Gastrointestinal Mesenchymal Lesions – Some Favorites

Elizabeth Montgomery, MD

University of Miami Miller School of Medicine

Vice Chair, Academic Development

Disclosures

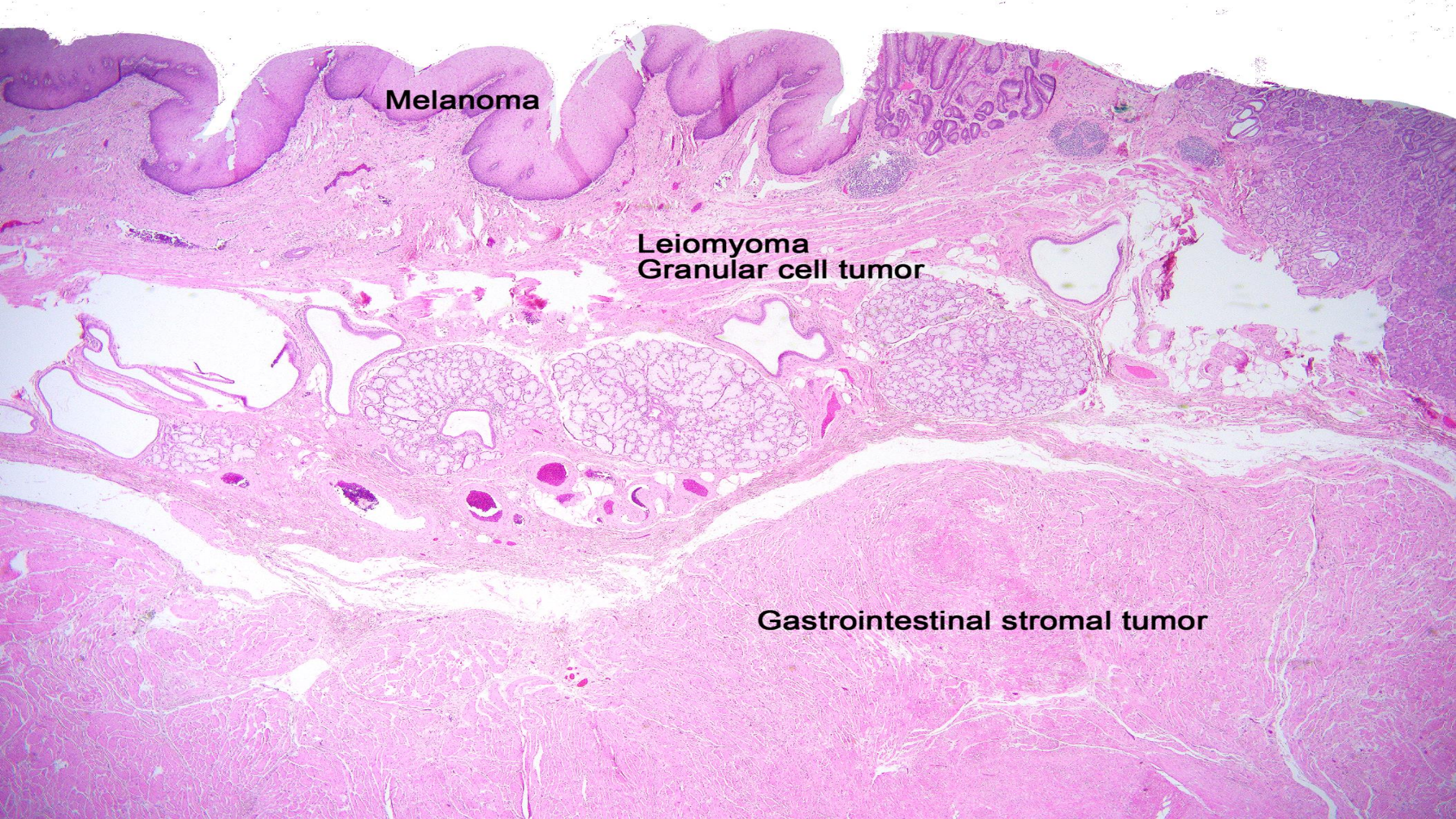
- Consultation for Olympus
- Consultant for Johnson and Johnson
- Consultant for Merck
- Received honorarium and travel expense money from ARUP Laboratories

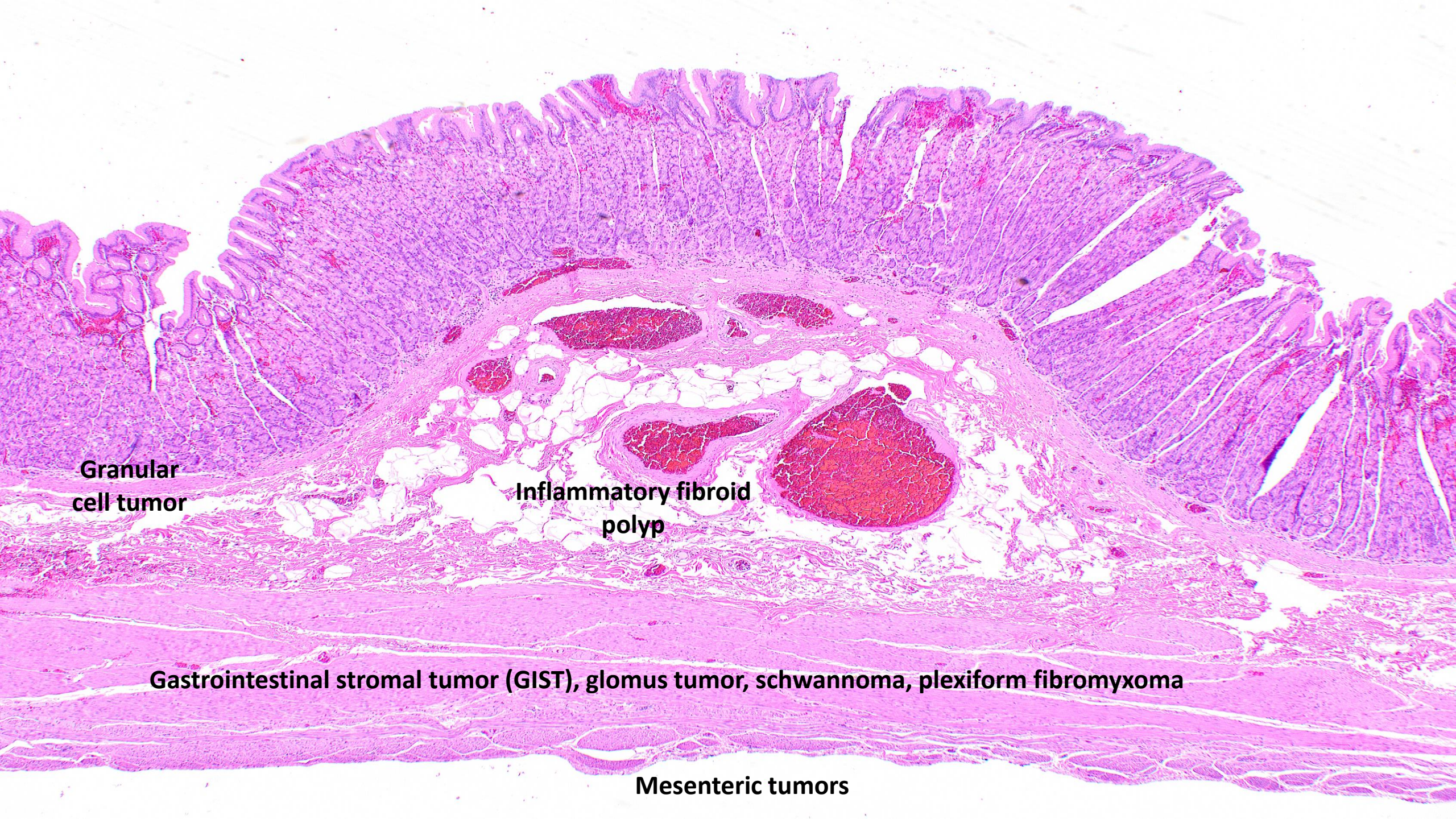
Objectives

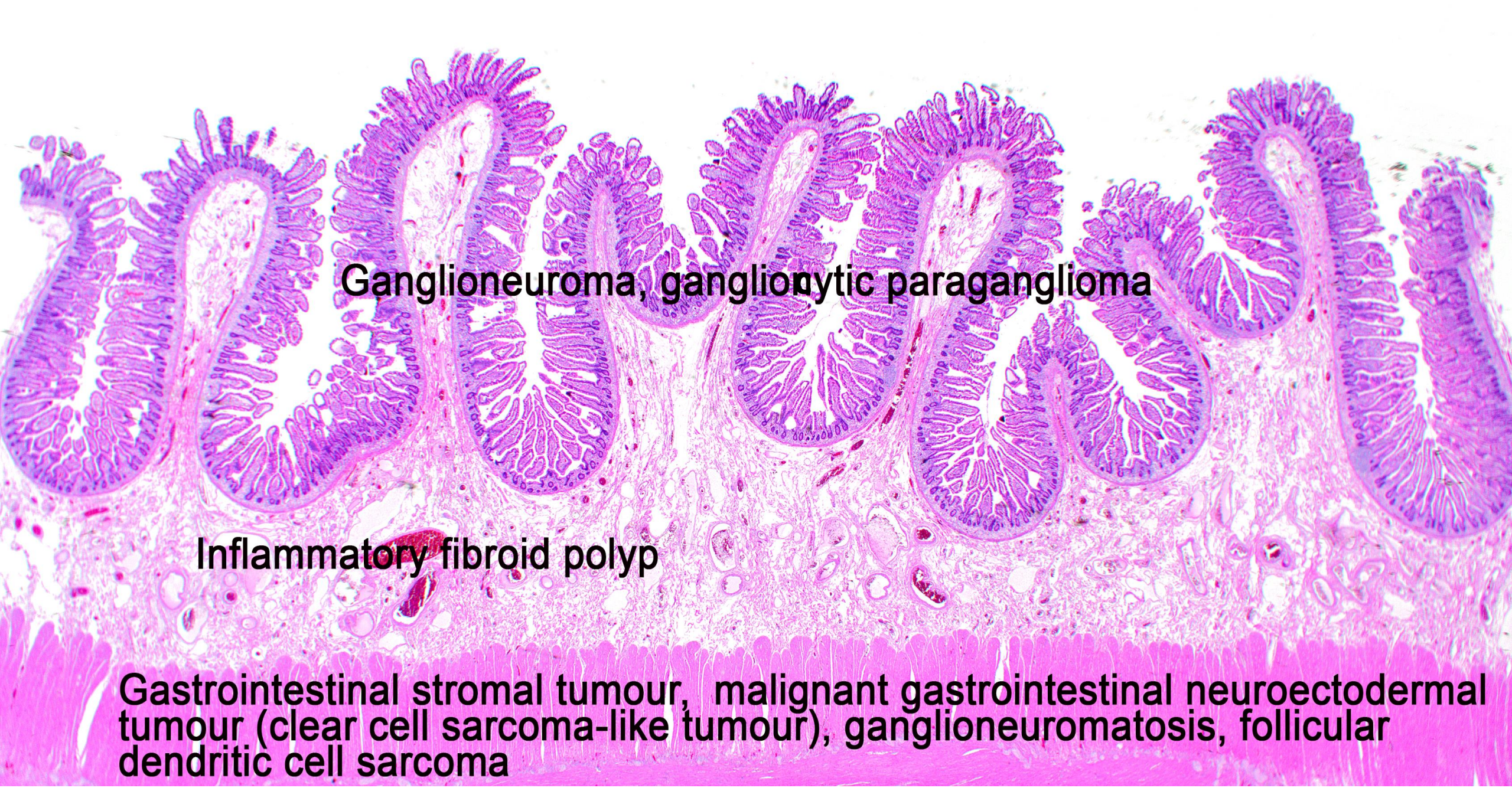
- To discuss the layers of the GI tract in which GI mesenchymal tumors tend to arise.
- To discuss several types of GI mesenchymal tumors, with emphasis on their location and depth in the GI tract.
- To comment on some “exotic” lesions that may be encountered

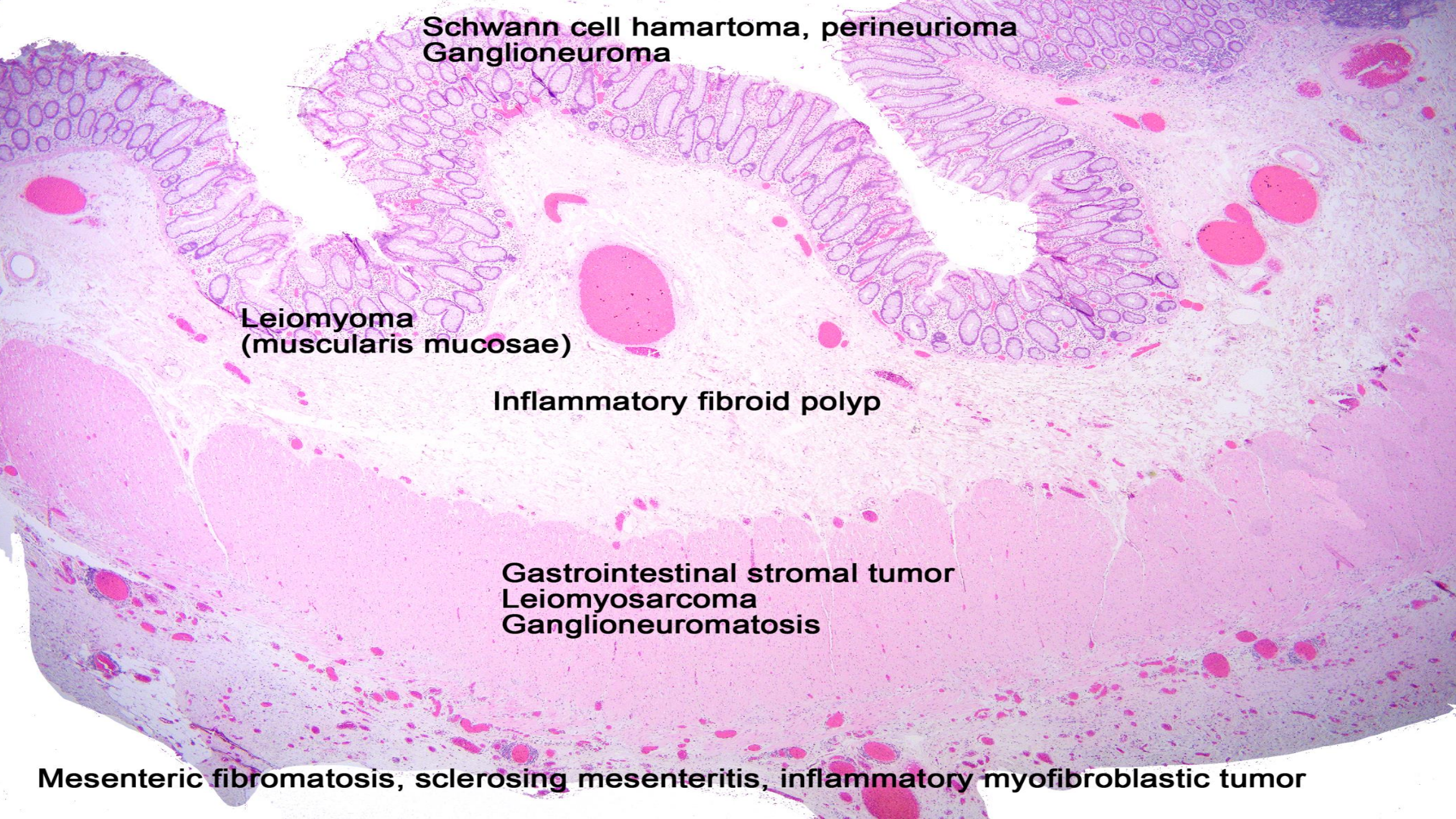
The Secret

- Diagnosing GIT mesenchymal tumors is really about knowing which tumors live in which layers
- For example, inflammatory fibroid polyp (with *PDGFRA* mutations) is in the submucosa whereas GIST (also with *PDGFRA* mutations) is in the muscularis propria


Melanoma
Leiomyoma
Granular cell tumor
Gastrointestinal stromal tumor


Granular
cell tumor
Inflammatory fibroid
polyp
Gastrointestinal stromal tumor (GIST), glomus tumor, schwannoma, plexiform fibromyxoma
Mesenteric tumors

