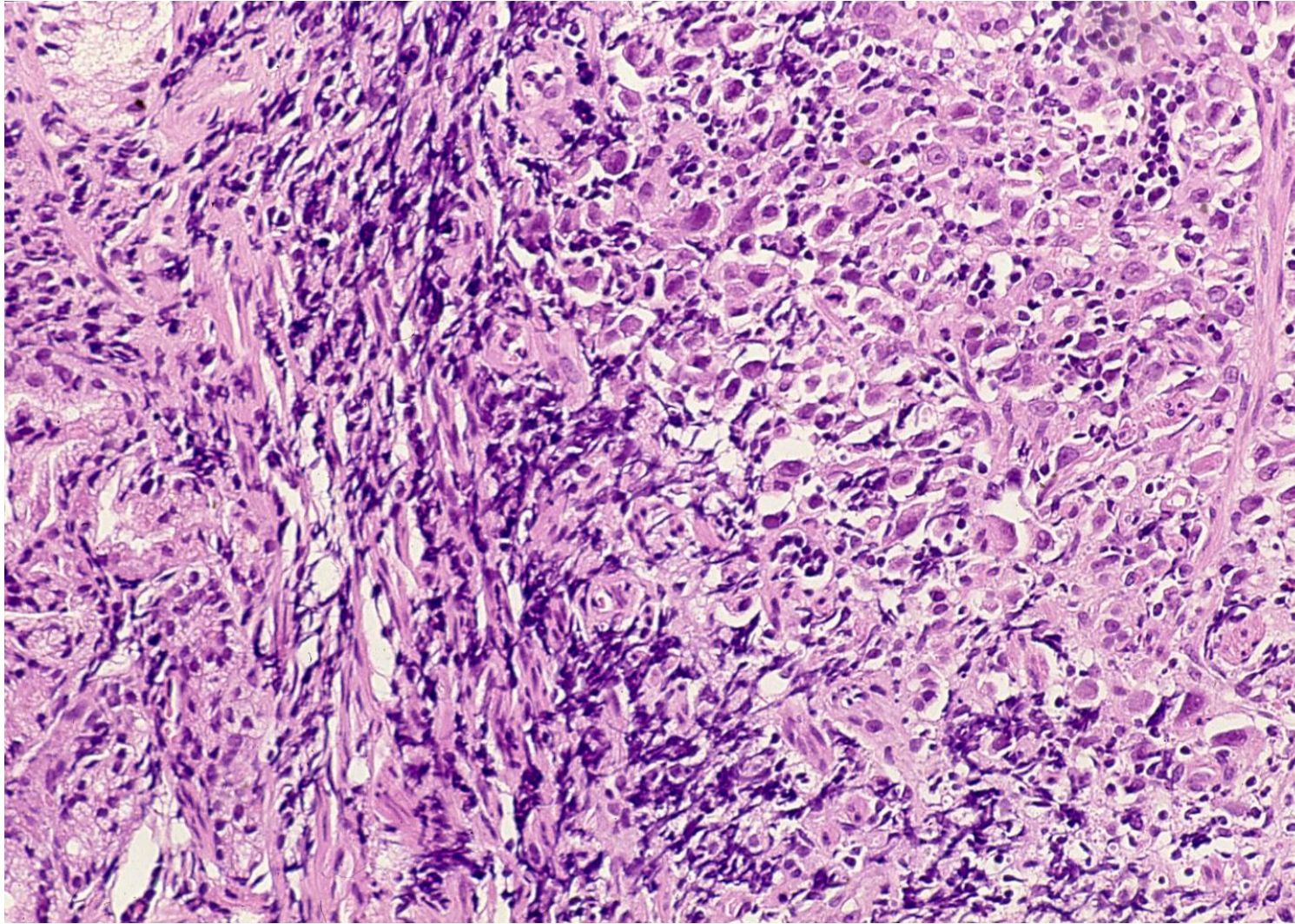


Blood typing to prove cross-contamination of gastric biopsy specimens

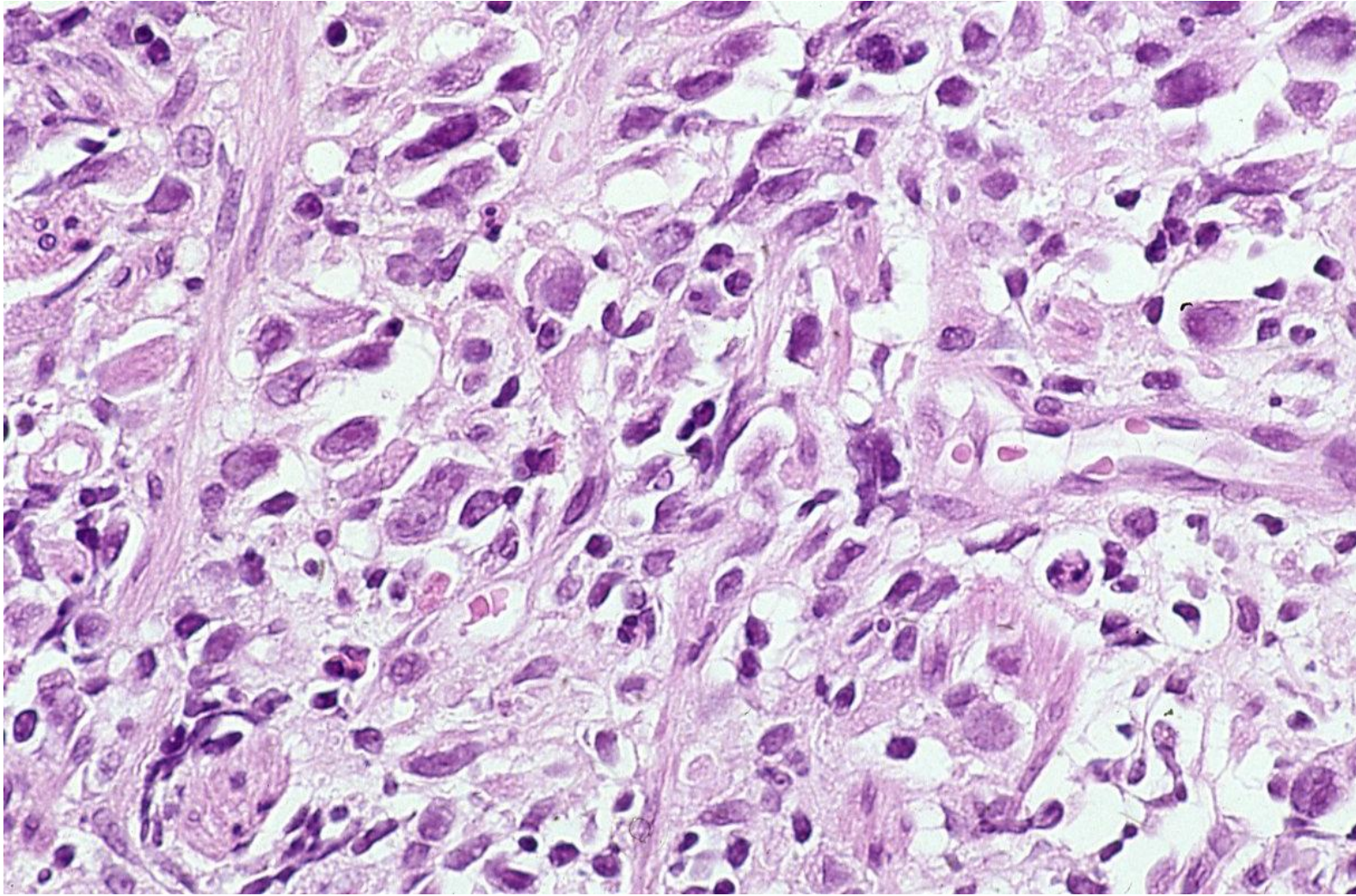
A 50-year-old male patient (with blood group A) suffered from gastric ulcer for 18 years. The histopathological diagnosis of signet ring cell carcinoma was made by gastric biopsy. He was admitted to a university hospital. An open ulcer was endoscopically seen at the gastric angle. Gastric biopsy was repeated four times, but no cancerous lesions were identified. The initial gastric biopsy specimen was then reviewed, showing invasive (advanced) poorly differentiated adenocarcinoma. The pathologist strongly suspected specimen cross-contamination. Therefore, the blood typing was performed using formalin-fixed, paraffin-embedded biopsy specimens. Namely, blood group carbohydrate antigens type A, type B and type H were immunostained. The vascular endothelial cells were stained for type B antigen, but not for type A. This indicated that the ABO blood group of the patient with gastric cancer was type B. In order to confirm the specimen mix-up in the first clinic, the pathologist asked to check if gastric cancer patient to be mistaken for the diagnosis may be pointed out. They said that the biopsy was taken from a female patient aged 60 with advanced gastric cancer (Borrmann's type 4) in the same day, but the histopathological diagnosis was benign. Her blood type was B. The benign biopsy specimen was further blood typed immunohistochemically, and it showed blood group A. Eventually, cross-contamination of the specimens was proven. The stomach of this male patient was preserved without performing surgery. Blood typing for the histopathological specimens is quite effective to prove the specimen mix-up.

