

NTP Nonneoplastic Lesion Atlas

Thyroid Gland, Follicle, Epithelium – Hyperplasia

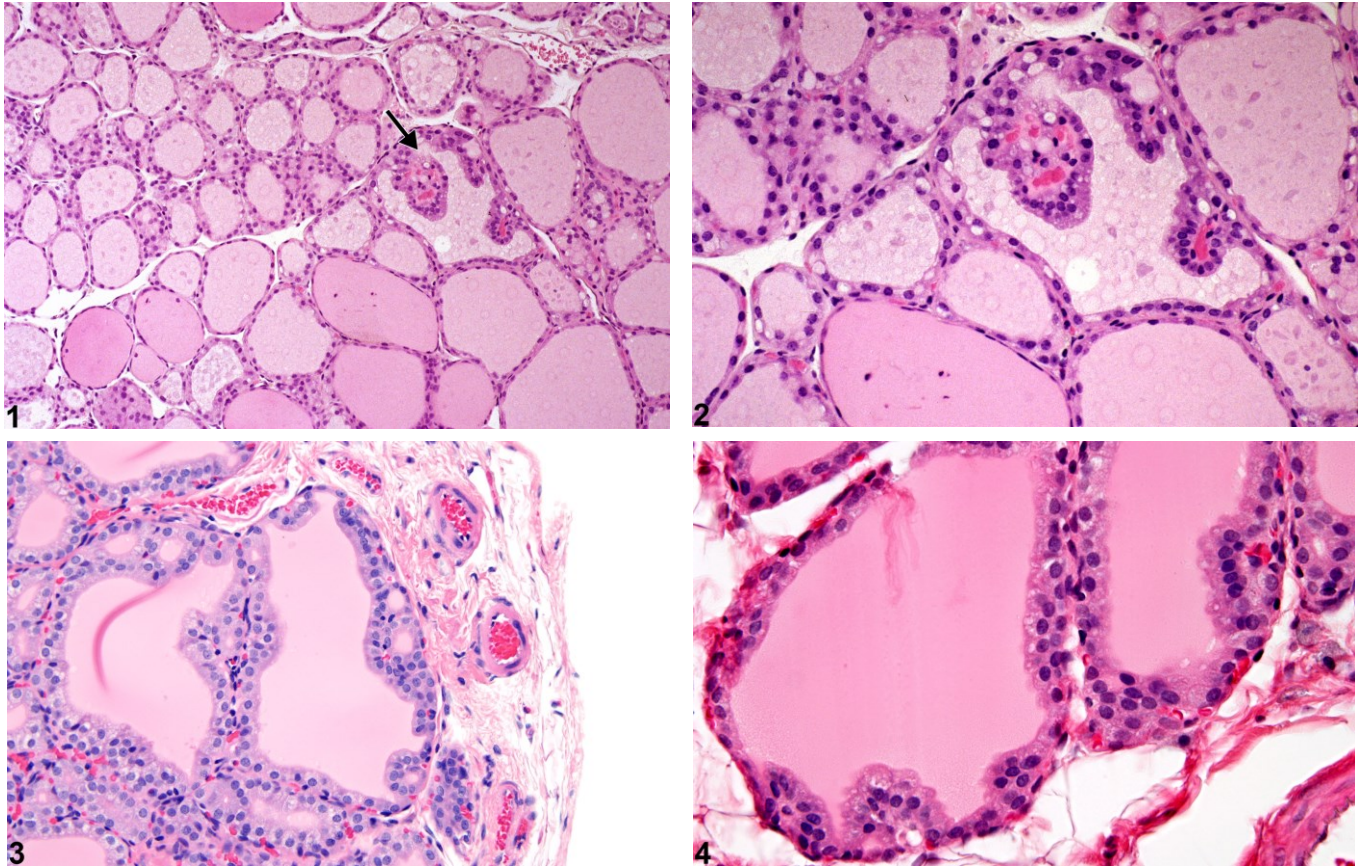
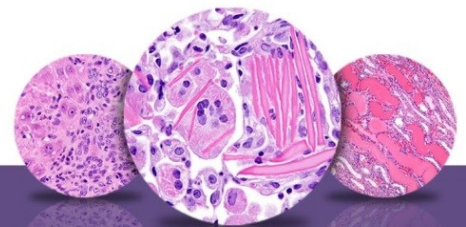


Figure Legend: **Figure 1** Thyroid gland, Follicle, Epithelium - Hyperplasia in a male B6C3F1 mouse from a chronic study. Proliferative projections of hyperplastic epithelium are present in a single follicle (arrow). **Figure 2** Thyroid gland, Follicle, Epithelium - Hyperplasia in a male B6C3F1 mouse from a chronic study. Higher magnification of Figure 1 shows the proliferative projections of hyperplastic epithelium in more detail. **Figure 3** Thyroid gland, Follicle, Epithelium - Hyperplasia in a male F344/N rat from a subchronic study. Some degree of hypertrophy is present in this example of minimal epithelial hyperplasia. **Figure 4** Thyroid gland, Follicle, Epithelium - Hyperplasia in a male F344/N rat in a subchronic study. There is minimal hyperplasia of the follicular epithelium with crowding of the nuclei and minimal protrusion into the follicular lumen.

