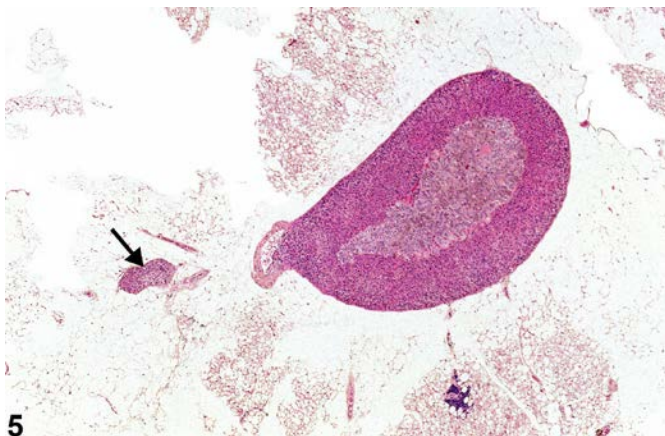
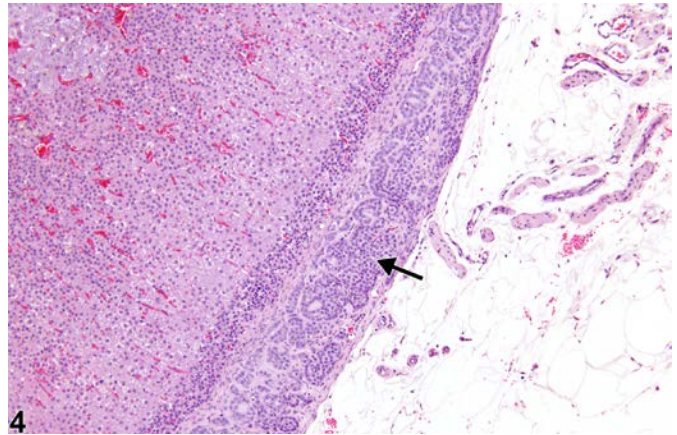
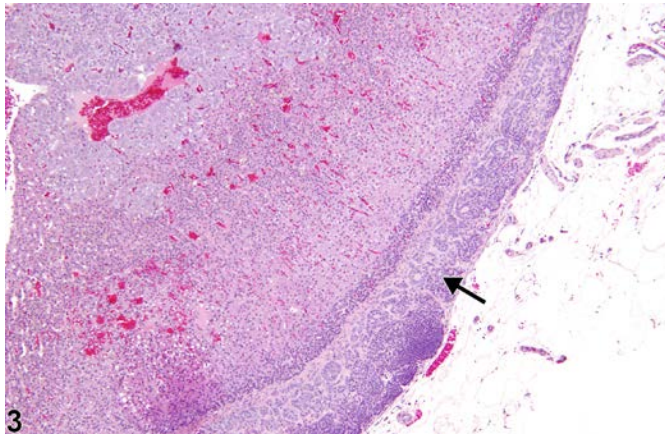
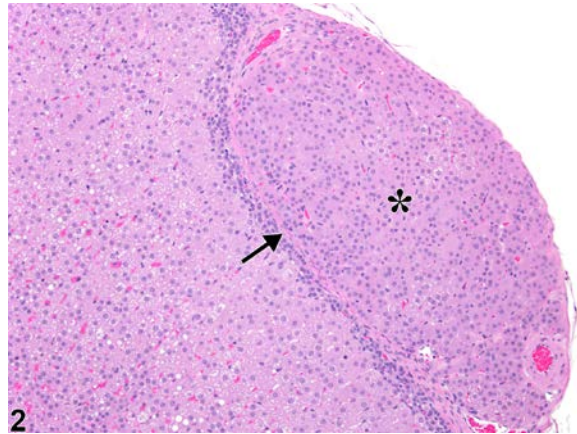
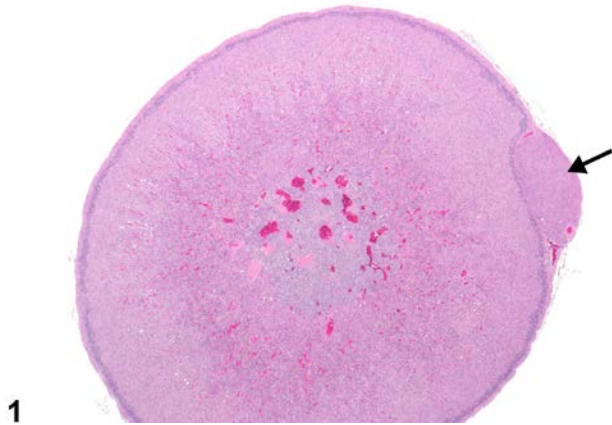




