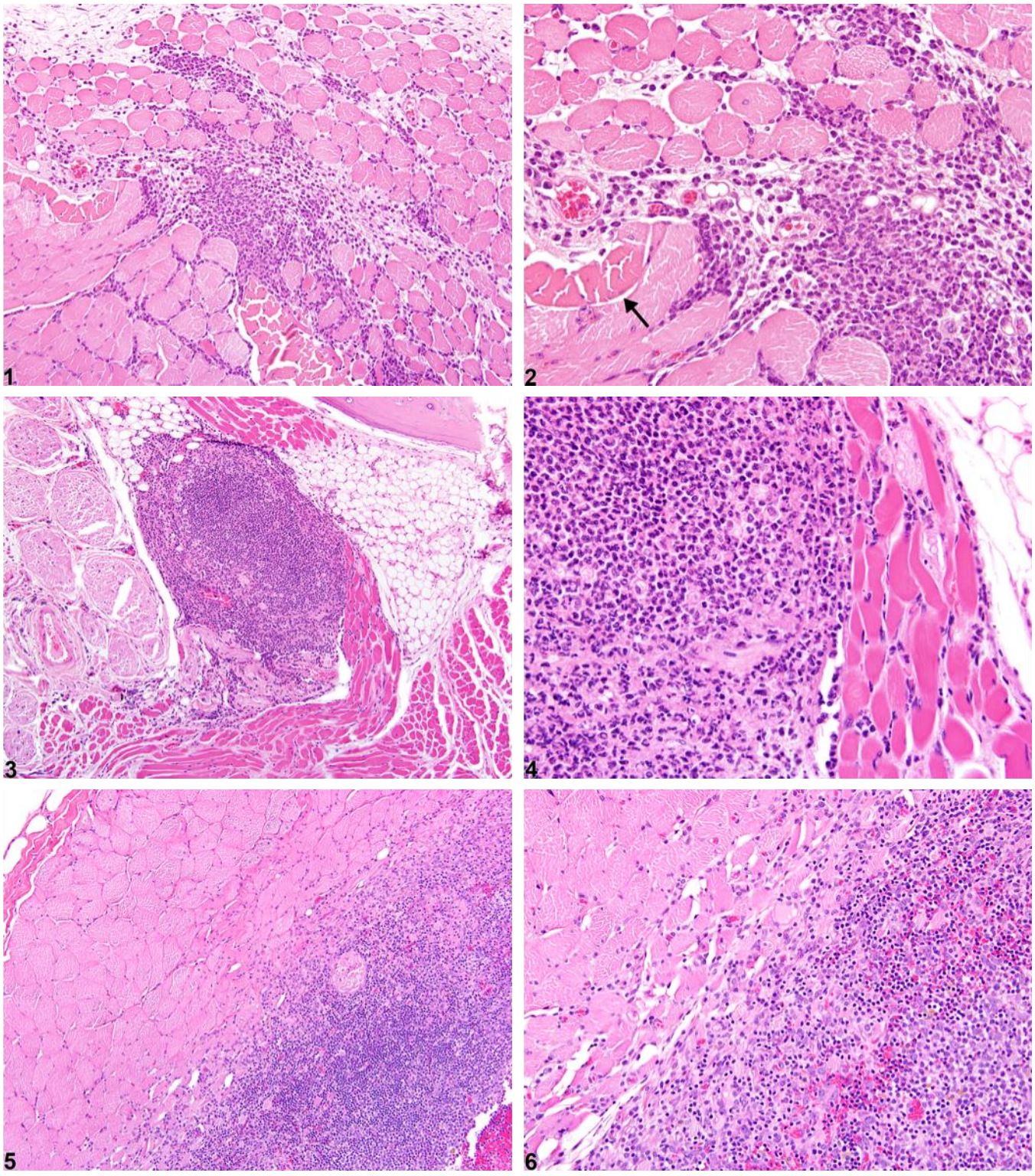
Skeletal Muscle – Inflammation



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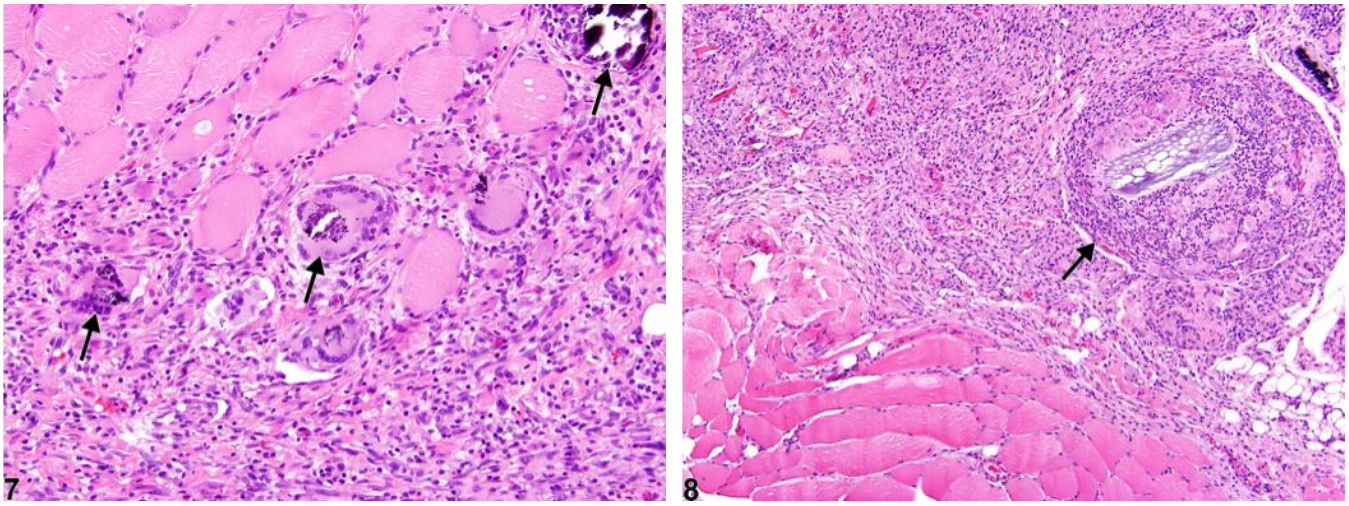
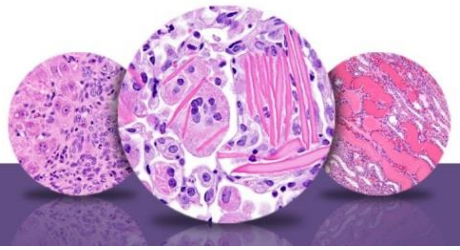


Figure Legend: **Figure 1** Skeletal muscle - Inflammation, Acute in a female Swiss CD-1 mouse from a chronic study. A neutrophilic infiltrate has led to necrosis and loss of muscle fibers. **Figure 2** Skeletal muscle - Inflammation, Acute in a female Swiss CD-1 mouse from a chronic study (higher magnification of Figure 1). There is loss of muscle fibers and a hypereosinophilic degenerative fiber (arrow). **Figure 3** Skeletal muscle - Inflammation, Suppurative in a male B6C3F1/N mouse from a chronic study. A localized collection of intact and degenerating neutrophils is present in the muscle. **Figure 4** Skeletal muscle - Inflammation, Suppurative in a male B6C3F1/N mouse from a chronic study (higher magnification of Figure 3). There is a localized collection of intact and degenerating neutrophils, as well as early neutrophilic infiltration between adjacent muscle fibers. **Figure 5** Skeletal muscle - Inflammation, Chronic in a female F344/N rat from a chronic study. A mixed mononuclear cellular response is associated with degeneration and loss of muscle fibers. **Figure 6** Skeletal muscle - Inflammation, Chronic in a female F344/N rat from a chronic study (higher magnification of Figure 5). Lymphocytes and mononuclear cells, along with some hemorrhage, are present in skeletal muscle. **Figure 7** Skeletal muscle - Inflammation, Granulomatous in a male Sprague Dawley rat from a subchronic study. A mixture of mononuclear cells, along with multinucleated giant cells, has replaced muscle fibers, and muscle fiber degeneration and mineralization within multinucleated giant cells (arrows) can be seen in the area of inflammation. **Figure 8** Skeletal muscle - Inflammation, Chronic-active in a male Tg.Ac (FVB/N) homozygous mouse from a subchronic study. A circumscribed area of