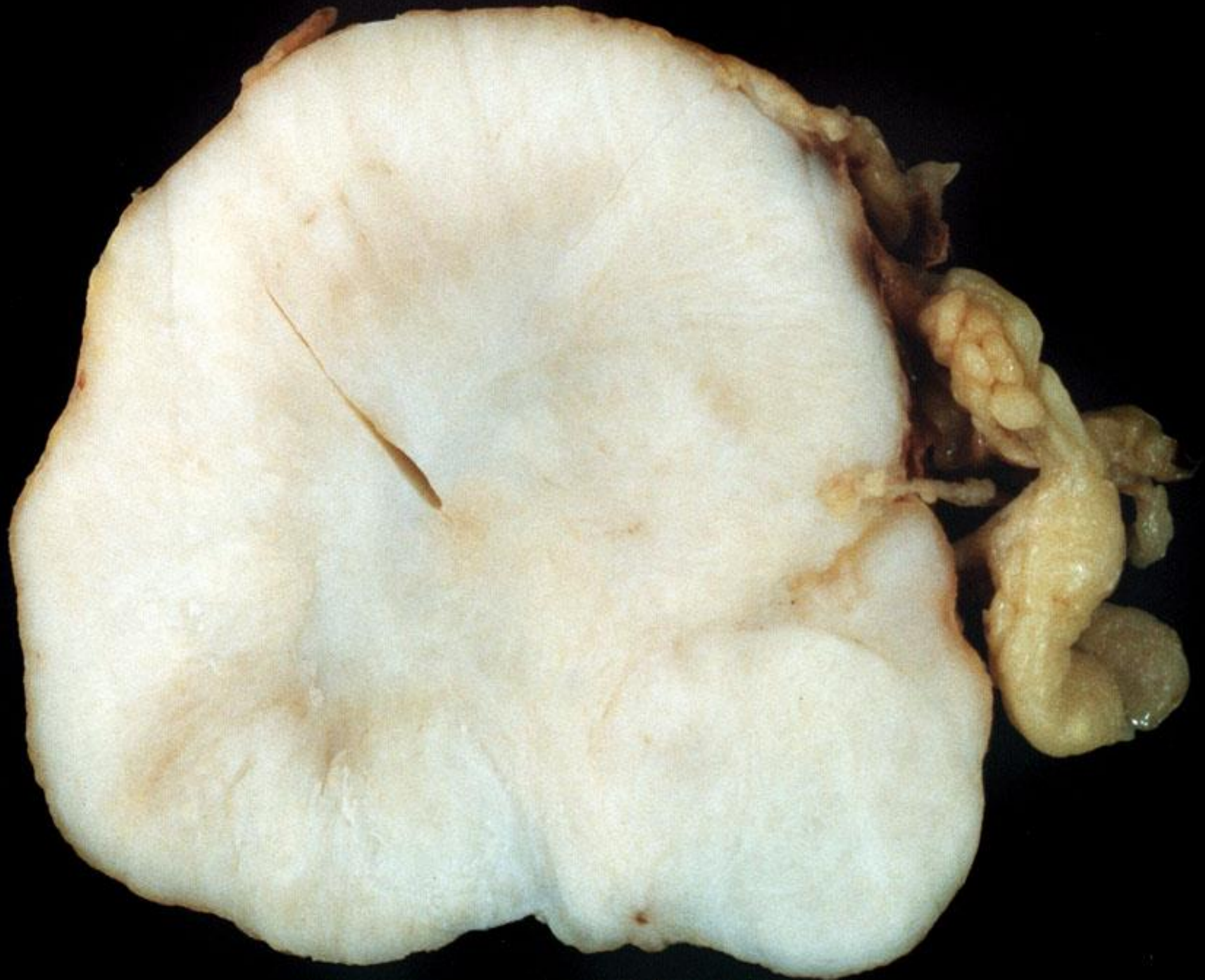


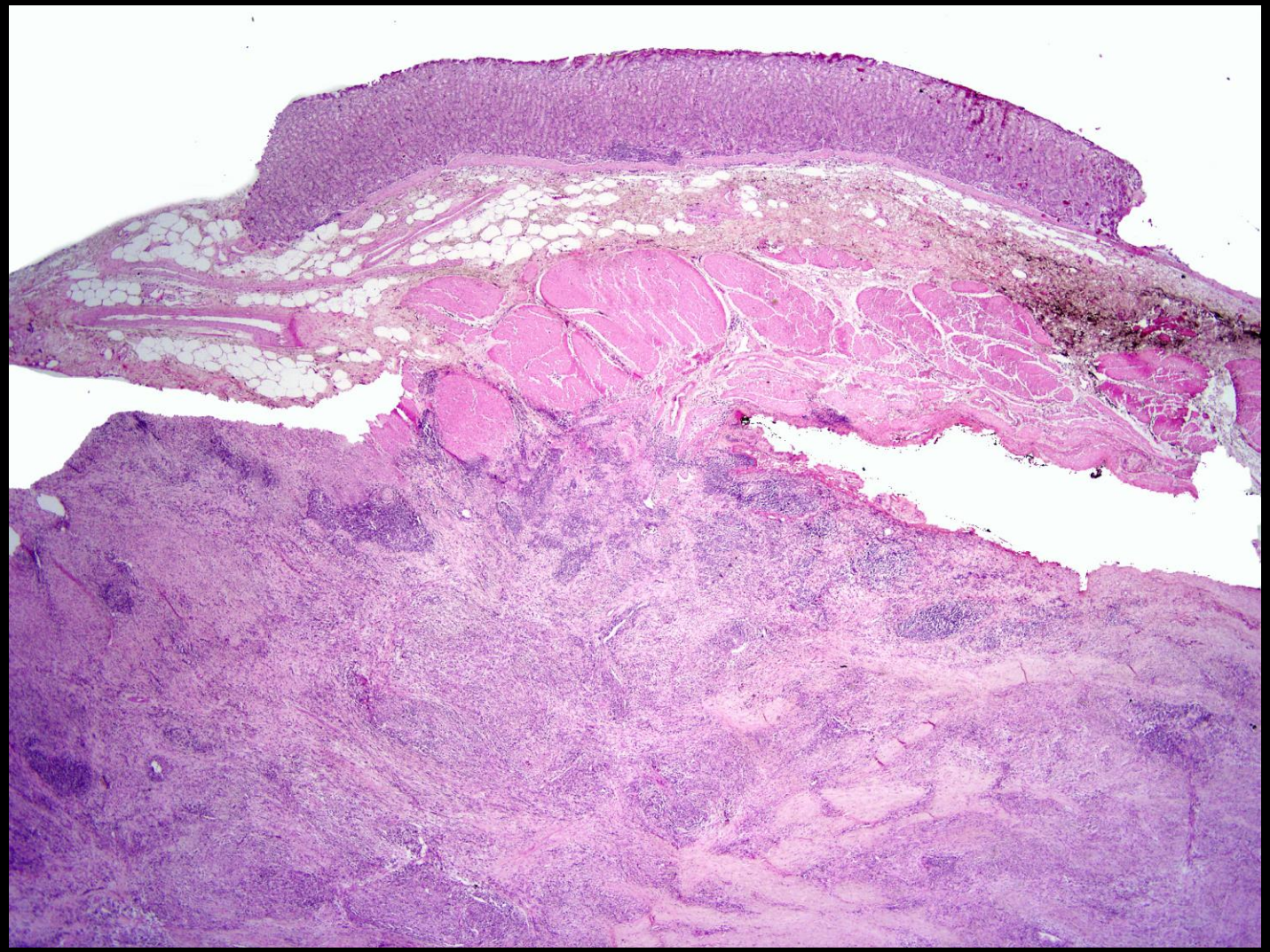

Schwann cell hamartoma, perineurioma
Ganglioneuroma
Leiomyoma
(muscularis mucosae)
Inflammatory fibroid polyp
Gastrointestinal stromal tumor
Leiomyosarcoma
Ganglioneuromatosis
Mesenteric fibromatosis, sclerosing mesenteritis, inflammatory myofibroblastic tumor

Mesentery

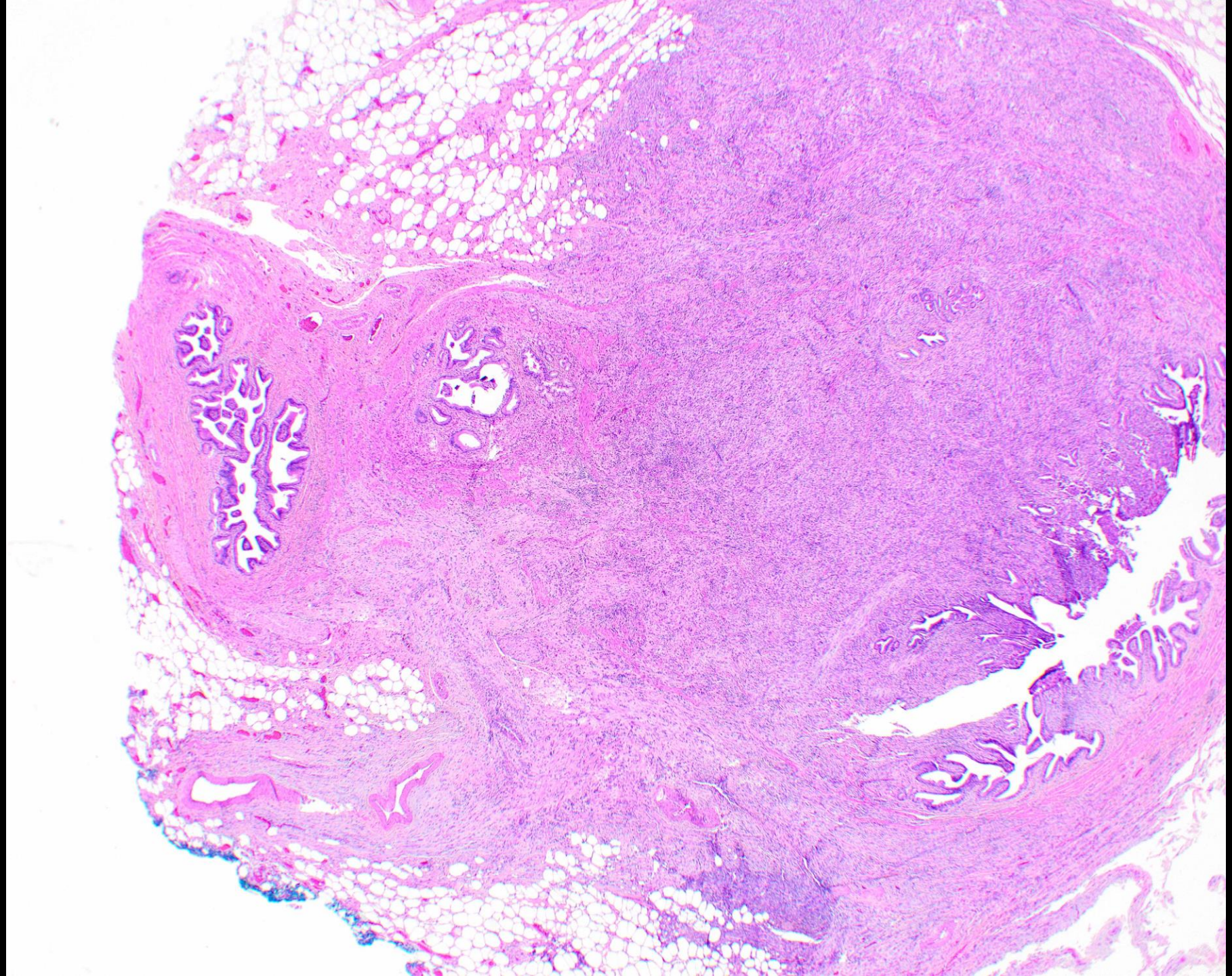
Inflammatory Myofibroblastic Tumor (IMT)

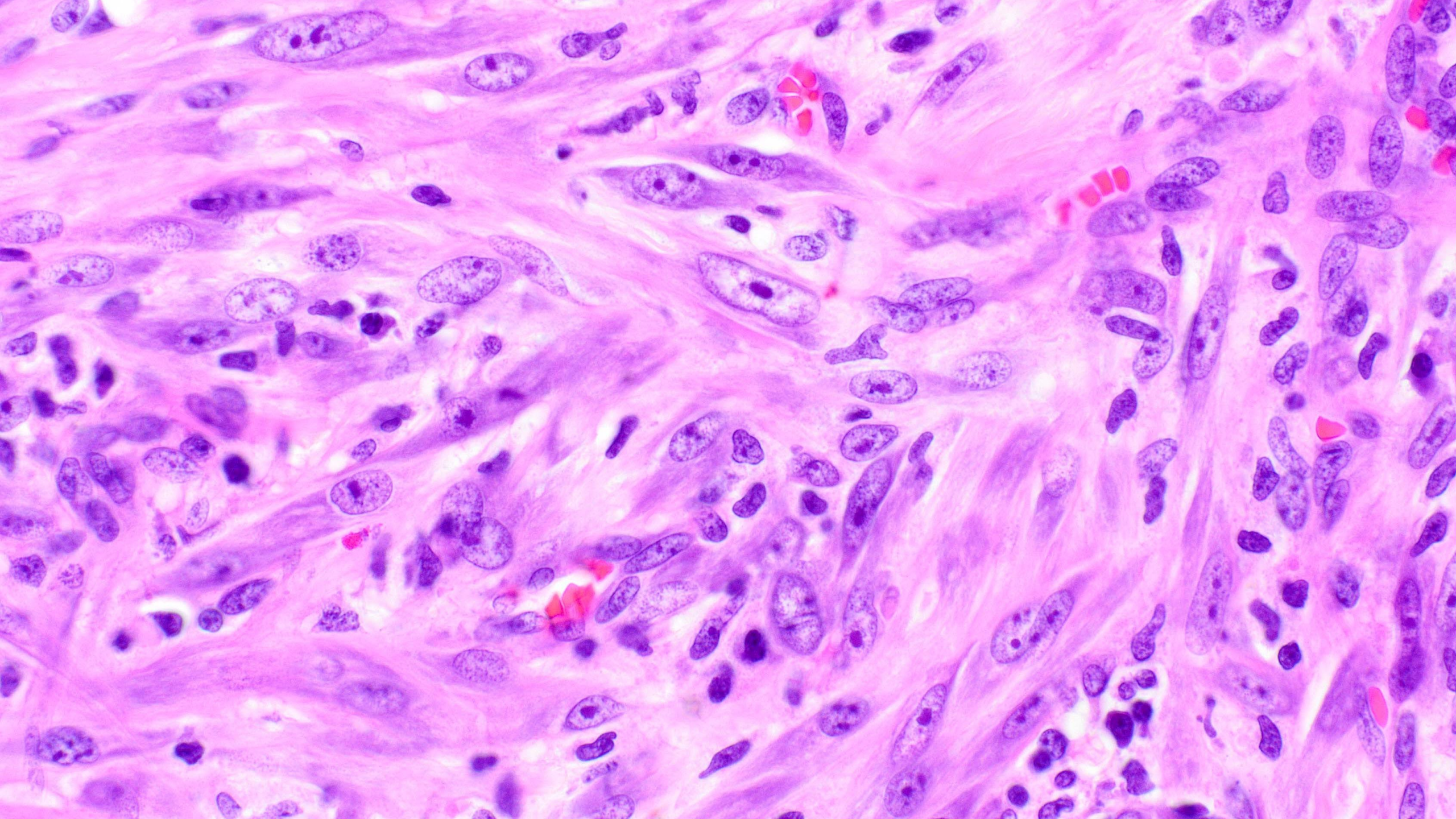
- Pulmonary lesions called “inflammatory pseudotumor” have been recognized for many years and regarded as part of a spectrum of lesions called “plasma cell granulomas”
- Subsequently, similar tumors were described in the abdomen and other soft tissue sites.





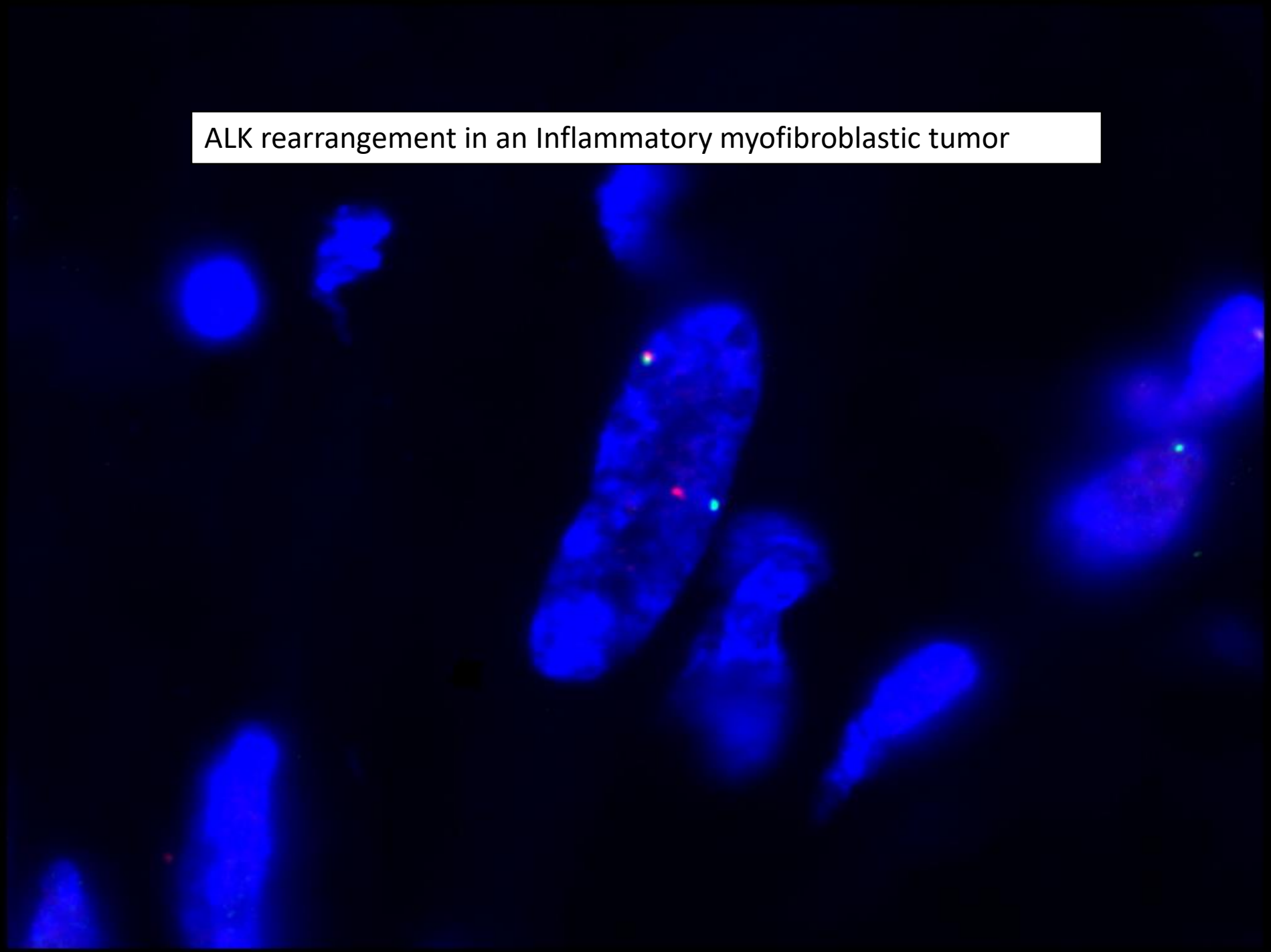
Inflammatory Myofibroblastic Tumor [Extrapulmonary

