Nervous lesions in Hansen's disease

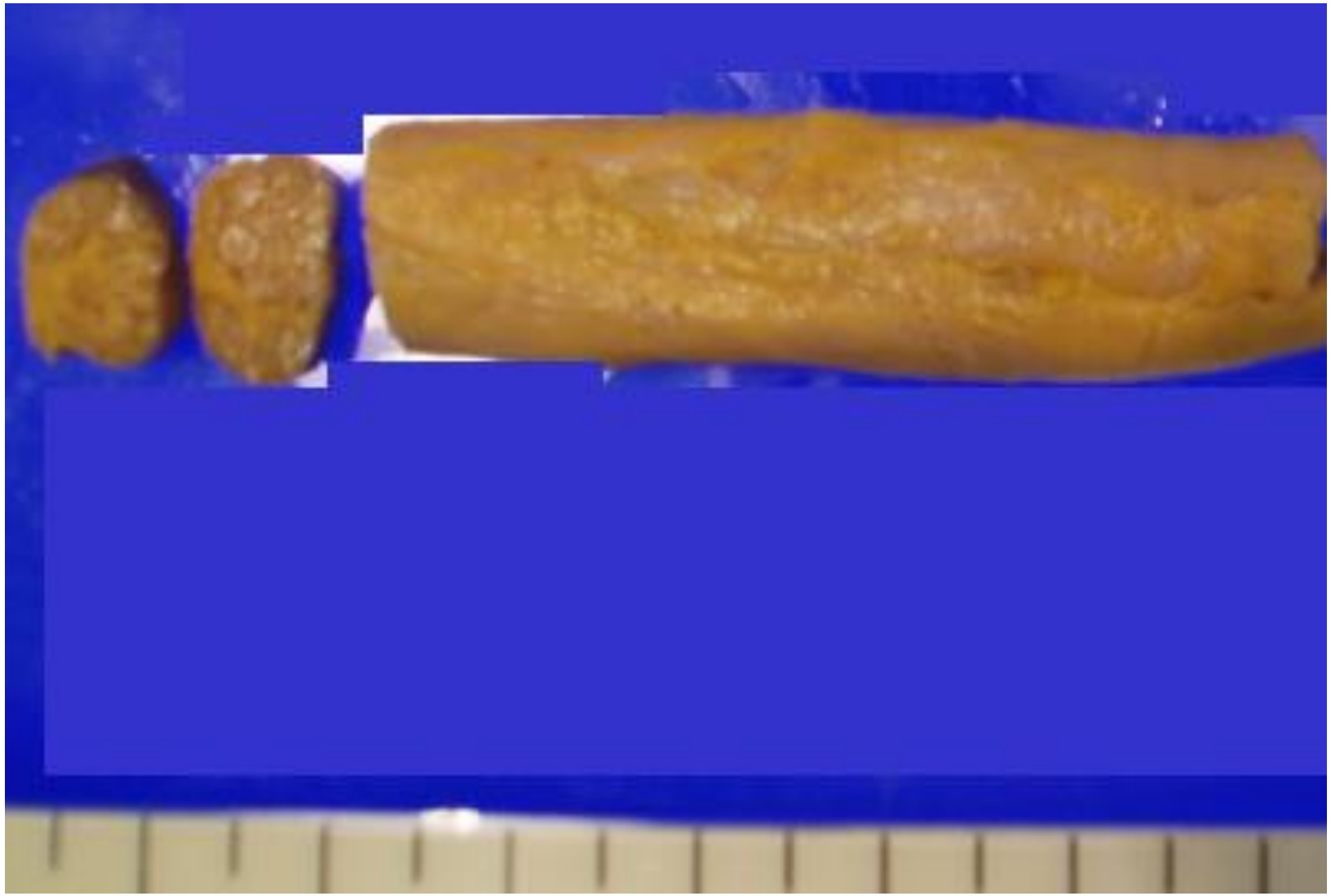
In Hansen's disease, *Mycobacterium leprae* infects the skin with lower surface temperature, iris, nasal mucosa, epiglottis, testis and peripheral nerves. In lepromatous leprosy, numerous acid-fast bacilli are proven in internal organs, including the liver, spleen and lymph nodes as lepromas. BCG immunostaining using BCG antiserum is a powerful tool for consistent identification of the acid-fast bacilli via cross-reactivity. It is of note that *M. leprae* show ascending infection to the posterior root ganglion and motor neurons of the spinal cord and brain stem. Ganglionitis and myelitis may happen around the infected ganglion cells/neurons. The introduction of the therapeutic drug, glucosulfone sodium (so-called Promin), effective eradicated the pathogens to result in clinical cure state. However, the BCG-reactive bacterial antigens may focally remain in the peripheral and central nervous system, as well in the testis and cartilage cells. Myelitis may persist even after the clinical cure.

Ref.: Bafna P, et al. Ganglionitis and myelitis: myriad neurological manifestations of Hansen's disease. BMJ Case Rep. 2020; 13(8): e236813. doi: 10.1136/bcr-2020-236813

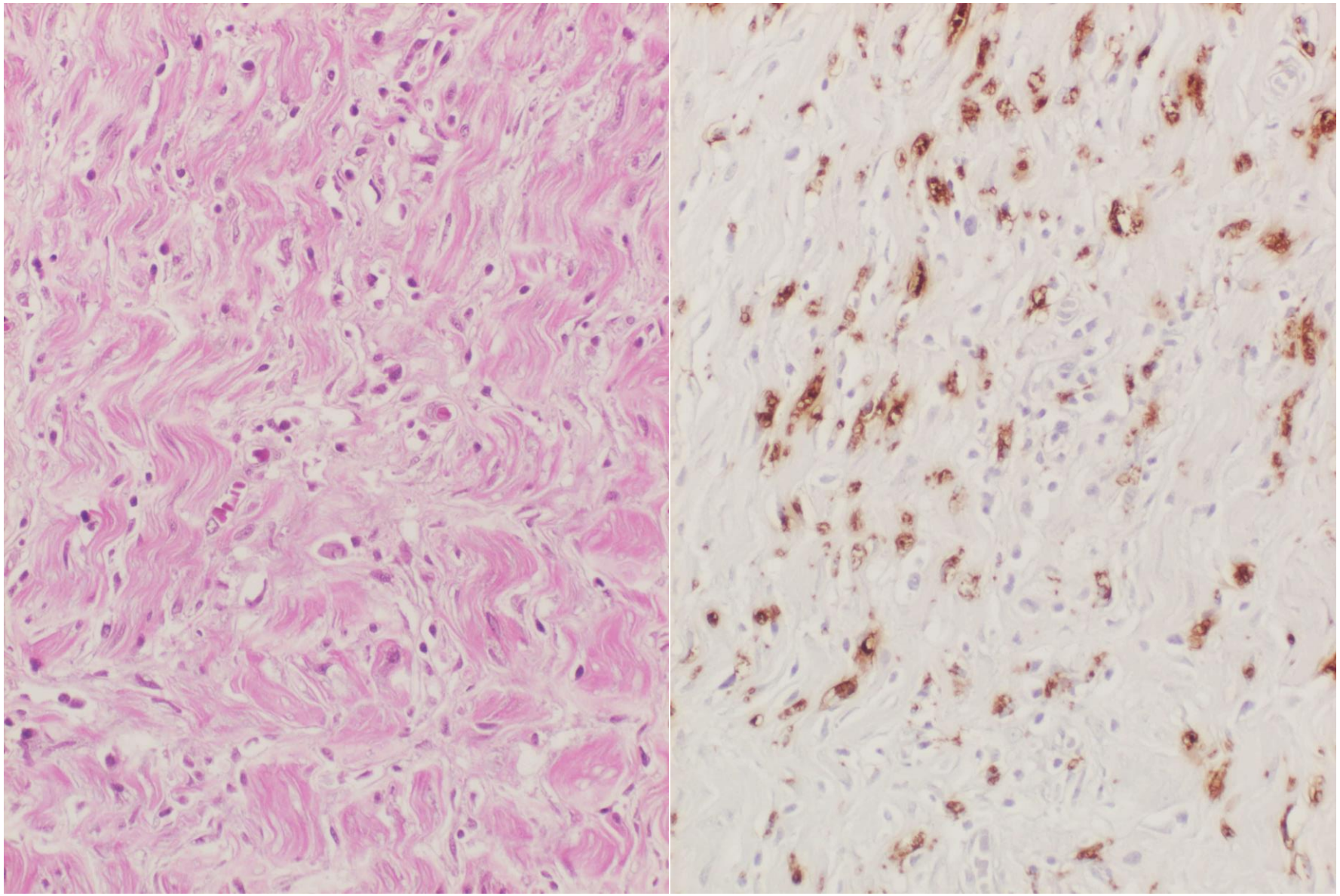
Ref.: Tsutsumi Y. Pitfalls and caveats in applying chromogenic immunostaining to histopathological diagnosis. Cells. 2021; 10(6), 1501. doi: 10.3390/cells10061501. (57 pages)

