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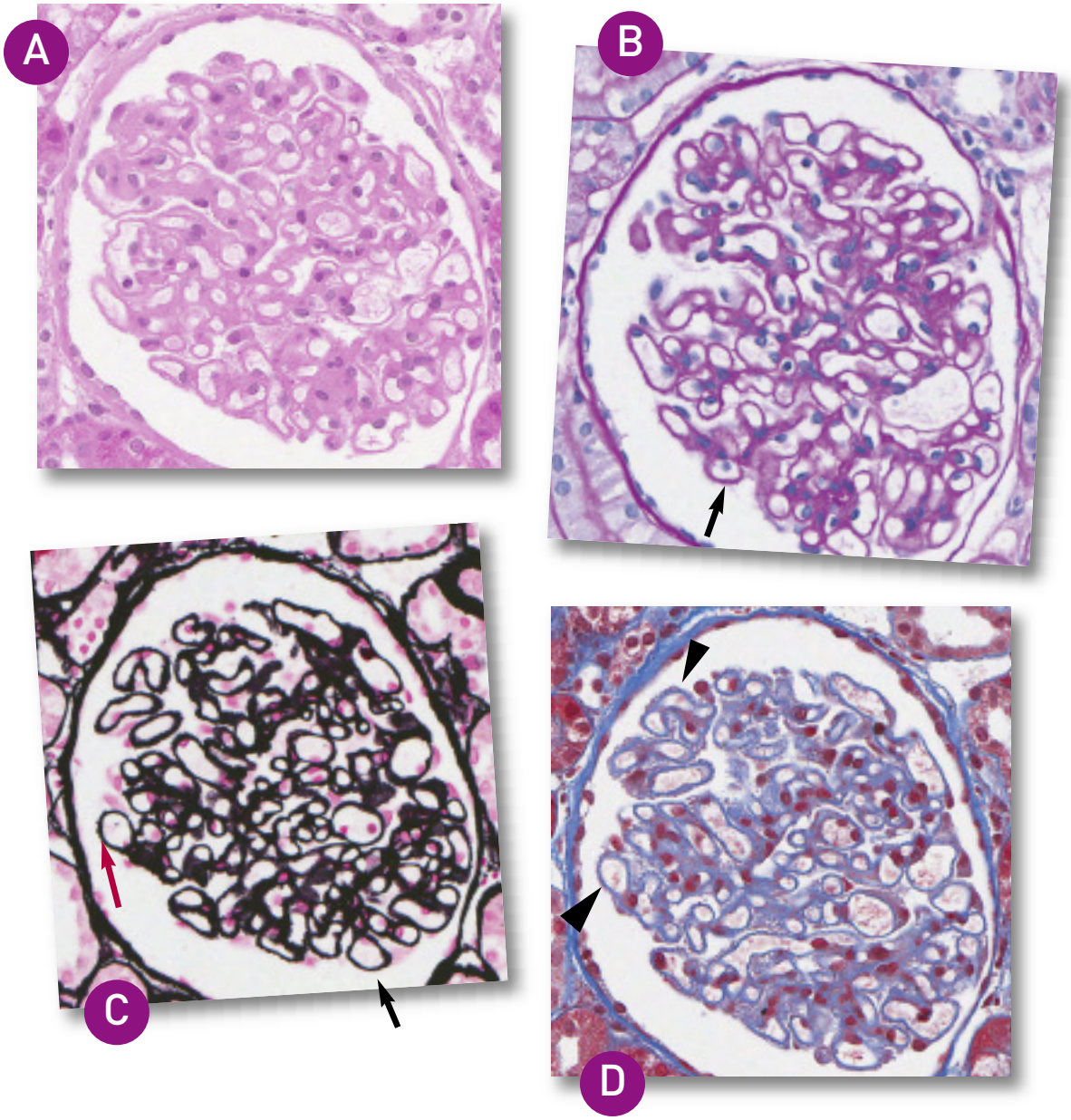
Renal Biopsy Stains

Several special stains—hematoxylin and eosin (H&E), periodic acid–Schiff (PAS), Masson's trichrome, Jones methenamine silver (JMS), and Congo red—are routinely used for histopathologic evaluation of renal biopsy specimens. Tissue sections should be thinner (2–3 microns thick instead of 5–6 microns thick) than those for other common histopathologic evaluations. This is particularly important when evaluating glomerular disorders, one of the most common reasons for renal biopsy.



