



NTP Nonneoplastic Lesion Atlas

Bone Marrow – Infiltration cellular, histiocyte

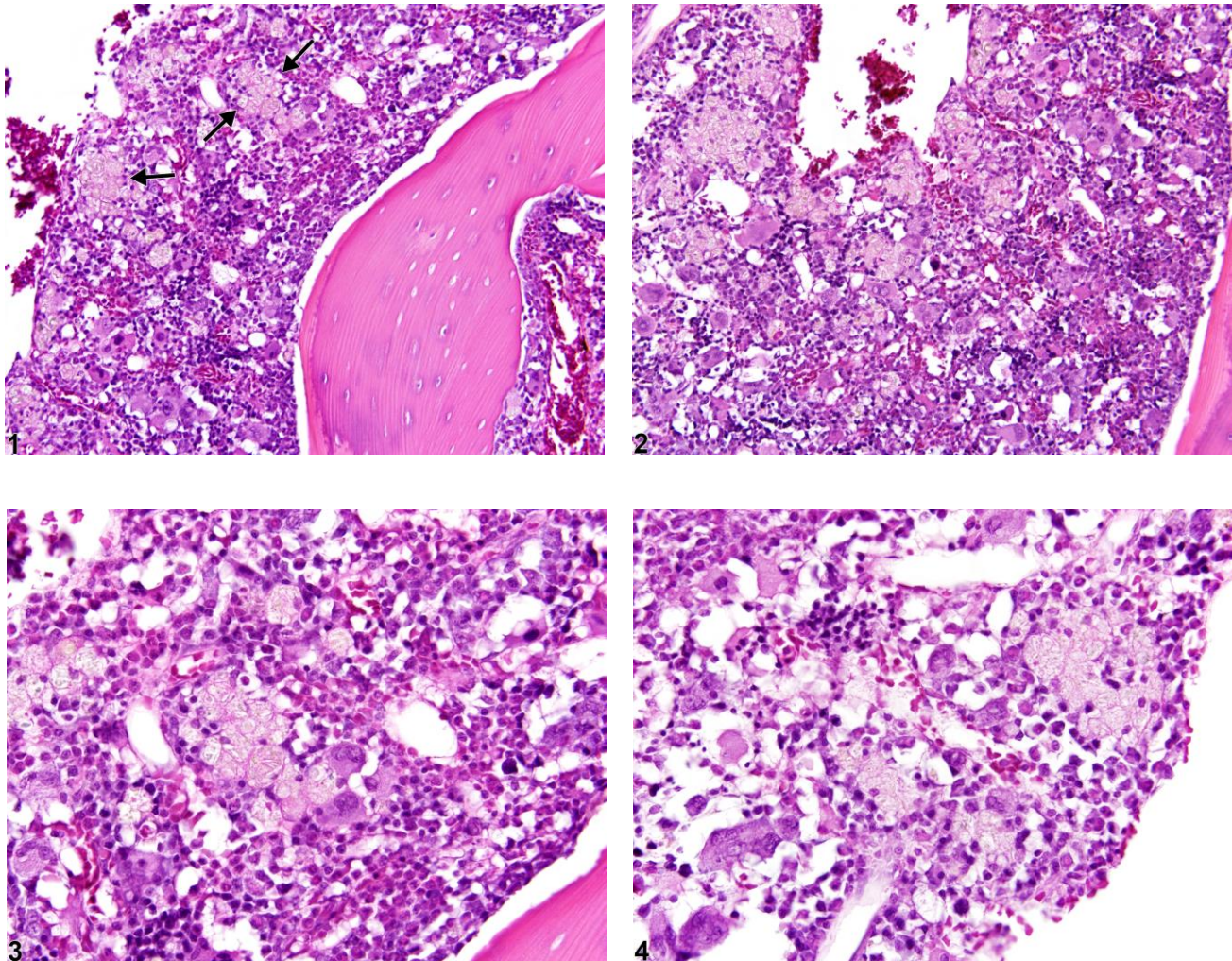


Figure Legend: **Figure 1** Bone marrow in a female F344/N rat from a chronic study. Increased numbers of pale-staining vacuolated histiocytes (arrows) can be seen among the hematopoietic cells. **Figure 2** Bone marrow in a female F344/N rat from a chronic study. Increased numbers of pale-staining vacuolated histiocytes can be seen among the hematopoietic cells. **Figure 3** Bone marrow in a female F344/N rat from a chronic study. Increased numbers of pale-staining vacuolated histiocytes containing cholesterol crystals can be seen among the hematopoietic cells. **Figure 4** Bone marrow in a female F344/N rat from a chronic study. Increased numbers of pale-staining vacuolated histiocytes can be seen among the hematopoietic cells.



NTP Nonneoplastic Lesion Atlas

Bone Marrow – Infiltration cellular, histiocyte

Comment: Histiocytic infiltration is defined as an increase in the numbers of macrophages or histiocytes in the bone marrow. These macrophages may be vacuolated and/or contain variable amounts of cellular debris, cholesterol clefts, or pigment (e.g., hemosiderin) and are usually found in ill-defined, unorganized aggregates (Figures 1–4). Use of the term “histiocytic infiltration” is reserved for those instances when macrophage infiltration is present without other evidence of inflammation. The presence of (a) epithelioid or multinucleated macrophages, which may form organized aggregates (granulomas), (b) other inflammatory cells in the area, or (c) vascular changes, such as edema, warrants a diagnosis of granulomatous inflammation.