Comment: Hyperplasia of follicular epithelium may be focal, diffuse, or sometimes cystic. Focal or multifocal follicular hyperplasia can be present in a single or in a few follicles. Focal hyperplasia is not encapsulated and does not compress surrounding parenchyma, which differentiates it from benign



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tumors. Affected follicles may be small with minimal colloid or large and irregular with papillary projections of hyperplastic epithelium extending into the follicular lumen (Figure 1 and Figure 2). Thyroid follicular hypertrophy and hyperplasia often occur together (Figure 3). Hyperplasia characterized by crowding of follicular epithelium nuclei and minimal protrusion into the follicular lumen may occur (Figure 4).

Recommendation: Although follicular hyperplasia can occur spontaneously, it should be diagnosed and given a severity grade whenever present. Severity may be based on the percentage of the gland involved and the morphologic complexity of the hyperplasia. The nature and extent of the hyperplasia and whether it is unilateral or bilateral should be described in the pathology narrative. Distinction between focal, diffuse, and cystic thyroid follicular hyperplasia is recommended and should be included as a qualifier of the diagnosis. The nature of any associated hypertrophy in follicles with hyperplasia should not be diagnosed separately, unless warranted by severity. If not diagnosed, hypertrophy should be described in the pathology narrative.

References:

Capen CC, Martin SL. 1989. The effects of xenobiotics on the structure and function of thyroid follicular and C-cells. *Toxicol Pathol* 17:266-293.

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/2675279>

Capen CC, DeLellis RA, Yarrington JT. 2002. Endocrine system. In: *Handbook of Toxicologic Pathology, Vol 2* (Haschek WM, Rousseaux CG, Wallig MA, eds). Academic Press, New York, 681-783.

Abstract: <http://www.sciencedirect.com/science/book/9780123302151>

Collins WT, Capen CC, Kasza L, Carter C, Dailey RE. 1977. Effect of polychlorinated biphenyl (PCB) on the thyroid gland of rats. Ultrastructural and biochemical investigations. *Am J Pathol* 89:119-136.

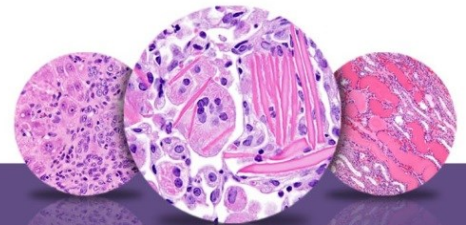
Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/199066>

Greaves P. 2007. *Histopathology of Preclinical Toxicity Studies: Interpretation and Relevance in Drug Safety Evaluation*, 3rd ed. Academic Press, Amsterdam, 819-839.

Abstract: <http://www.sciencedirect.com/science/book/9780444527714>

Hardisty JF, Boorman GA. 1990. Thyroid gland. In: *Pathology of the Fischer Rat: Reference and Atlas* (Boorman GA, Eustis SL, Elwell MR, Montgomery CA, MacKenzie WF, eds). Academic Press, San Diego, 519-536.

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



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Hardisty JF, Boorman GA. 1999. Thyroid and parathyroid glands. In: Pathology of the Mouse: Reference and Atlas (Maronpot RR, Boorman GA, Gaul BW, eds). Cache River Press, Vienna, IL, 537-554.

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

Hood A, Hashmi R, Klaassen CD. 1999. Effects of microsomal enzyme inducers on thyroid-follicular cell proliferation, hyperplasia, and hypertrophy. Toxicol Appl Pharmacol 160:163-170.

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/10527915>

Hooth MJ, Deangelo AB, George MH, Gaillard ET, Travlos GS, Boorman GA, Wolf DC. 2001. Subchronic sodium chlorate exposure in drinking water results in a concentration-dependent increase in rat thyroid follicular cell hyperplasia. Toxicol Pathol 29:250-259.

Full-Text: <http://tpx.sagepub.com/content/29/2/250.full.pdf>

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