1

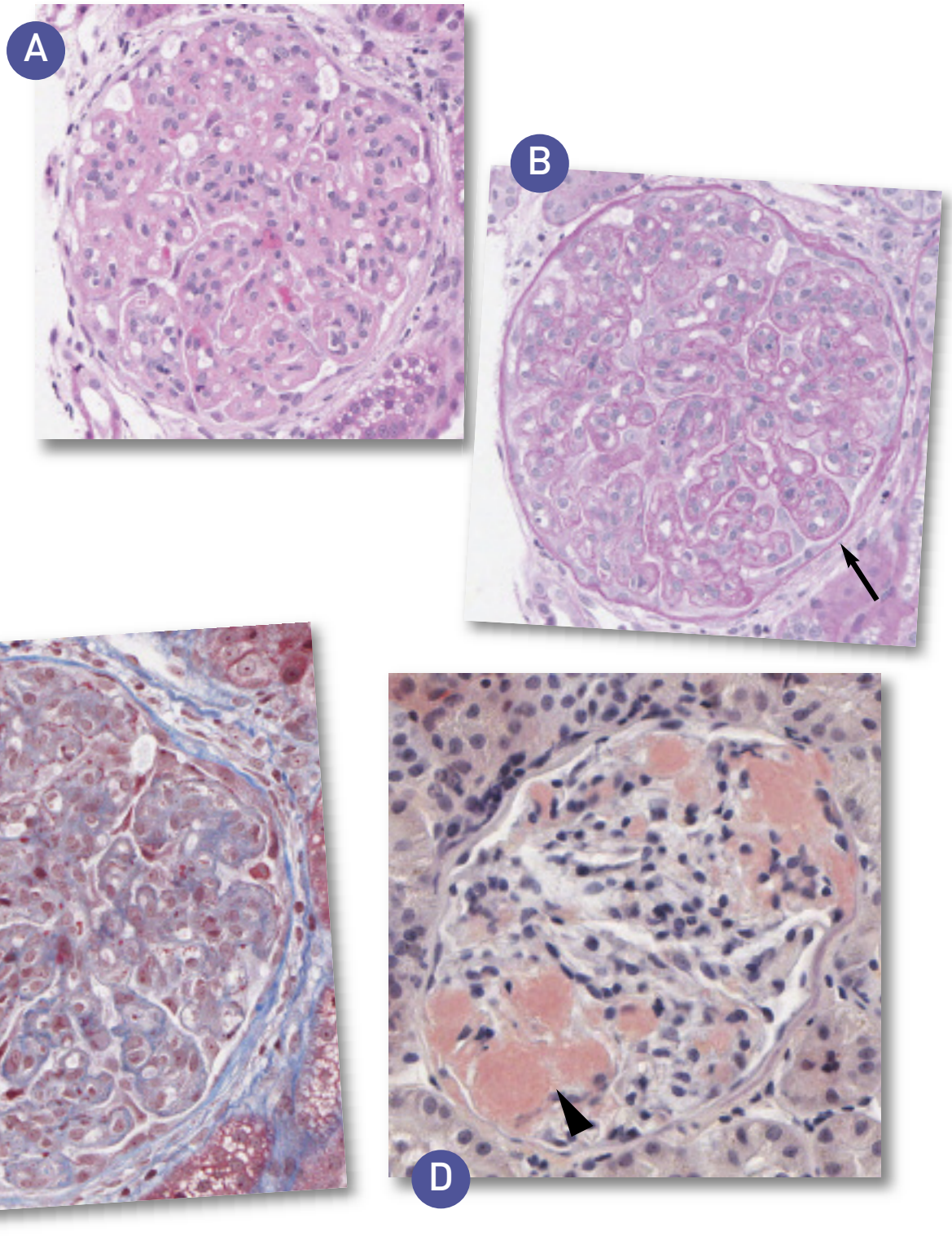
A glomerulus from a dog with membranous glomerulonephropathy stained with H&E **(A)**, PAS **(B)**, JMS **(C)**, and Masson's trichrome **(D)**. The glomerulus exhibits normal cellularity and moderate thickening of the capillary walls. The PAS and especially the JMS stains are particularly useful for assessing thickness of the glomerular basement membrane (GBM, **black arrows**). The JMS stain shows that the external (ie, subepithelial) surfaces of the GBM have irregular contours and small projections of GBM matrix (called spikes) extending outward **(red arrow)**. The Masson's trichrome stain shows red granules on the outer (ie, subepithelial) surfaces of the GBM that are deposits of immune complexes **(arrowheads)**. *Original magnification, 400×*