Ref.: Tsutsumi Y. Low-specificity and high-sensitivity immunostaining for demonstrating pathogens in formalin-fixed paraffin-embedded sections. In: Immunohistochemistry: the ageless Biotechnology. IntechOpen 2019. doi: 10.5772/intechopen.85055. (46 pages)

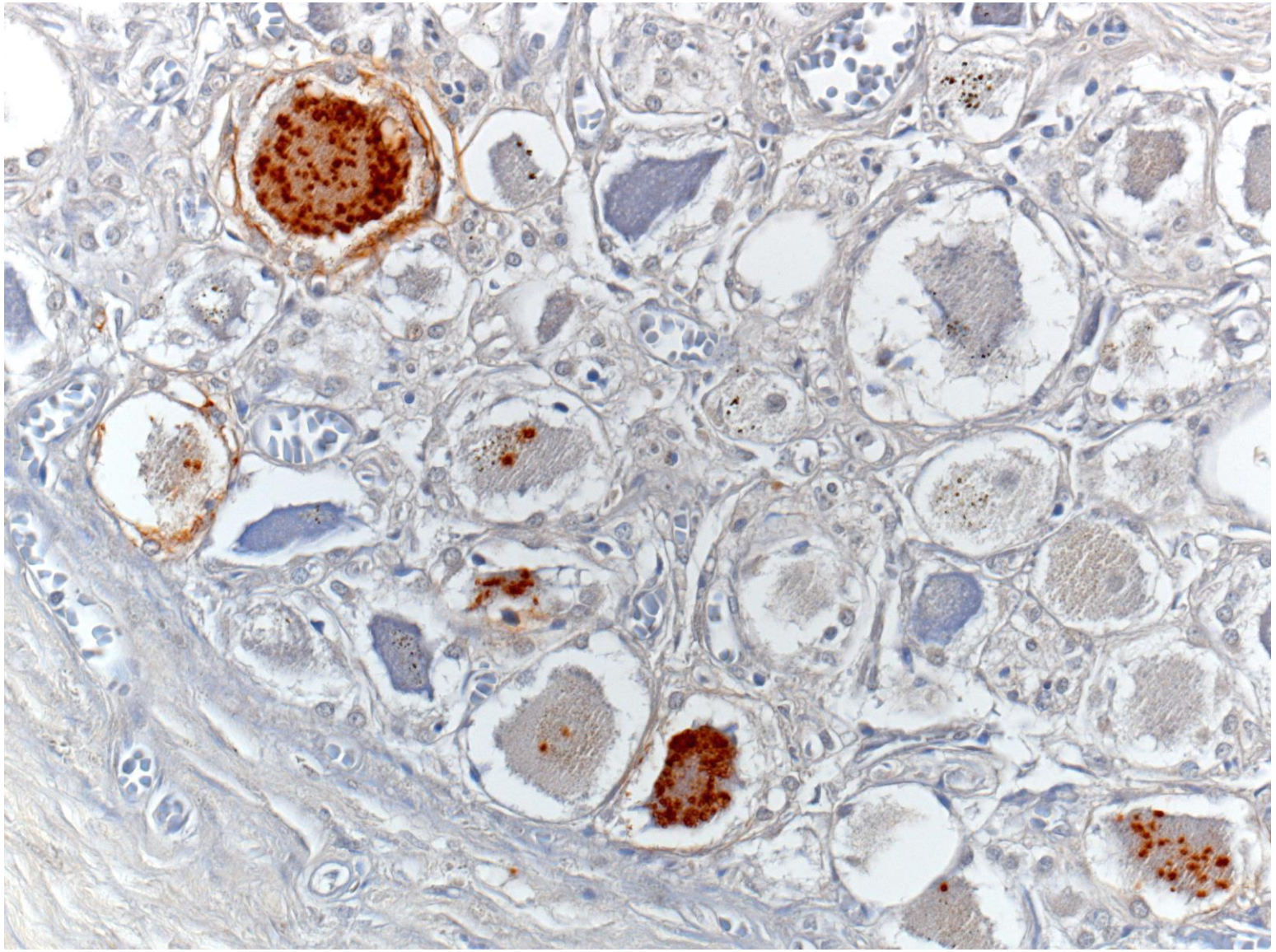
Ref.: Tsutsumi Y. Electron microscopic study using formalin-fixed, paraffin-embedded material, with special reference to observation of microbial organisms and endocrine granules. Acta Histochem Cytochem. 2018; 51(2): 63–71. doi: 10.1267/ahc.18012



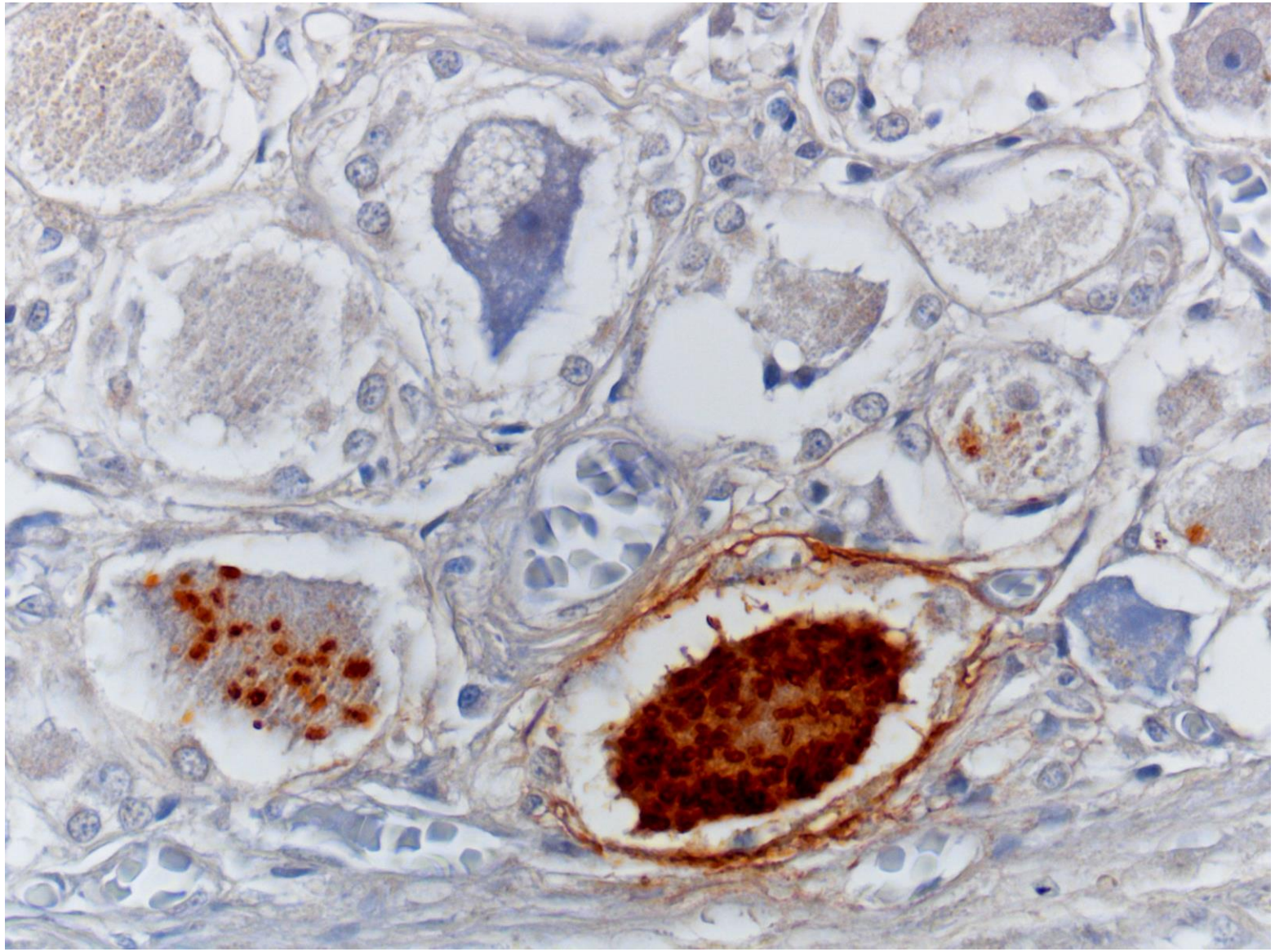
Gross appearance of thickened peripheral nerve. Massive infection of *Mycobacteriun leprae* is proven microscopically.



