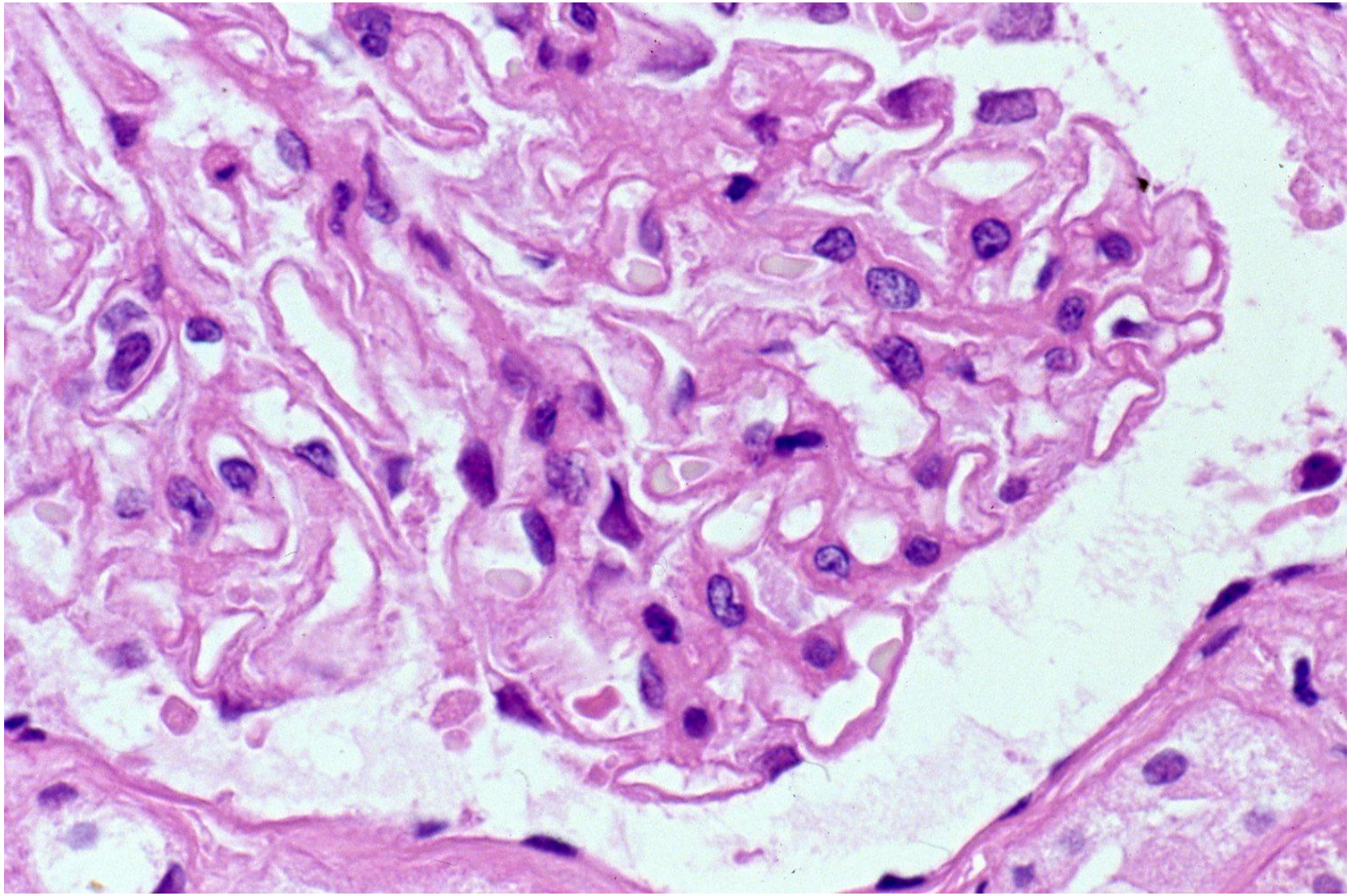
Detection of immunoglobulins and complements in formalin-fixed paraffin-embedded sections of kidney

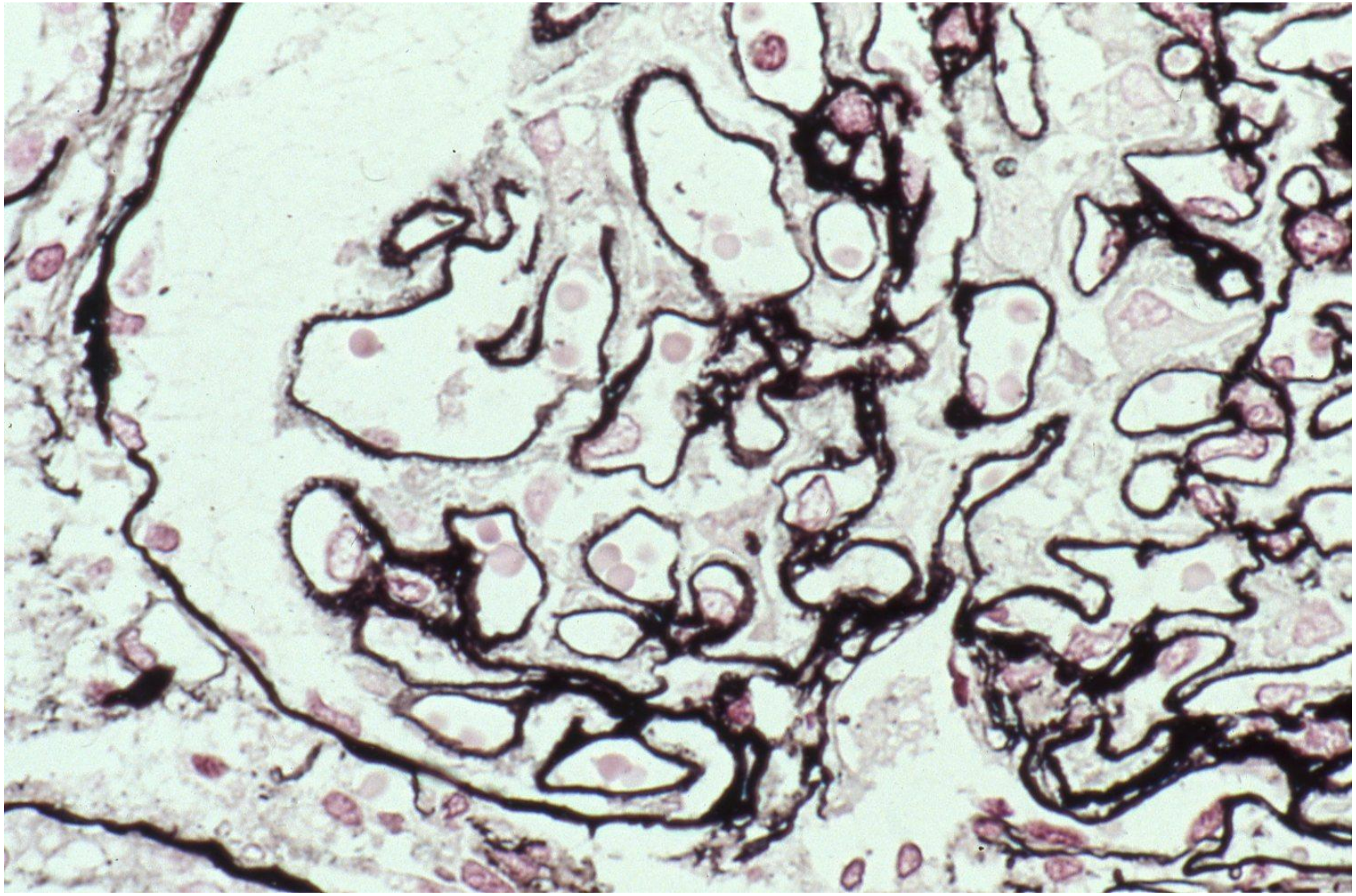
Direct immunofluorescence using fresh frozen sections of the biopsied kidney is an essential tool for the diagnosis of glomerulonephritis. Immunoperoxidase study using formalin-fixed, paraffin-embedded sections can also be applicable to the histopathological diagnosis. It can replace the immunofluorescence, after prolonged proteinase treatment for epitope retrieval. The appropriate condition should be determined before use. In general, digestion with 0.1% trypsin at room temperature for 2 hours or 0.04% proteinase K at room temperature for 30 minutes can be used. Representative features of immunostaining for immunoglobulins and complements are presented.

Ref.: Tsutsumi Y. Pitfalls and caveats in applying chromogenic immunostaining to histopathological diagnosis. Cells 2021; 10: 1501. doi: 10.3390/cells10061501

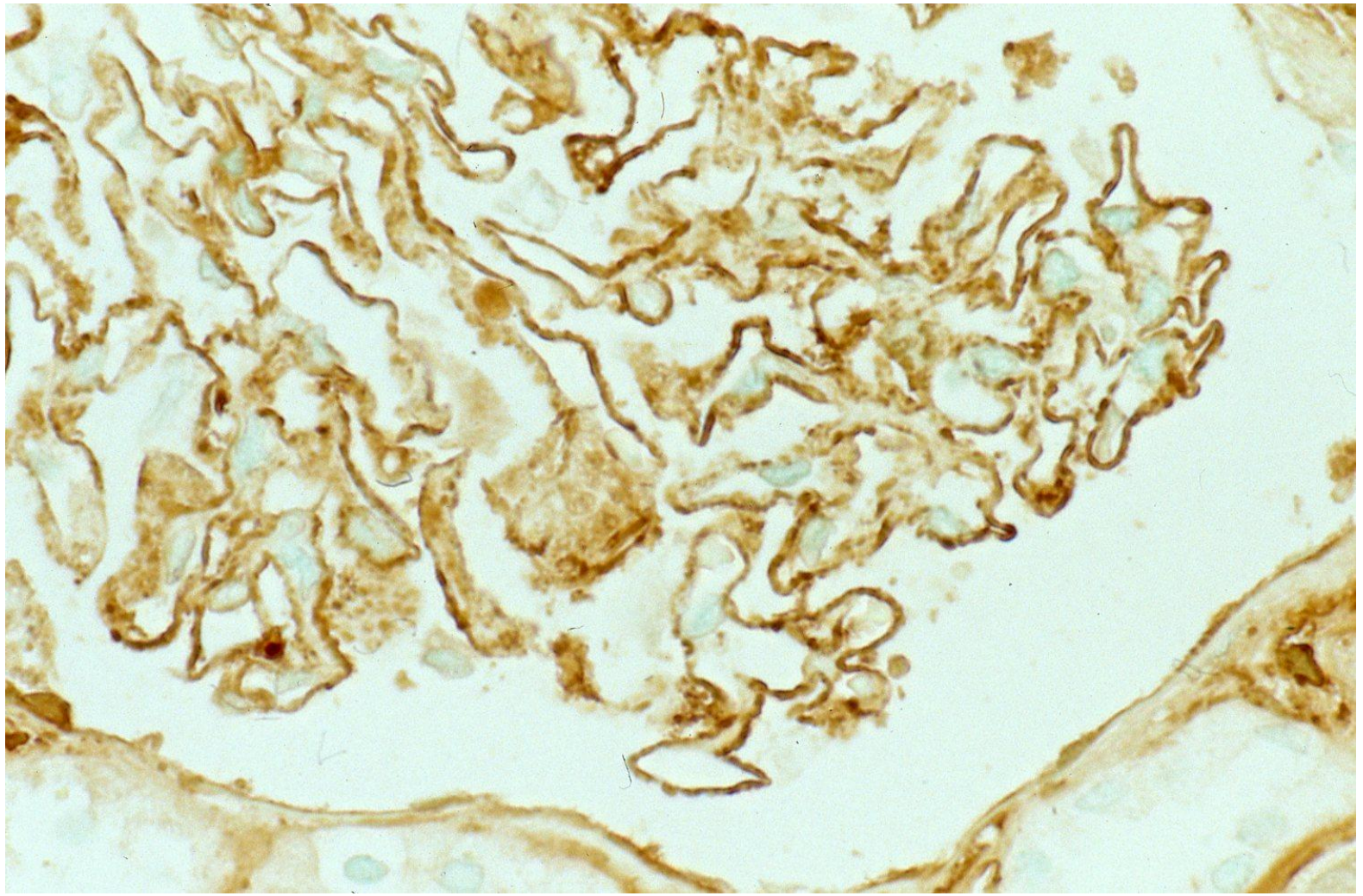
Refer also to: Sk-68-2-Bull. Paraneoplastic pemphigus caused by mantle cell lymphoma.