CONTINUES

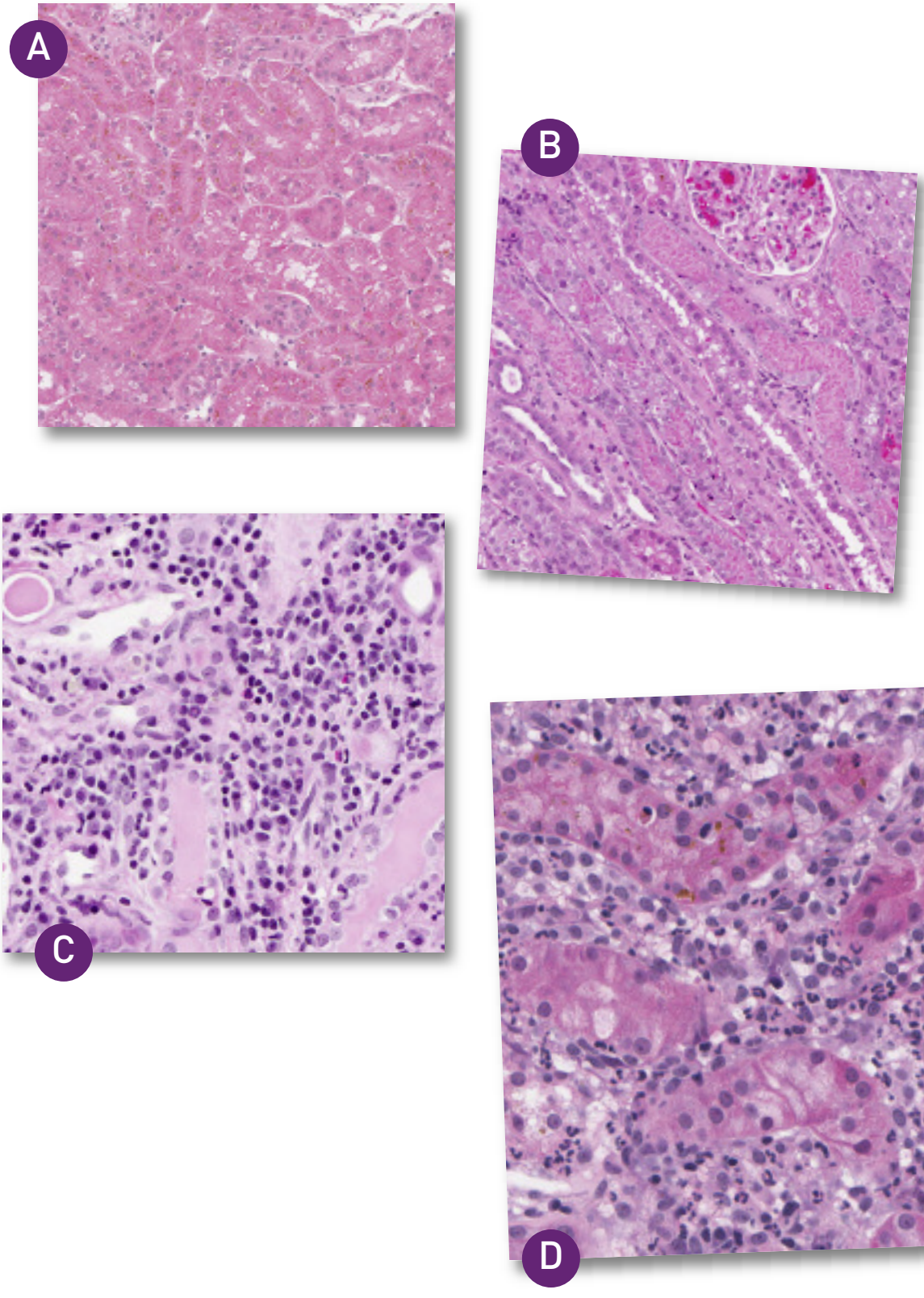
GBM = glomerular basement membrane; H&E = hematoxylin and eosin; JMS = Jones methenamine silver; PAS = periodic acid–Schiff

2

Glomerulus from a dog with membranoproliferative glomerulonephritis (MPGN) stained with H&E **(A)**, PAS **(B)**, and Masson's trichrome **(C)**, and a glomerulus from a dog with amyloidosis stained with Congo red **(D)**. The MPGN glomerulus exhibits markedly increased cellularity, predominantly in the endocapillary compartment, as well as moderate thickening and some reduplication of the GBM in capillary walls **(arrow)**. The amyloidosis glomerulus shows multiple deposits of a homogenous and acellular material that stains salmon-pink **(arrowhead)**. *Original magnifications, 320× **(A–C)** and 400× **(D)***



GBM = glomerular basement membrane; H&E = hematoxylin and eosin, JMS = Jones methenamine silver, MPGN = membranoproliferative glomerulonephritis; PAS = periodic acid–Schiff