Microscopic appearance of thickened peripheral nerve. Massive infection of *Mycobacteriun leprae* is proven (left: H&E. right immunostaining for BCG).



Posterior root ganglion of the spinal cord in an autopsy case before the era of Promin treatment. Ganglion cells are positive for BCG antigens, indicating the infection of *M. leprae*.



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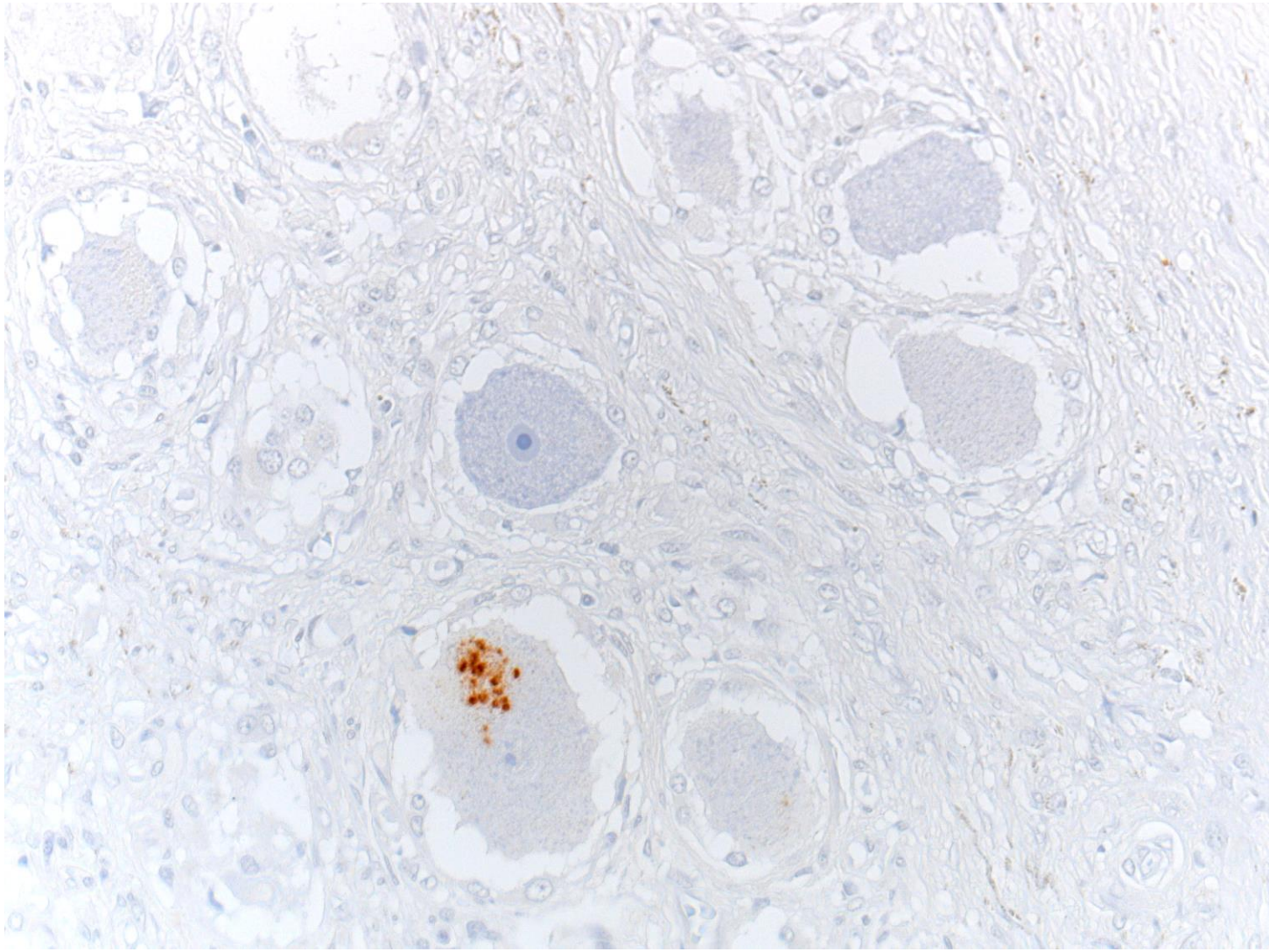
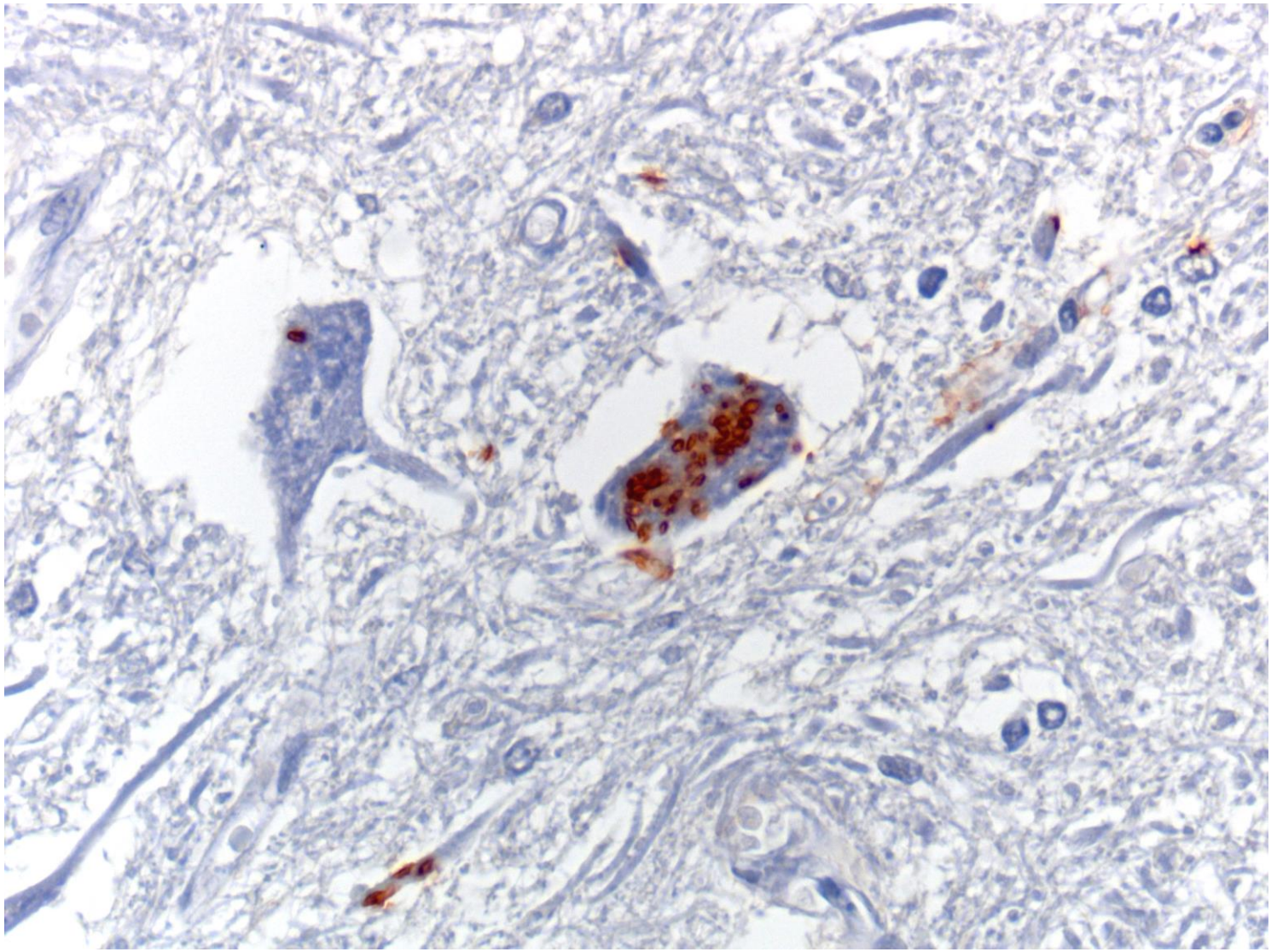
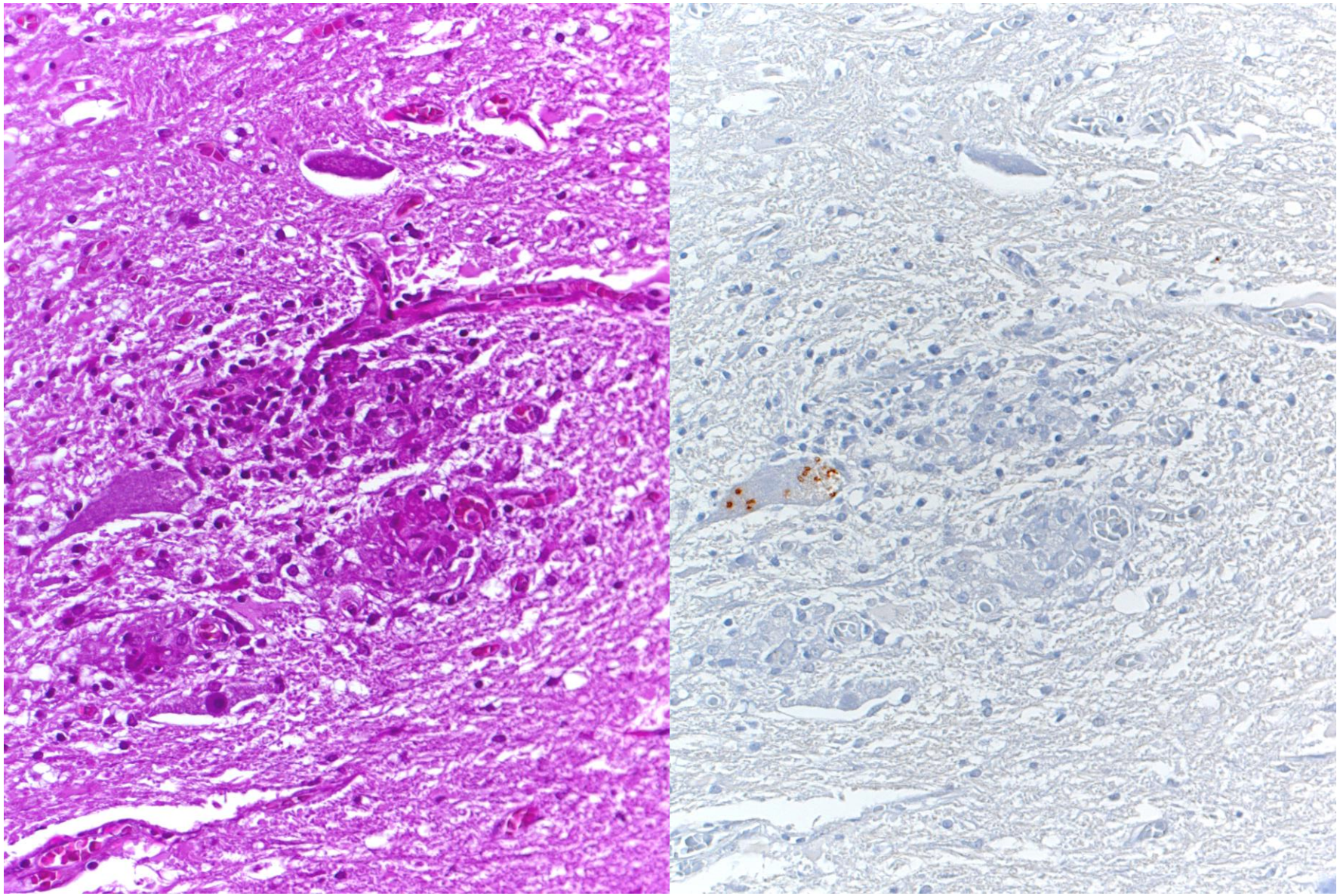