NTP Nonneoplastic Lesion Atlas

Adrenal Gland – Accessory Adrenocortical Nodule





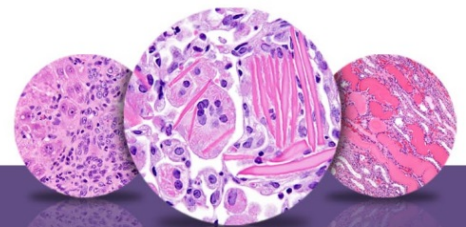
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Figure Legend: **Figure 1** Adrenal gland - Accessory adrenocortical nodule in a male F344/N rat from a chronic study. There is a nodule of adrenal cortical cells on the extracapsular surface (arrow). **Figure 2** Adrenal gland - Accessory adrenocortical nodule in a male F344/N rat from a chronic study (higher magnification of Figure 1). The cells of this accessory adrenocortical nodule (asterisk) at the extracapsular surface are well-differentiated zona fasciculata cells and are surrounded by a delicate fibrous capsule (arrow). **Figure 3** Adrenal gland - Accessory adrenocortical nodule in a male F344/N rat from a chronic study. Accessory cortical tissue within the capsule is composed of nests of cortical cells (arrow). **Figure 4** Adrenal gland - Accessory adrenocortical nodule in a male F344/N rat from a chronic study (higher magnification of Figure 3). The cortical cells comprising this accessory cortical tissue in the capsule have a more primitive appearance (arrow). **Figure 5** Periadrenal fat - Accessory adrenocortical nodule in a male B6C3F1/N mouse from a chronic study. An accessory cortical nodule (arrow) is present in the periadrenal (retroperitoneal) fat. **Figure 6** Periadrenal fat - Accessory adrenocortical nodule in a male B6C3F1/N mouse from a chronic study (higher magnification of Figure 5). Accessory cortical nodule (arrow) is composed of well-differentiated adrenal cortical cells surrounded by a thin fibrous capsule in the periadrenal (retroperitoneal) fat.

Comment: Accessory adrenocortical nodules (Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, and Figure 6) are fairly common in rats and mice. Also known by many other terms (e.g., ectopic adrenal tissue, accessory cortical tissue, hamartoma, accessory adrenal gland, supernumary adrenal, and adrenocortical rest), accessory adrenocortical nodules are minor developmental anomalies arising from partly or completely detached rests of the coelomic epithelial primordia from which the adrenal cortex is derived. They are most frequently located in contact with the capsule at one pole of the adrenal gland (Figure 1, Figure 2, Figure 3, and Figure 4) but can occur completely separated from the adrenal gland in the retroperitoneal fat (Figure 5, Figure 6), attached to the kidney capsule, or anywhere in the peritoneal cavity. In and of themselves, accessory adrenocortical nodules are almost always innocuous incidental findings without clinical or toxicologic relevance. However, they can develop the same degenerative, hyperplastic, and even neoplastic changes as the adrenal cortex proper.

Most nodules are spherical to ovoid structures surrounded by a usually delicate fibrous capsule and composed of well-differentiated zonae glomerulosa-type and fasciculata-type cells (Figure 1 and Figure



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2), sometimes admixed and sometimes arranged in typical layers. Some adrenocortical accessory tissue consists of less densely packed nests of more primitive-appearing cortical cells (Figure 3 and Figure 4). The typical surrounding fibrous capsule distinguishes accessory adrenocortical nodules from focal cortical hyperplasia and from extracapsular protrusions of cortical tissue. Accessory nodules must also be distinguished from cortical adenomas and carcinomas, which exhibit cellular pleomorphism and atypia and loss of cortical layering but are not commonly encapsulated.

