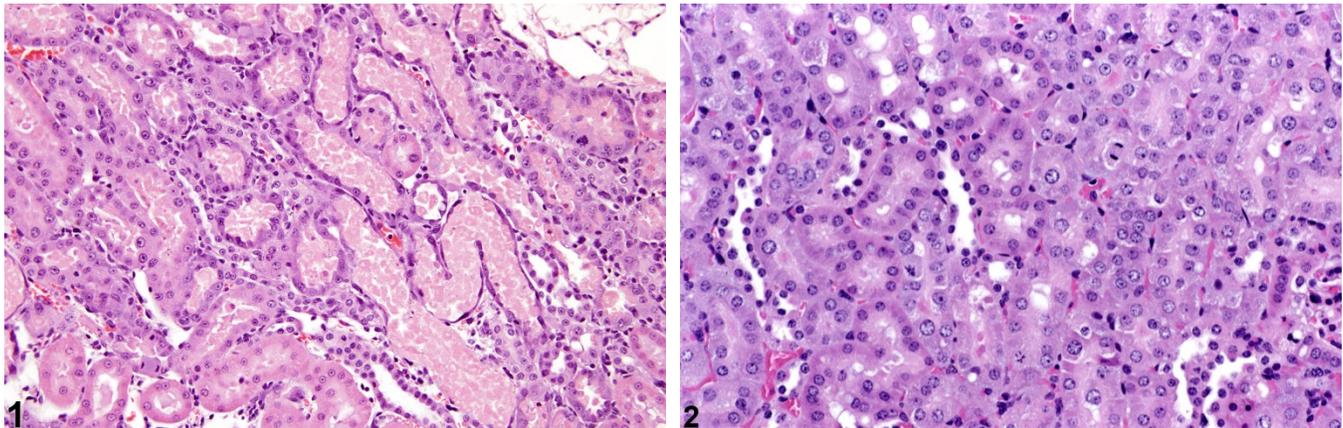




# NTP Nonneoplastic Lesion Atlas

## *Kidney, Renal Tubule – Regeneration*



**Figure Legend:** **Figure 1** Kidney, Renal tubule - Regeneration in a male rat from an acute study. Regeneration following acute tubule epithelial injury is characterized by flattened epithelium and tubule epithelial cell basophilia and is accompanied by nuclear crowding. **Figure 2** Kidney, Renal tubule - Regeneration in a male P53 +/- (C57BL/6) mouse from a subchronic study. Following an acute phase of tubule injury, regeneration is characterized by tubule basophilia, nuclear crowding, and increased mitoses.

**Comment:** Renal tubule regeneration occurs as a reparative response to previous degeneration and/or necrosis of renal tubular epithelium. It is one of the most common test-article-related lesions observed in the kidney. Regeneration is characterized by a spectrum of histologic changes, including cytoplasmic basophilia, karyomegaly, and nuclear crowding along the affected tubule segment (Figure 1 and Figure 2). In contrast to chronic progressive nephropathy (CPN), thickened basement membranes are generally not a feature with chemically induced injury and regeneration. Mitotic figures are variable. However, the determination of chemically mediated regeneration can be confounded by the presence of CPN and may be difficult for the toxicologic pathologist to distinguish.

**Recommendation:** Regeneration should be diagnosed and given a severity grade. Tubule regeneration accompanying CPN-related regeneration should not be diagnosed separately but should be included in the diagnosis of CPN. If necrosis is significant, it may be diagnosed concurrently. The difference between hyperplasia and regeneration can be problematic, and the pathologist must use his or her judgment in differentiating these lesions.



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