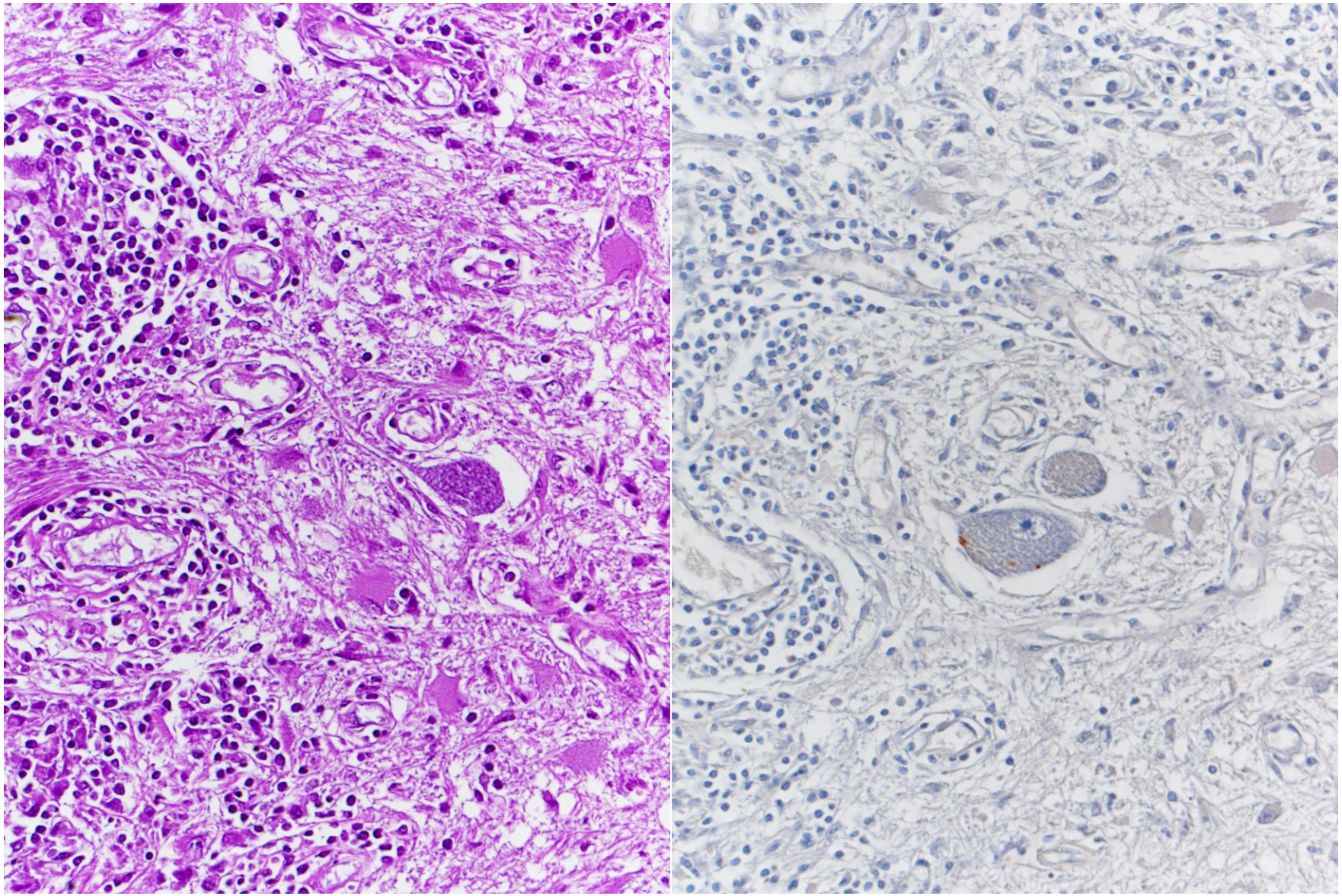
Posterior rot ganglion of the spinal cord in an autopsy case after Promin treatment. Systemic lesion has cured. A few ganglion cells are positive for BCG antigens, indicating the persistence of *M. leprae* in nervous system.



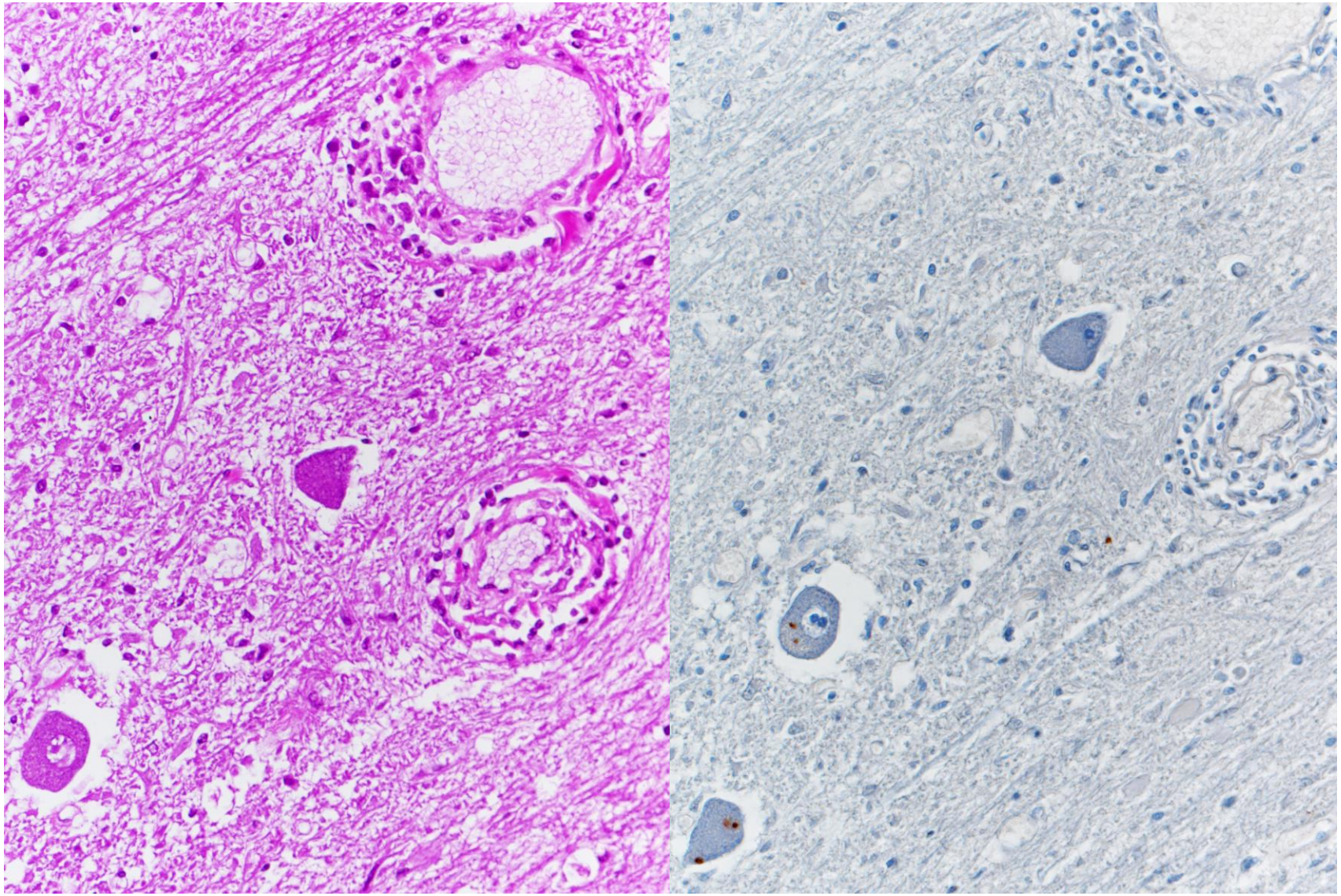
Neurons of the anterior horn of the spinal cord in an autopsy case before the era of Promin treatment. Motor neurons are positive for BCG antigens, indicating the infection of *M. leprae*.



Myelitis of the anterior horn of the spinal cord in an autopsy case before the era of Promin treatment. Neuronophagia is evident, and a remaining motor neuron is positive for BCG antigens, indicating *M. leprae*.-infection-related myelitis.



Myelitis of the anterior horn of the spinal cord in an autopsy case before the era of Promin treatment. Lymphocytic infiltration is evident, and a remaining motor neuron is positive for BCG antigens, indicating *M. leprae*.-infection-related myelitis.