Histiocytic infiltration usually represents a reactive process, the reasons for which are not well defined in rodents. Compounds that are cytotoxic and cause necrosis of the bone marrow may result in increased numbers of macrophages, which serve to remove the cellular debris. In addition, any condition capable of causing bone marrow injury or inflammation can result in increased macrophages. In other species (humans and dogs), noninflammatory histiocytic infiltrates have been associated with bone marrow hyperplasia, ineffective hematopoiesis, or increased breakdown of blood cells.

Recommendation: Histiocytic infiltration should be consistently recorded and graded for all animals in a study. Grading is based on the degree of infiltration and/or numbers of aggregates.



NTP Nonneoplastic Lesion Atlas

Bone Marrow – Infiltration cellular, histiocyte

References:

Bain BJ, Clark DM, Lampert IA, Wilkins BS. 2001. Bone Marrow Pathology, 3rd ed. Blackwell, Ames, IA, 90–140.

Abstract: <http://onlinelibrary.wiley.com/book/10.1002/9780470757130>

Rosenthal NS. 2011 Bone marrow findings in inflammatory, infectious and metabolic disorders. In: Hematopathology (Jaffe ES, Harris NL, Vardiman JW, Campo E, Arber DA, eds). Elsevier Saunders, St Louis, 194–207.

Abstract:

<http://www.us.elsevierhealth.com/Medicine/Pathology/book/9780721600406/Hematopathology/>

MacKenzie WF, Eustis SL. 1900. Bone marrow. In: Pathology of the Fischer Rat: Reference and Atlas (Boorman GA, Eustis SL, Elwell MR, Montgomery CA, Mackenzie WF, eds). Academic Press, San Diego, 315–337.

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

Weiss DJ. 2010. Chronic inflammation and secondary myelofibrosis. In: Schalm's Veterinary Hematology, 5th ed (Weiss DJ, Wardrop KJ, eds). Wiley-Blackwell, Ames, IA, 112–117.

Abstract: <http://vet.sagepub.com/content/40/2/223.1>

Authors:

Michelle C. Cora, DVM, DACVP
Veterinary Medical Officer
NTP Clinical Pathologist
NTP Clinical Pathology Group
National Institute of Environmental Health Sciences
Research Triangle Park, NC

Gregory Travlos, DVM, DACVP
Group Leader, Clinical Pathology Group
Cellular and Molecular Pathology Branch
National Institute of Environmental Health Sciences
Research Triangle Park, NC