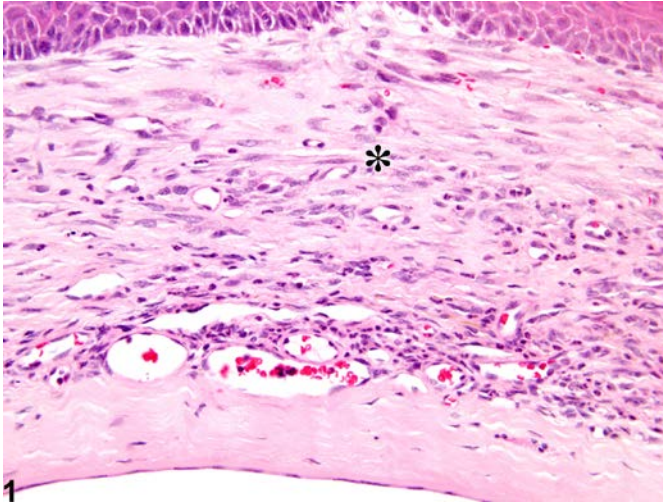




# NTP Nonneoplastic Lesion Atlas

## Eye, Cornea – Fibrosis



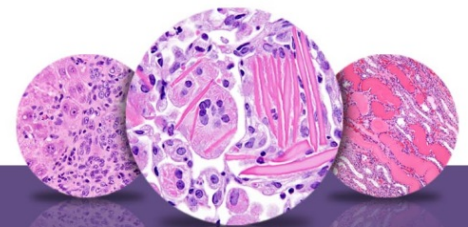
**Figure Legend:** **Figure 1** Eye, Cornea - Fibrosis in a male B6C3F1 mouse from a chronic study. The normal orderly collagen lamellar architecture is replaced by coarse, irregular bundles of collagen fibers.

**Comment:** Fibrosis of the corneal stroma (Figure 1) is characterized by replacement of the normal orderly collagen lamellar architecture by coarse, irregular bundles of collagenous fibers (scar tissue). These changes result in loss of corneal transparency. The new replacement collagen is produced by the resident stromal keratocytes, which respond to injury by undergoing phenotypic transition into fibroblasts and myofibroblasts, as well as by bone-marrow-derived cells that migrate to the cornea in response to injury. Corneal fibrosis is a reactive change resulting from various causes that generally occur in conjunction with neovascularization and/or inflammation (Figure 1).

**Recommendation:** Fibrosis that occurs without, or with only minimal, concurrent inflammation, it should be diagnosed and assigned a severity grade. When corneal fibrosis is considered secondary to inflammation, it should not be diagnosed separately unless warranted by its severity, though it should be described in the pathology narrative.

### References:

Chen M, Matsuda H, Wang L, Watanabe T, Kimura MT, Igarishi J, Wang X, Sakimoto T, Fukuda N, Sawa M, Nagase H. 2010. Pretranscriptional regulation of Tgf- $\beta$ 1 by PI polyamide prevents scarring and accelerates wound healing of the cornea after exposure to alkali. *Mol Ther* 18:519-527.  
Full-text: <http://www.nature.com/mt/journal/v18/n3/full/mt2009263a.html>



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### References:

Galiacy SD, Fournié P, Massoudi D, Ancèle E, Quintyn JC, Erraud A, Raymond-Letron I, Rolling F, Malecaze F. 2011. Matrix metalloproteinase 14 overexpression reduces corneal scarring. *Gene Ther* 18:462-468.

Abstract: <http://www.nature.com/qt/journal/v18/n5/full/qt2010159a.html>

Geiss V, Yoshitomi K. 1991. Eyes. In: *Pathology of the Mouse: Reference and Atlas* (Maronpot RR, Boorman GA, Gaul BW, eds). Cache River Press, Vienna, IL, 471-489.

Abstract: <http://www.cacheriverpress.com/books/pathmouse.htm>

Newkirk KM, Chandler HL, Parent AE, Young DC, Colitz CMH, Wilkie DA, Kusewitt DF. 2007. Ultraviolet radiation-induced corneal degeneration in 129 mice. *Toxicol Pathol* 35:817-824.

Full-text: <http://tpx.sagepub.com/content/35/6/817.full>

National Toxicology Program. 1989. NTP TR-342. Toxicology and Carcinogenesis Studies of Dichlorvos (CAS No. 62-73-7) in F344/N Rats and B6C3F<sub>1</sub> Mice (Gavage Studies). NTP, Research Triangle Park, NC.

Abstract: <http://ntp.niehs.nih.gov/go/10790>

West-Mays JA. 2006. The keratocyte: Corneal stromal cell with variable repair phenotypes. *Int J Biochem Cell Biol* 38:1625-1631.

Full-text: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2505273/>

Wilson SE. 2012. Corneal myofibroblast biology and pathobiology: Generation, persistence, and transparency. *Exp Eye Res* 99:78-88.

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/22542905>

Yoshitomi K, Boorman GA. 1990. Eye and associated glands. In: *Pathology of the Fischer Rat: Reference and Atlas* (Boorman GA, Eustis SL, Elwell MR, Montgomery CA, MacKenzie WF, eds). Academic Press, San Diego, CA, 239-260.

Abstract: <http://www.ncbi.nlm.nih.gov/nlmcatalog/9002563>

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