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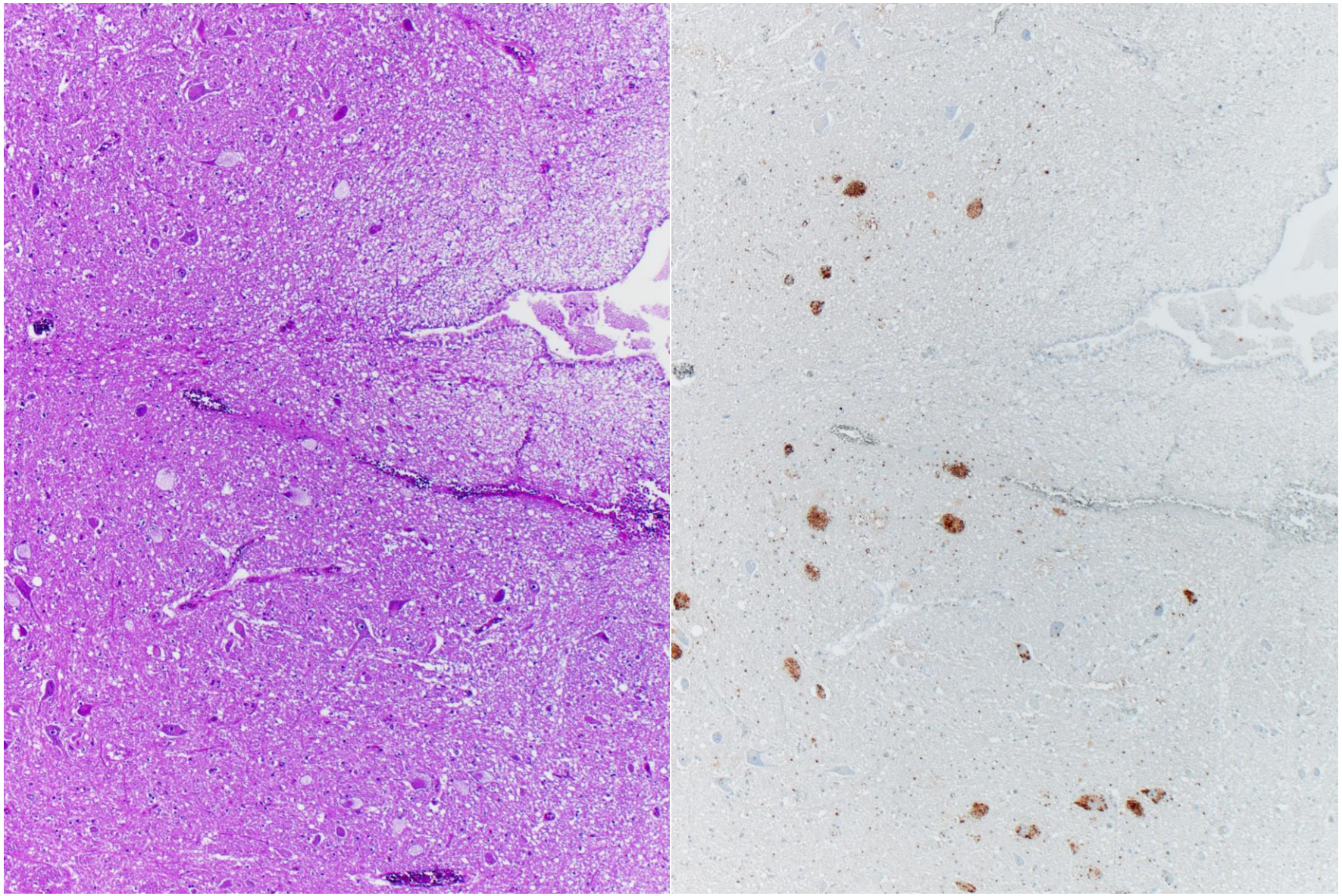
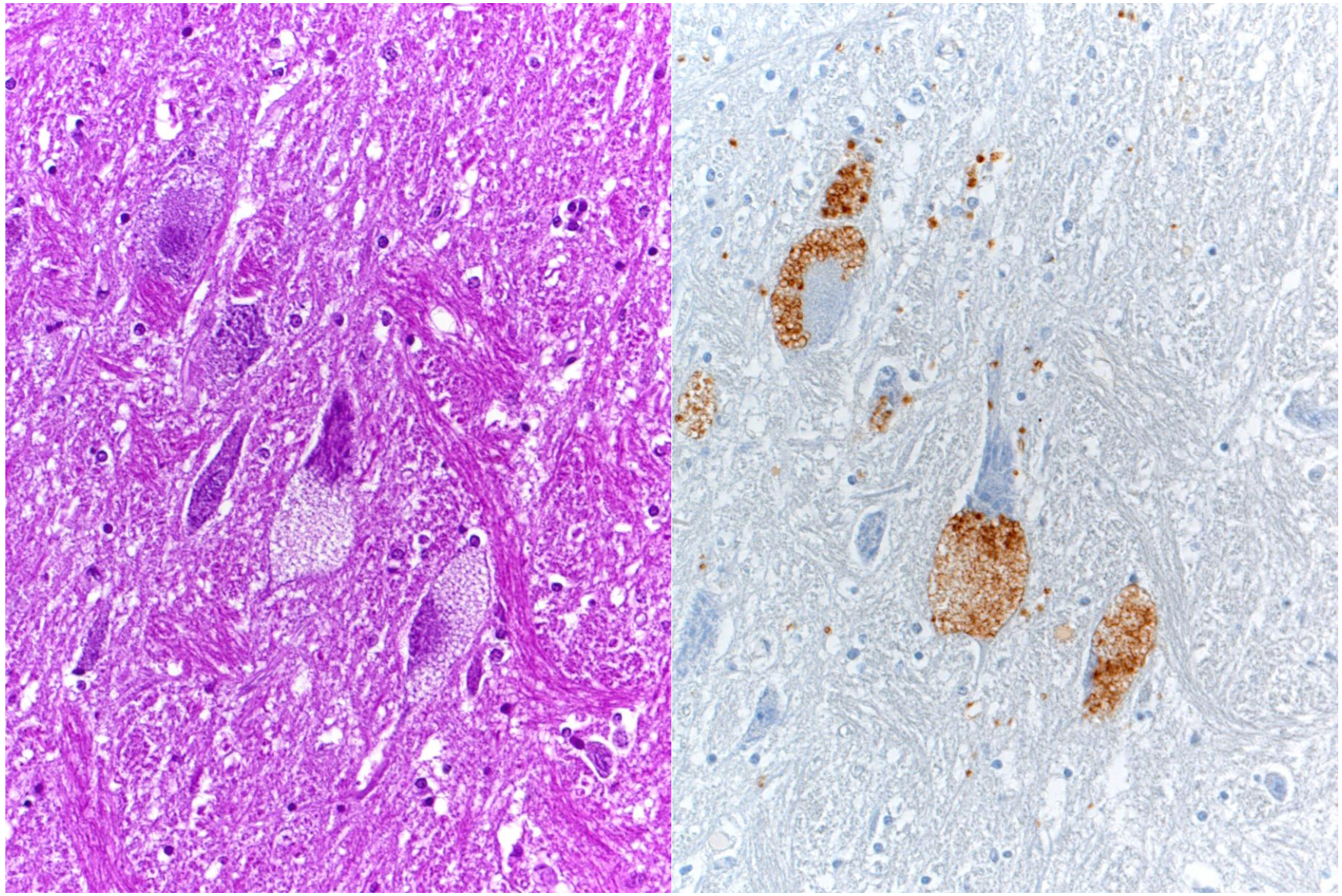
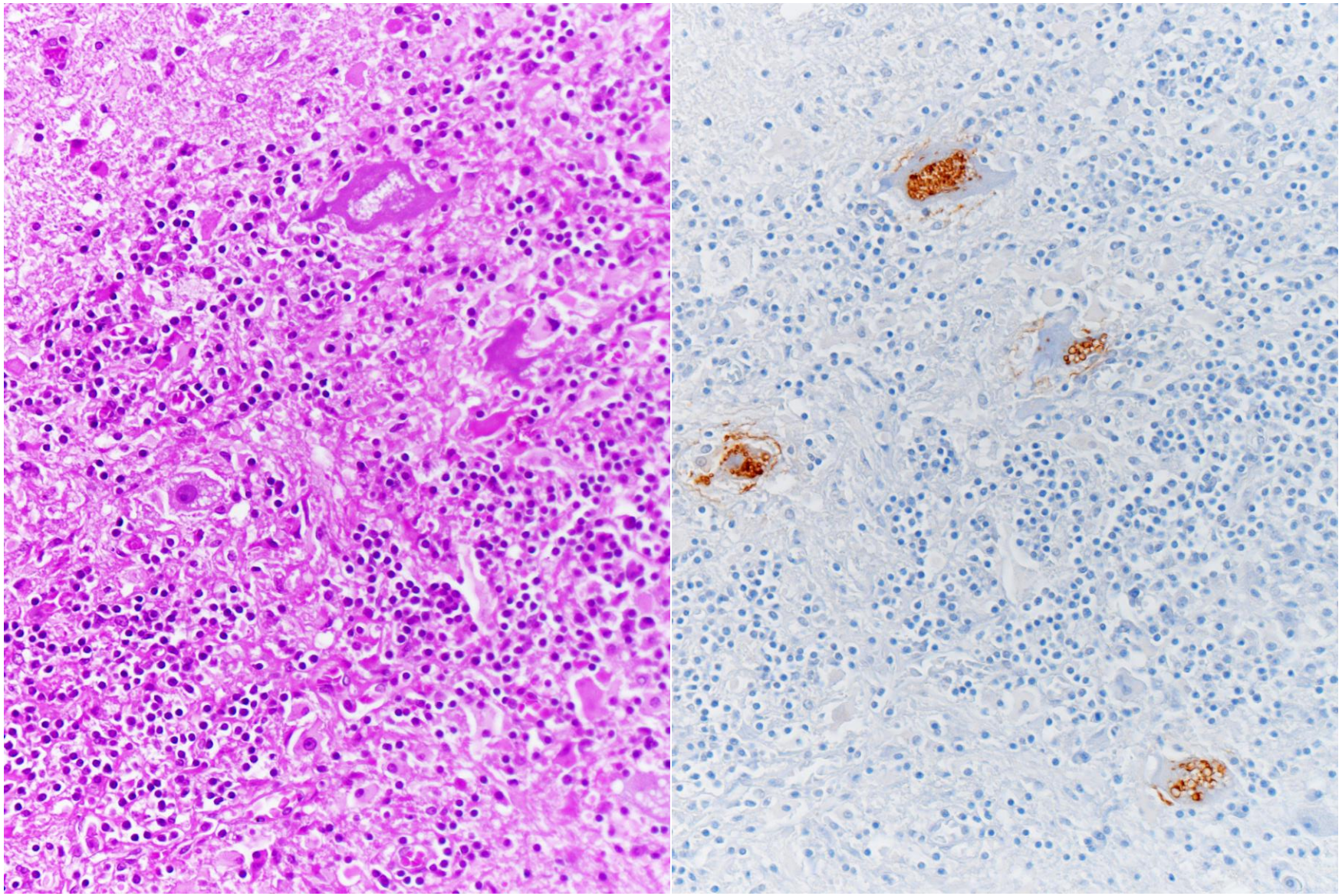


