



NTP Nonneoplastic Lesion Atlas

Heart – Mineral

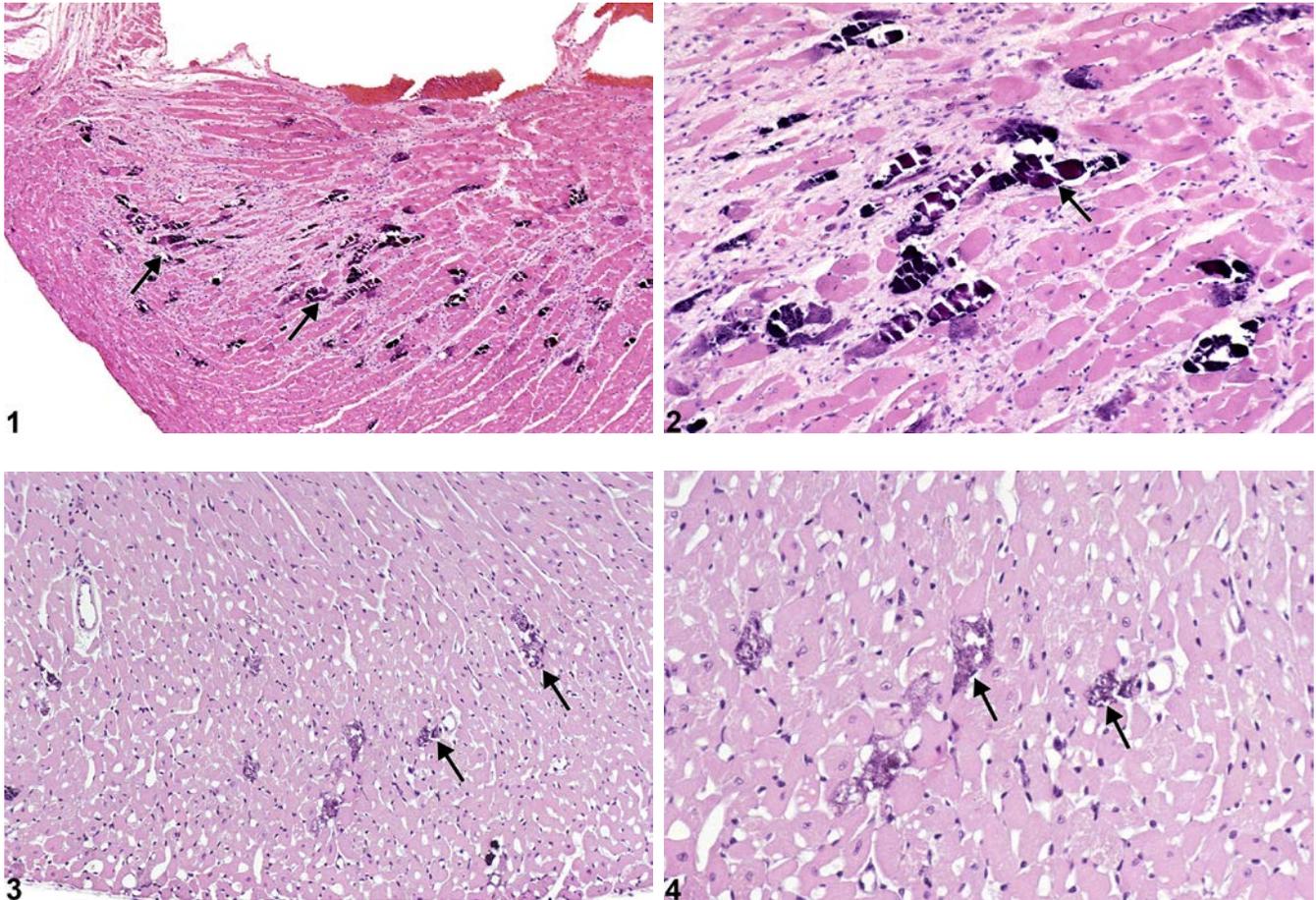


Figure Legend: **Figure 1** Heart - Mineral in a male F344/N rat from a chronic study. Dark blue crystalline material is present in the myocardium (arrows). **Figure 2** Heart - Mineral in a male F344/N rat from a chronic study (higher magnification of Figure 1). The dark blue mineral (arrow) in the cardiomyocytes is associated with a region of fibrosis. **Figure 3** Heart - Mineral in a female B6C3F1/N mouse from a subchronic study. Focal areas of mineral are present in the myocardium (arrows). **Figure 4** Heart - Mineral in a female B6C3F1/N mouse from a subchronic study (higher magnification of Figure 3). There is blue mineral within the cardiomyocytes.

Comment: Microscopically, mineral (Figure 1, Figure 2, Figure 3, and Figure 4) ranges from light basophilic stippling in slightly affected myofibers to intense, diffuse basophilic granularity that completely obscures the sarcoplasm in severely affected cardiomyocytes. The mineralization may be



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localized within individual cardiomyocytes, associated with sites of cellular necrosis (dystrophic), or found within the interstitial connective tissue or epicardium. Cardiac mineralization may be a spontaneous change (e.g., genetically or age related), a manifestation of primary cardiotoxicity (dystrophic mineralization), or secondary to renal disease (metastatic mineralization).

BALB/c mice develop epicardial mineralization, predominantly of the right ventricle. C3H mice develop myocardial mineralization of both ventricles. DBA mice may develop epicardial and myocardial mineralization.

Recommendation: Whenever present, mineral in the heart should be recorded and graded based on the extent of the mineralized deposits. Special stains are generally not needed for confirmation of mineral deposition. The location of the lesion (i.e., myocardium, epicardium) should be described in the narrative. If possible, differentiate dystrophic from metastatic mineral and discuss if changes are present secondary to renal disease (metastatic mineralization). Because it is secondary to necrosis, dystrophic mineralization should not be diagnosed separately, unless its severity warrants a separate diagnosis. However, its presence may be noted in the pathology narrative.

References:

Jokinen MP, Boyle M, Lieuallen WG, Johnson CL, Malarkey DE, Nyska A. 2011. Morphologic aspects of rodent cardiotoxicity in a retrospective evaluation of National Toxicology Program studies. *Toxicol Pathol* 39(5):850-860.

Abstract: <https://www.ncbi.nlm.nih.gov/pubmed/21747121>

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