Recommendation: Adrenal gland - Accessory adrenocortical nodule should be diagnosed whenever present, but a severity grade is not necessary. If a nodule is located in the periadrenal fat (separated from the adrenal gland), the tissue should be listed as periadrenal fat. If a nodule is associated with another organ (e.g., kidney), ectopic tissue of that organ is a more appropriate diagnosis (e.g., Kidney - Ectopic tissue, Adrenal gland).

References:

Dunn TB. 1970. Normal and pathologic anatomy of the adrenal gland of the mouse, including neoplasms. *J Natl Cancer Inst* 44:1323-1389.

Abstract: <http://inci.oxfordjournals.org/content/44/6/1323.abstract>

Hamlin MH, Banas DA. 1990. Adrenal gland. In: *Pathology of the Fischer Rat: Reference and Atlas* (Boorman GA, Eustis SL, Elwell MR, Montgomery CA, MacKenzie WF, eds). Academic Press, San Diego, 501-518.

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

McInnes EF. 2011. Wistar and Sprague Dawley rats. In: *Background Lesions in Laboratory Animals: A Color Atlas* (McInnes EF, ed). Saunders Elsevier, Amsterdam, 16-36.

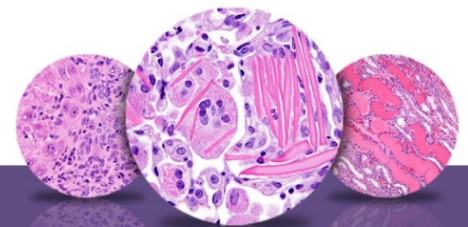
Abstract: <http://www.sciencedirect.com/science/book/9780702035197>

Parker GA, Valerio MG. 1983. Accessory adrenocortical tissue, rat. In: *Monographs on the Pathology of Laboratory Animals: Endocrine System* (Jones TC, Mohr U, Hunt RD, eds). Springer, Berlin, 16-17.

Abstract: <http://www.springer.com/medicine/pathology/book/978-3-642-64649-2>

National Toxicology Program. 2007. NTP TR-535. Toxicology and Carcinogenesis Studies of 4-Methylimidazole (CAS No. 822-36-6) in F344/N Rats and B6C3F1 Mice (Feed Studies). NTP, Research Triangle Park, NC.

Abstract: <http://ntp.niehs.nih.gov/go/13651>



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References:

National Toxicology Program. 2010. NTP TR-560. Toxicology and Carcinogenesis Studies of Androstenedione (CAS No. 63-05-8) in F344/N Rats and B6C3F1 Mice (Gavage Studies). NTP, Research Triangle Park, NC.

Abstract: <http://ntp.niehs.nih.gov/go/33555>

National Toxicology Program. 2013. NTP TR-578. Toxicology and Carcinogenesis Studies of *Ginkgo biloba* Extract in F344/N Rats and B6C3F1/N Mice (Gavage Studies). NTP, Research Triangle Park, NC.

Abstract: <http://ntp.niehs.nih.gov/go/37193>

Nyska A, Maronpot RR. 1999. Adrenal gland. In: Pathology of the Mouse: Reference and Atlas (Maronpot RR, Boorman GA, Gaul BW, eds). Cache River Press, Vienna, IL, 509-536.

Abstract: <http://www.cacheriverpress.com/books/pathmouse.htm>

Sass B. 1983. Accessory adrenocortical tissue, mouse. In: Monographs on the Pathology of Laboratory Animals: Endocrine System (Jones TC, Mohr U, Hunt RD, eds). Springer, Berlin, 12-15.

Abstract: <http://www.springer.com/medicine/pathology/book/978-3-642-64649-2>

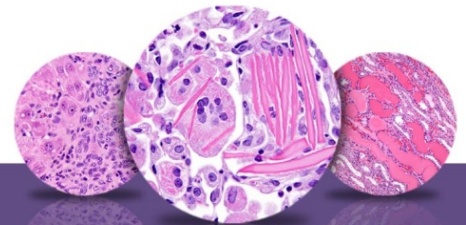
Taylor I. 2011. Mouse. In: Background Lesions in Laboratory Animals: A Color Atlas (McInnes EF, ed). Saunders Elsevier, Amsterdam, 45-72.

Abstract: <http://www.sciencedirect.com/science/book/9780702035197>

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