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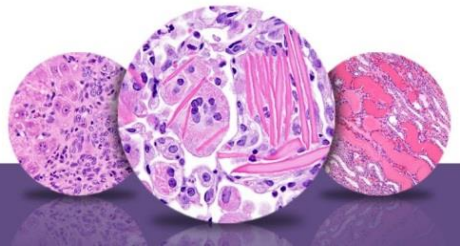
granulomatous inflammation with multinucleated giant cells (arrow) and neutrophils within an extensive area of chronic-active inflammation surrounds a foreign body consistent with plant material.

Comment: Inflammation of skeletal muscle can occur as a result of numerous types of injury, including physical trauma (e.g., injection sites, bite wounds, and blunt trauma), exposure to myotoxins or infectious agents, and ischemia, thrombosis, or myofiber necrosis. Inflammation can exhibit various morphologic patterns. It can be primarily interstitial, with little or no myofiber necrosis, or can be the predominant feature, with little inflammation.

In NTP studies, there are five standard categories of inflammation: acute, suppurative, chronic, chronic-active, and granulomatous; abscesses are diagnosed as *suppurative inflammation*. In *acute inflammation* (Figure 1 and Figure 2), the predominant infiltrating cell is the neutrophil, though fewer macrophages and lymphocytes may also be present. There may also be evidence of edema or hyperemia. The neutrophil is also the predominant infiltrating cell type in *suppurative inflammation* (Figure 3 and Figure 4), but the neutrophils are aggregated, and many of them are degenerate (suppurative exudate). Cell debris (both from the resident cell populations and from infiltrating leukocytes); proteinaceous fluid containing fibrin, fewer macrophages, occasional lymphocytes, and/or plasma cells; and possibly an infectious agent 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 a significant number of neutrophils are also present (Figure 5 and Figure 6). Both lesions 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, or multinucleated giant cells (Figure 7 and Figure 8).

Since inflammation can occur in response to, or result in, myofiber necrosis, myopathic changes in addition to edema and/or hemorrhage often occur concurrently. An inflammatory response is necessary to effectively repair damaged tissues; however, the nature, duration, and intensity of this response will crucially influence the overall outcome of repair.



Skeletal Muscle – Inflammation

Recommendation: Inflammation should be diagnosed and graded whenever it is considered a primary lesion. It may be diagnosed as a secondary lesion (e.g., secondary to necrosis) if it is particularly severe or more severe than expected relative to the severity of the primary lesion. The diagnosis should include the type of inflammation (e.g., acute, chronic, chronic-active) as a modifier. Generally it is not necessary to include a site modifier unless it is needed to separate two distinct lesions. Associated lesions, such as vascular lesions, foreign bodies, or infectious agents, should be diagnosed separately. Lesions secondary to the inflammation (e.g., necrosis) and lesions that are part of the inflammatory process (e.g., edema or hemorrhage) should not be diagnosed separately unless warranted by severity but should be described in the pathology narrative.

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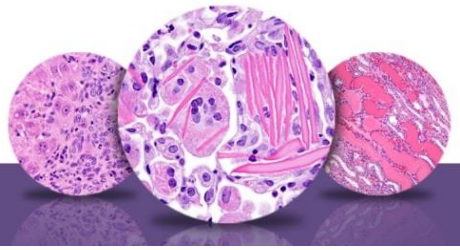

Skeletal Muscle – Inflammation

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Author:

Torrie A. Crabbs, DVM, DACVP
Pathologist
Experimental Pathology Laboratories, Inc.
Research Triangle Park, NC