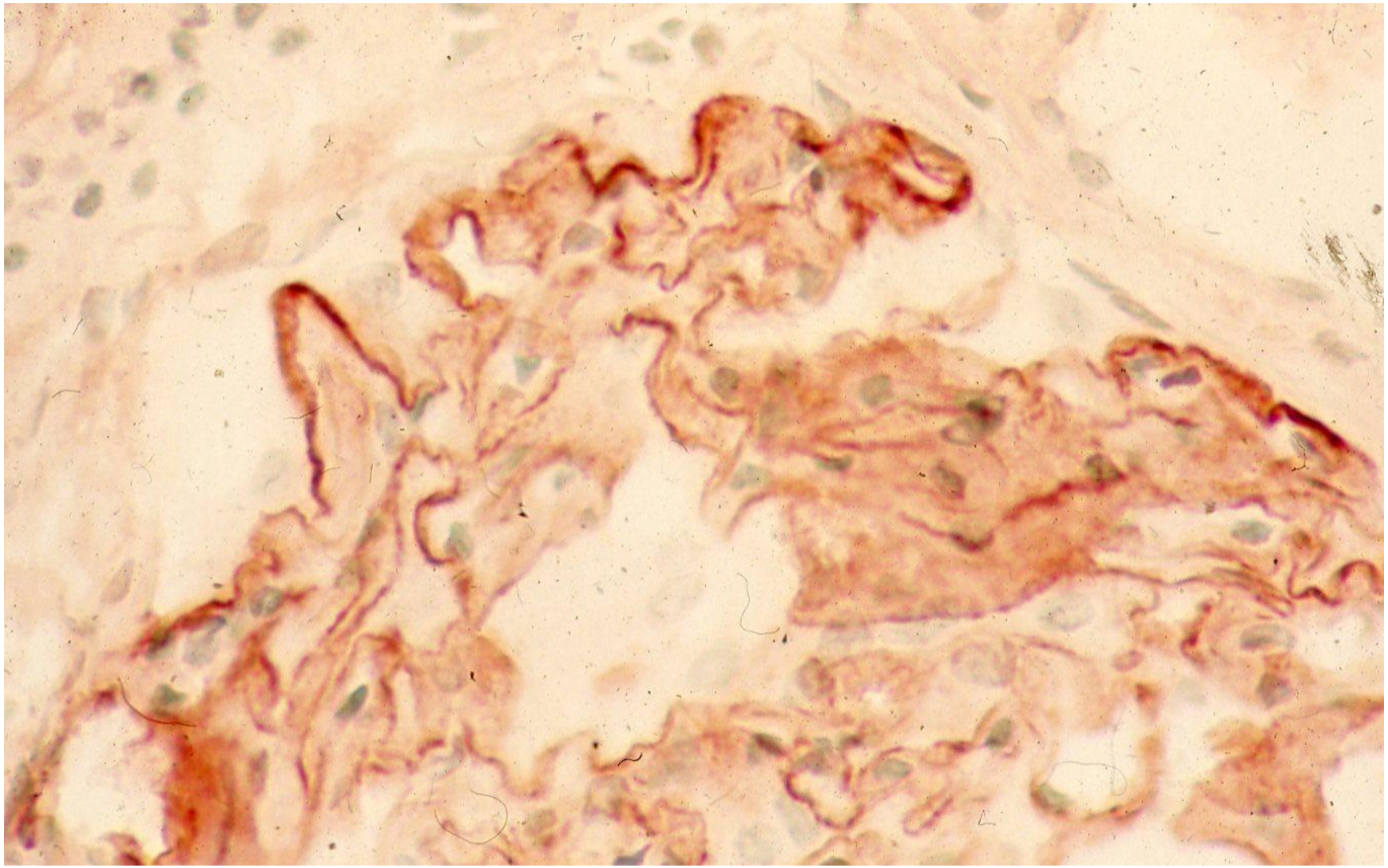
Membranous nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Thickening of the glomerular basement membrane is observed. No cellular growth is discernible. H&E



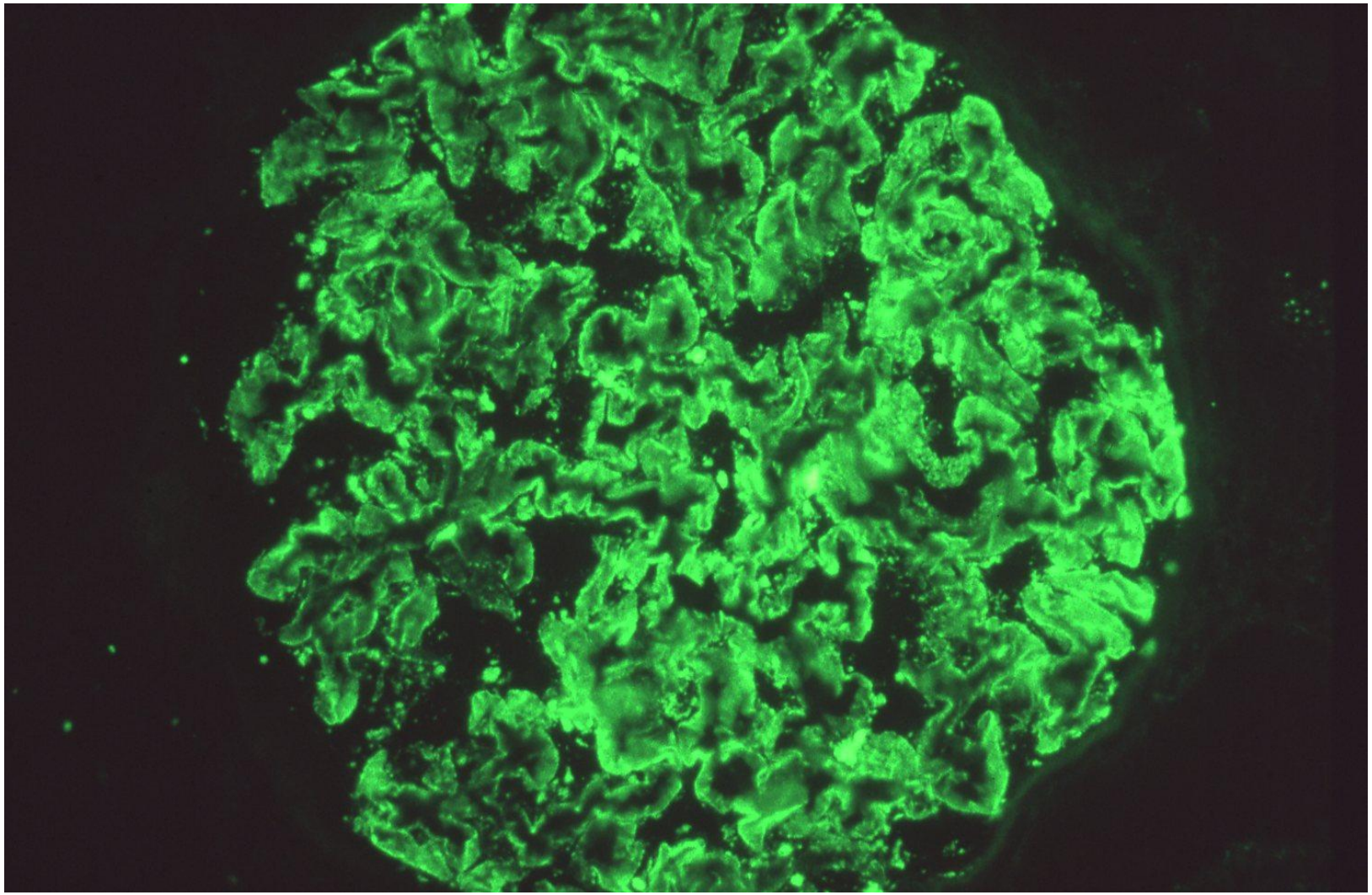
Membranous nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Spike formation along the glomerular basement membrane is observed. PAM



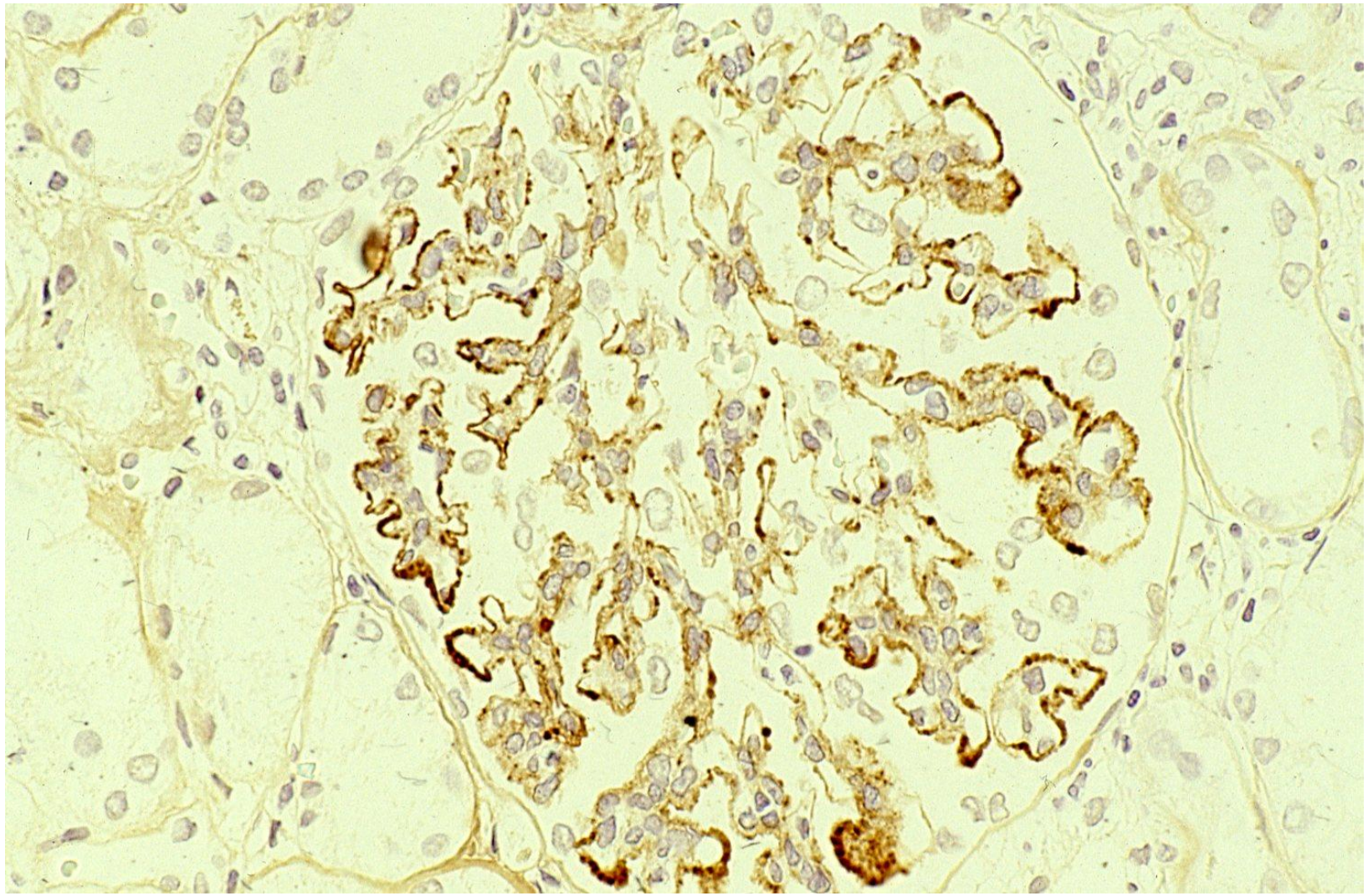
Membranous nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. After epitope retrieval with trypsin for 2 hours, granular deposition of IgG is clearly demonstrated along the glomerular basement membrane. Immunostaining for IgG after trypsinization-1