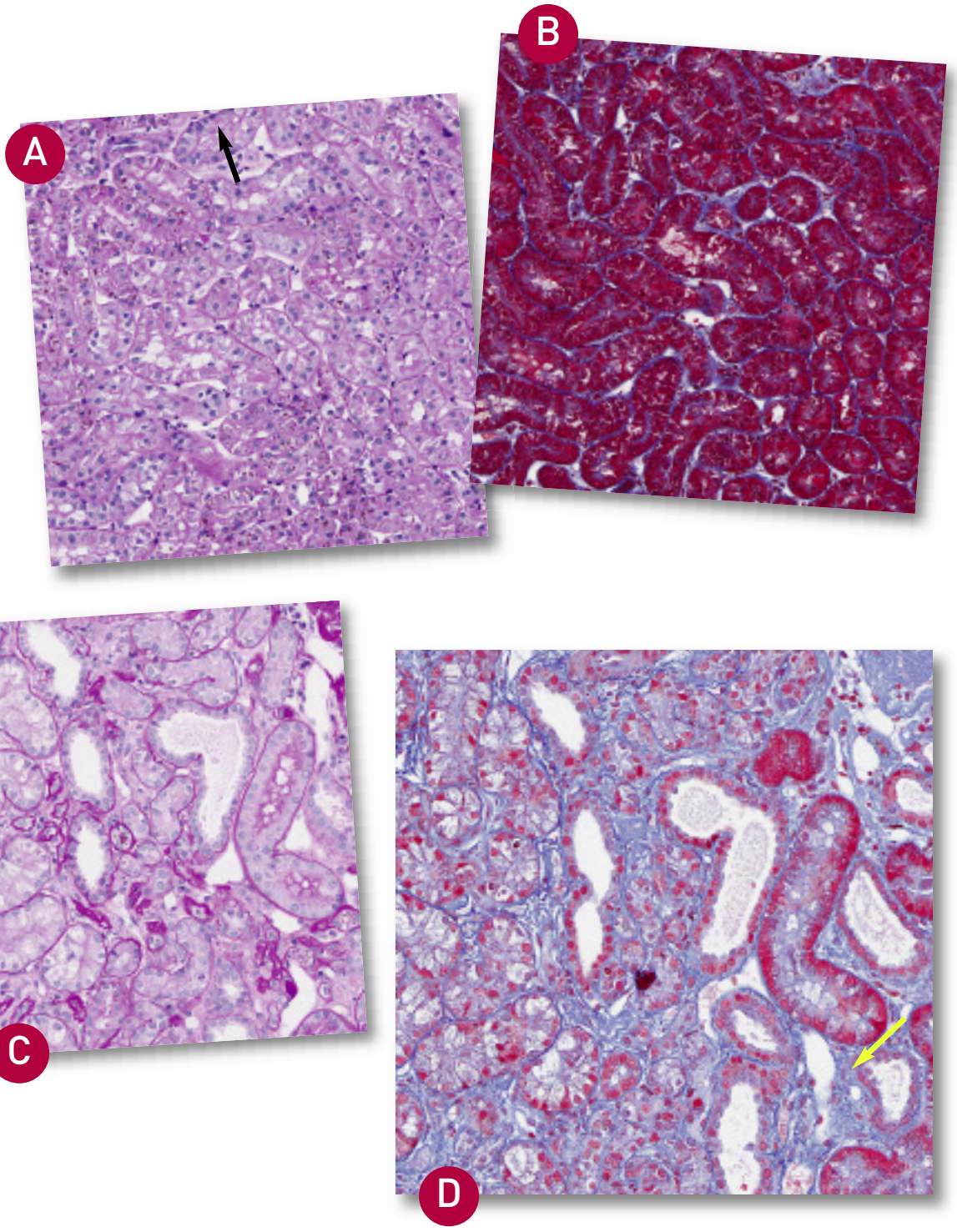
3

Examples of H&E-stained sections of cortical tubulointerstitium illustrating the utility of this stain for assessment of cellular details. The top panels show healthy cortex **(A)** and cortex with acute tubular necrosis **(B)** at the same magnification. In the bottom panels, higher magnification is used to illustrate interstitial inflammation. The inflammatory cell infiltrate seen in **C** is composed of mixed mononuclear cells (predominantly lymphocytes and plasma cells) mixed with scattered neutrophils, whereas the inflammatory cell infiltrate seen in **D** is composed predominantly of neutrophils.
*Original magnifications, 200× **(A & B)** and 400× **(C & D)***

CONTINUES

4

Examples of cortical tubulointerstitium with negligible changes **(A and B)** and with tubular degeneration and interstitial fibrosis **(C and D)** are shown with PAS stain **(A and C)** and Masson's trichrome stain **(B and D)**. With PAS, tubular basement membranes are readily discerned **(black arrow)**; with Masson's trichrome, fibrous connective tissue that stains blue is readily appreciated **(yellow arrow)**. In the tubulointerstitium with negligible changes, the tubules are very close to one another; there is scant interstitium (ie, between the tubules). In the tubulointerstitium that is abnormal, the tubules are separated by interstitium that is expanded by collagenous connective tissue. In addition, degenerating and atrophic tubules can be seen, especially with the PAS stain that clearly shows the thickened and irregular basement membranes around the collapsed profiles of numerous degenerate tubules. *Original magnification, 200×*



PAS = periodic acid–Schiff