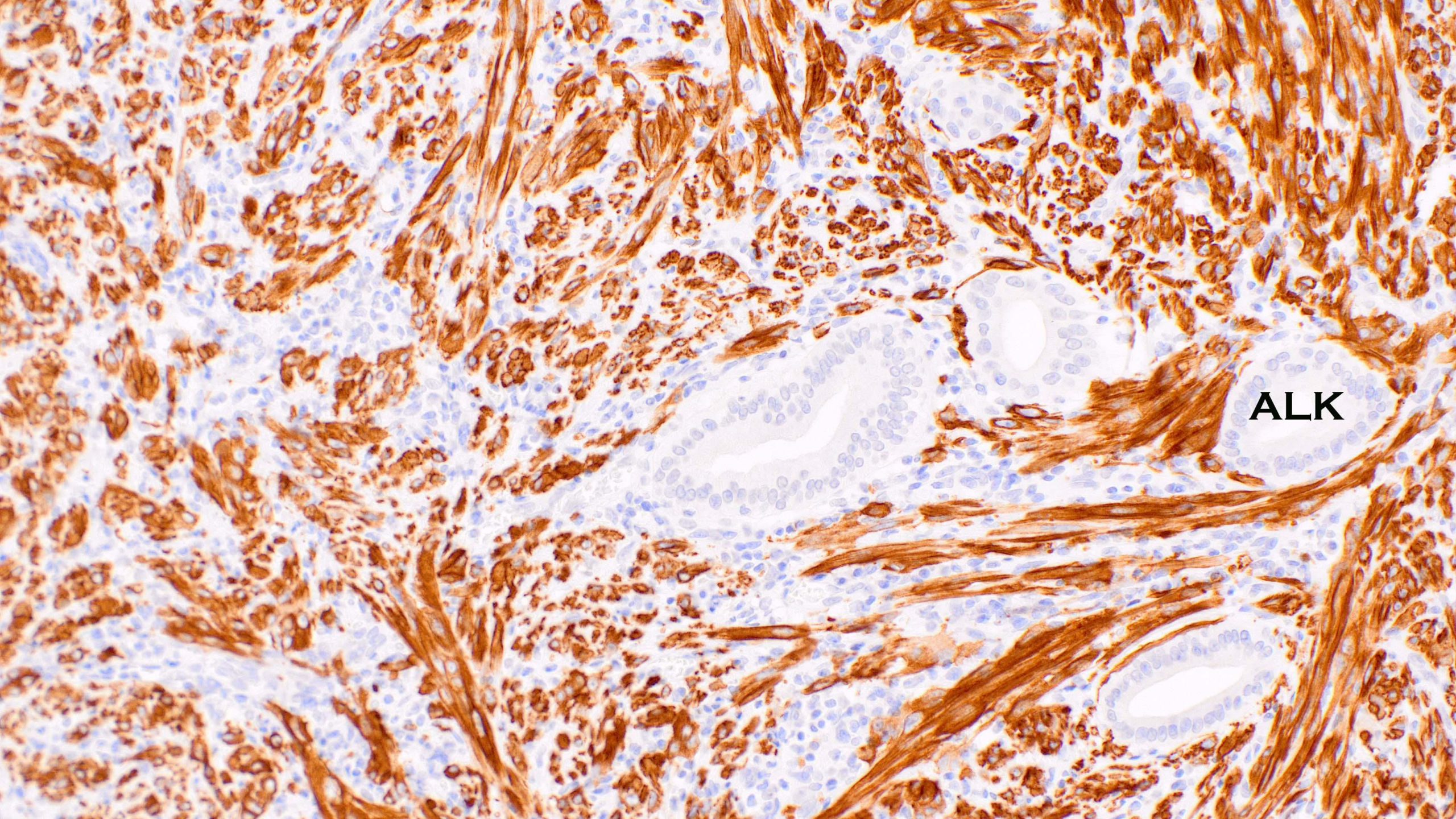




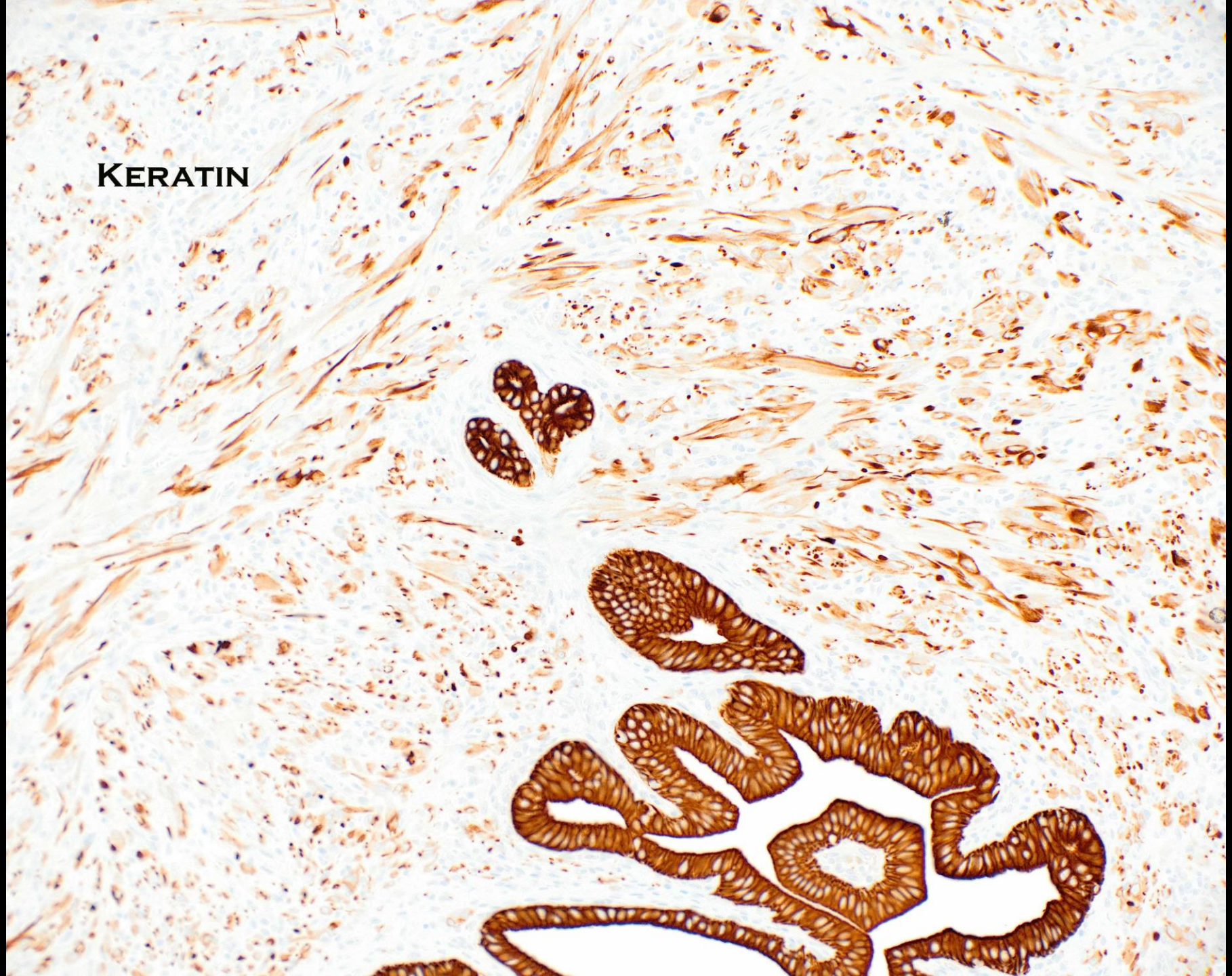
IMT; Important Discovery

- **Griffin et al [1999] reported 3 IMT with rearrangements at 2p23 involving *ALK* gene**
- **Subsequently, *ALK* shown to be rearranged in a subset of IMTs from many sites**
- **Identified partners including *CLTC* , *RANBP2*, *TPM3* , *TPM4* , *CARS* *ATIC*, and**


ALK rearrangement in an Inflammatory myofibroblastic tumor


ALK

IMT – Pitfall alert



Targeted Therapy

- Crizotinib (PF-02341066, Pfizer) - orally bioavailable, ATP-competitive, small-molecule inhibitor of the receptor tyrosine kinases (RTKs) c-Met (also known as hepatocyte growth factor receptor) and anaplastic lymphoma kinase (ALK)
- Used in lung cancer (about 5% of lung cancers have *ALK* rearrangements) and now IMT!!!
- Butrynski JE, D'Adamo DR, Hornick JL, Dal Cin P, Antonescu CR, Jhanwar SC, Ladanyi M, Capelletti M, Rodig SJ, Ramaiya N, Kwak EL, Clark JW, Wilner KD, Christensen JG, Jänne PA, Maki RG, Demetri GD, Shapiro GI. Crizotinib in ALK-rearranged inflammatory myofibroblastic tumor. N Engl J Med. 2010 Oct 28;363(18):1727-33.
- Ceritinib, Alectinib are newer agents

More Targets for IMT

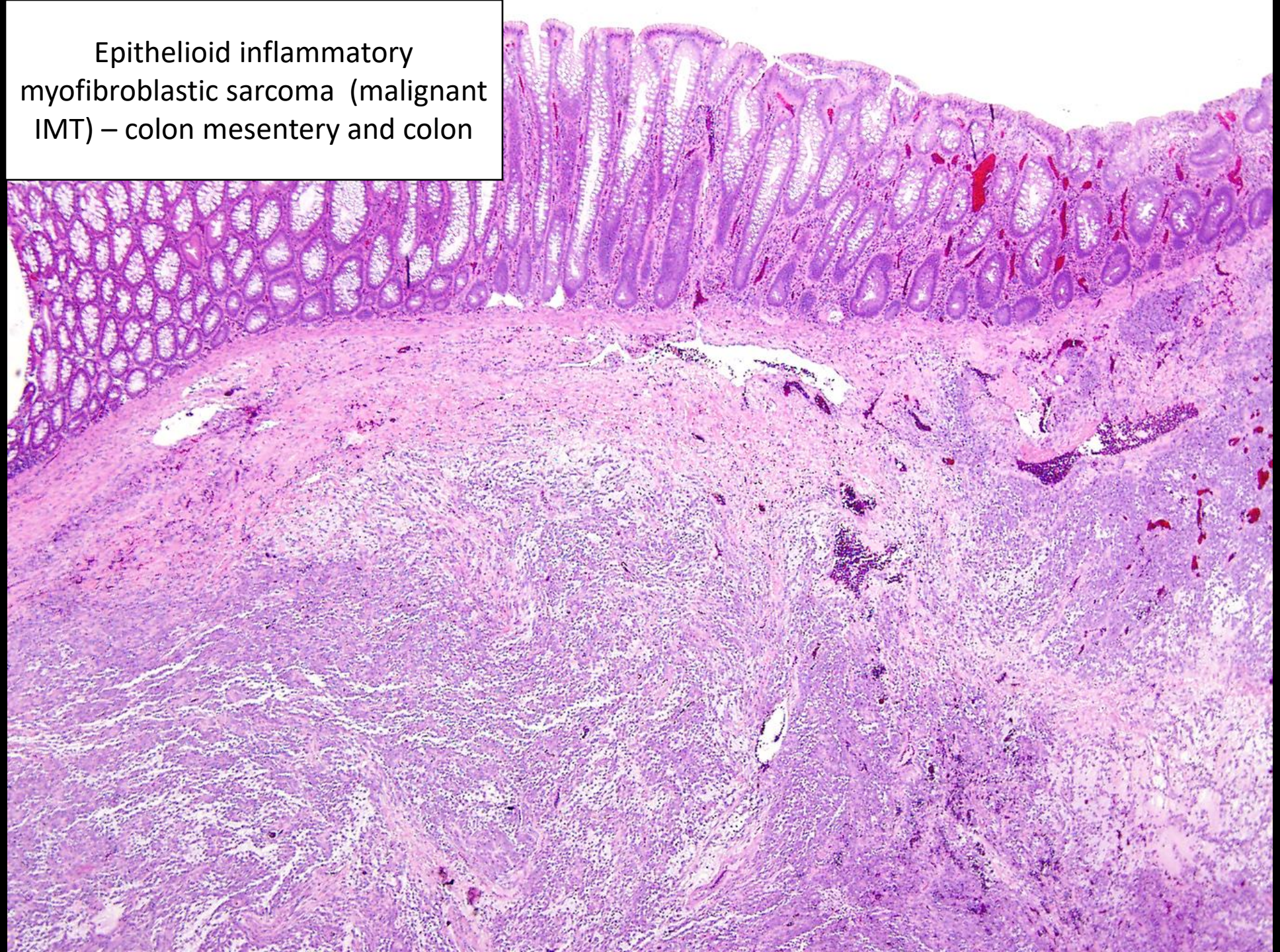
- There are *ROS1* rearrangements as well as *ALK* ones.
- *ROS1* more likely in children (also targetable with the same compounds as *ALK*)
- *ETV6::NTRK3* in some ALK negative IMTs – also targetable