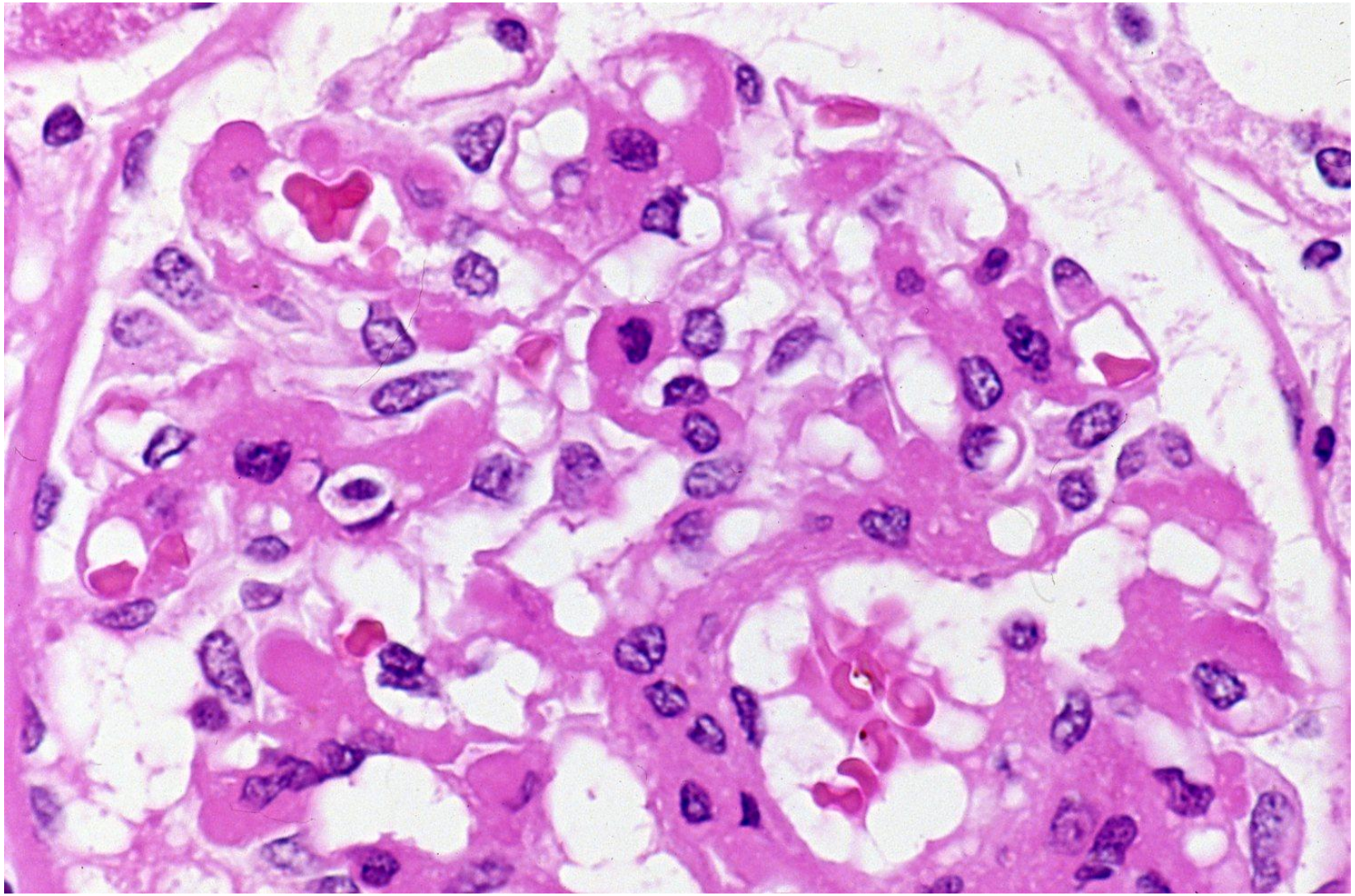
Membranous nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. After epitope retrieval with trypsin for 2 hours, granular deposition of IgG is clearly demonstrated along the glomerular basement membrane. Immunostaining for IgG after trypsinization-2



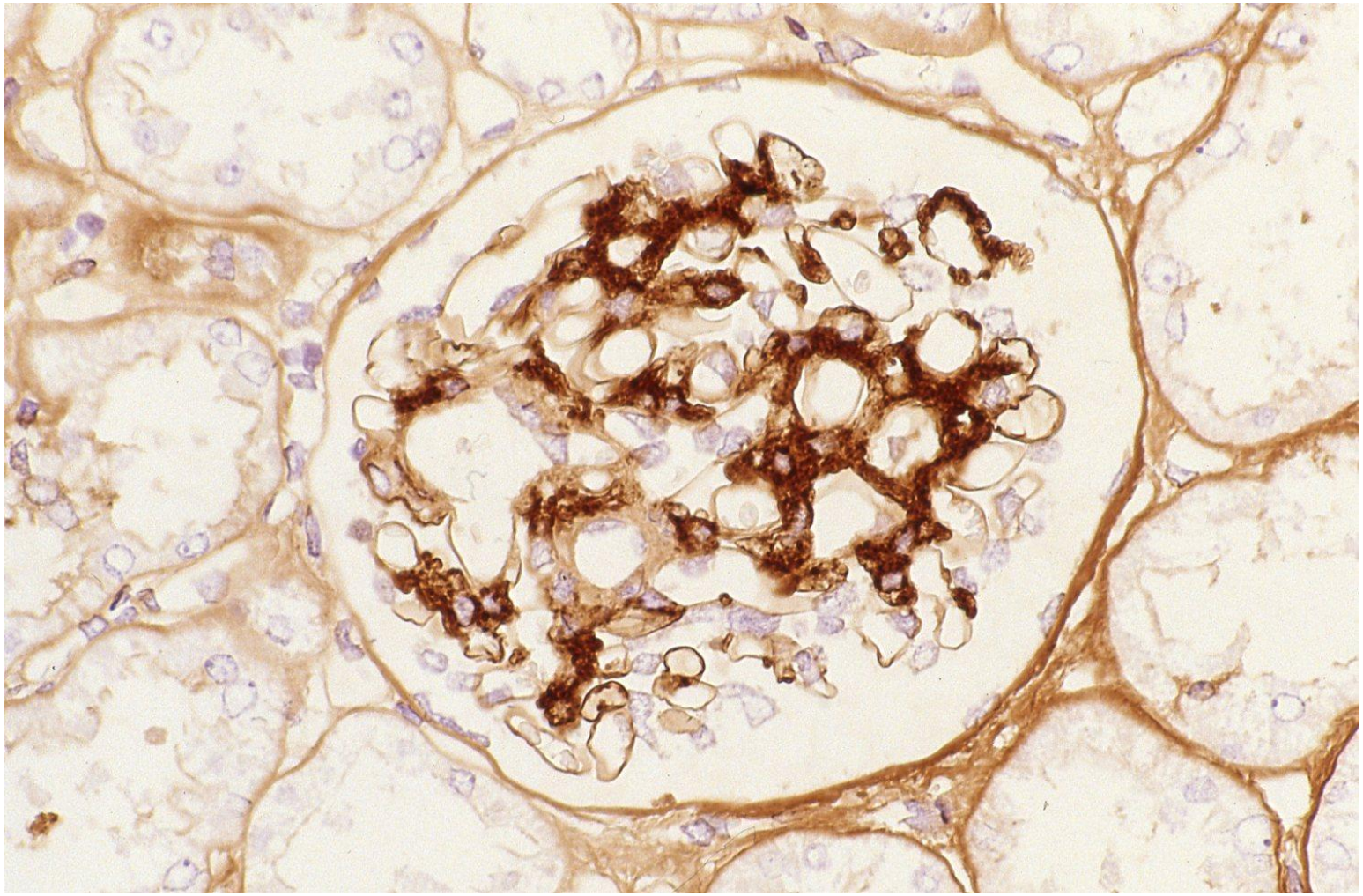
Membranous nephropathy. Immunofluorescence using fresh frozen sections reveals granular deposition of IgG along the glomerular basement membrane. Direct immunofluorescence for IgG



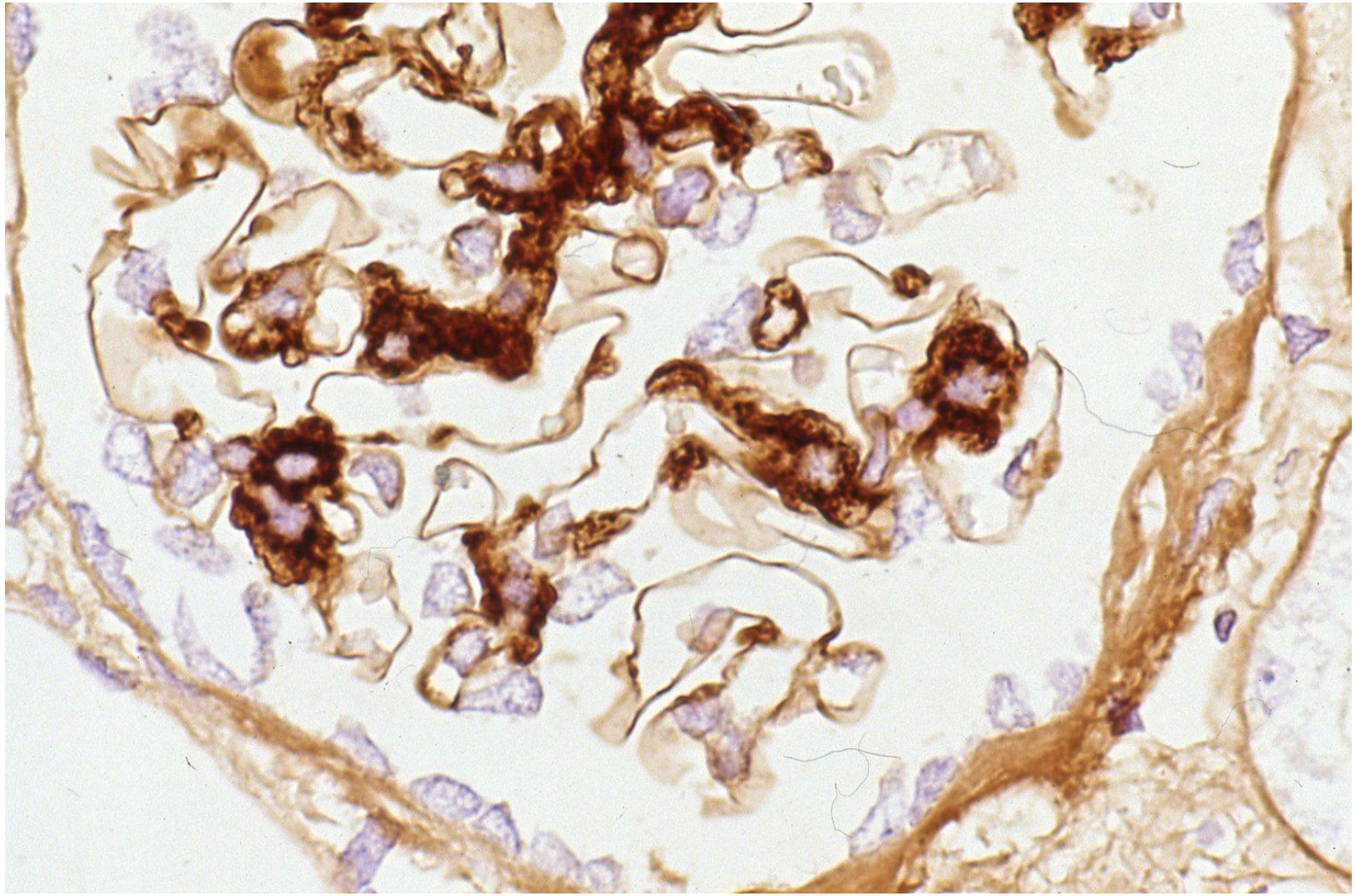
Membranous nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. After epitope retrieval with trypsin for 2 hours, granular deposition of complement, C3c is clearly demonstrated along the glomerular basement membrane. Immunostaining for C3c after trypsinization



