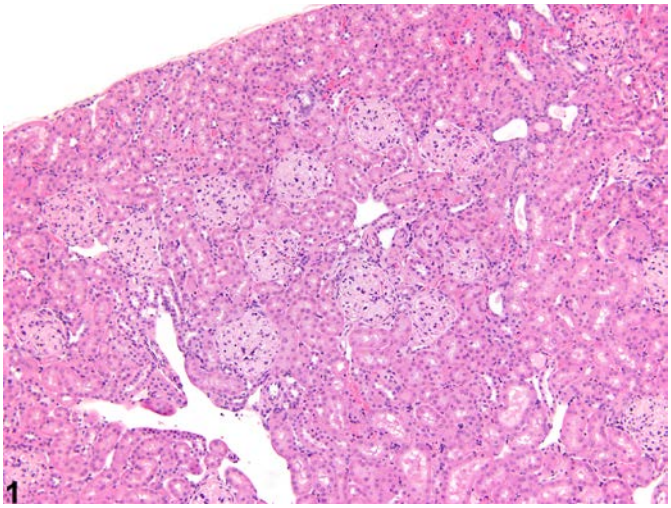
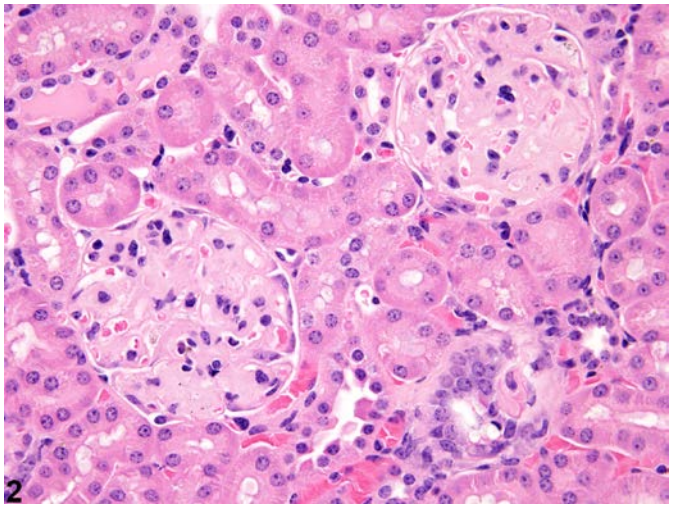
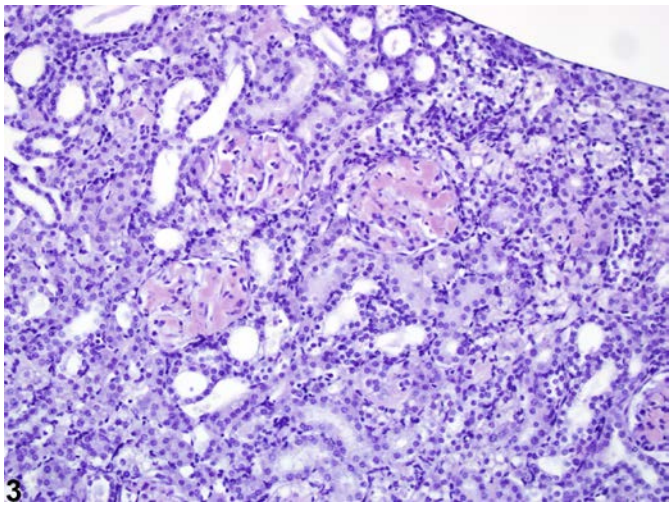
National Toxicology Program
U.S. Department of Health and Human Services