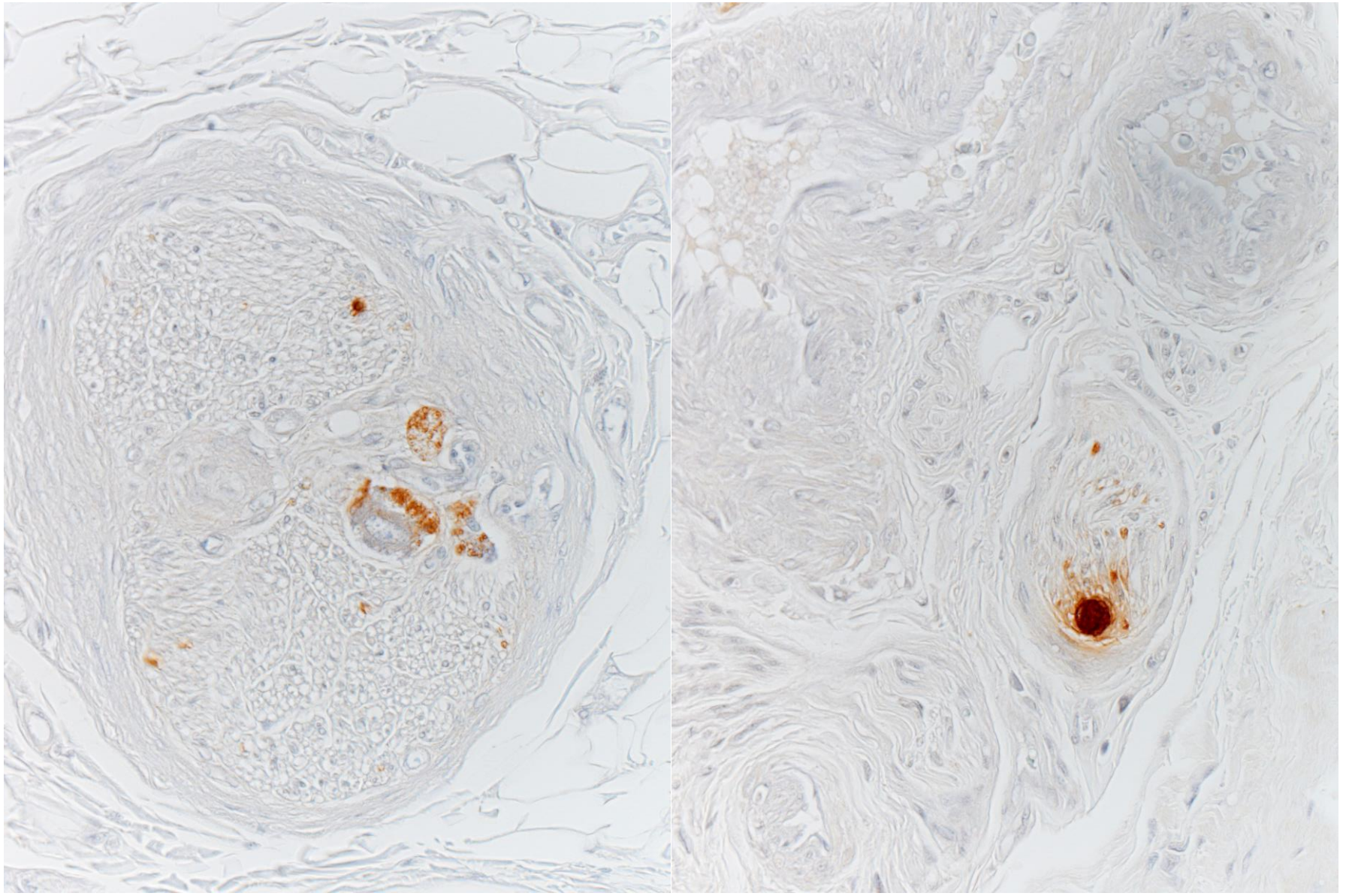
Hypoglossal nucleus of the medulla oblongata in an autopsy case after Promin treatment. Motor neuron cells are immunoreactive for BCG antigens, indicating the persistence of *M. leprae*.