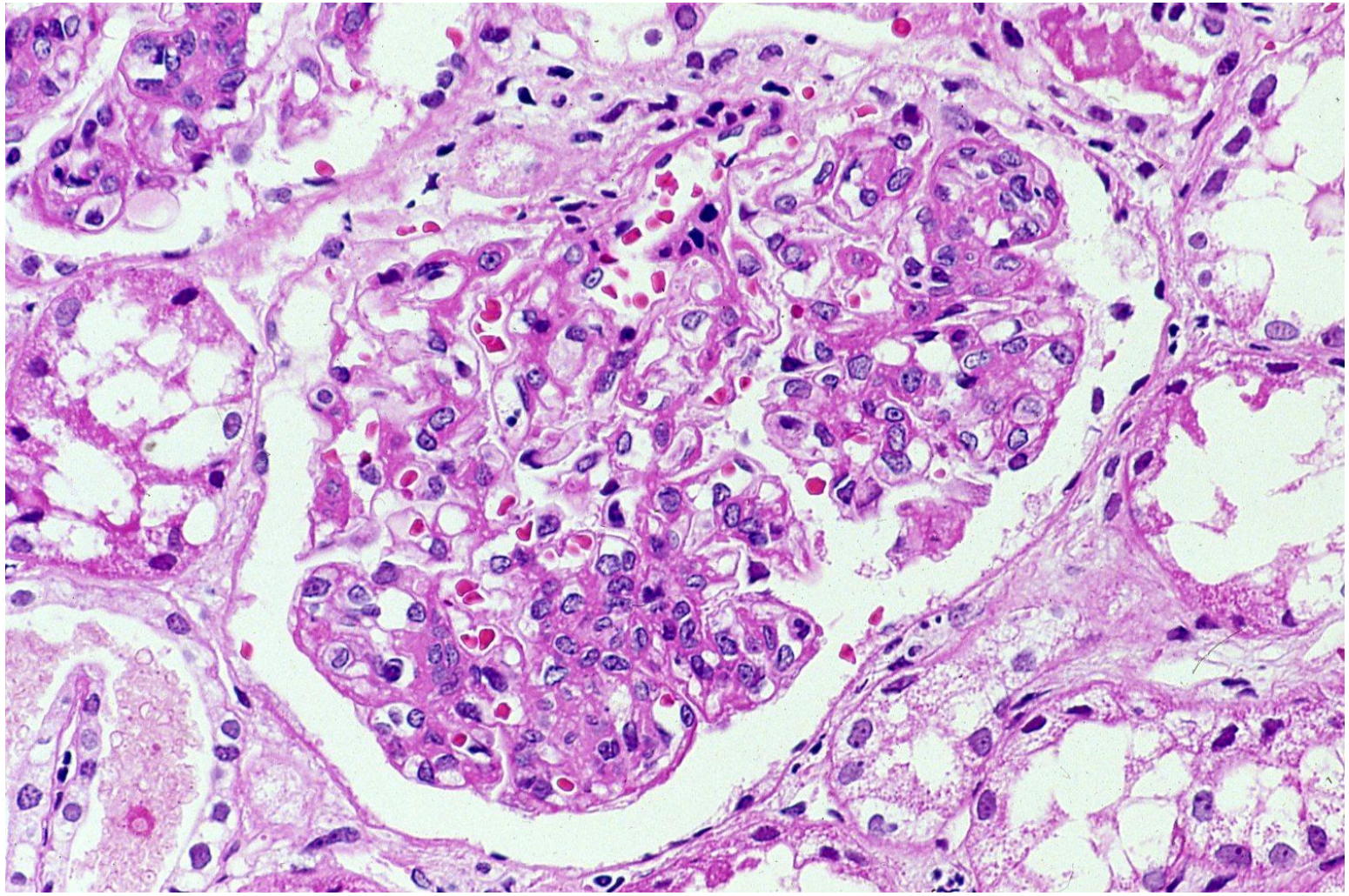
IgA nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Paramesangial deposits are evident. Mesangial cell growth is mildly associated. H&E



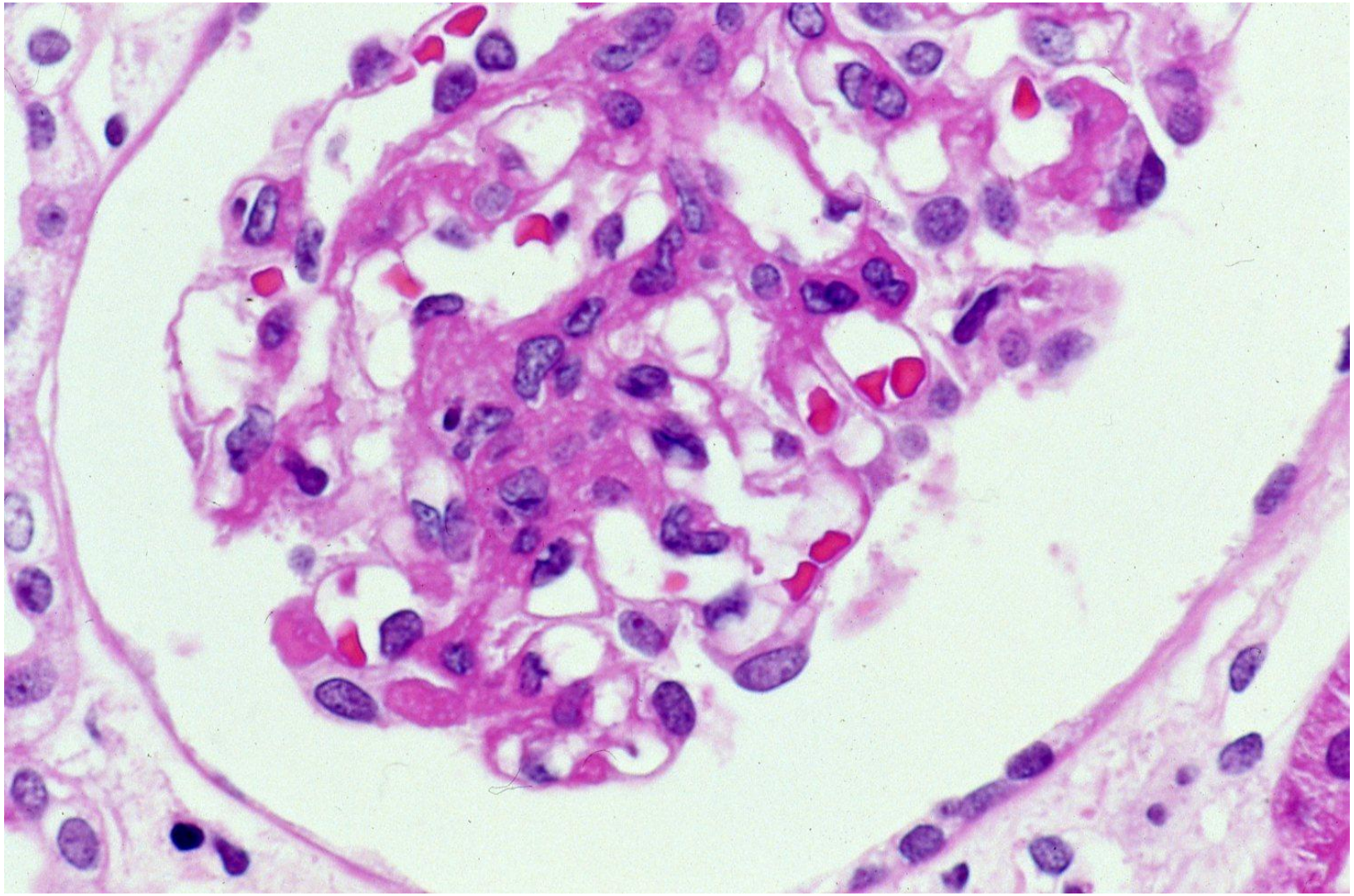
IgA nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. After epitope retrieval with trypsin for 2 hours, paramesangial deposition of IgA is clearly demonstrated. Immunostaining for IgA after trypsinization-1



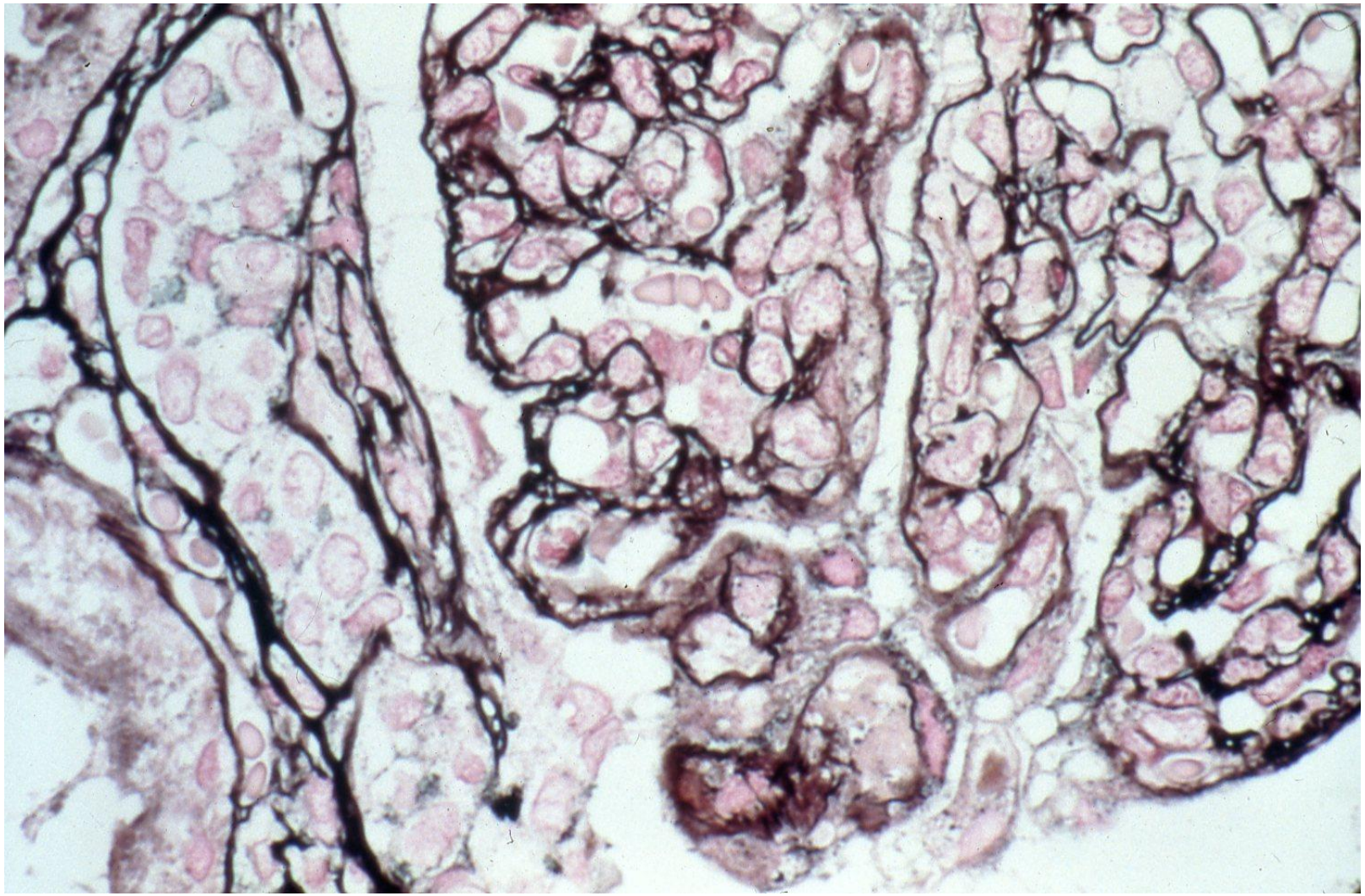
IgA nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. After epitope retrieval with trypsin for 2 hours, paramesangial deposition of IgA is clearly demonstrated. Immunostaining for IgA after trypsinization-2