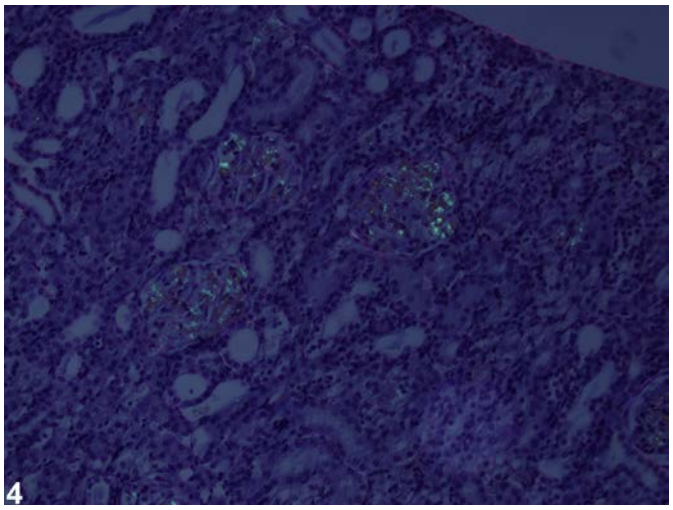
NTP Nonneoplastic Lesion Atlas

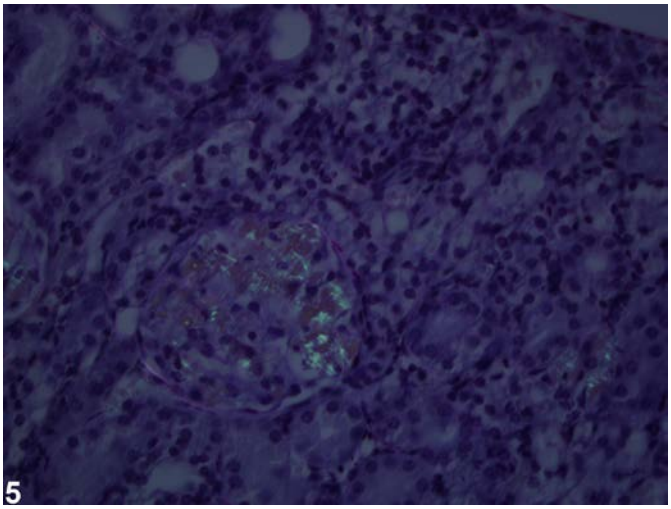
Kidney – Amyloid

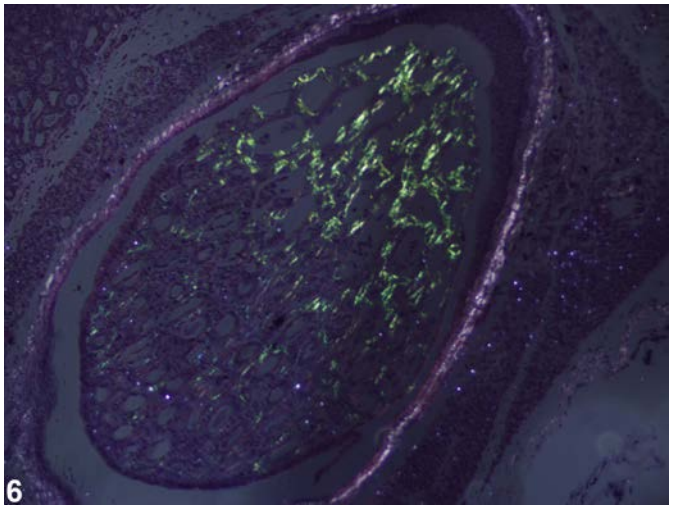












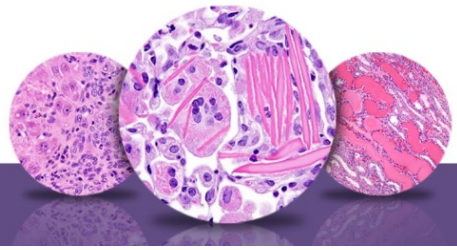


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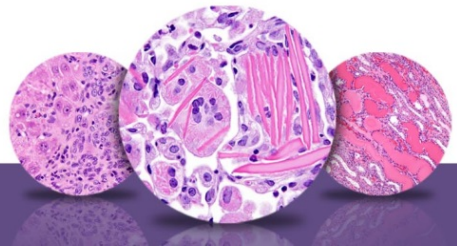
Figure Legend: Figure 1 Kidney, Glomerulus - Amyloid in a female B6C3F1 mouse from a chronic study. Glomeruli contain a pale, amorphous, eosinophilic material identified as amyloid. **Figure 2** Kidney, Glomerulus - Amyloid in a female B6C3F1 mouse from a chronic study. Increased amounts of pale-staining eosinophilic glomerular deposits of amyloid are present. **Figure 3** Kidney, Glomerulus - Amyloid in a B6C3F1 mouse from a chronic study. Positive Congo red staining of glomerular amyloid deposits are present in the glomeruli. **Figure 4** Kidney, Glomerulus - Amyloid in a B6C3F1 mouse from a chronic study (same mouse as in Figure 3). Congo red staining with polarization of amyloid deposits shows the characteristic apple-green birefringence. **Figure 5** Kidney, Glomerulus - Amyloid in a B6C3F1 mouse from a chronic study (higher magnification of Figure 4). Congo red staining with polarization shows the characteristic apple-green birefringence of amyloid deposits. **Figure 6** Kidney, Papilla - Amyloid in a B6C3F1 mouse from a chronic study (same mouse as in Figure 3). Congo red staining with polarization of amyloid deposits in the renal papilla shows the characteristic apple-green birefringence.

Comment: Amyloid deposition is a spontaneous and age-related disease that occasionally can be related to test item administration. It is commonly noted in some strains of mouse, particularly the CD-1 mouse, but is rarely reported or observed in the rat. Amyloid is most commonly noted as an extracellular deposition of pale, homogeneous, slightly eosinophilic material in renal glomeruli (Figure 1, Figure 2, and Figure 3). However, amyloid may also be identified in peritubular interstitial spaces. Special stains are often used to identify amyloid, including Congo red positivity with apple green birefringence when polarized (Figure 4, Figure 5, and Figure 6) and periodic acid-Schiff negativity. Amyloid deposits in mice seem to be faintly positive with Congo red compared with other species, where apple green birefringence is more pronounced. Amyloid must be distinguished from hyaline glomerulopathy, a morphologically similar disease of mice with a different pathogenesis and staining pattern (see Kidney - Hyaline glomerulopathy). Amyloid may result in papillary necrosis. Concurrently, amyloid deposits may be present in other organs, such as the spleen, liver, and gastrointestinal tract.



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Recommendation: Amyloid should be diagnosed and graded. The location of the amyloid deposits should be indicated in the diagnosis by using a site modifier. Any secondary lesions, such as necrosis or degeneration, should not be diagnosed separately unless warranted by severity. Secondary lesions should, however, be described in the pathology narrative.

References:

Frith CH, Chandra M. 1991. Incidence, distribution, and morphology of amyloidosis in Charles Rivers CD-1 mice. Toxicol Pathol 19:123-127.
Abstract: http://www.ncbi.nlm.nih.gov/pubmed/1771365

Higuchi K, Naiki H, Kitagawa K, Hosokawa M, Takeda T. 1991. Mouse senile amyloidosis. ASSAM amyloidosis in mice presents universally as a systemic age-associated amyloidosis. Virchows Arch B Cell Pathol Incl Mol Pathol 60:231-238.
Abstract: http://www.ncbi.nlm.nih.gov/pubmed/1681611

Wojcinski ZW, Albassam MA, Smith GS. 1992. Hyaline glomerulopathy in B6C3F1 mice. Toxicol Pathol 19:224-229.

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