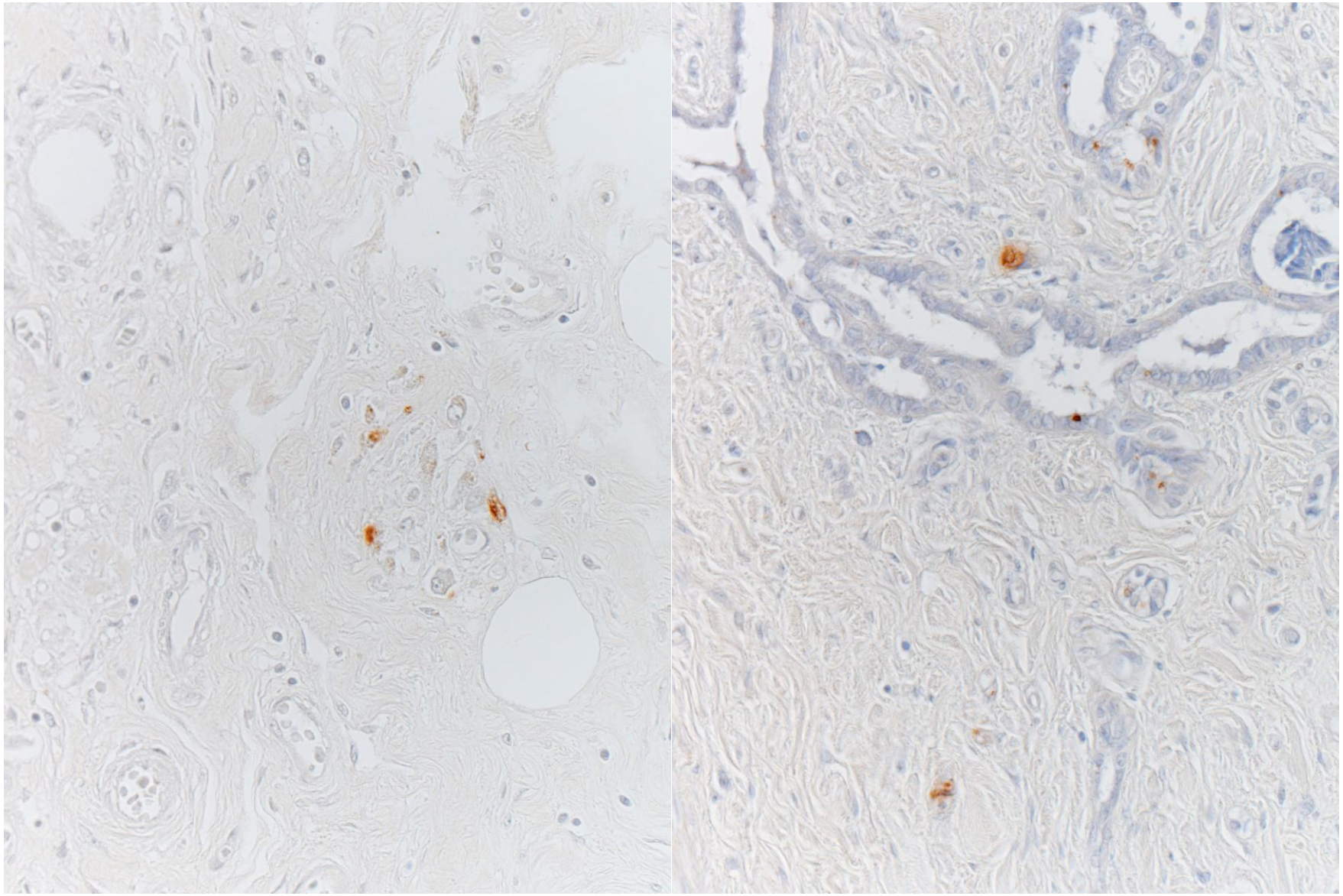
Nucleus ambiguous of the medulla oblongata in an autopsy case after Promin treatment. Motor neuron cells are swollen with foamy cytoplasm and immunoreactive for BCG antigens, indicating the persistence of *M. leprae*.



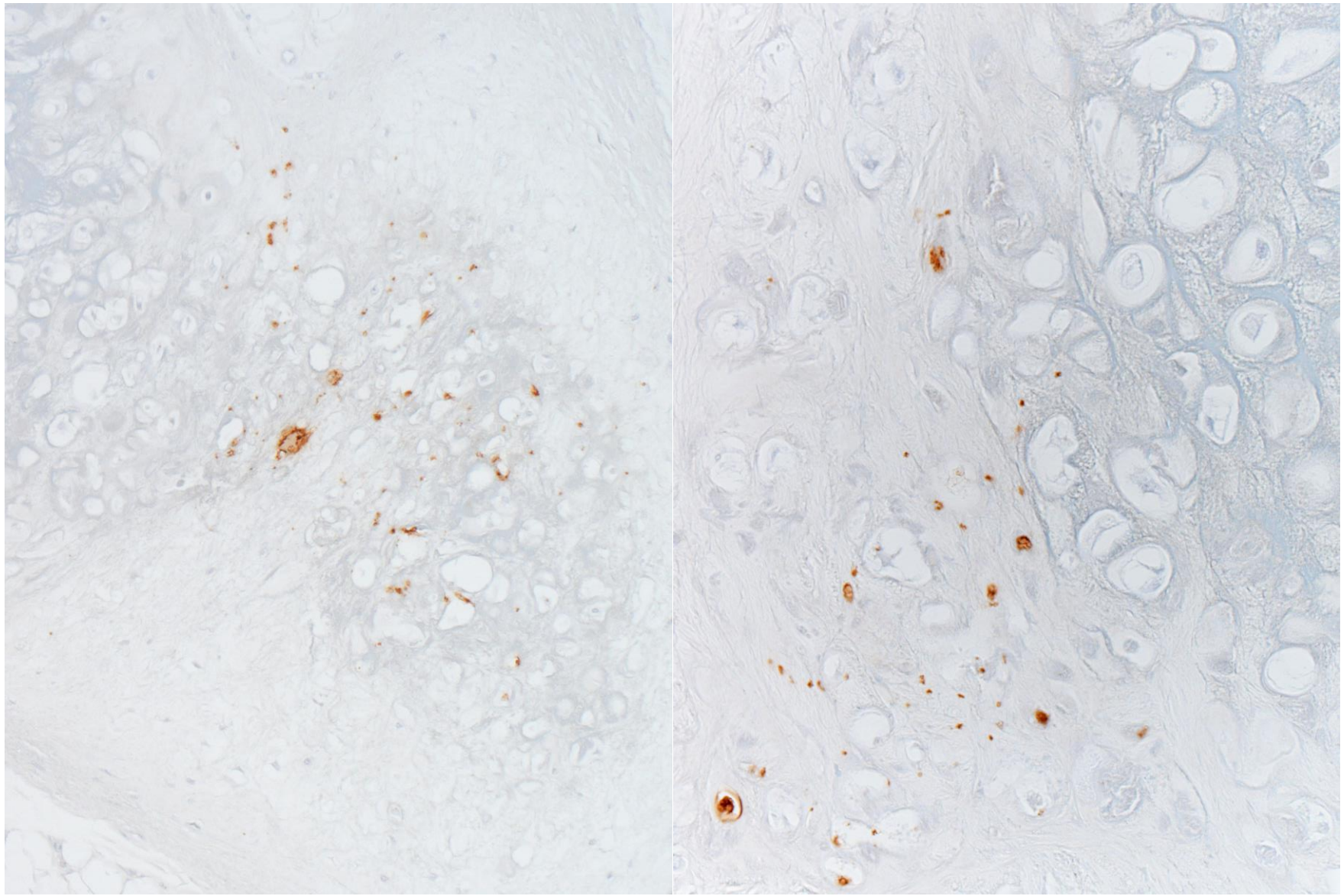
Nucleus ambiguous of the medulla oblongata in an autopsy case before the era of Promin treatment. Motor neuron cells, partly with foamy cytoplasmic change, contain immunoreactive BCG antigens, and lymphocytic myelitis is associated.



Pharyngeal nerve fascicles in an autopsy case after Promin treatment. BCG immunoreactivity remains part of the peripheral nerve tissue. After the clinical cure, bacterial antigens still remain in the nerve.



Testicular tissue in an autopsy case after Promin treatment. BCG immunoreactivity focally remains in a few stromal spindled cells and in some ductal epithelial cells. After the clinical cure, bacterial antigens still remain in the testis.



Epiglottis in an autopsy case after Promin treatment. BCG immunoreactivity remains part of the cartilaginous cells and stromal cells. After the clinical cure, bacterial antigens still remain in the epiglottis.