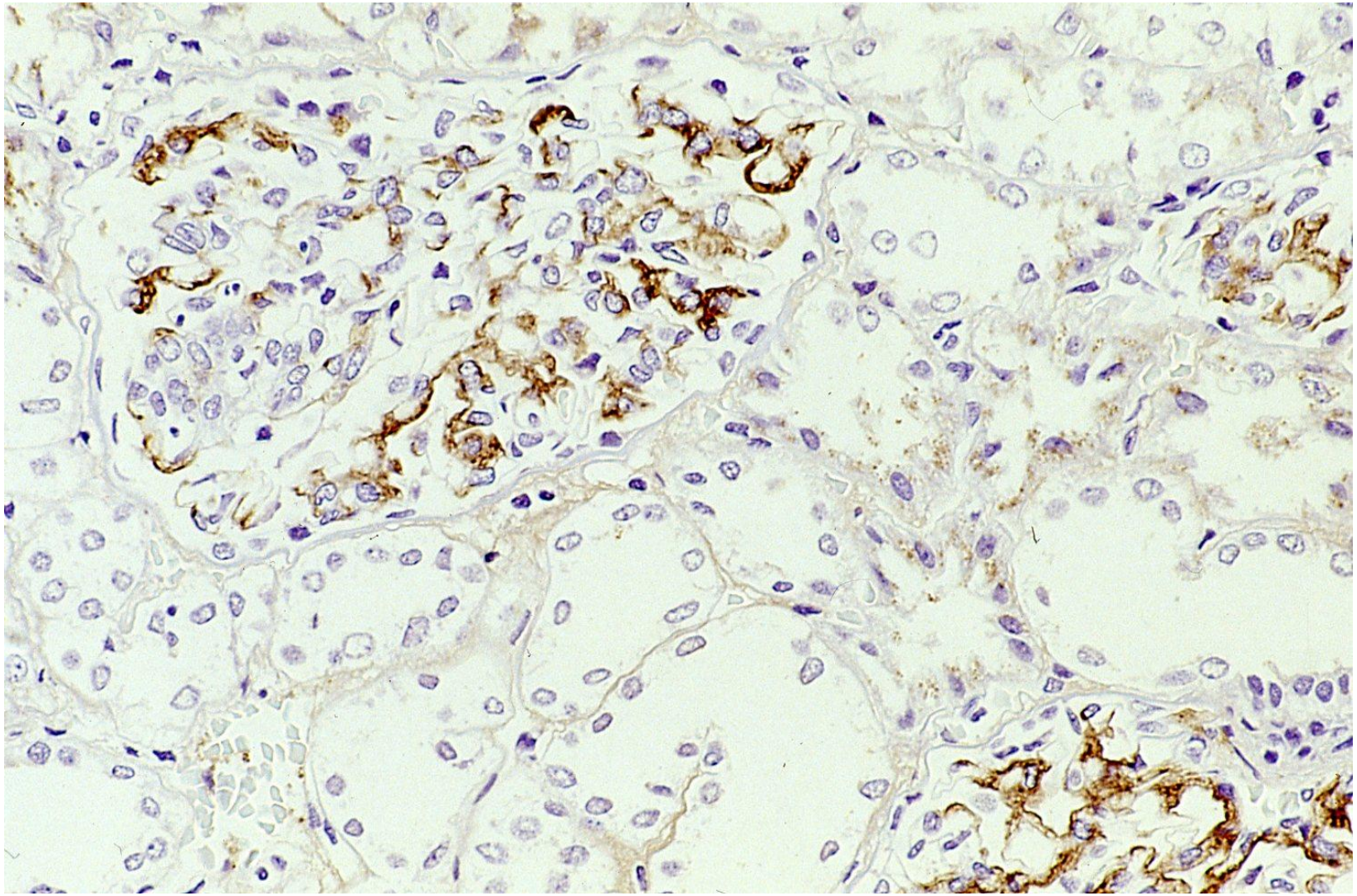
IgA nephropathy with a membranoproliferative glomerulonephritis pattern. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Thickening of the capillary tufts and active mesangial cell proliferation are observed. The microscopic features resemble those of membranoproliferative glomerulonephritis. H&E



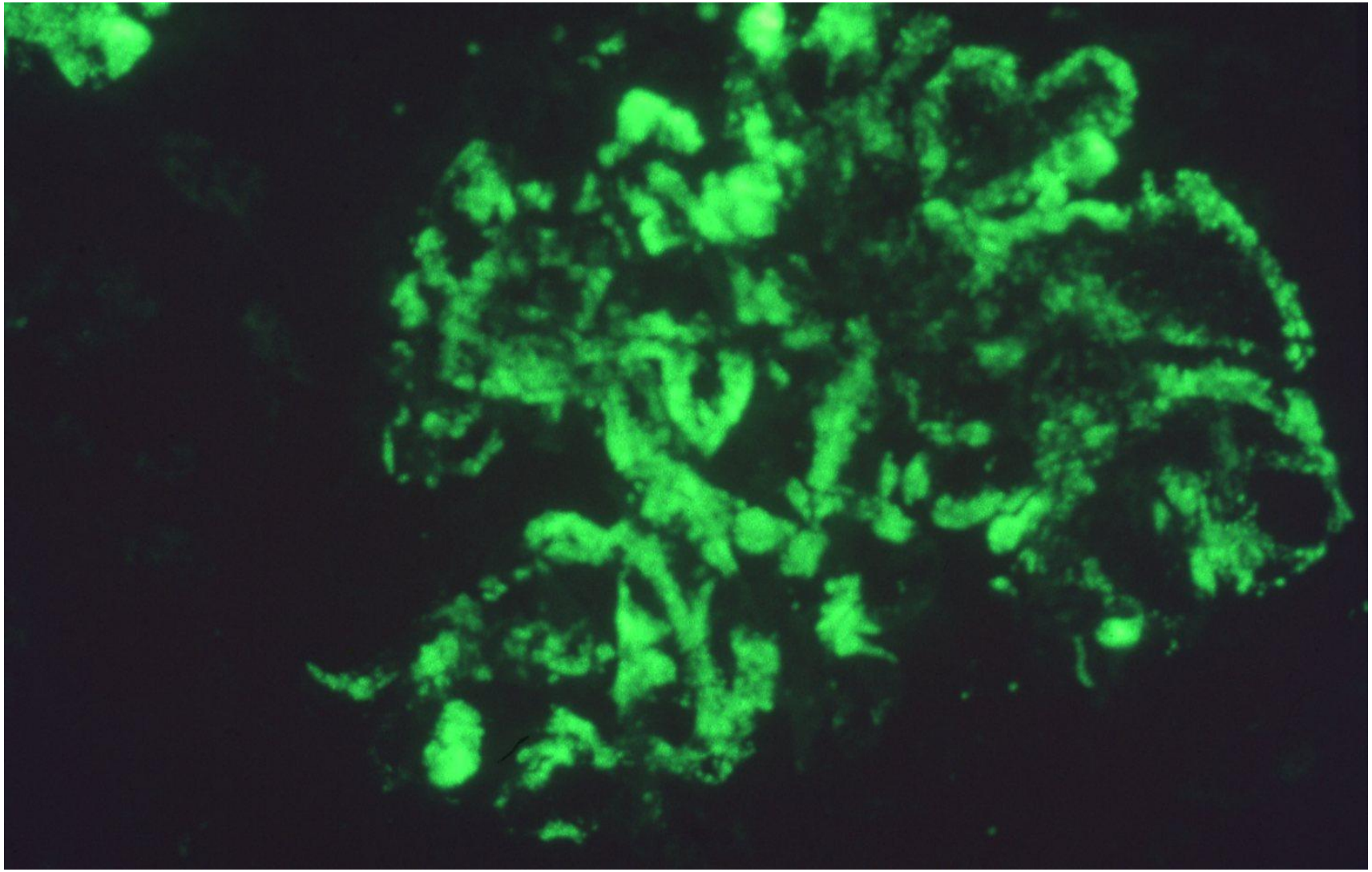
IgA nephropathy with a membranoproliferative glomerulonephritis pattern. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Mild thickening of the capillary tufts, paramesangial deposition and mesangial cell proliferation are observed. The microscopic features resemble those of membranoproliferative glomerulonephritis. H&E



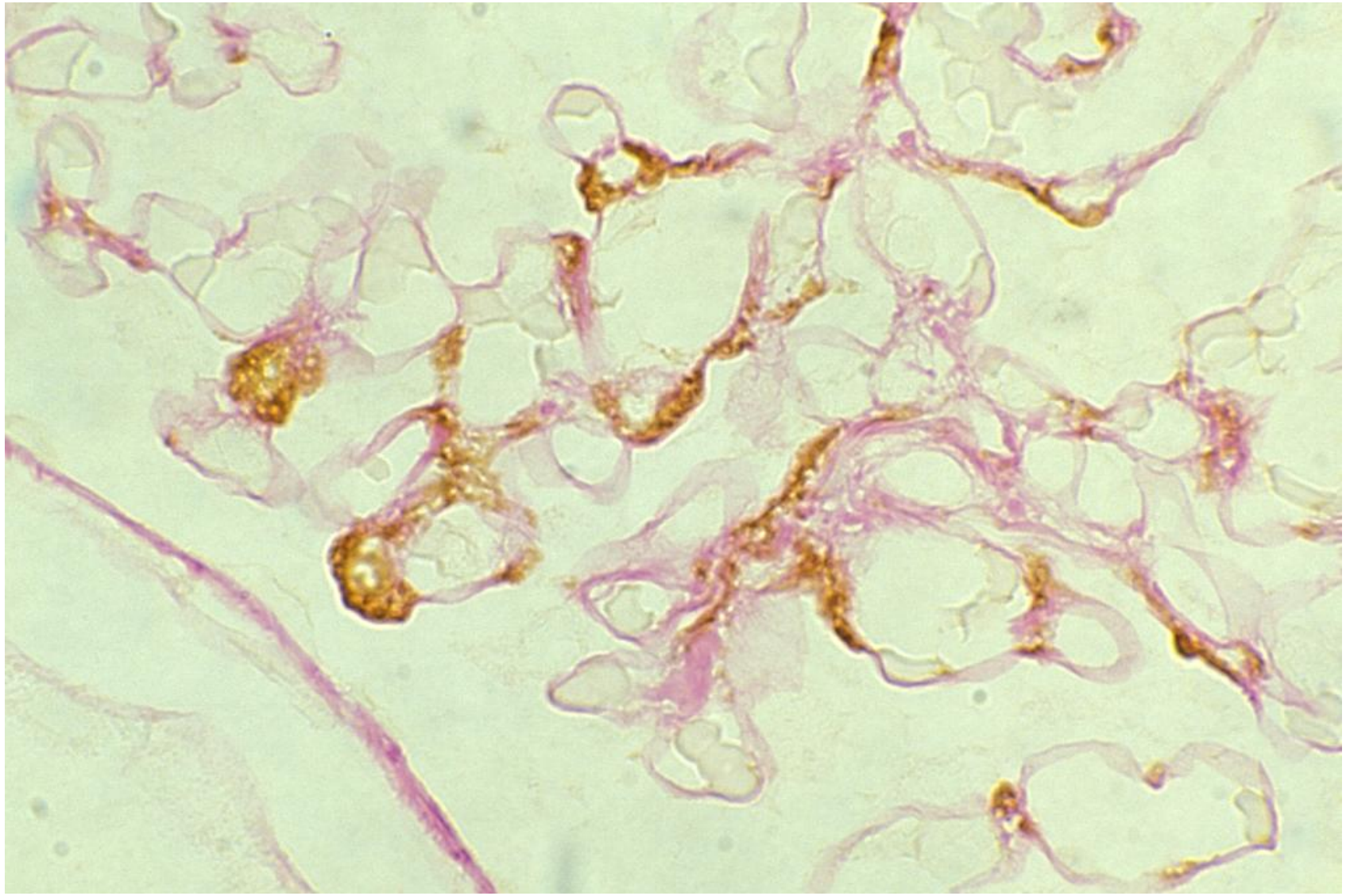
IgA nephropathy with a membranoproliferative glomerulonephritis pattern. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. PAM silver stain reveals double contour (tram track appearance) of the capillary tufts are observed. PAM