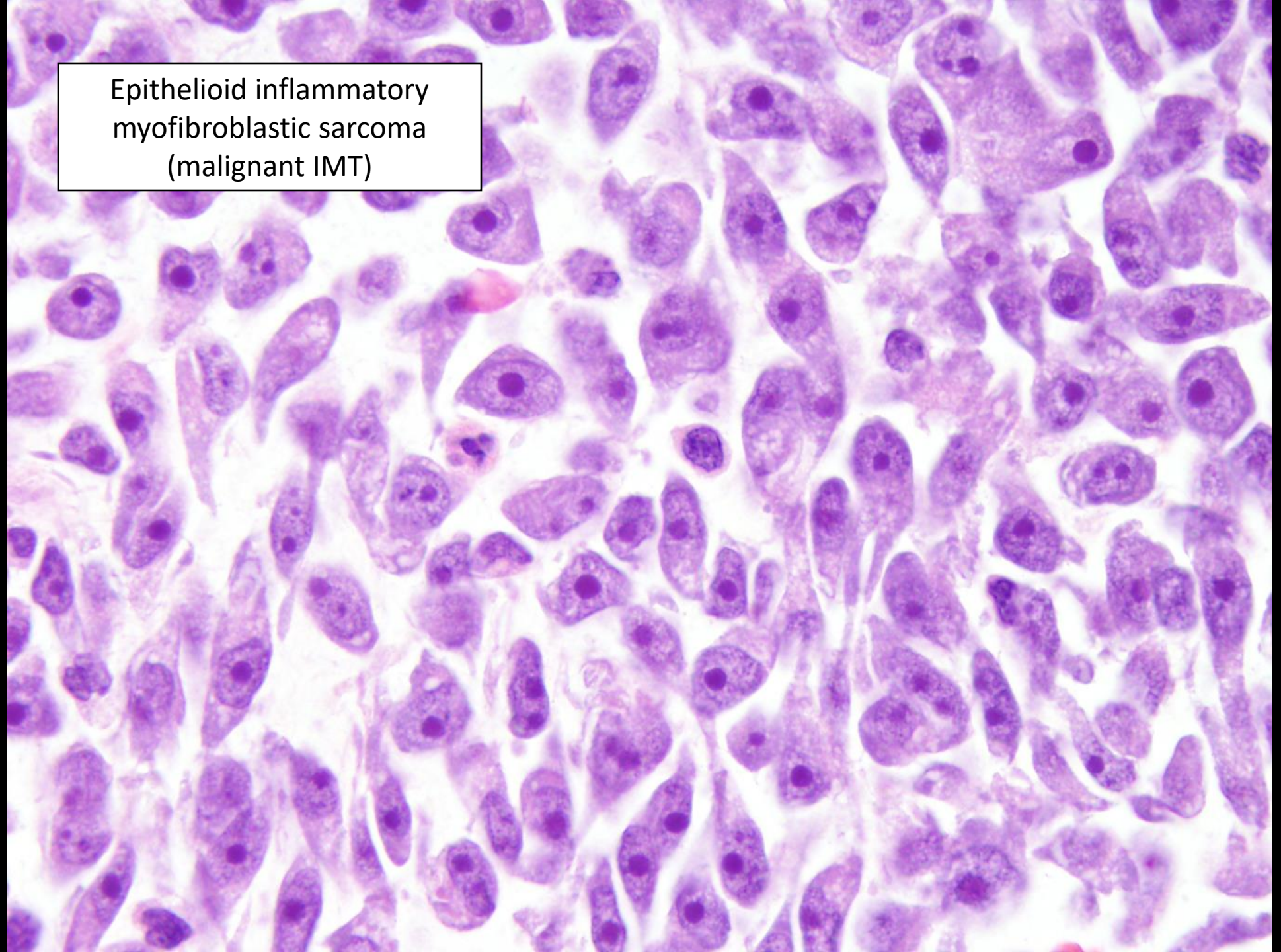
High grade form of IMT

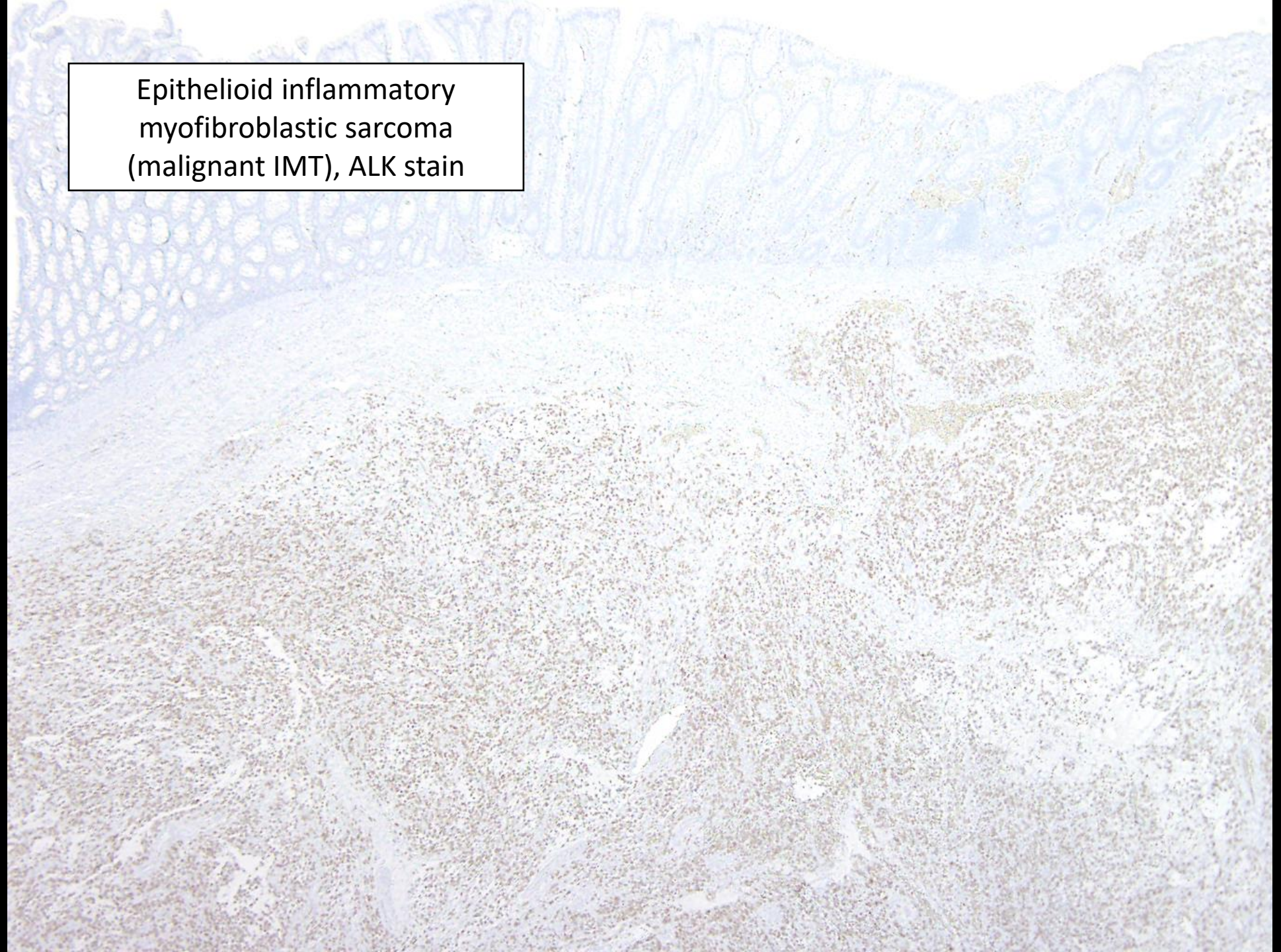
- Termed epithelioid inflammatory myofibroblastic sarcoma
- Appears similar to epithelioid leiomyosarcoma (and probably some old “epithelioid leiomyosarcomas” are these)
- Can have an unusual ALK pattern on immunolabeling
- Some response to targeted therapy then the tumor loses responsiveness

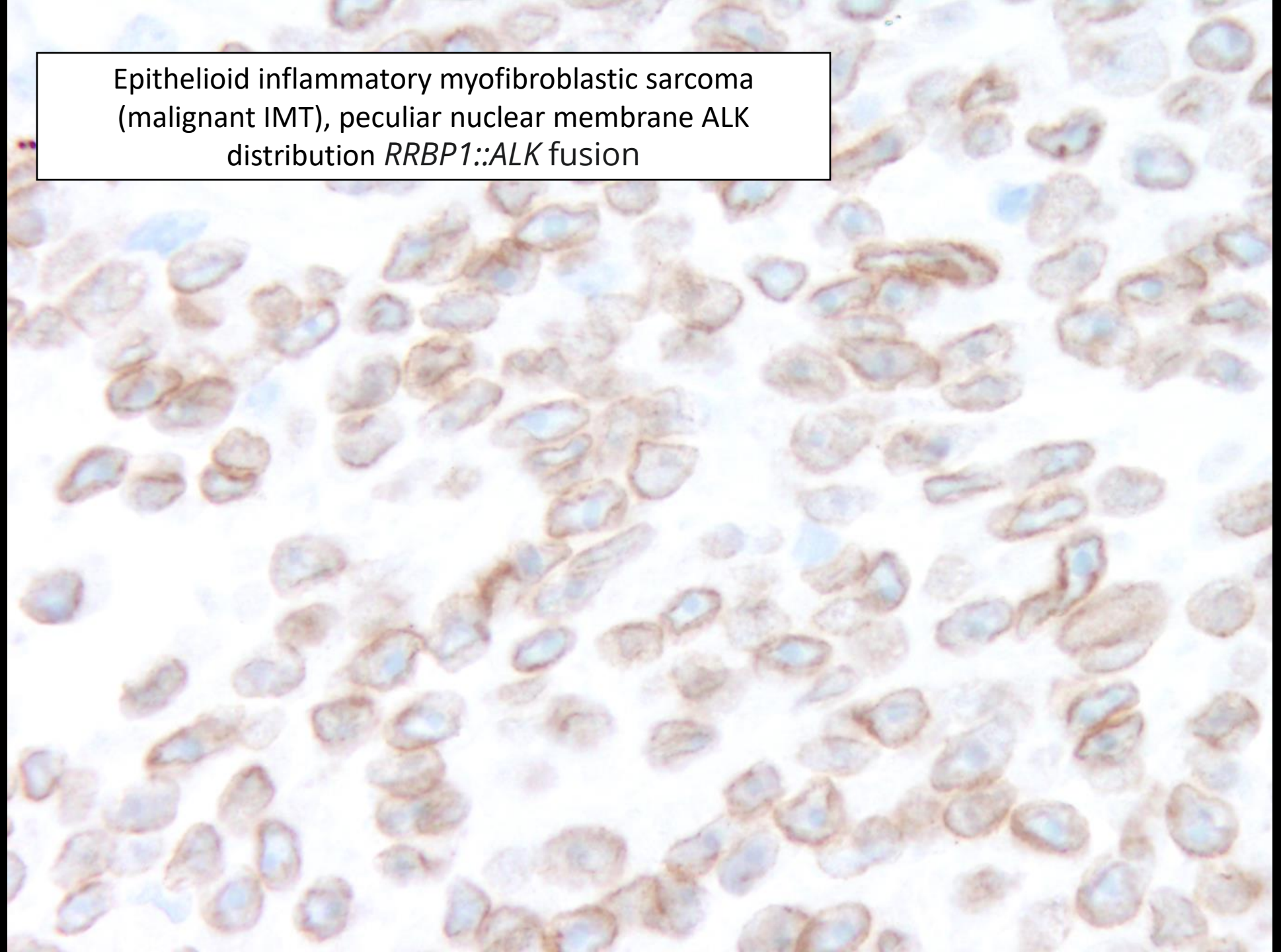
- Mariño-Enríquez A, Wang WL, Roy A, Lopez-Terrada D, Lazar AJ, Fletcher CD, Coffin CM, Hornick JL. Epithelioid inflammatory myofibroblastic sarcoma: An aggressive intra-abdominal variant of inflammatory myofibroblastic tumor with nuclear membrane or perinuclear ALK. Am J Surg Pathol. 2011 Jan;35(1):135-44.

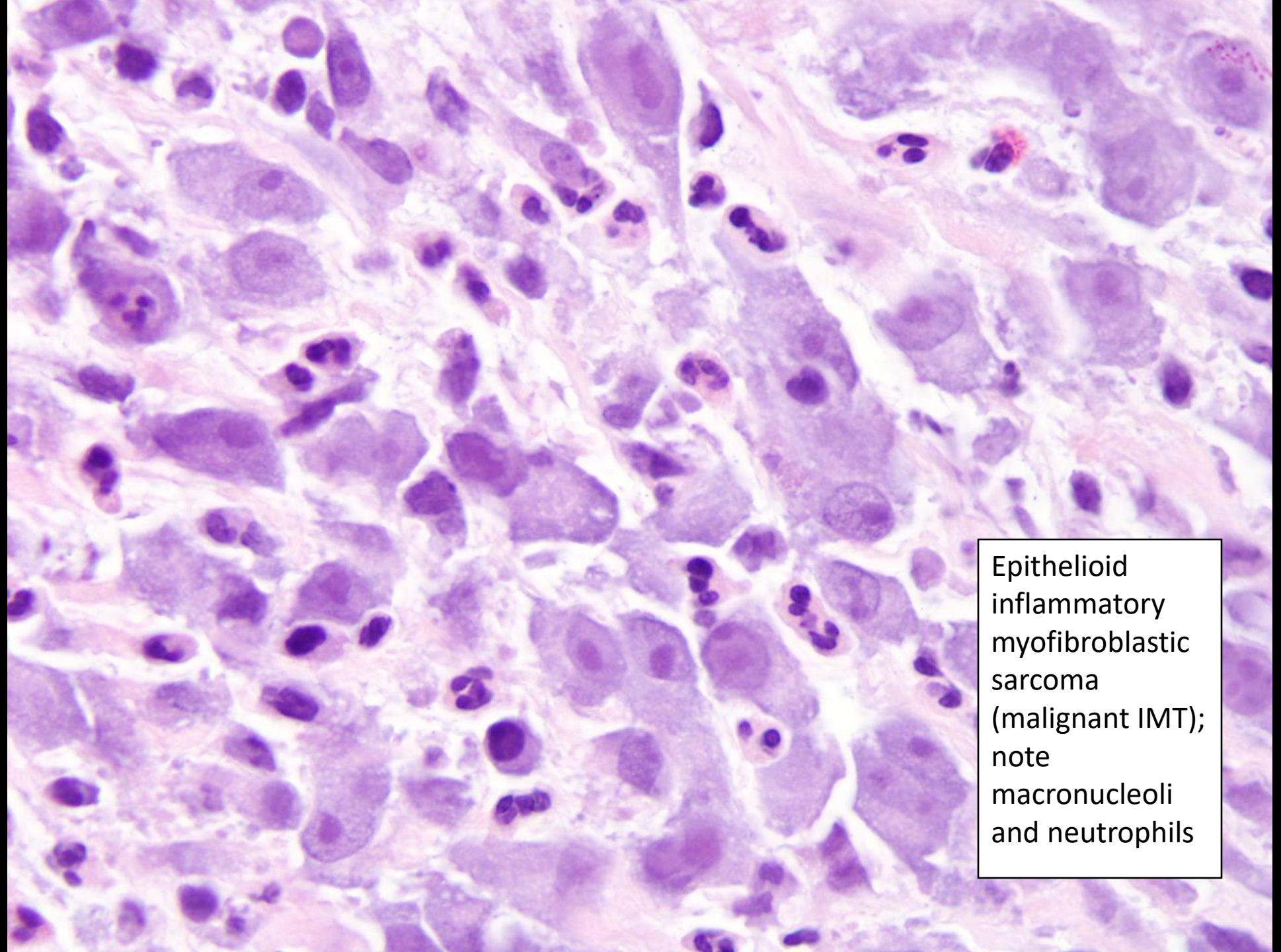
Epithelioid inflammatory myofibroblastic sarcoma (malignant IMT) – colon mesentery and colon

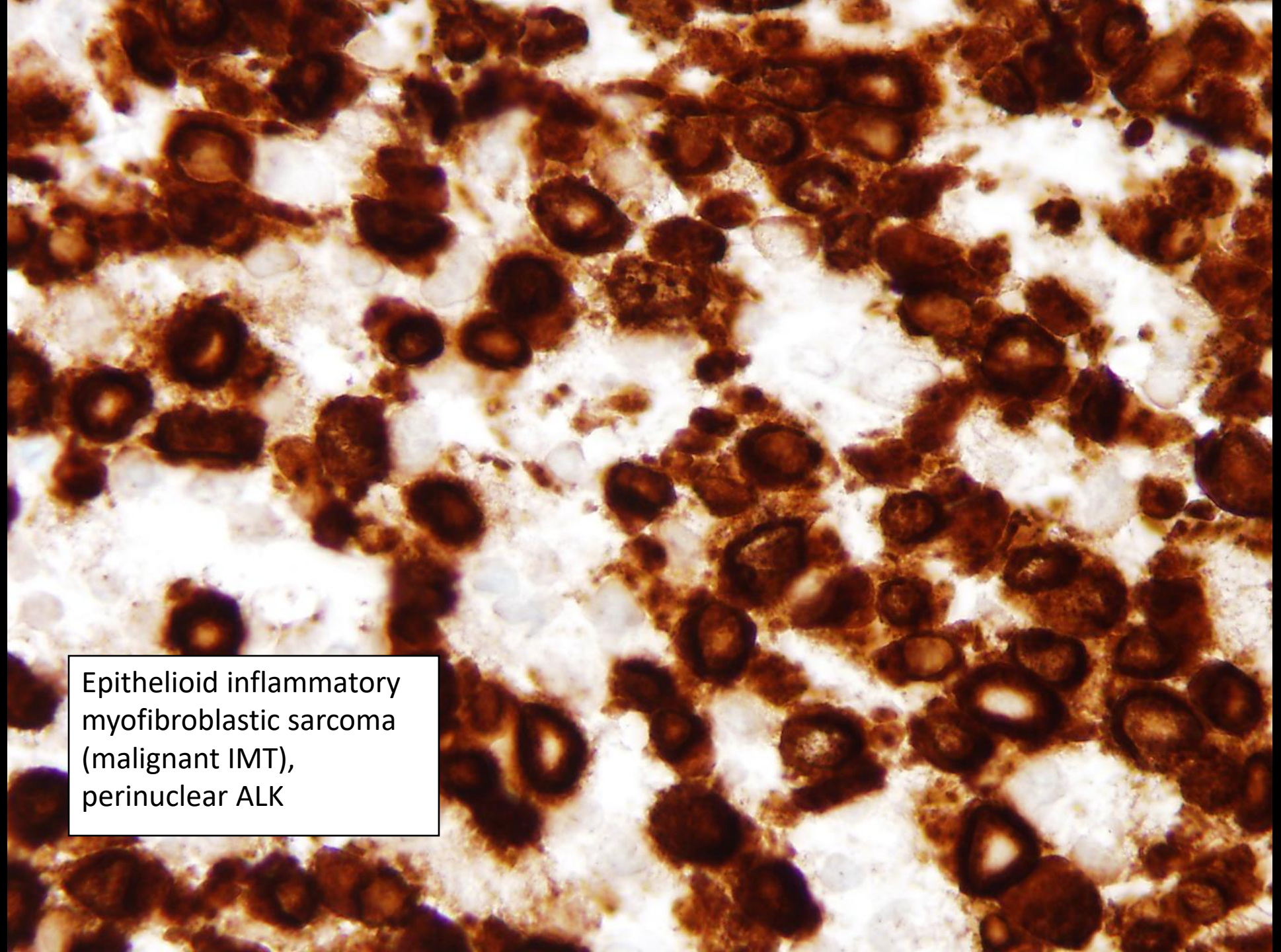



Epithelioid inflammatory
myofibroblastic sarcoma
(malignant IMT)


Epithelioid inflammatory
myofibroblastic sarcoma
(malignant IMT), ALK stain


Epithelioid inflammatory myofibroblastic sarcoma (malignant IMT), peculiar nuclear membrane ALK distribution *RRBP1::ALK* fusion


Epithelioid inflammatory myofibroblastic sarcoma (malignant IMT); note macronucleoli and neutrophils


Epithelioid inflammatory myofibroblastic sarcoma (malignant IMT), perinuclear ALK