Ref.-1: Tsutsumi Y. How to judge the laboratory data. *Medicina* 1989; 26(4): 692-693 (in Japanese),

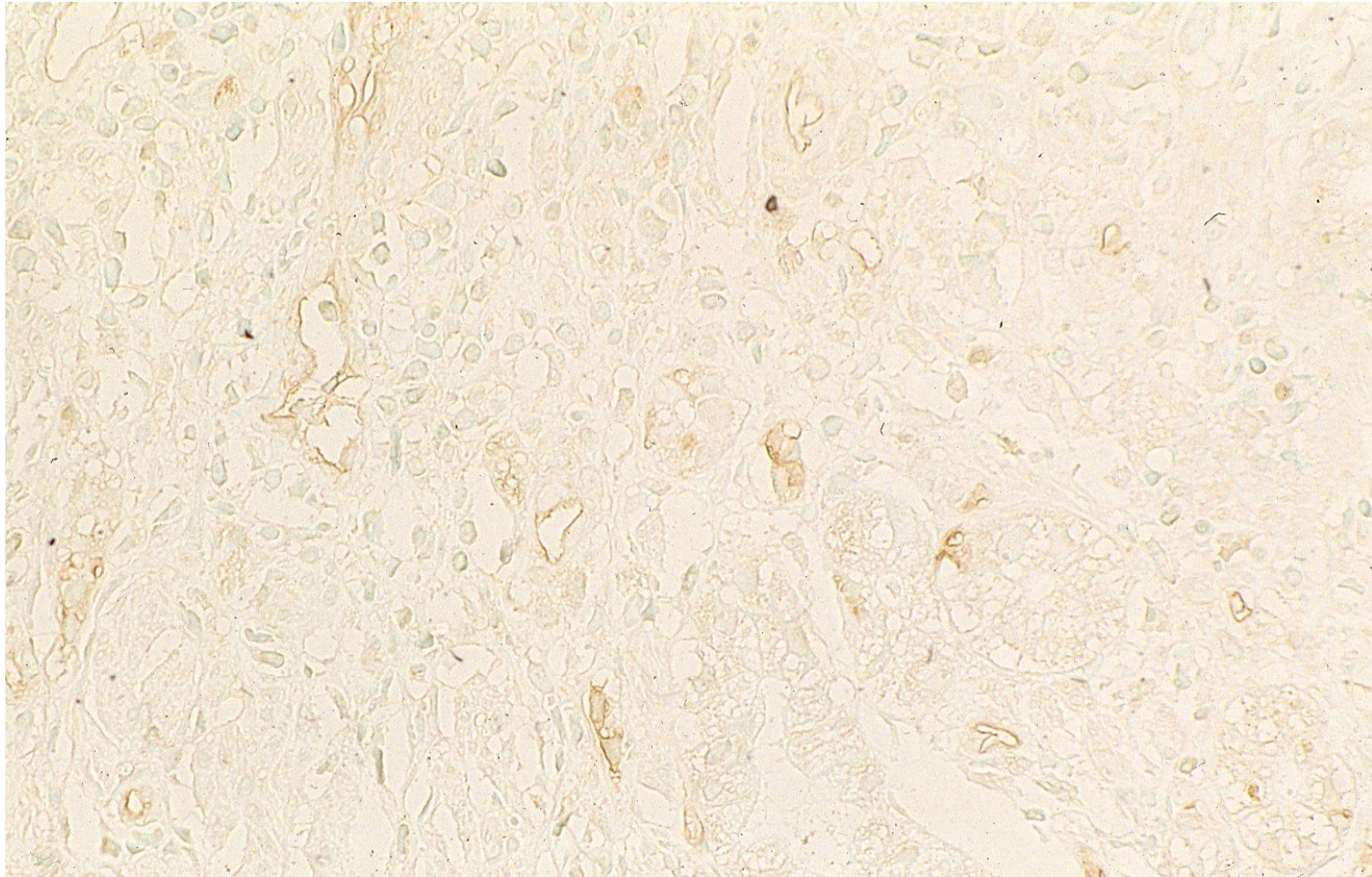
Ref.-2: Tsutsumi Y. Pitfalls and caveats in applying chromogenic immunostaining to histopathological diagnosis. *Cells* 2021, 10: 1501. doi: 10.3390/cells10061501