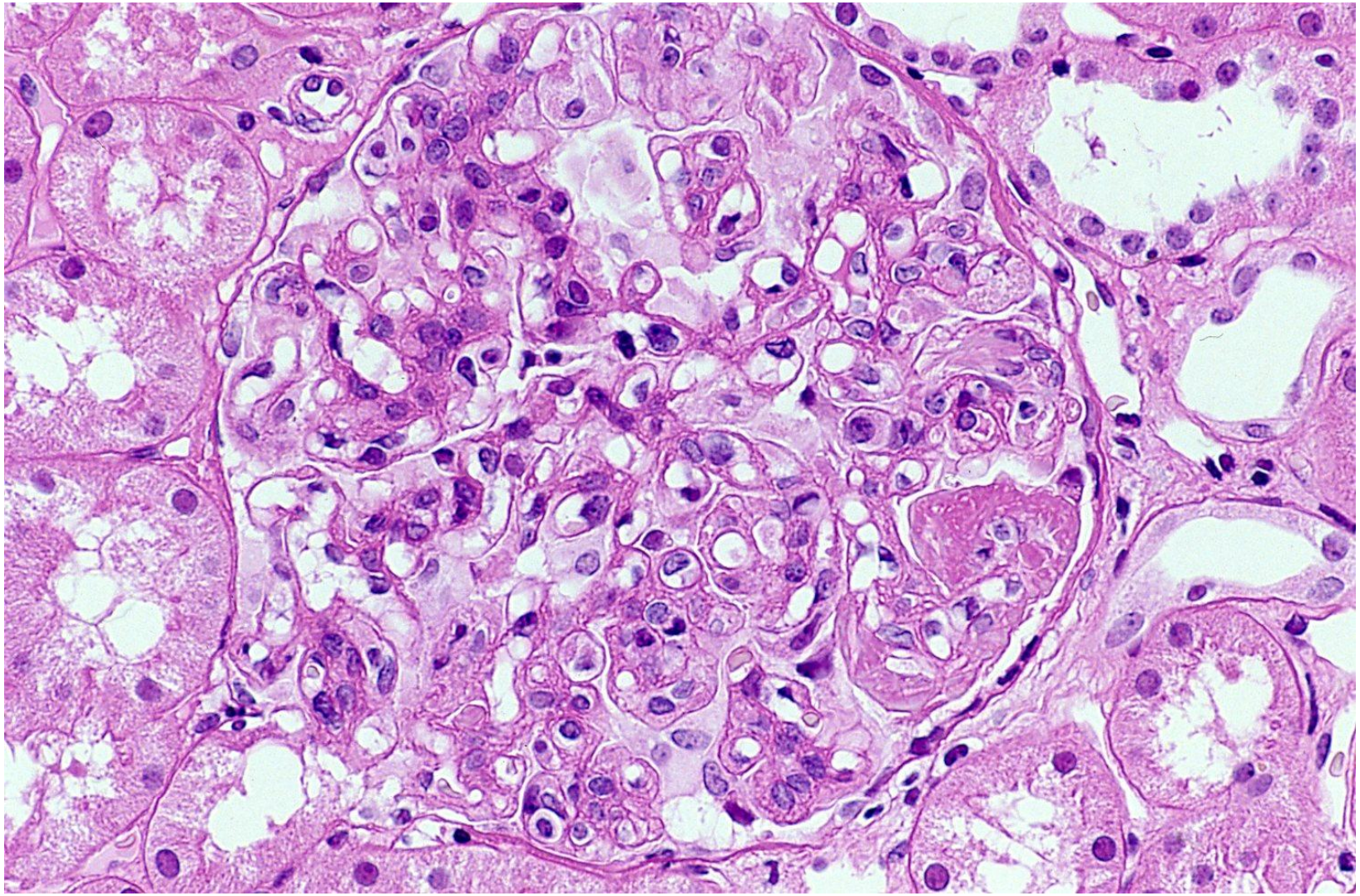
IgA nephropathy with a membranoproliferative glomerulonephritis pattern. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. After epitope retrieval with trypsin for 2 hours, deposition of IgA in the mesangial matrix is clearly demonstrated. Immunostaining for IgA after trypsinization



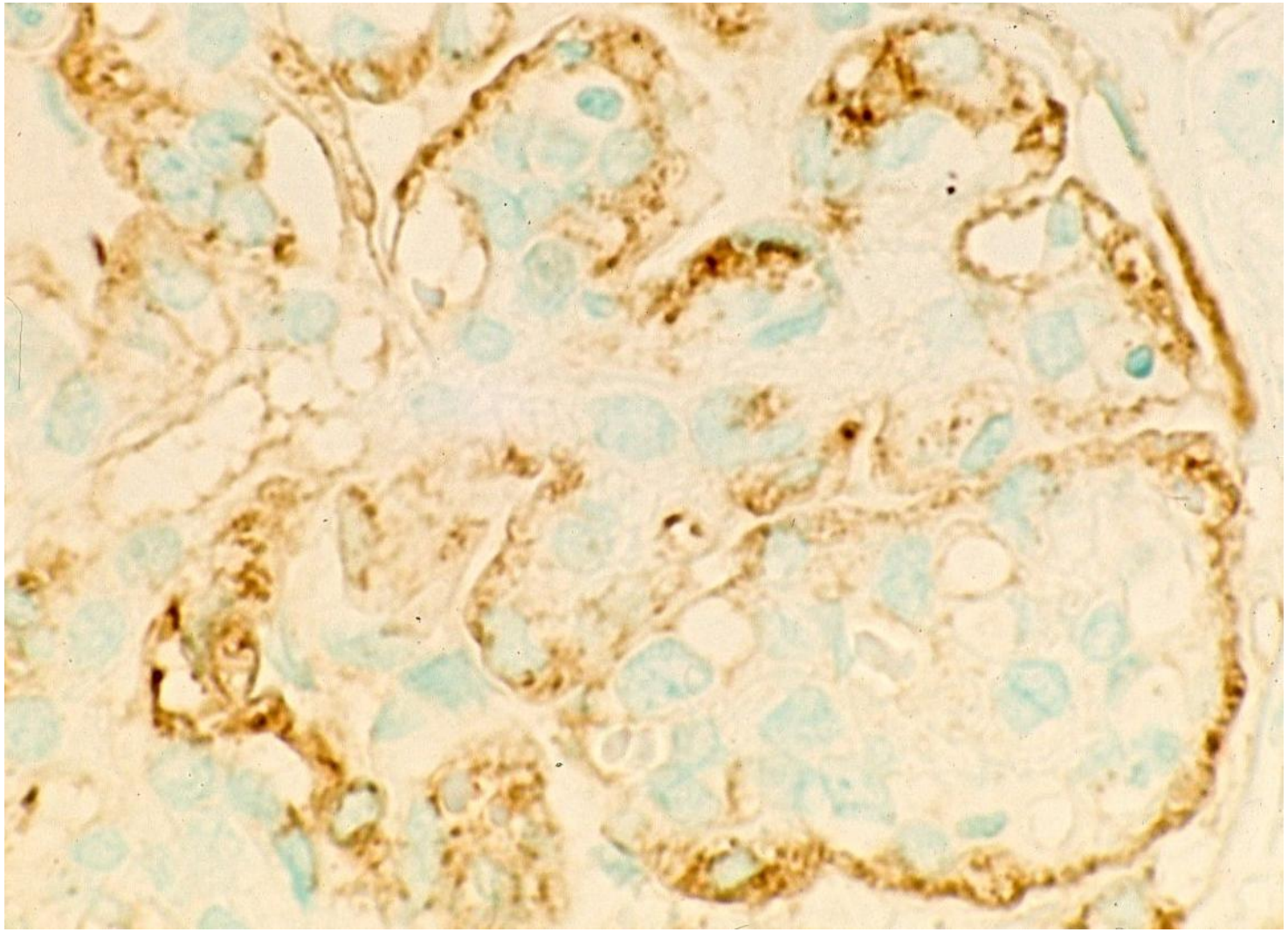
IgA nephropathy with a membranoproliferative glomerulonephritis pattern. Immunofluorescence using fresh frozen sections reveals paramesangial deposition of IgA. Direct immunofluorescence for IgA