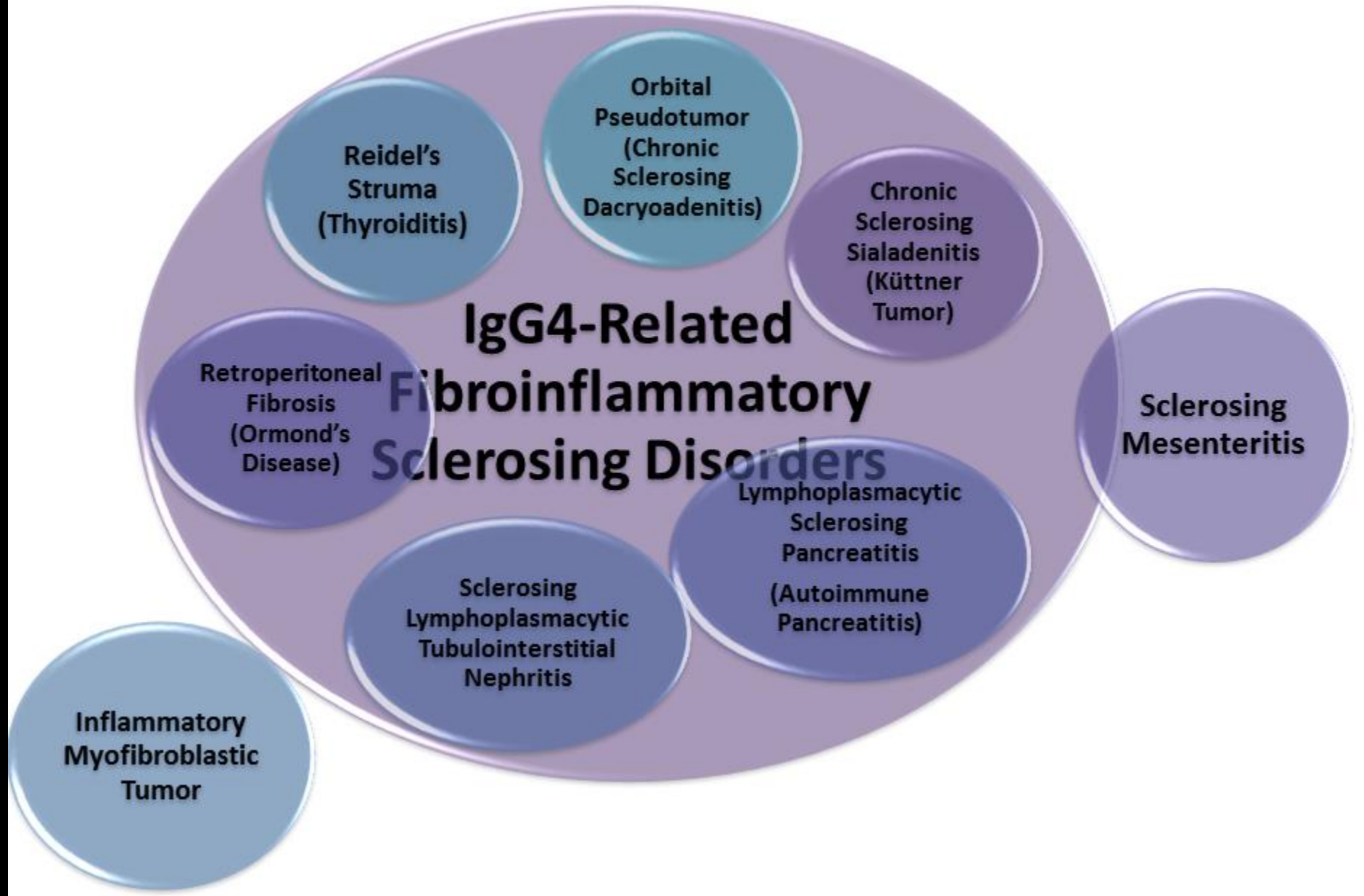
So let’s all get ready to target these lesions!

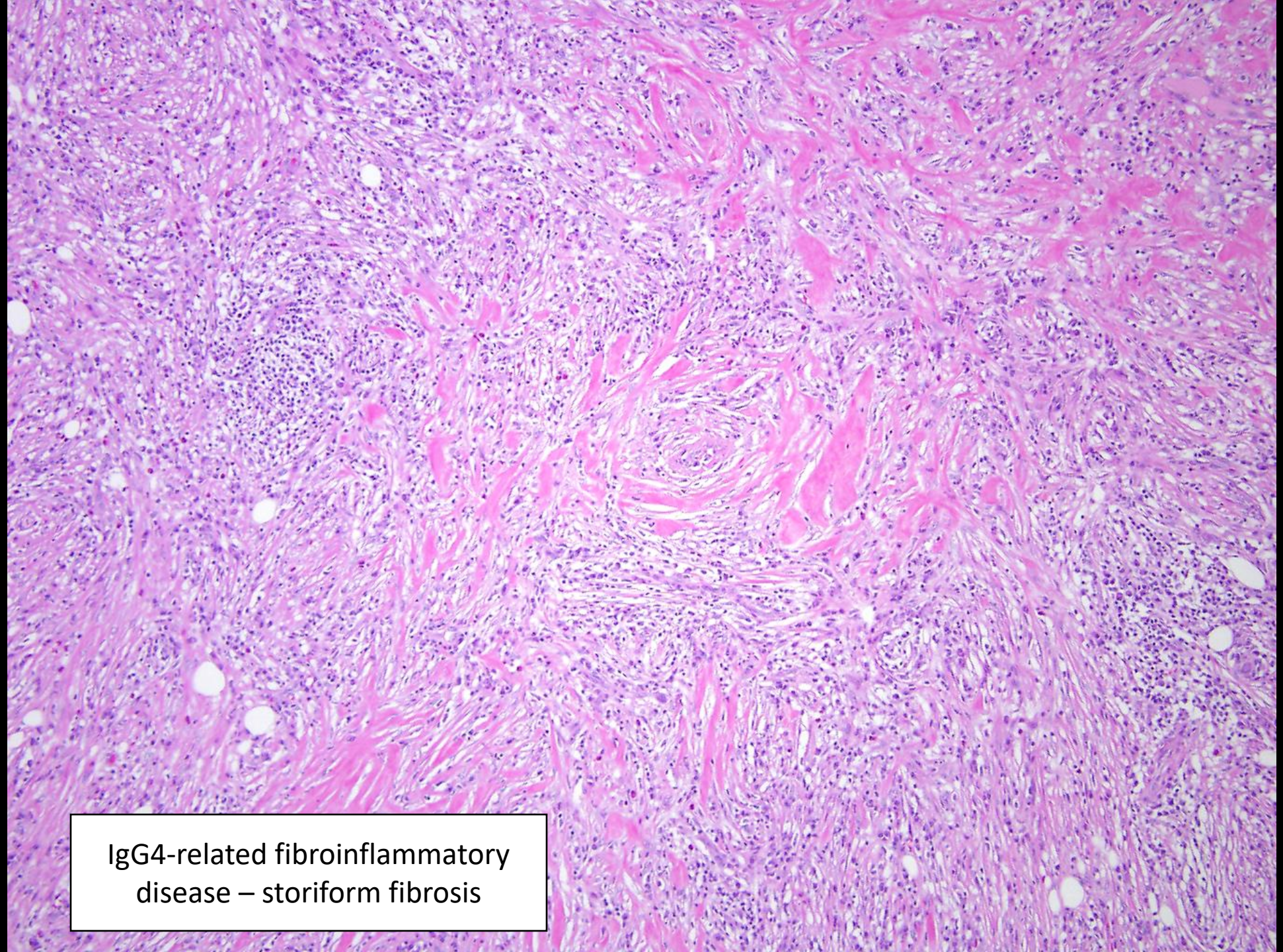
An Aside

IgG4-related disease

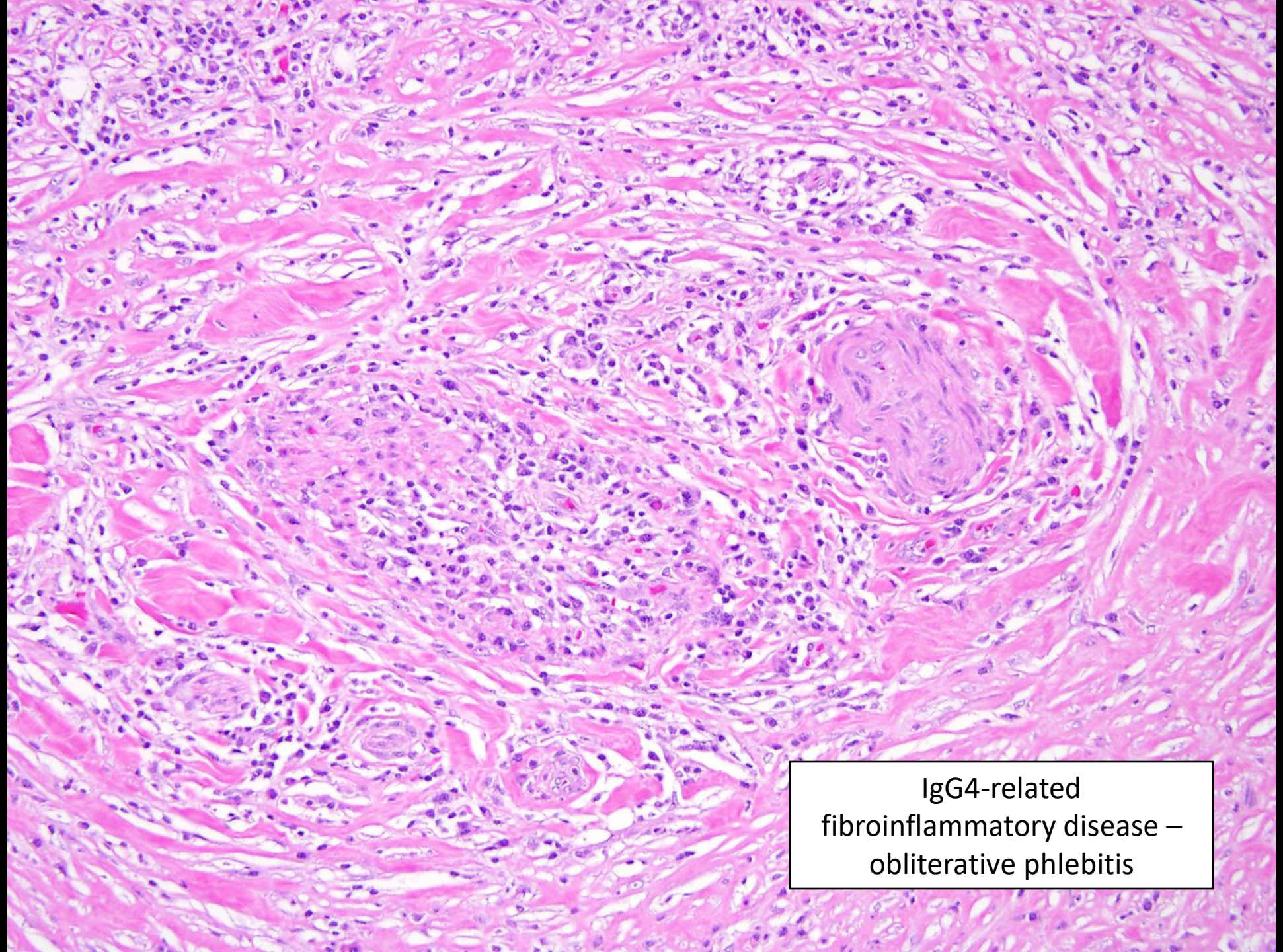
- Remains poorly understood
- Steroid-responsive
- Overlap with other immune disease
- IgG4 can also be found associated with other conditions that are malignant or infectious so important to insist on the histology criteria before managing with steroids

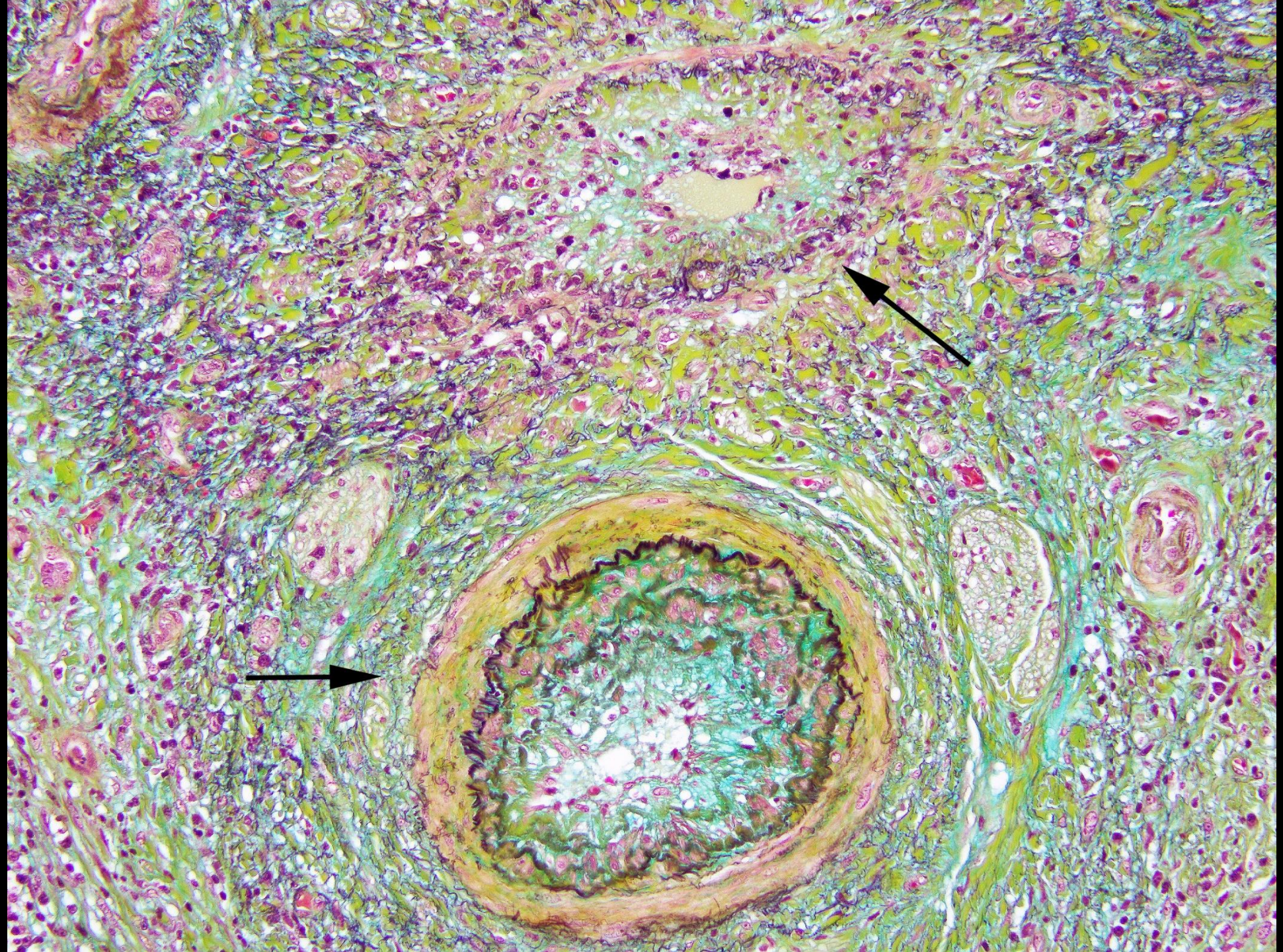
- Ref; Wallace ZS, Naden RP, Chari S, et al. The 2019 American College of Rheumatology/European League Against Rheumatism Classification Criteria for IgG4-Related Disease. *Arthritis Rheumatol*. 2020;72(1):7-19.


IgG4-Related Fibroinflammatory Sclerosing Disorders
Reidel's Struma (Thyroiditis)
Orbital Pseudotumor (Chronic Sclerosing Dacryoadenitis)
Chronic Sclerosing Sialadenitis (Küttner Tumor)
Retroperitoneal Fibrosis (Ormond's Disease)
Sclerosing Mesenteritis
Lymphoplasmacytic Sclerosing Pancreatitis (Autoimmune Pancreatitis)
Sclerosing Lymphoplasmacytic Tubulointerstitial Nephritis
Inflammatory Myofibroblastic Tumor



IgG4-related fibroinflammatory disease – storiform fibrosis


IgG4-related
fibroinflammatory disease –
obliterative phlebitis



What causes it?

- No one knows
- Presumably a peculiar immune condition – trigger unknown
- Studies currently strictly observations
- ? Link to H. pylori - Frulloni L, Lunardi C, Simone R, Dolcino M, Scattolini C, Falconi M, Benini L, Vantini I, Corrocher R, Puccetti A. Identification of a novel antibody associated with autoimmune pancreatitis. N Engl J Med. 2009 Nov 26;361(22):2135-42.)
- ?Laminin - Shiokawa M, Kodama Y, Sekiguchi K, Kuwada T, Tomono T, Kuriyama K, Yamazaki H, Morita T, Marui S, Sogabe Y, Kakiuchi N, Matsumori T, Mima A, Nishikawa Y, Ueda T, Tsuda M, Yamauchi Y, Sakuma Y, Maruno T, Uza N, Tsuruyama T, Mimori T, Seno H, Chiba T. Laminin 511 is a target antigen in autoimmune pancreatitis. Sci Transl Med. 2018 Aug 8;10(453). PubMed PMID: 30089633.