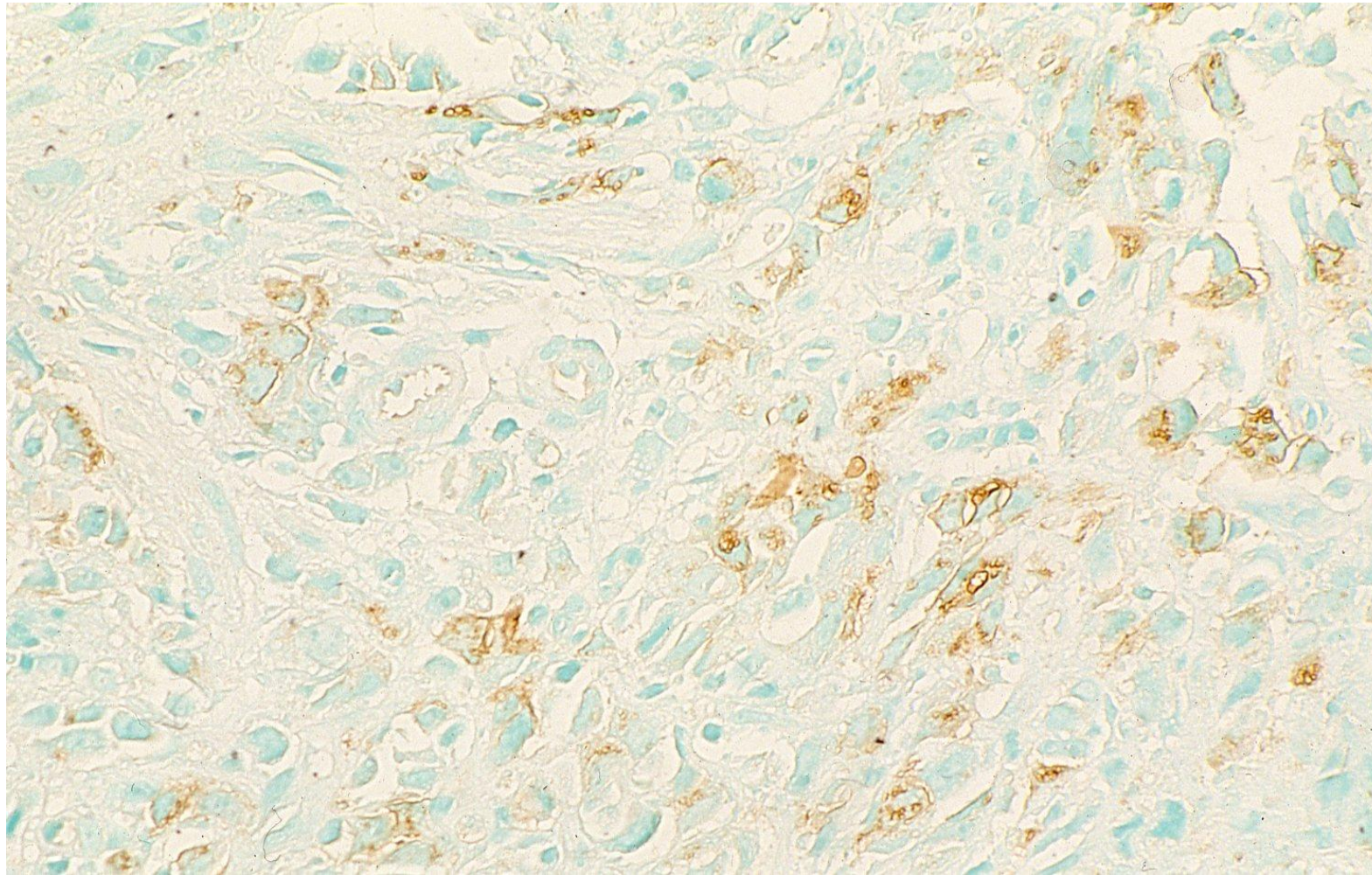
The gastric biopsy specimen in the first clinic shows submucosally invading poorly differentiated adenocarcinoma with signet ring-type cancer cells. H&E-1



The gastric biopsy specimen in the first clinic shows submucosally invading poorly differentiated adenocarcinoma with signet ring-type cancer cells. H&E-2



Blood typing for the gastric biopsy specimen in the first clinic. The vascular endothelial cells express type B carbohydrate antigen, but type A antigen is negative. The cancer cells are not stained. Immunostaining for blood group type B



Blood typing for the gastric biopsy specimen in the first clinic. The cancer cells are immunostained for blood group H antigen. Type H antigen is a precursor molecule for types A and B antigens. Immunostaining for blood group type H