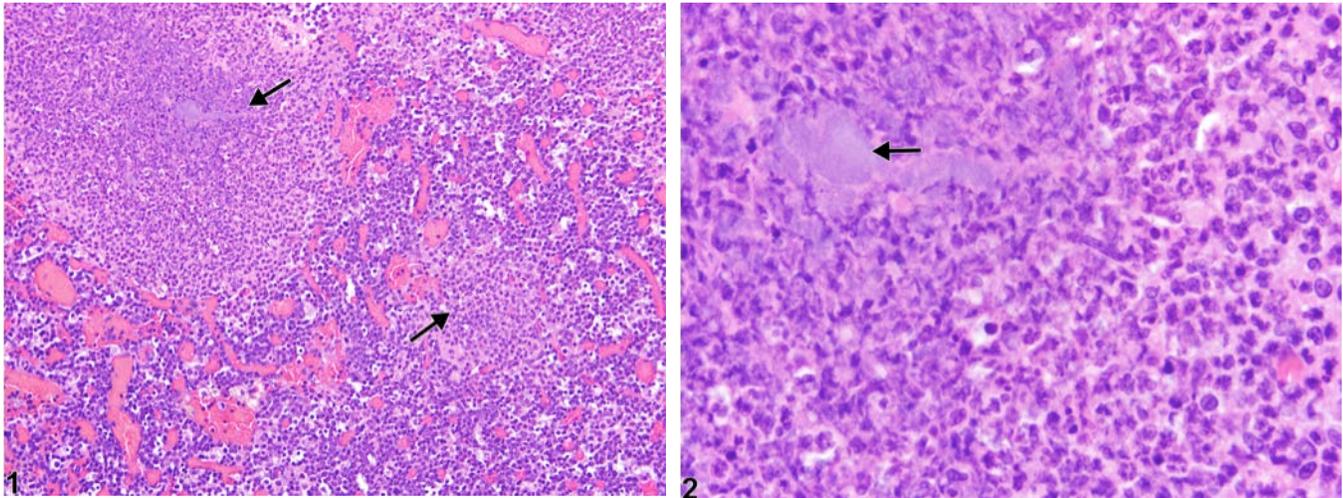




# NTP Nonneoplastic Lesion Atlas

## Thymus – Inflammation



**Figure Legend:** **Figure 1** Thymus - Inflammation, Suppurative in a female B6C3F1/N mouse from a chronic study. Multifocal, discrete regions of suppurative exudate (abscesses) are present (arrows).

**Figure 2** Thymus - Inflammation, Suppurative in a female B6C3F1/N mouse from a chronic study (higher magnification of Figure 1). Suppurative inflammation is associated with a central focus of bacteria (arrow).

**Comment:** Primary inflammation is an uncommon lesion in the thymus of rodents. If present, it is more likely an extension of inflammation from other tissues, particularly inflammation secondary to perforation of the esophagus during oral gavage. In NTP studies, the five standard categories of inflammation are acute, suppurative, chronic, chronic active, and granulomatous. In *acute inflammation*, the neutrophil is the predominant infiltrating cell, though fewer macrophages and lymphocytes may also be present. There may also be evidence of edema or hyperemia. The neutrophil is also the predominant cell type in *suppurative inflammation*, but the neutrophils are aggregated, and many of them are degenerate (suppurative exudate) (Figure 1, arrows). Cell debris, both from the resident cell populations and infiltrating leukocytes; proteinaceous fluid containing fibrin, fewer macrophages, occasional lymphocytes, or plasma cells; and, possibly, an infectious agent (Figure 2, arrow) may also be present within the exudate. Grossly, these lesions would be characterized by the presence of pus. In the tissue surrounding the exudate, there may be fibroblasts, fibrous connective tissue, and mixed inflammatory cells, depending on the chronicity of the lesion. Lymphocytes predominate in *chronic inflammation*. Lymphocytes also predominate in *chronic active inflammation*, but there are also a



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significant number of neutrophils. Chronic and chronic active inflammation may contain macrophages. *Granulomatous inflammation* is another form of chronic inflammation, but this diagnosis requires the presence of a significant number of aggregated, large, activated macrophages, epithelioid macrophages, and/ or multinucleated giant cells. Inflammation is differentiated from cellular infiltrates by the presence of other changes, such as edema, hemorrhage, degeneration, necrosis, or other evidence of tissue damage.

**Recommendation:** Whenever present, inflammatory lesions of the thymus should be diagnosed and graded. The inflammation should be categorized based on the predominant cell population present by adding the appropriate modifier to the diagnosis (acute, chronic active, etc.). The word “abscess” should be used as a gross diagnosis only; abscesses should be diagnosed as suppurative inflammation. Associated lesions, such as necrosis or hemorrhage, should not be diagnosed separately unless warranted by severity, but should be described in the pathology narrative. If the inflammation is secondary to another lesion, such as necrosis or neoplasia, it should not be diagnosed separately unless warranted by severity, but should be noted in the narrative.

### **References:**

- National Toxicology Program. 1992. NTP TR-396. Toxicology and Carcinogenesis Studies of Monochloroacetic Acid (CAS No. 79-11-8) in F344/N Rats and B6C3F1 Mice (Gavage Studies). NTP, Research Triangle Park, NC.  
Abstract: <http://ntp.niehs.nih.gov/go/12243>
- Stefanski SA, Elwell MR, Stromberg PC. 1990. Spleen, lymph nodes, and thymus. In: Pathology of the Fischer Rat: Reference and Atlas (Boorman GA, Eustis SL, Elwell MR, Montgomery CA, MacKenzie WF, eds). Academic Press, San Diego, 369-394.
- Ward JM, Mann PC, Morishima H, Frith CH. 1999. Thymus, spleen, and lymph nodes. In: Pathology of the Mouse (Maronpot RR, ed). Cache River Press, Vienna, IL, 333-360.



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