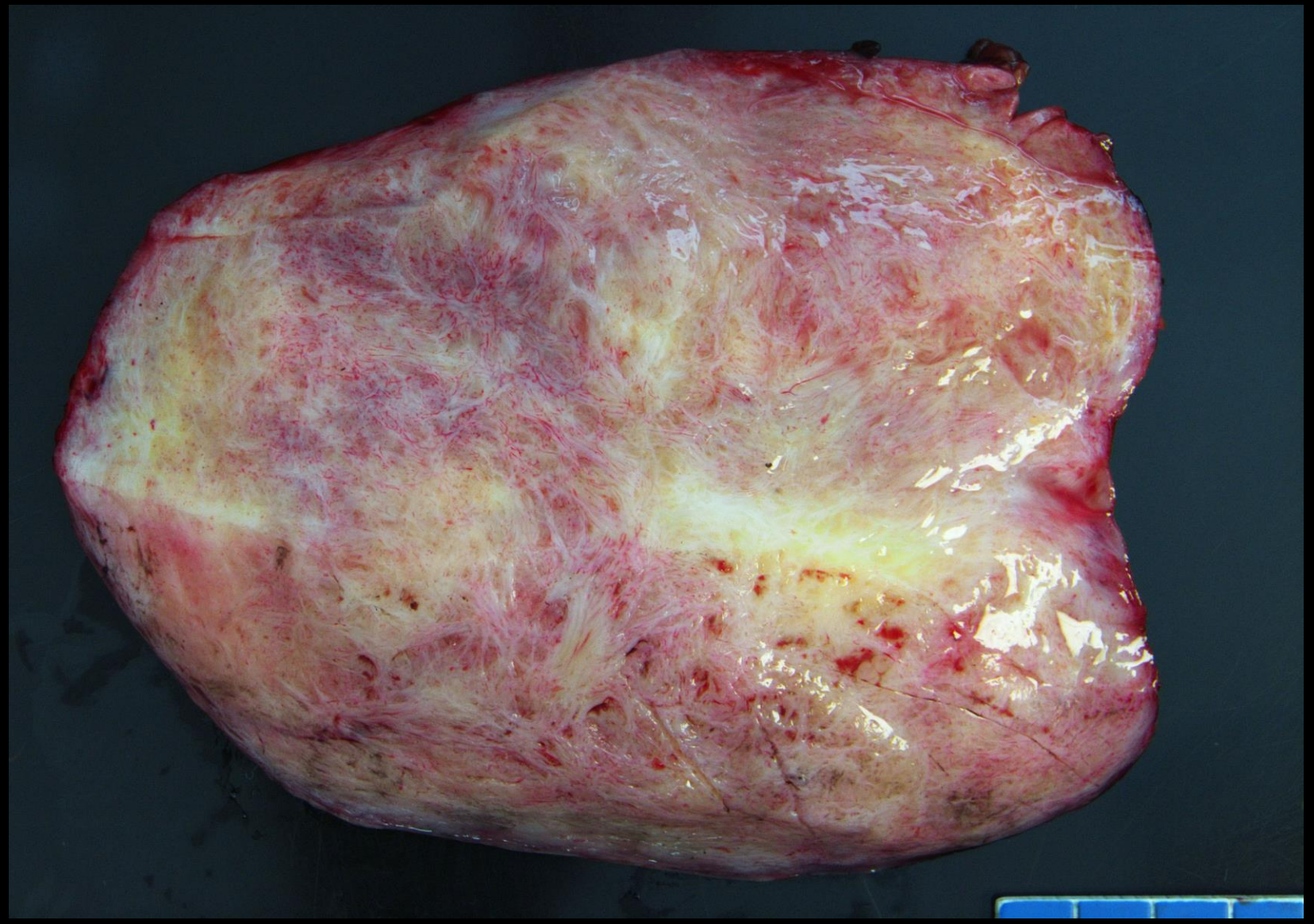
Disease that have lots of IgG4+ plasma cells in tissue that seem unrelated to IgG4-related sclerosing disease

- Peritumoral cells around cancers
- LYMPHOMAS – especially low-grade and plasmacytic ones (extranodal MALT, follicular)*
- Wegener's granulomatosis
- Parasitic infestations
- Inflammatory bowel disease
- Rosai-Dorfman disease
- Rheumatoid arthritis
- AUTOIMMUNE GASTRITIS
- Inflammatory myofibroblastic tumor (a neoplasm)

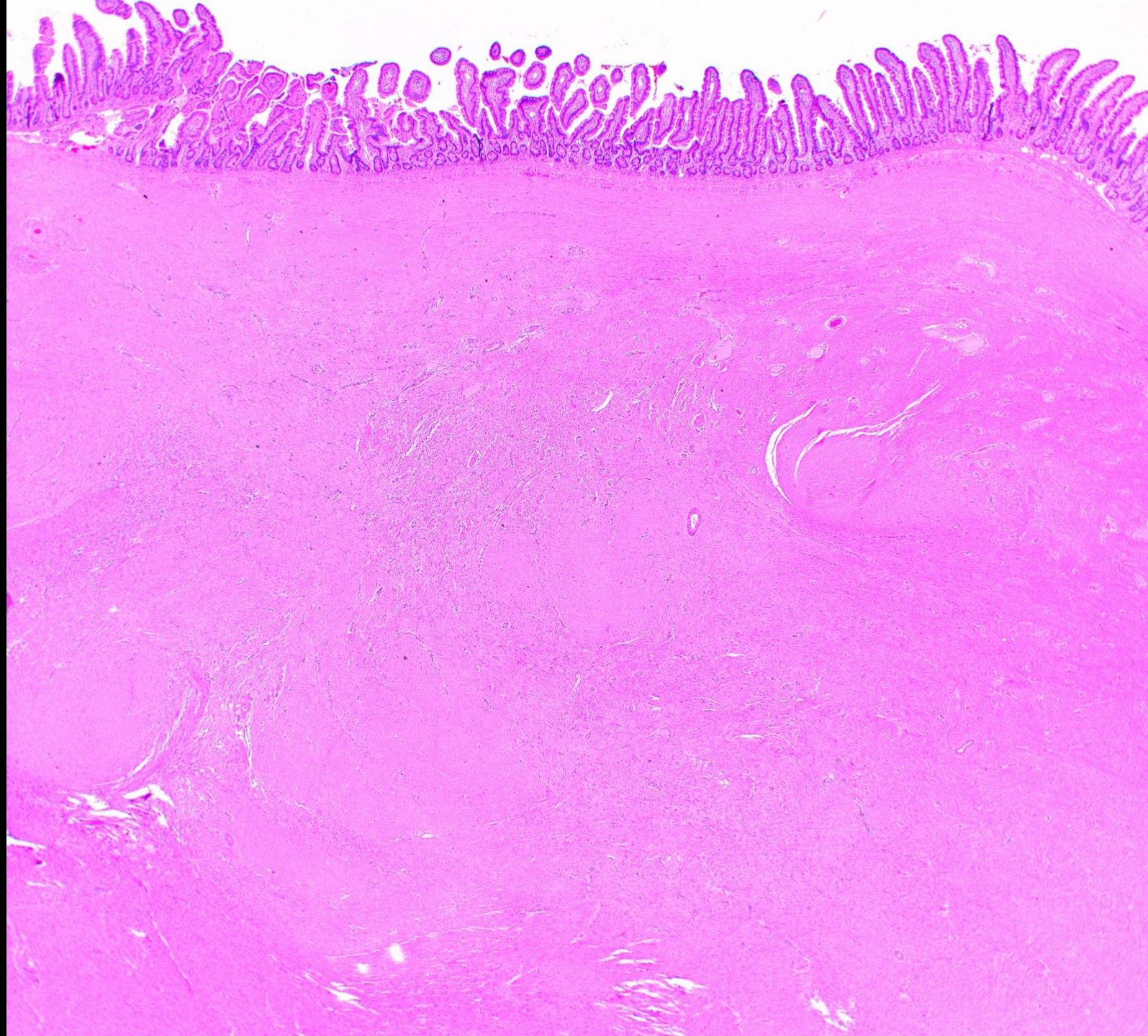
*now there are a number of reports of lymphomas arising in association with IgG4-related sclerosing disease – they tend to be MALT lymphomas

A 15 cm mass was excised from the jejunal wall and mesentery of a 33 year old woman.

