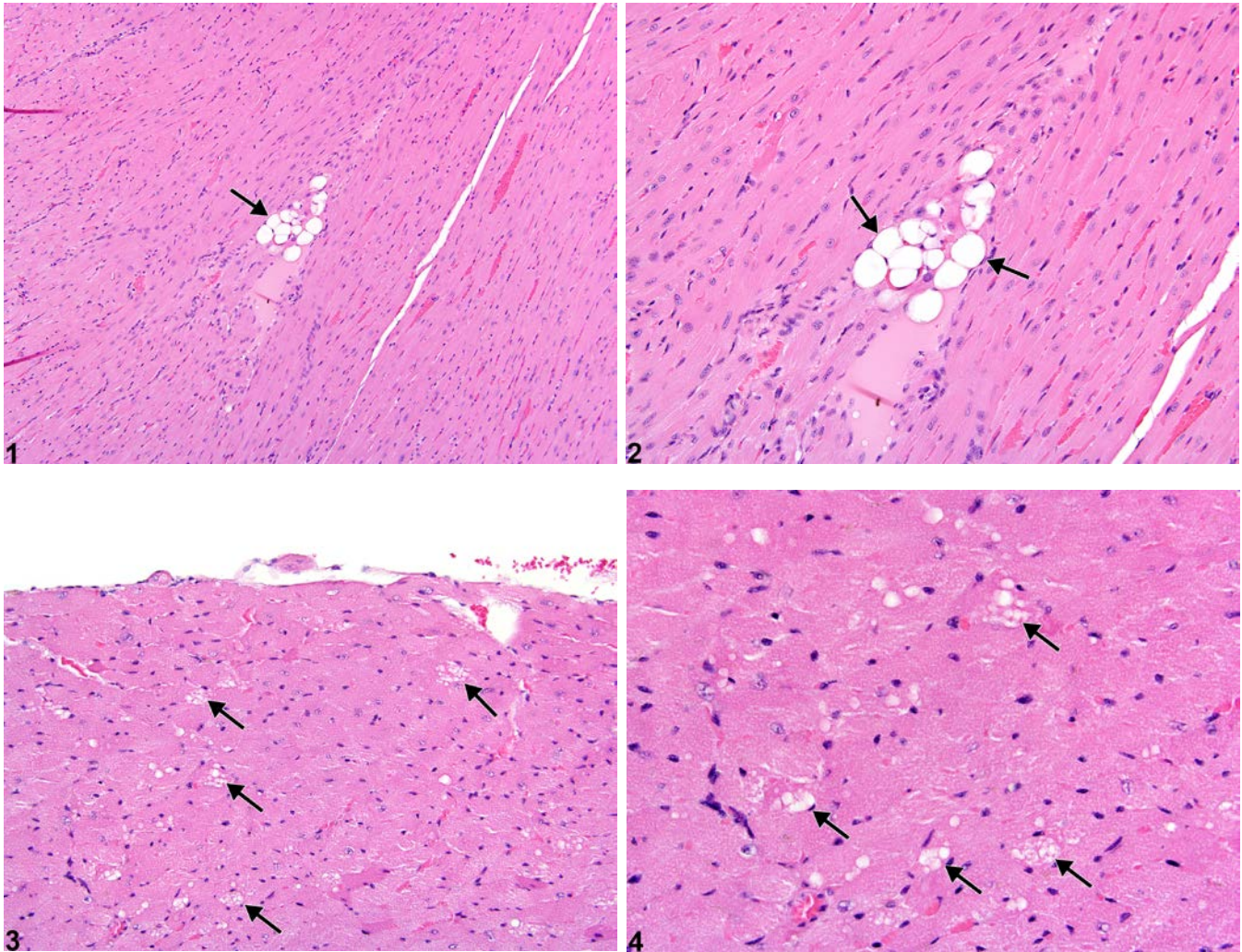


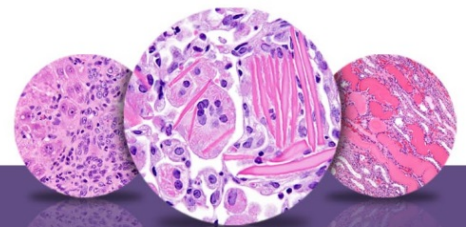


# NTP Nonneoplastic Lesion Atlas

## Heart, Myocardium – Vacuolation, Cytoplasmic



**Figure Legend:** **Figure 1** Heart, Myocardium - Vacuolation, Cytoplasmic in a female B6C3F1/N mouse from a subchronic study. A focal area of cytoplasmic vacuolation of myofibers is present (arrow). **Figure 2** Heart, Myocardium - Vacuolation, Cytoplasmic in a female B6C3F1/N mouse from a subchronic study (higher magnification of Figure 1). Large intracytoplasmic vacuoles are present in a group of myofibers (arrows). **Figure 3** Heart, Myocardium - Vacuolation, Cytoplasmic in a female B6C3F1/N mouse from a chronic study. Multiple cardiac myocytes contain cytoplasmic vacuoles (arrows). **Figure 4** Heart, Myocardium - Vacuolation, Cytoplasmic in a female B6C3F1/N mouse from a chronic study (higher magnification of Figure 3). Some of the cardiac myocytes have variably sized vacuoles (arrows).



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**Comment:** Cardiomyocyte vacuolation (Figure 1, Figure 2, Figure 3, and Figure 4) is considered to be a degenerative process, consisting of multifocal or widespread accumulation of multiple, well-demarcated, round, variably sized (primarily small), clear vacuoles. Vacuoles are found within the cardiomyocyte sarcoplasm and occasionally coalesce into larger vacuoles. Myofiber cytoplasmic vacuolation can be the only morphologic manifestation seen in cardiotoxicity or may be associated with other changes reflecting cardiotoxicity (e.g., myofiber necrosis, mononuclear cell infiltration, fibrosis), or it may be a minor component in the case of spontaneous cardiomyopathy. Ultrastructural analysis of heart tissue from chemical-related myofiber vacuolation has elucidated the primary site of damage in various organelles, including mitochondria and smooth endoplasmic reticulum. Vacuole formation occurs in damaged mitochondria with loss of cristae, subsequent swelling and possible coalescence due to disintegration of their outer membranes. In other cases, vacuolation forms from distension of the sarcoplasmic reticulum within cardiomyocytes. Electron microscopic examination may be used to positively identify the source and content of the vacuoles.

**Recommendation:** Cytoplasmic vacuolation of the cardiomyocytes should be diagnosed whenever present. It should be graded based on the extent of the lesion. The distribution of the vacuolation (i.e., focal, multifocal, or diffuse), as well as the location (i.e., right, left, or interventricular wall), should be described in the pathology narrative. If vacuolation is considered part of the spectrum of changes in cardiomyopathy, it should not be diagnosed separately but may be mentioned in the pathology narrative.

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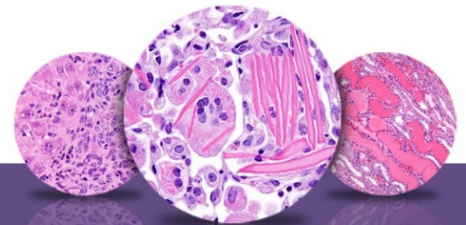
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