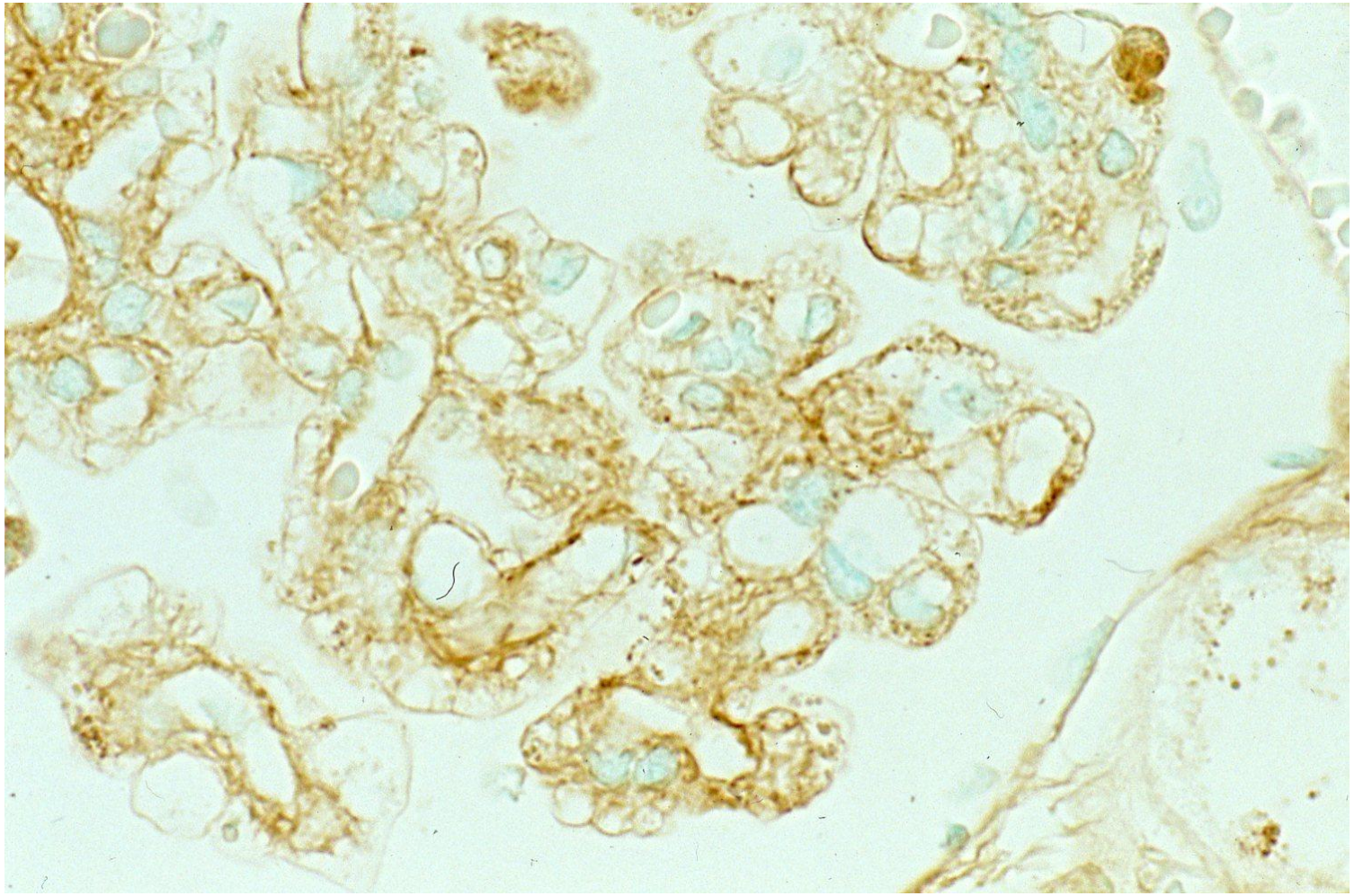
IgA nephropathy. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Mesangial deposition of IgA is double-stained with PAS. The relationship between the IgA deposited matrix and the basement membrane is shown. IgA is demonstrated after epitope retrieval with trypsin for 2 hours. Double staining for IgA and PAS



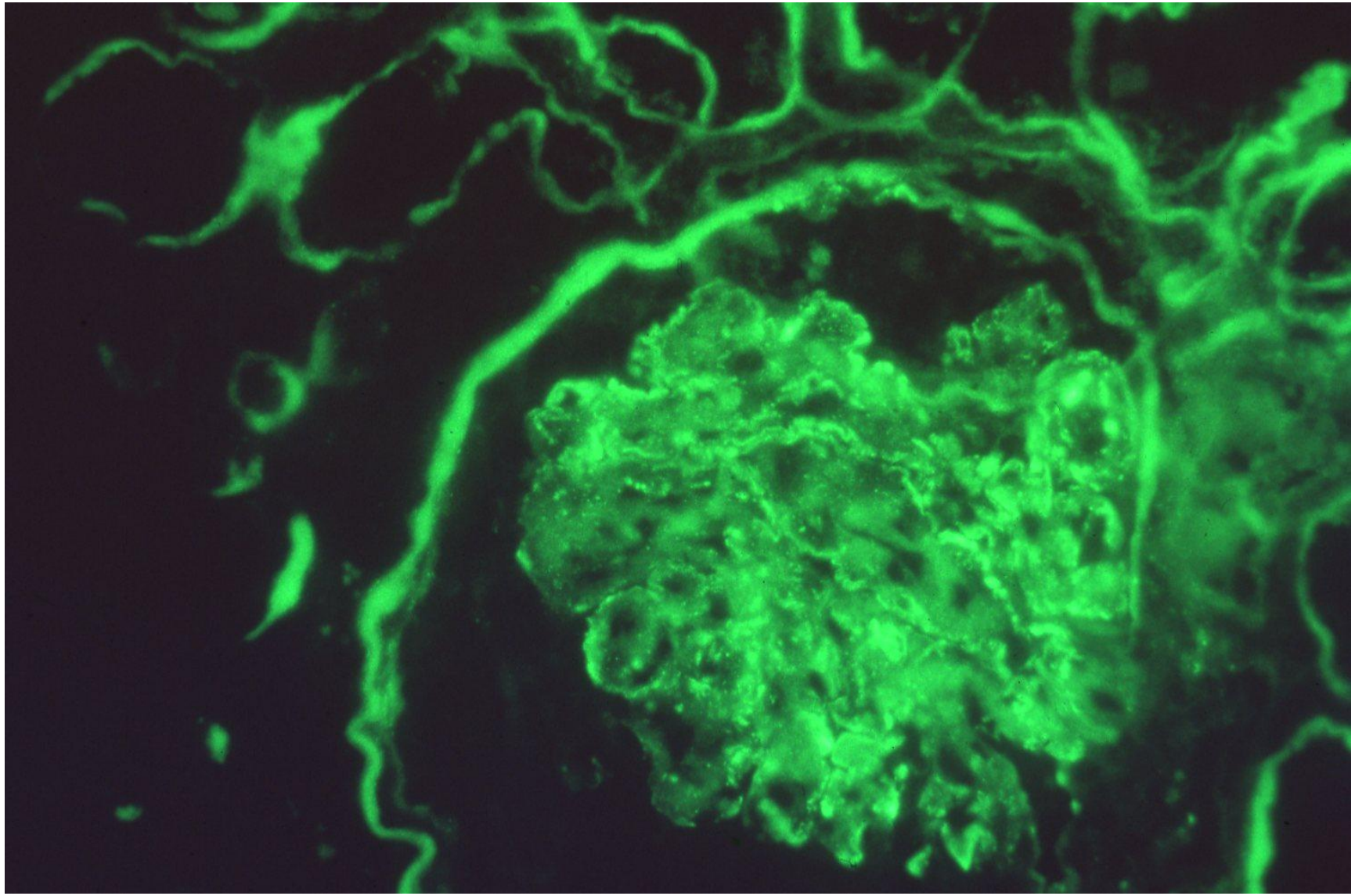
Membranoproliferative glomerulonephritis. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Thickening of the capillary tufts and active mesangial cell proliferation are observed. The glomerulus is enlarged. H&E



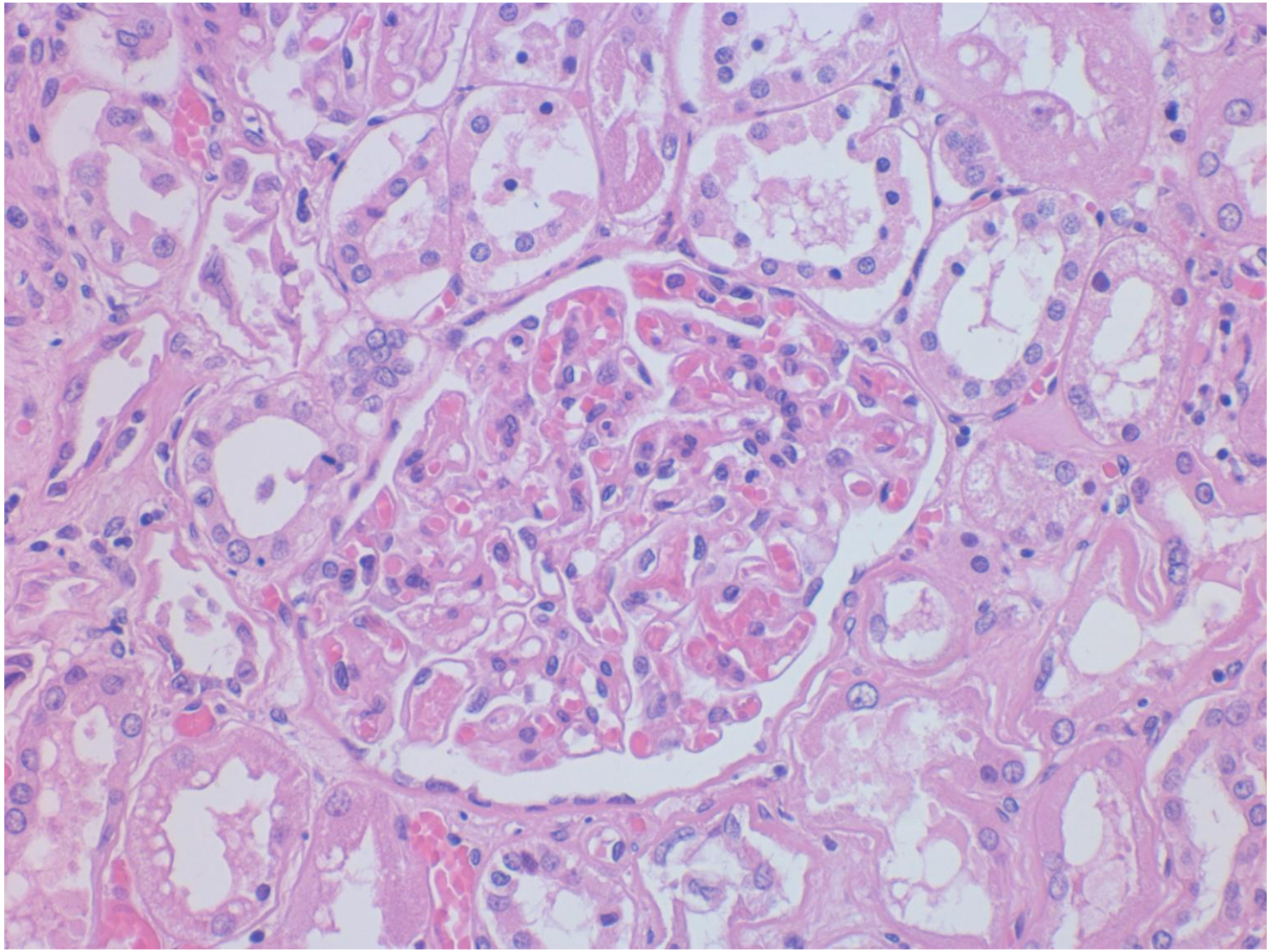
Membranoproliferative glomerulonephritis. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Deposition of IgM along of the capillary tufts as a fringe pattern is observed. Immunostaining for IgM after trypsinization