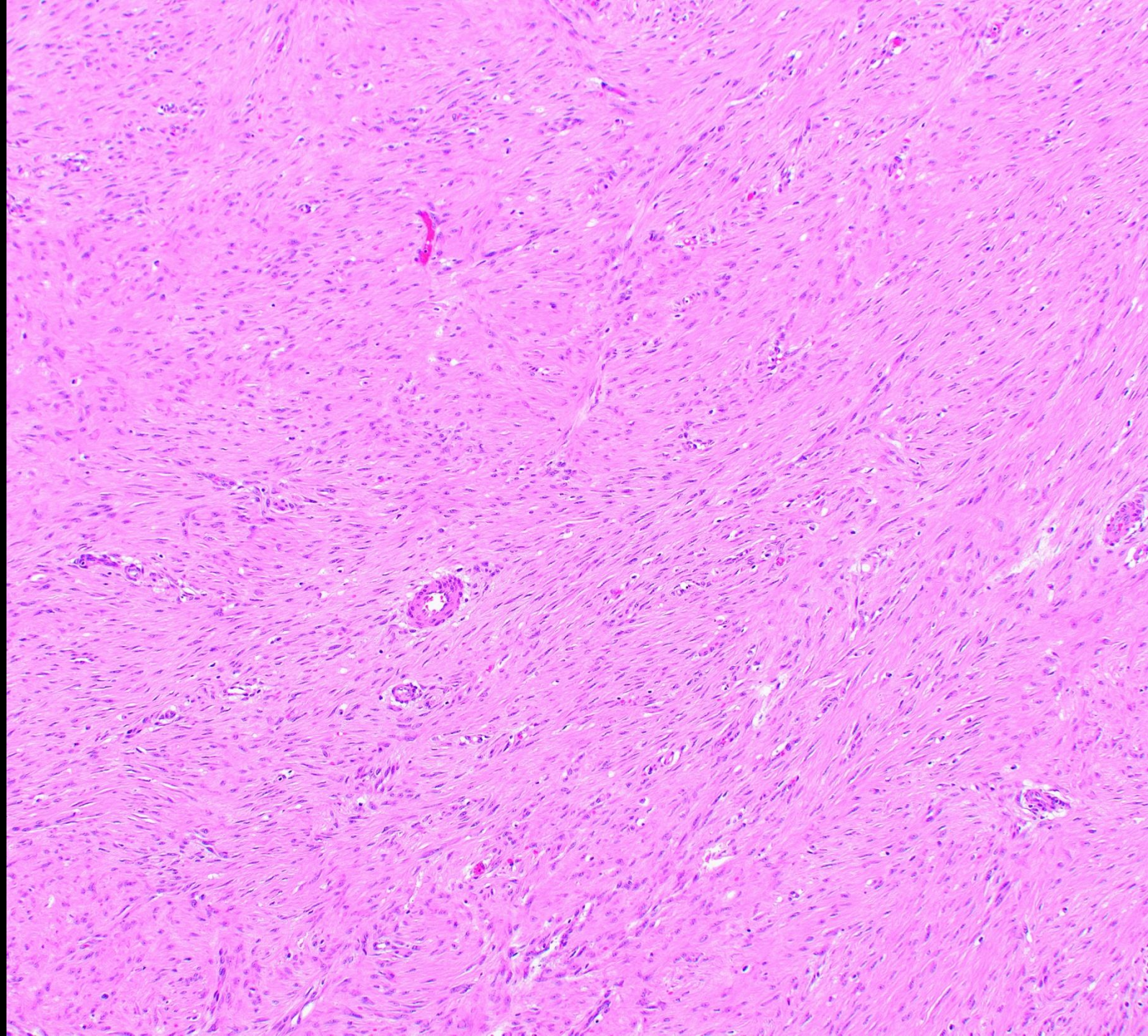
Gross specimen



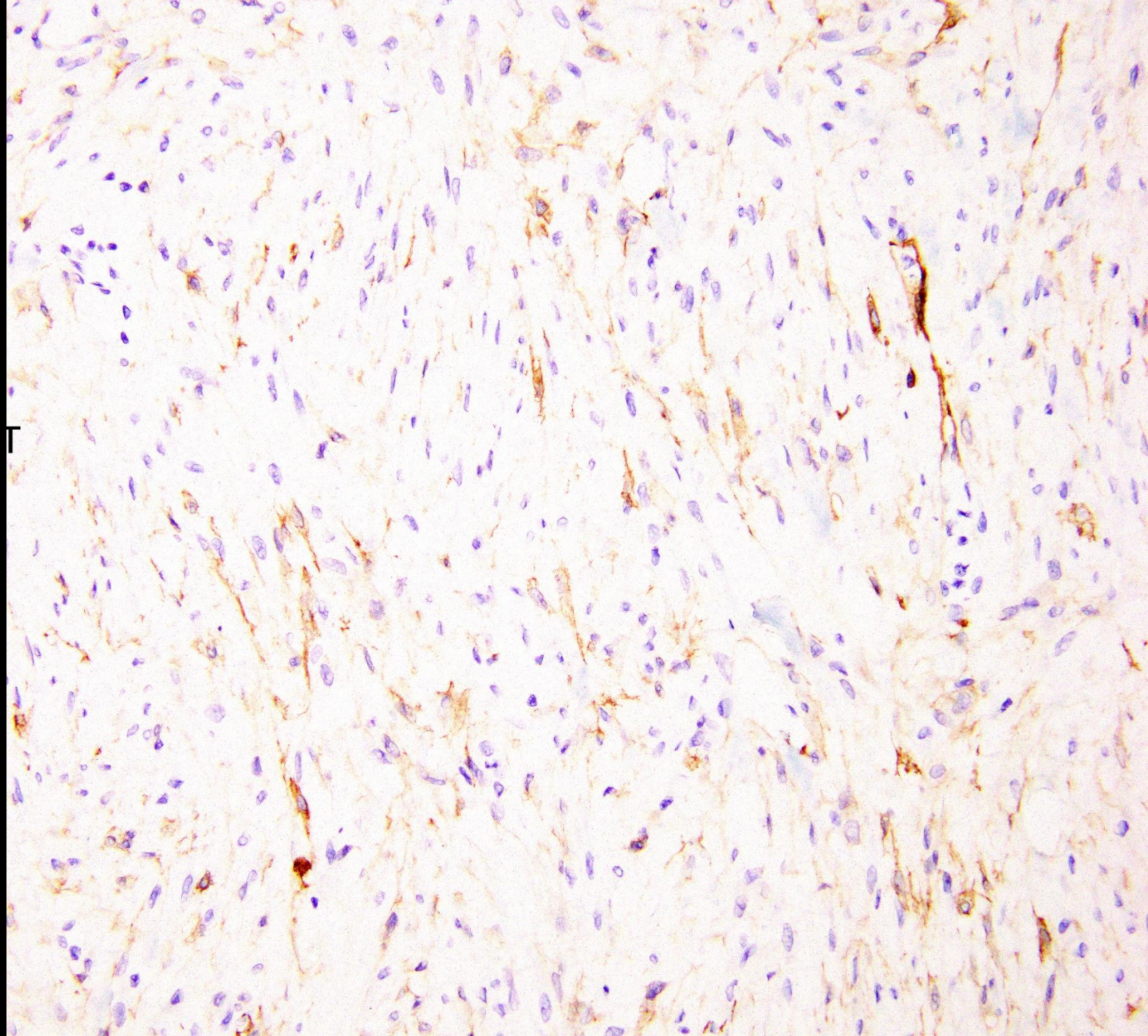
Low magnification



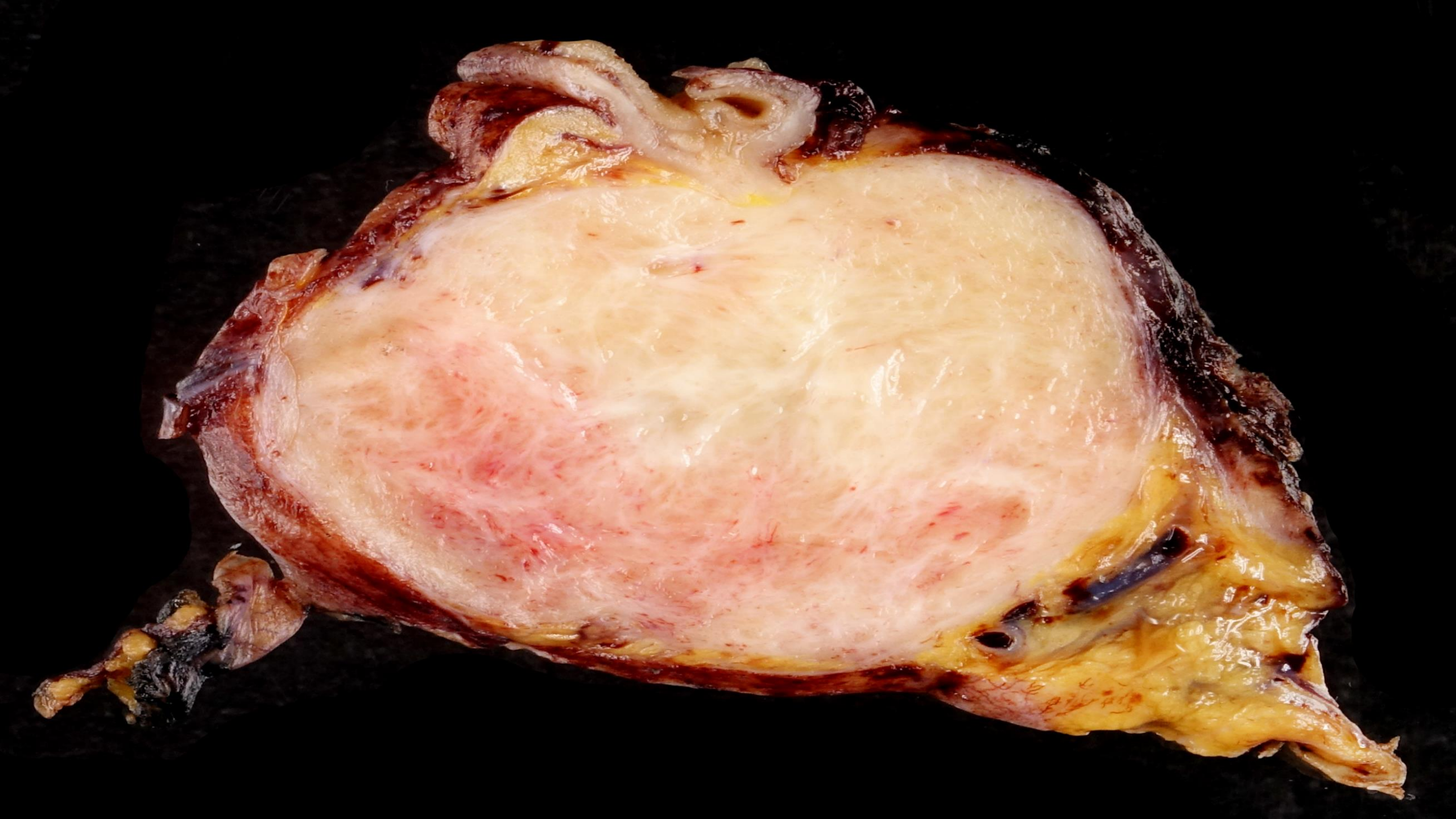
Medium power

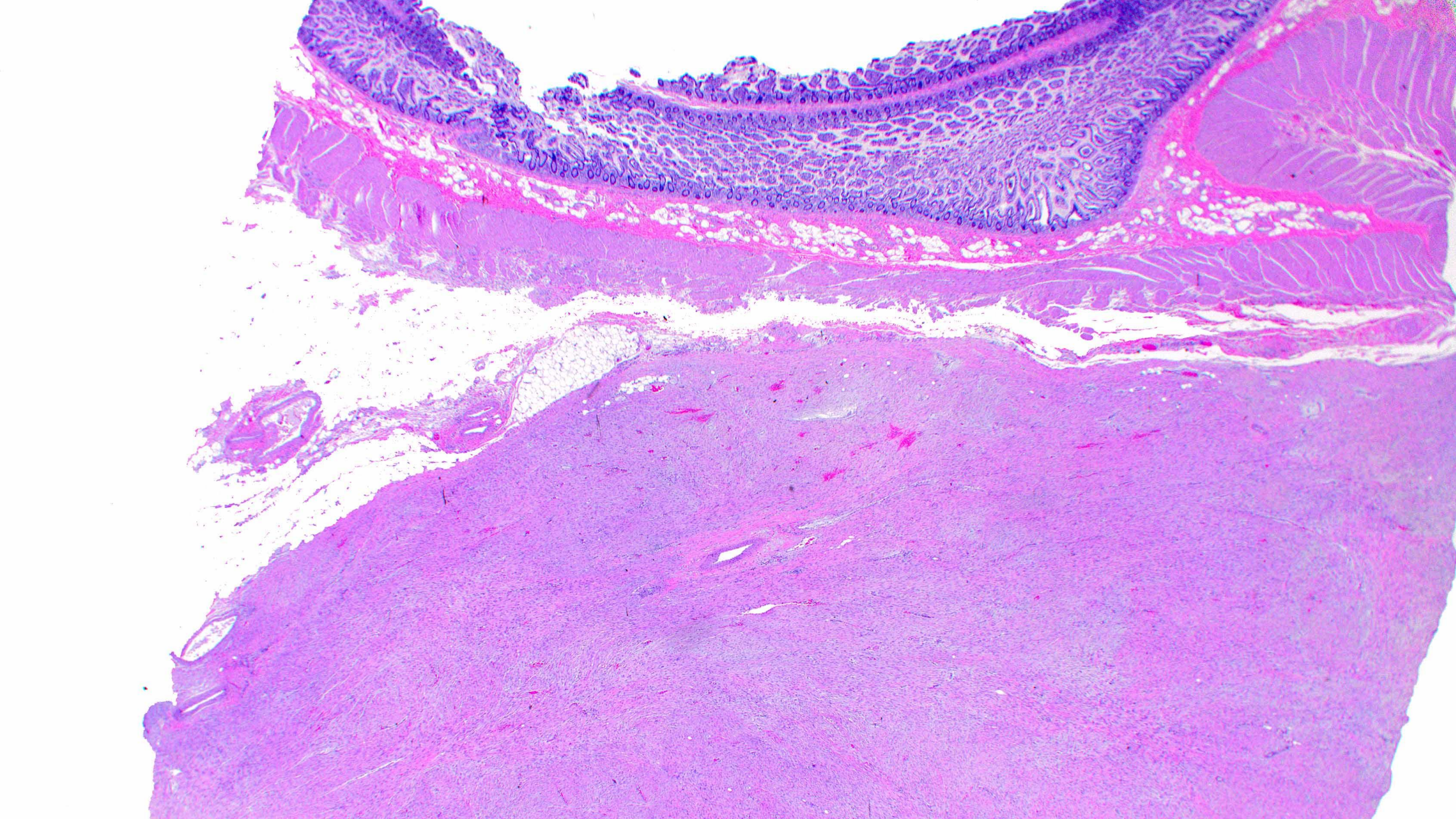


KIT/CD117



Diagnosis: Mesenteric Fibromatosis





Mesenteric Fibromatoses

- May be a component of Gardner syndrome (FAP)
- Virtually all familial fibromatoses have associated *APC* gene mutations
- Sporadic ones have *CTNNB1* mutations

Fibromatoses - Clinical

- 2-4 individuals per million per year.
- In children, equal gender incidence, mostly extra-abdominal.
- Puberty – age 40 usually in females [estrogen driven] and in abdominal wall.
- Older adults – mostly extra-abdominal – equal gender incidence.

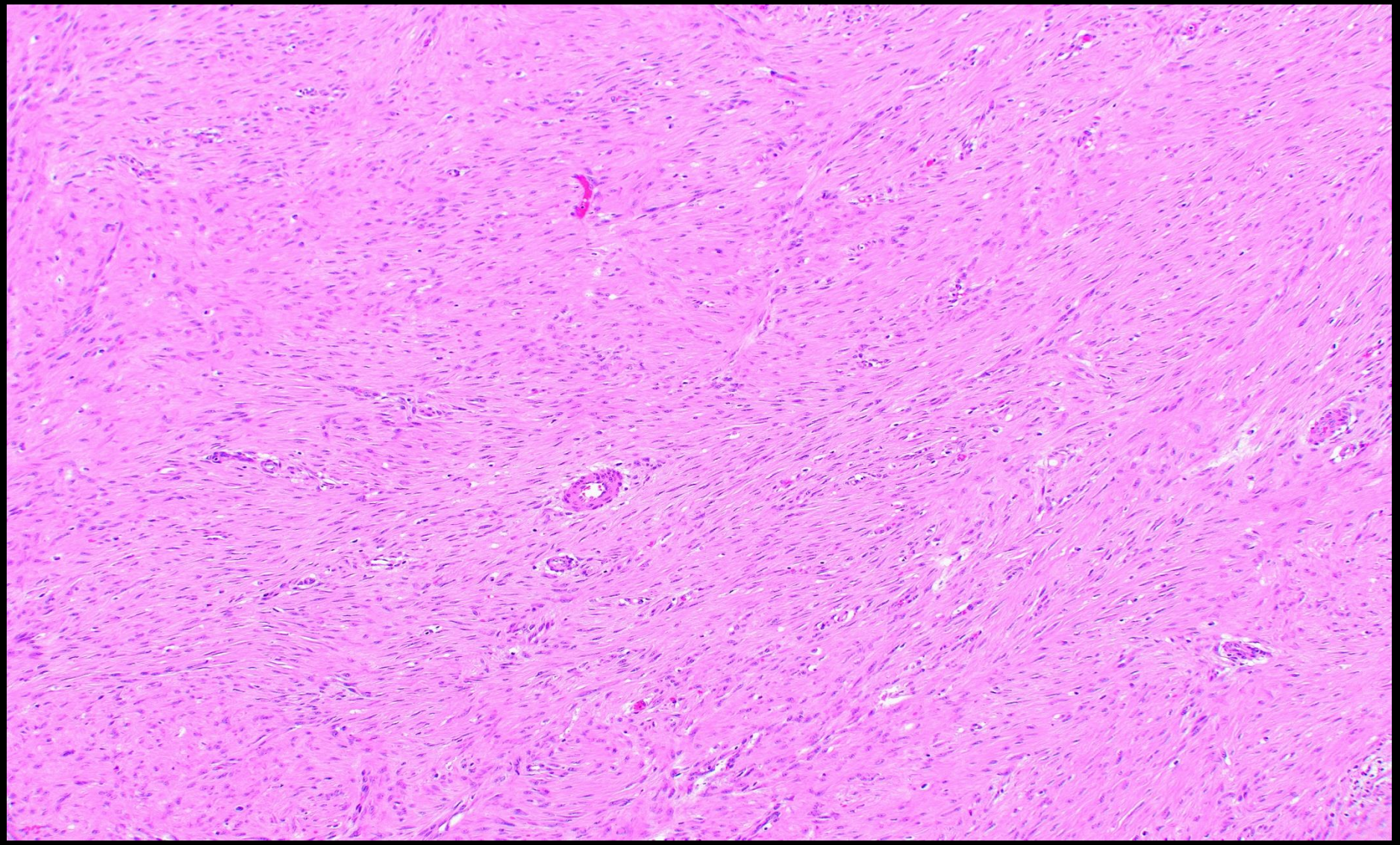
Features of Fibromatoses

- Sweeping Fascicles of Fibroblasts/myofibroblasts
- Infiltrative Growth Pattern
- Characteristic Vascular Pattern

