



NTP Nonneoplastic Lesion Atlas

Brain, Neuron – Cell loss

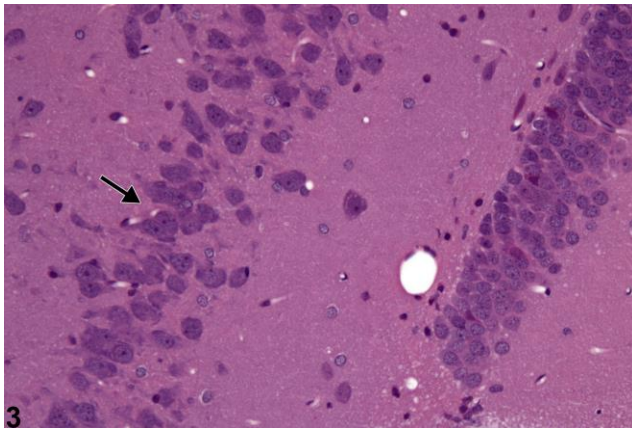
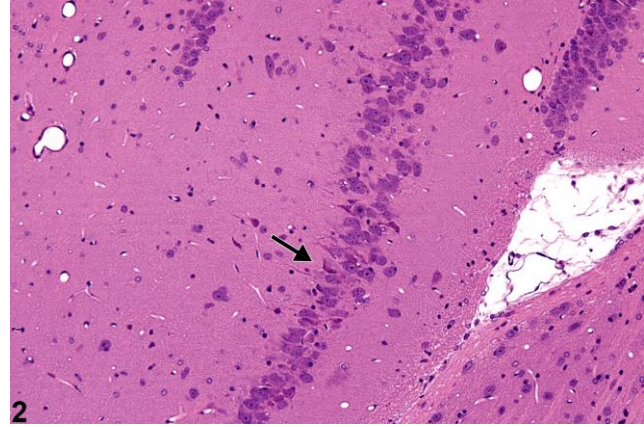
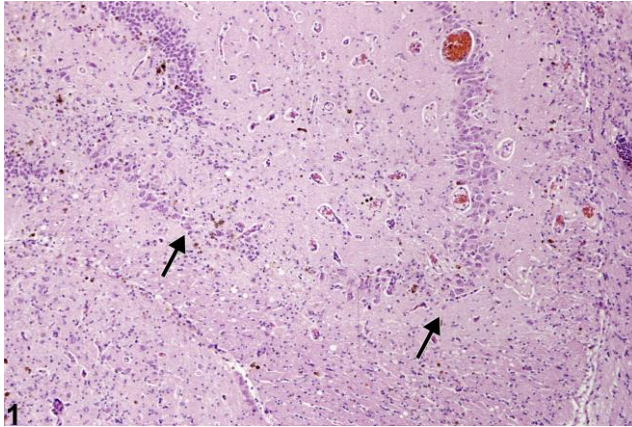


Figure Legend: **Figure 1** Neuronal cell loss in a female F344/N from a chronic study. Note the loss of neurons in CA3 region of the hippocampus (arrows). **Figure 2** Normal number and morphology of CA3 neurons (arrow) in a control male rat from a single-dose acute gavage study. **Figure 3** Normal number and morphology of CA3 neurons (arrow) in a control male rat from a single-dose acute gavage study.

Comment: Knowledge of the normal neuroanatomic structure of specialized regions of the brain (hippocampus, cerebellum) is necessary to detect neuronal cell loss. It is generally accepted that routine subjective light microscopy detects only significant reductions in cell numbers. Quantitation of more subtle losses requires special staining with glial fibrillary acidic protein or cresyl violet or with more sophisticated techniques of morphometry and stereology. Figure 1 is an example of hippocampal neuronal cell loss in the CA3 region. Note the pyramidal neuronal



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loss between the arrows, in contrast to the adjacent neuron-rich region. This is a late stage of neuronal necrosis. Compare this image with those of Figure 2 and Figure 3 depicting the same region of hippocampus in a control animal. The atrophy of this portion of the hippocampus interferes with normal function, notably learning, memory, and spatial recognition processes. Neuronal cell loss due to toxic insult must be differentiated from regional neuronal hypoplasia and neuronal abiotrophy. Neuronal hypoplasia is usually a spontaneous or induced developmental abnormality unassociated with reactive gliotic changes while neuronal abiotrophy is postnatal neuronal loss that is progressive and genetically related and may have reactive responses.

Recommendation: In NTP studies, any detected reduction in neuronal populations should be subjectively graded in severity and diagnosed as Neuron, Cell loss. Affected subsites of the brain should be noted and included in the narrative. In the presence of concurrent lesions, lesions with the most severity are typically diagnosed. Other concurrent lesions may be diagnosed separately, if warranted by the severity.

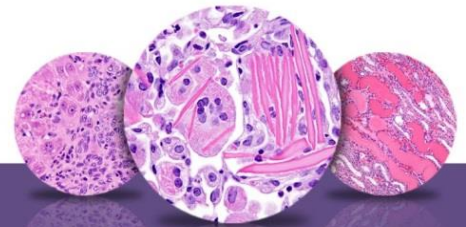
References:

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Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/6686615>

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Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/14435353>



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