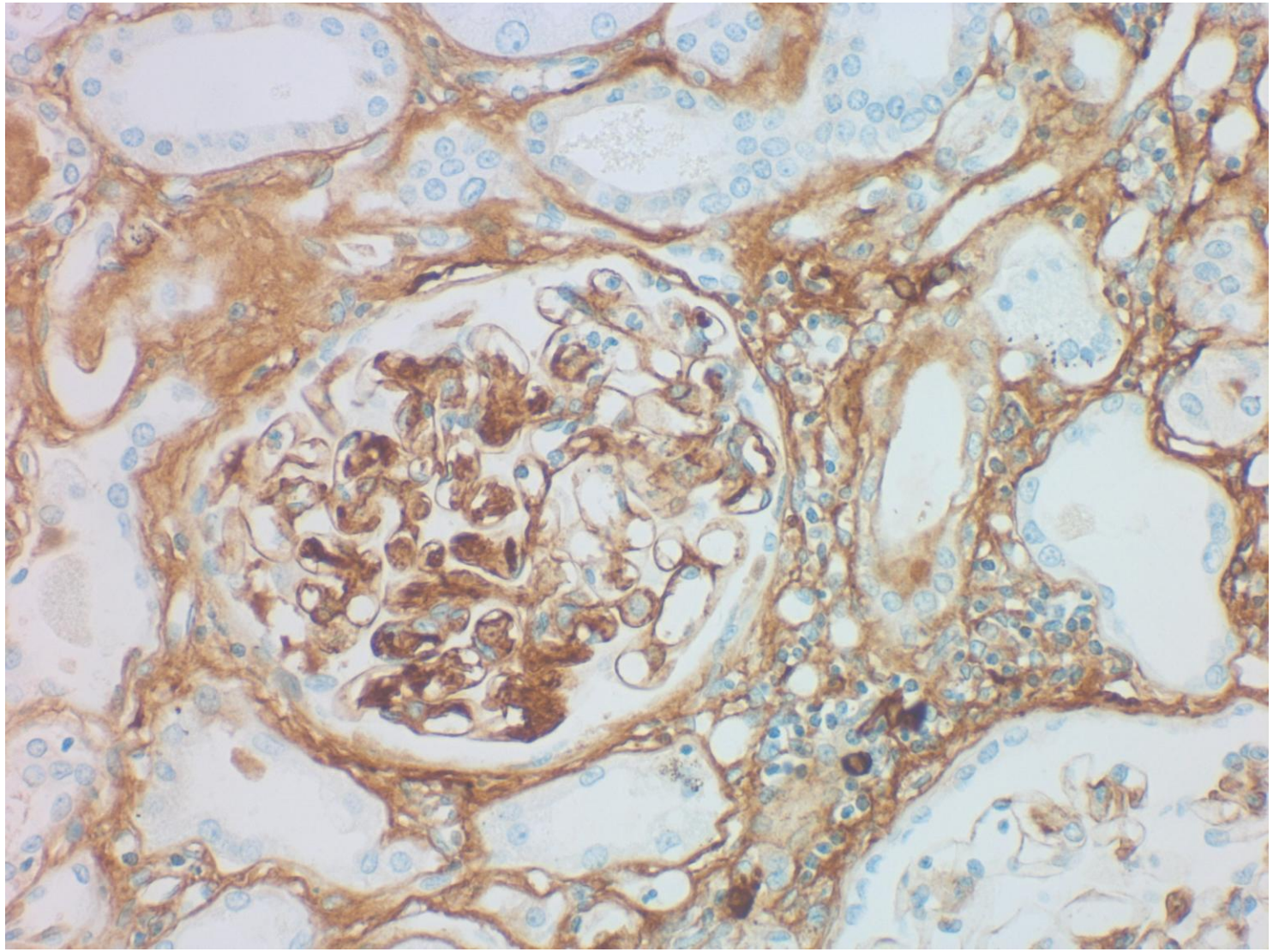
Membranoproliferative glomerulonephritis. Formalin-fixed, paraffin-embedded sections of the needle biopsy specimen. Deposition of C3 along of the capillary tufts as a fringe pattern is observed.
Immunostaining for C3 after trypsinization



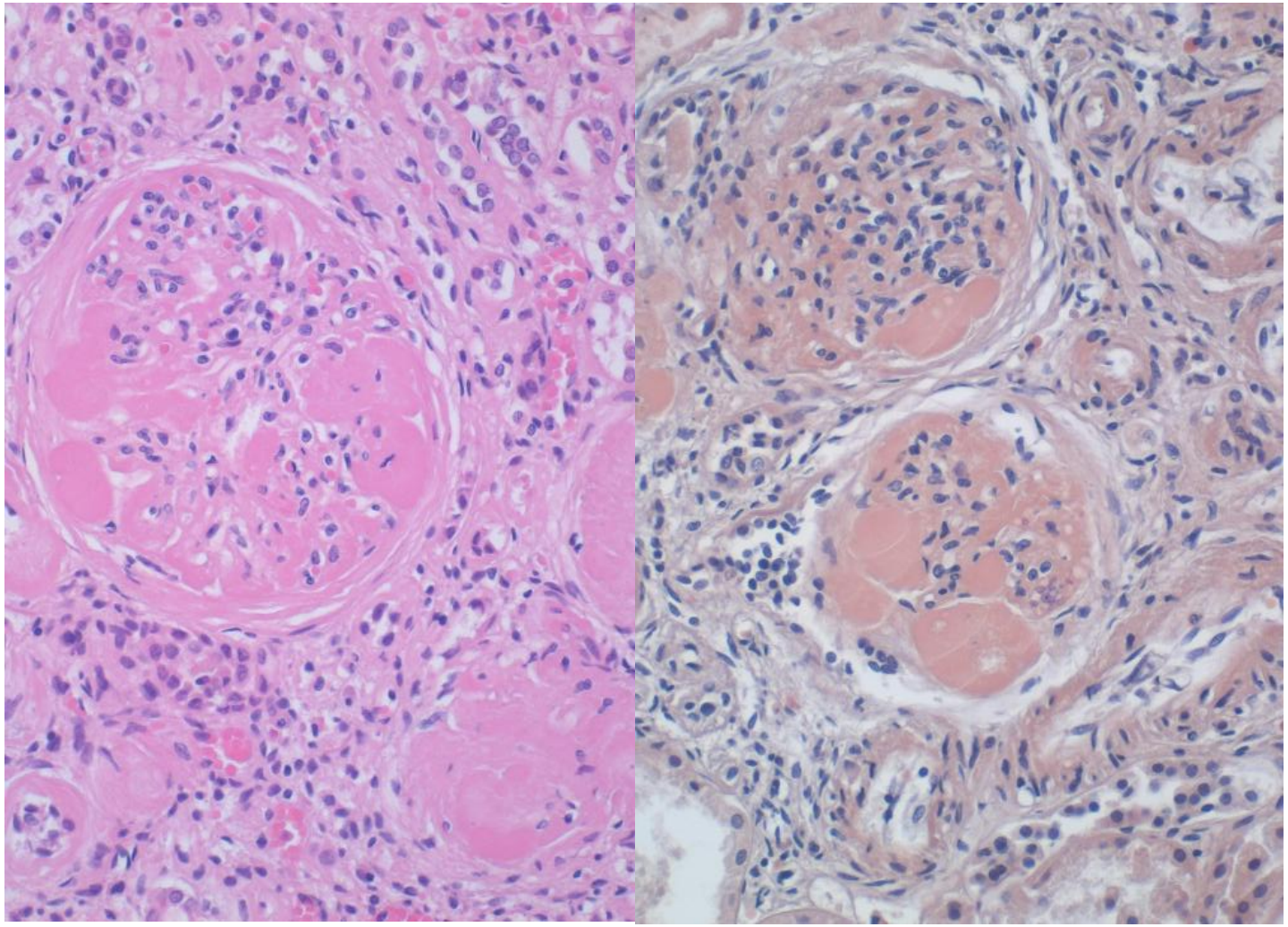
Membranoproliferative glomerulonephritis. Immunofluorescence using fresh frozen sections reveals deposition of C3 along the capillary tufts. Direct immunofluorescence for C3



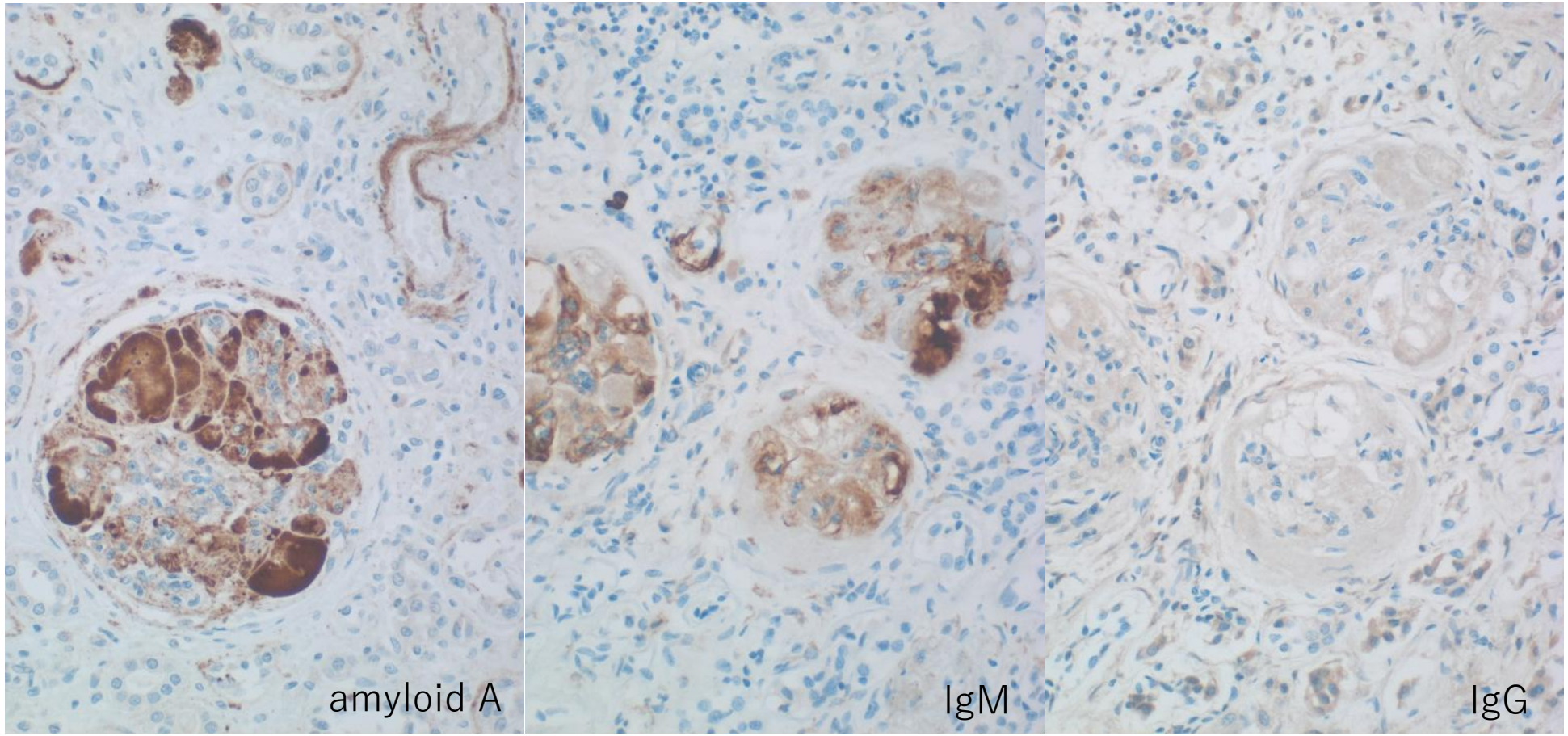
IgM nephropathy with features of minimal change nephropathy manifests as nephrotic syndrome (a male patient aged 60’s). Formalin-fixed, paraffin-embedded sections of autopsy specimen.



Mesangial deposition of IgM is detected with immunostaining for IgM after prolonged digestion with protease-1. Ref.: Odani K, et al. Late relapse of IgM nephropathy-associated nephrotic syndrome after repeated administration of immune checkpoint inhibitor against pulmonary adenocarcinoma. Clin Case Rep 2021; 00: 1–8. doi: 10.1002/ccr3.3903



Secondary systemic AA amyloidosis. Formalin-fixed, paraffin-embedded sections of autopsy specimen. Congophilic amyloid deposition is massively seen in the glomeruli (left: H&E, right: Dylon staining).



Secondary systemic AA amyloidosis. Formalin-fixed, paraffin-embedded sections of autopsy specimen. Amyloid deposition in the glomeruli is positive for amyloid A protein and IgM. IgG is negative (left: amyloid A, center: IgM, right: IgG). Co-deposition of amyloid A protein and IgM is characteristic. IgM and IgG were detected after prolonged digestion with protease-1. Ref.: Yamamoto H, et al. Gastric perforation caused by secondary systemic amyloidosis. Clin Case Rep 2021; 9: e04254. doi: 10.1002/ccr3.4254