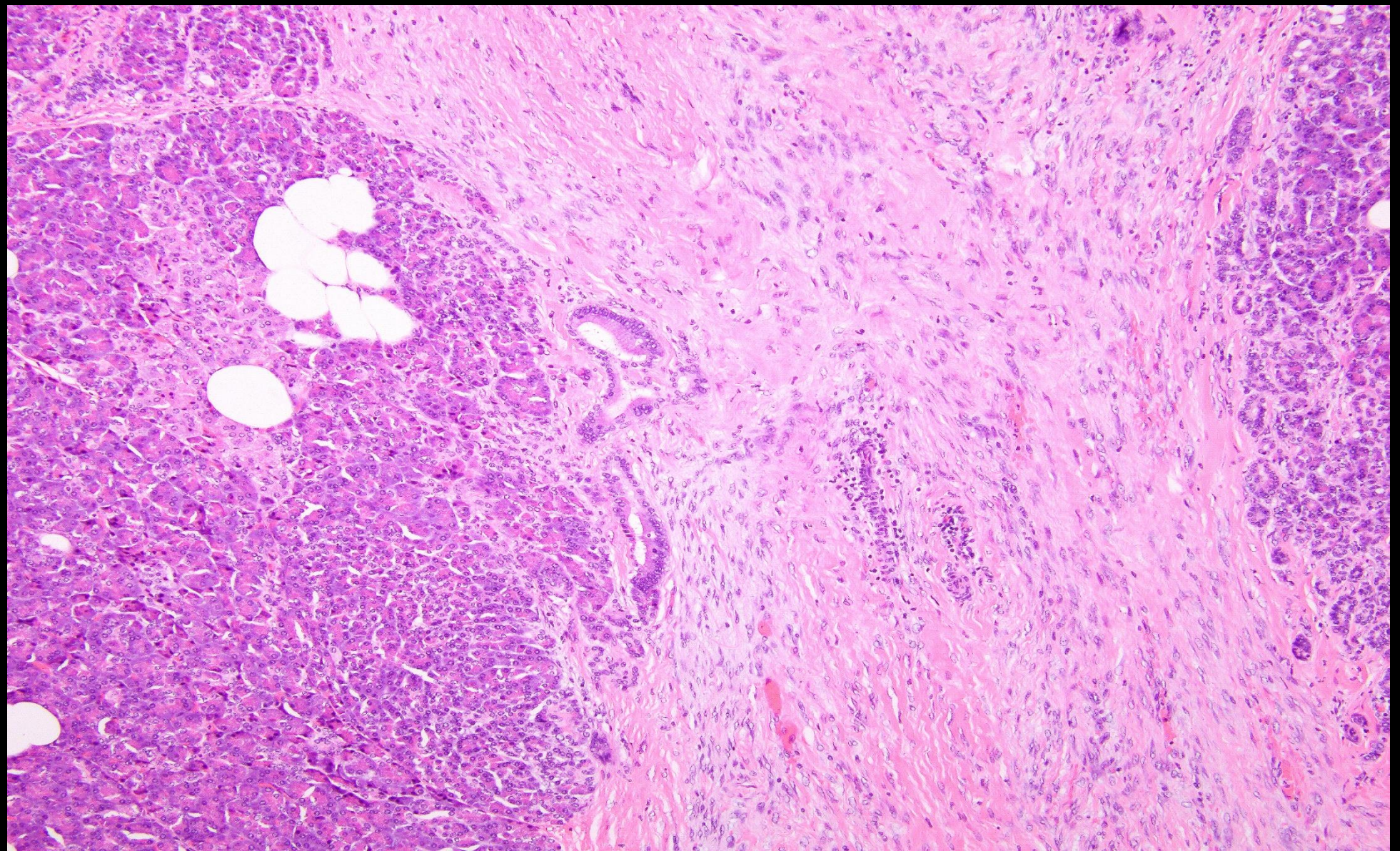
β catenin in Fibromatoses

- Accumulates in nucleus
- NOT detected in GISTs

Sweeping fascicles of myofibroblastic cells

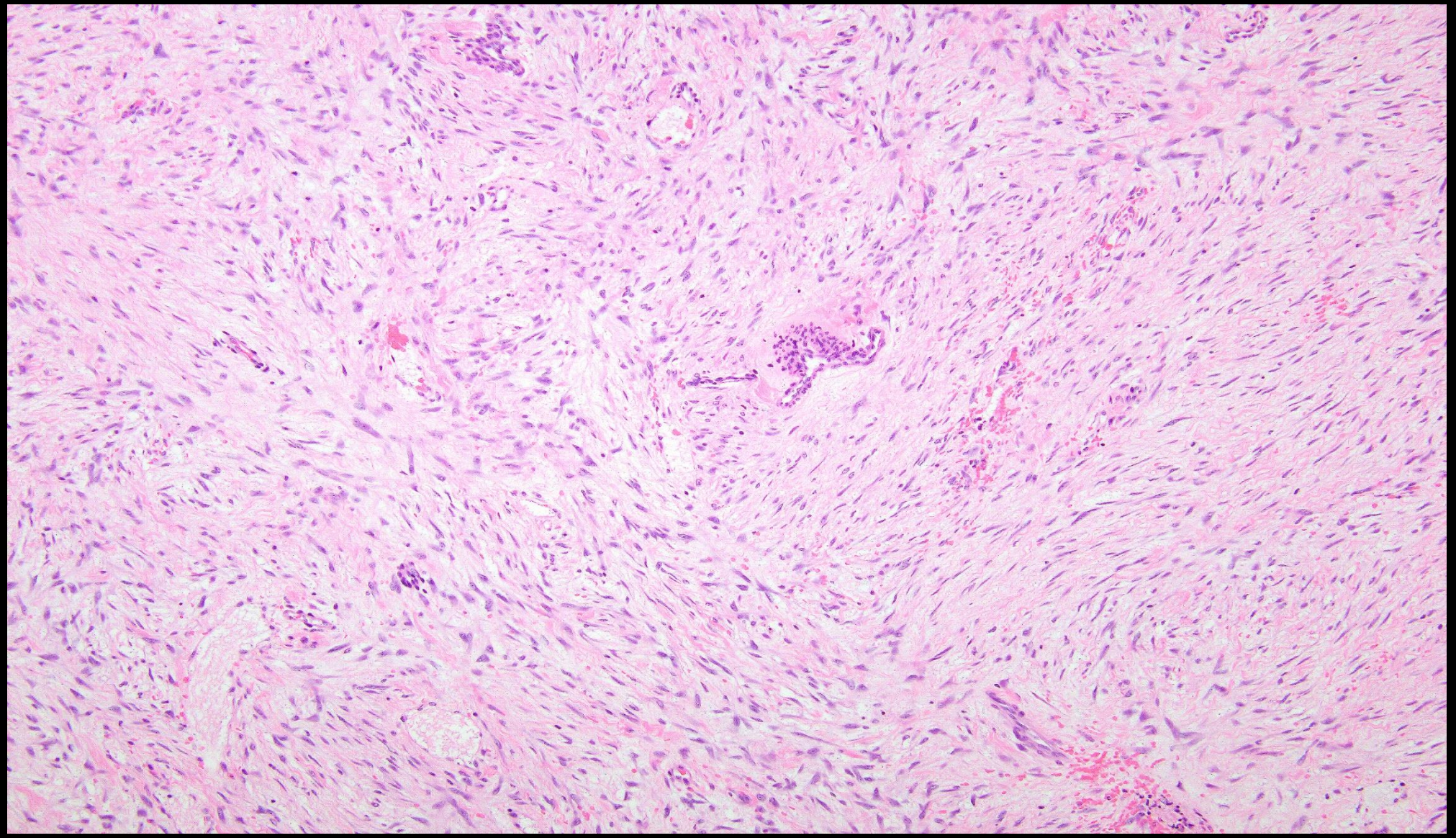


Infiltrative growth

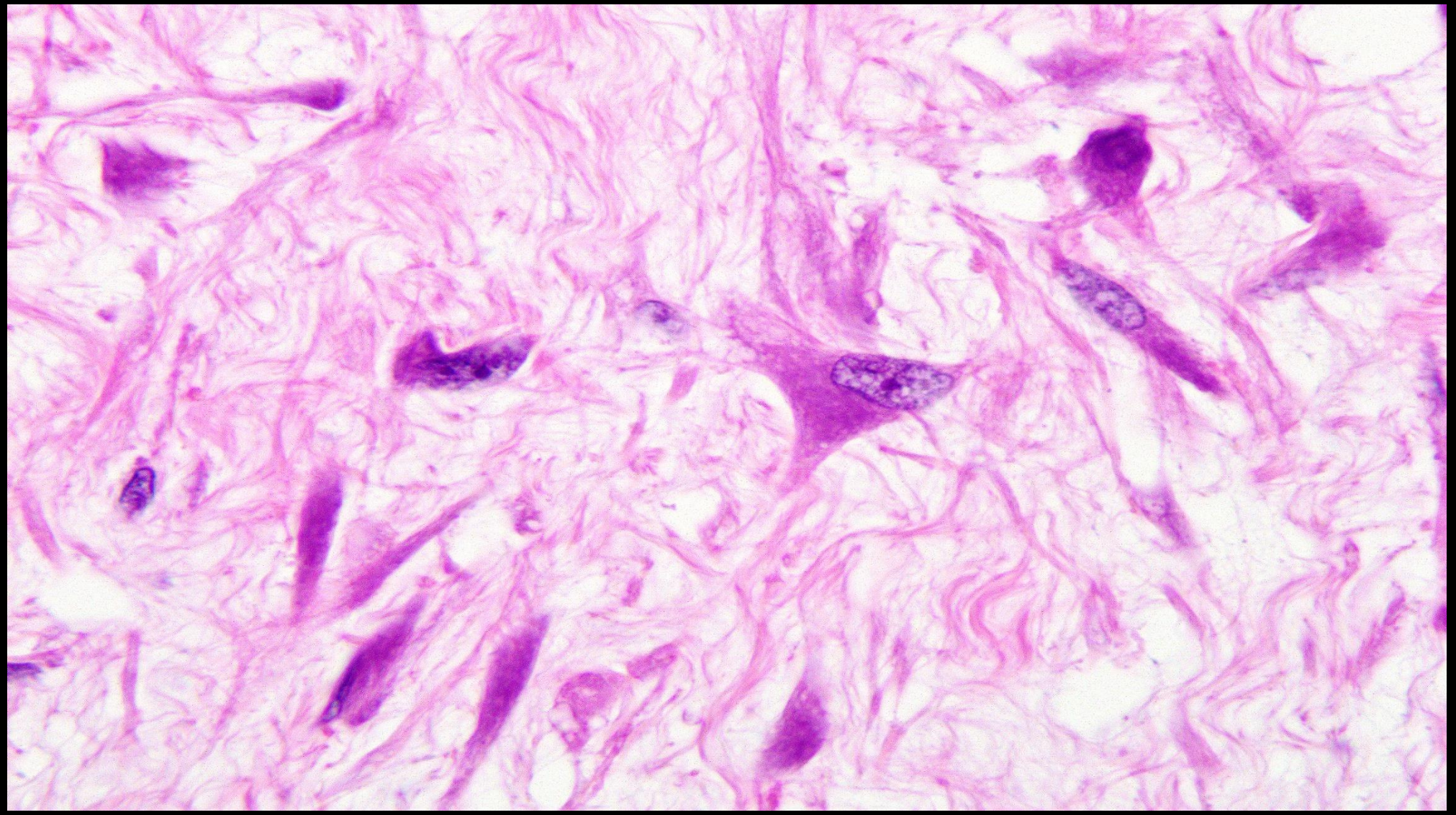


Hello,
Pancreas!

Vascular pattern

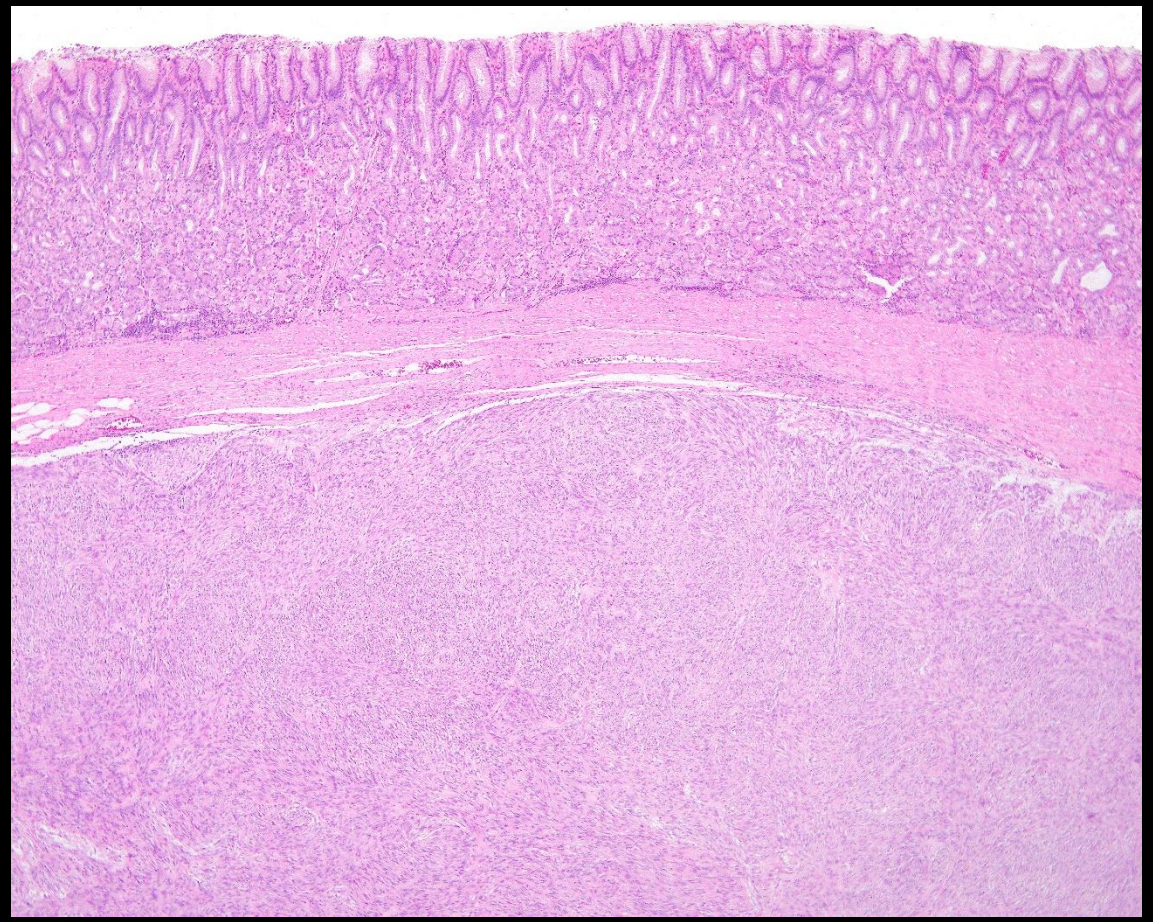


Characteristic cytologic features

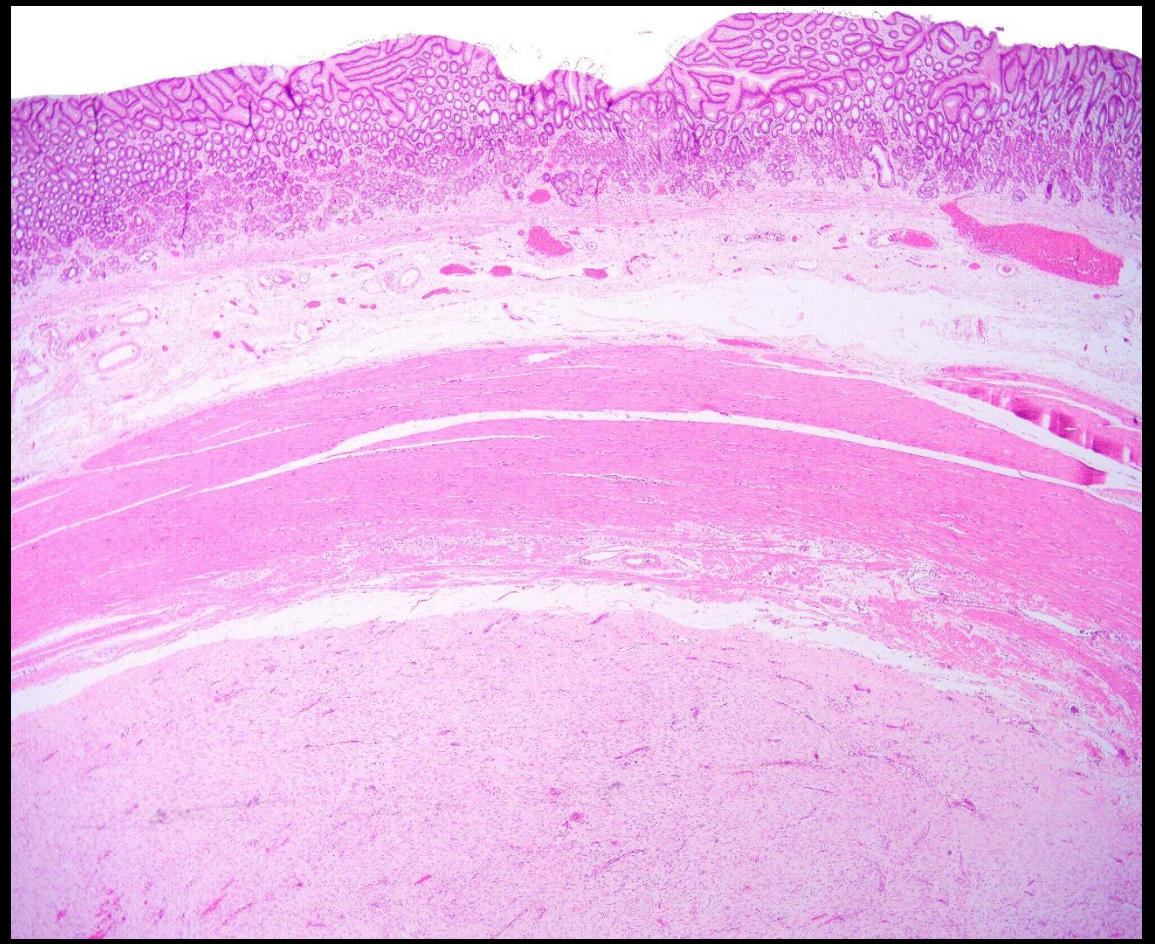


Beauty Contest

GIST

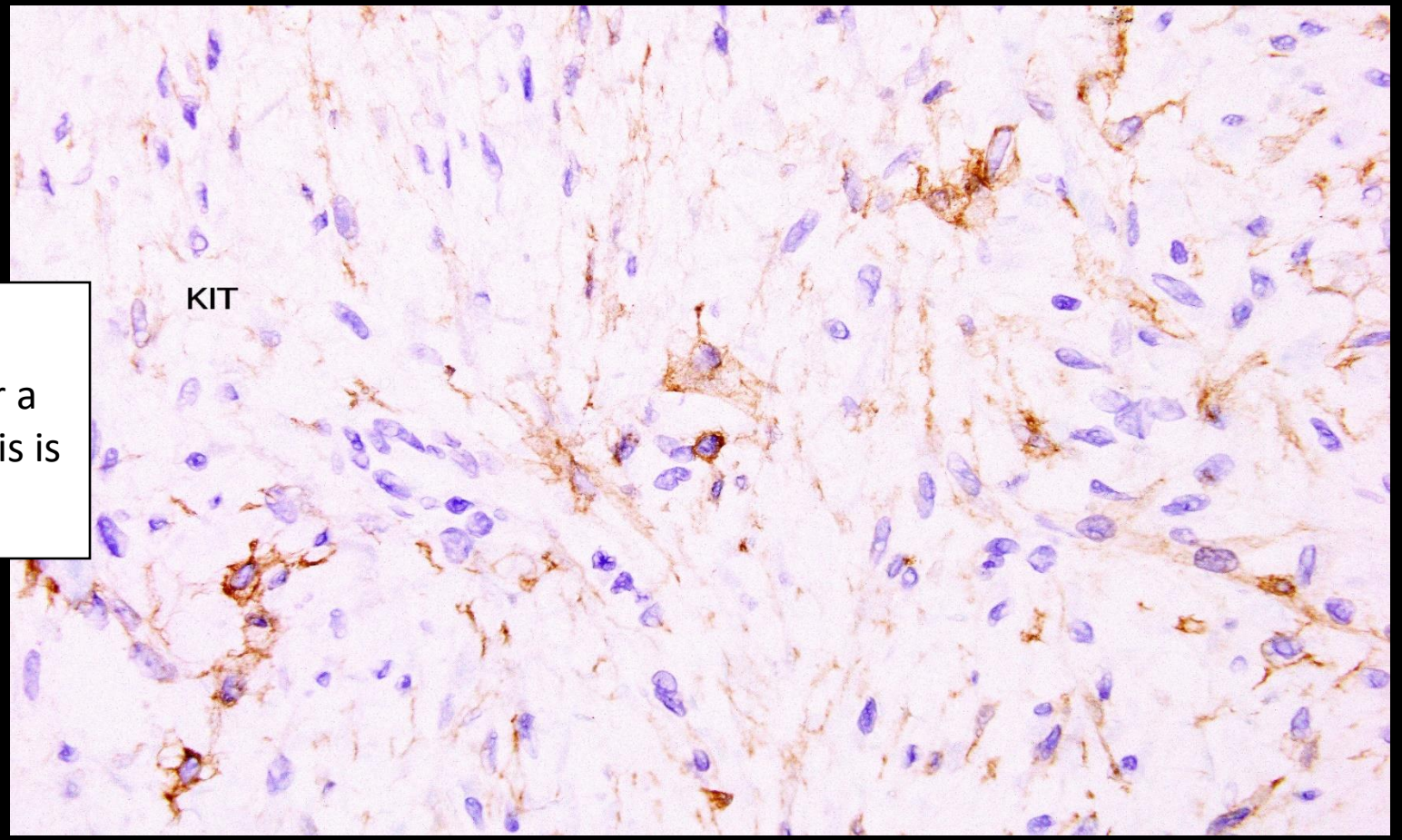


Fibromatosis



Pitfall alert – KIT in fibromatosis

Too much antigen retrieval – no longer a common issue but this is a 2020 case!

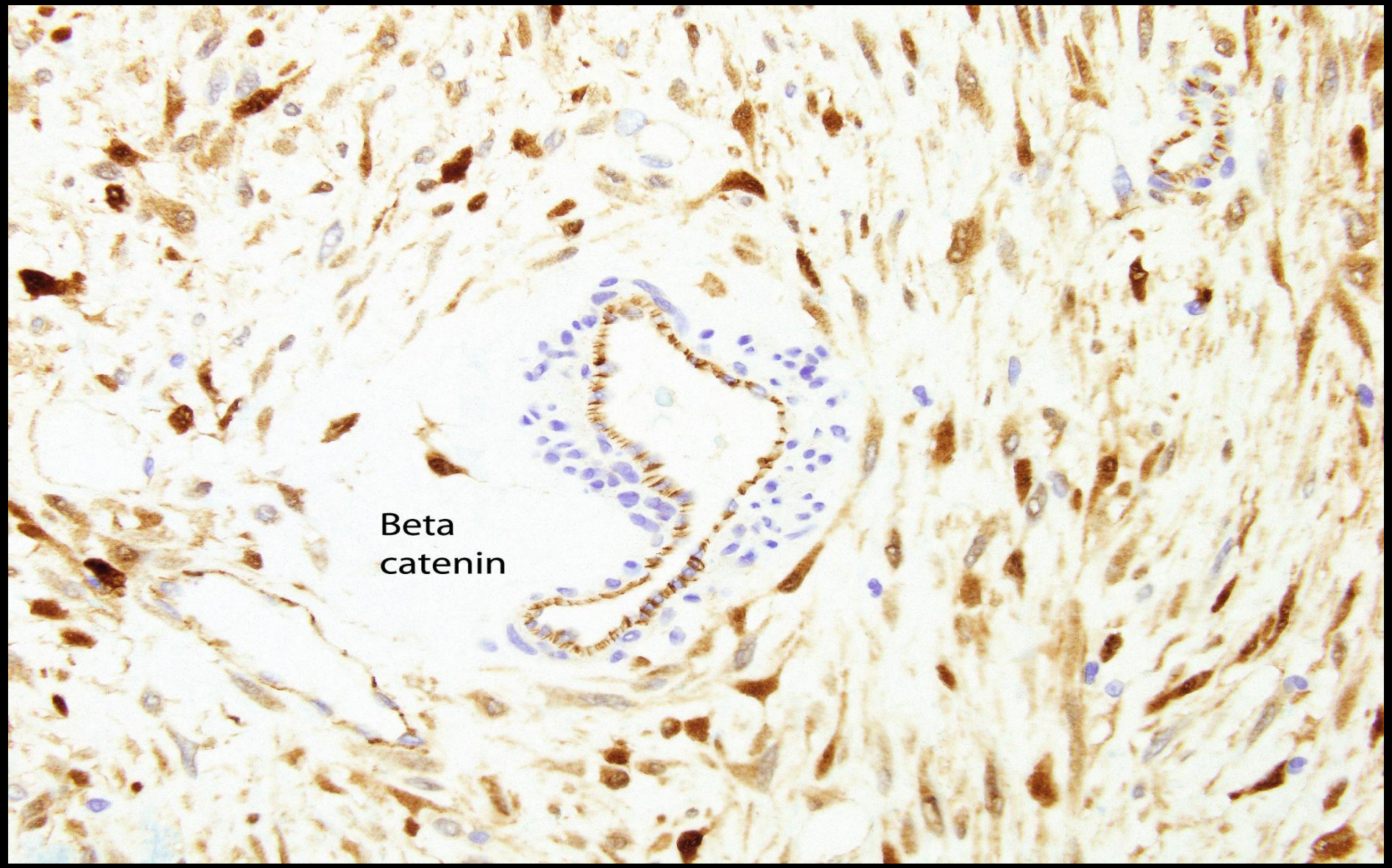


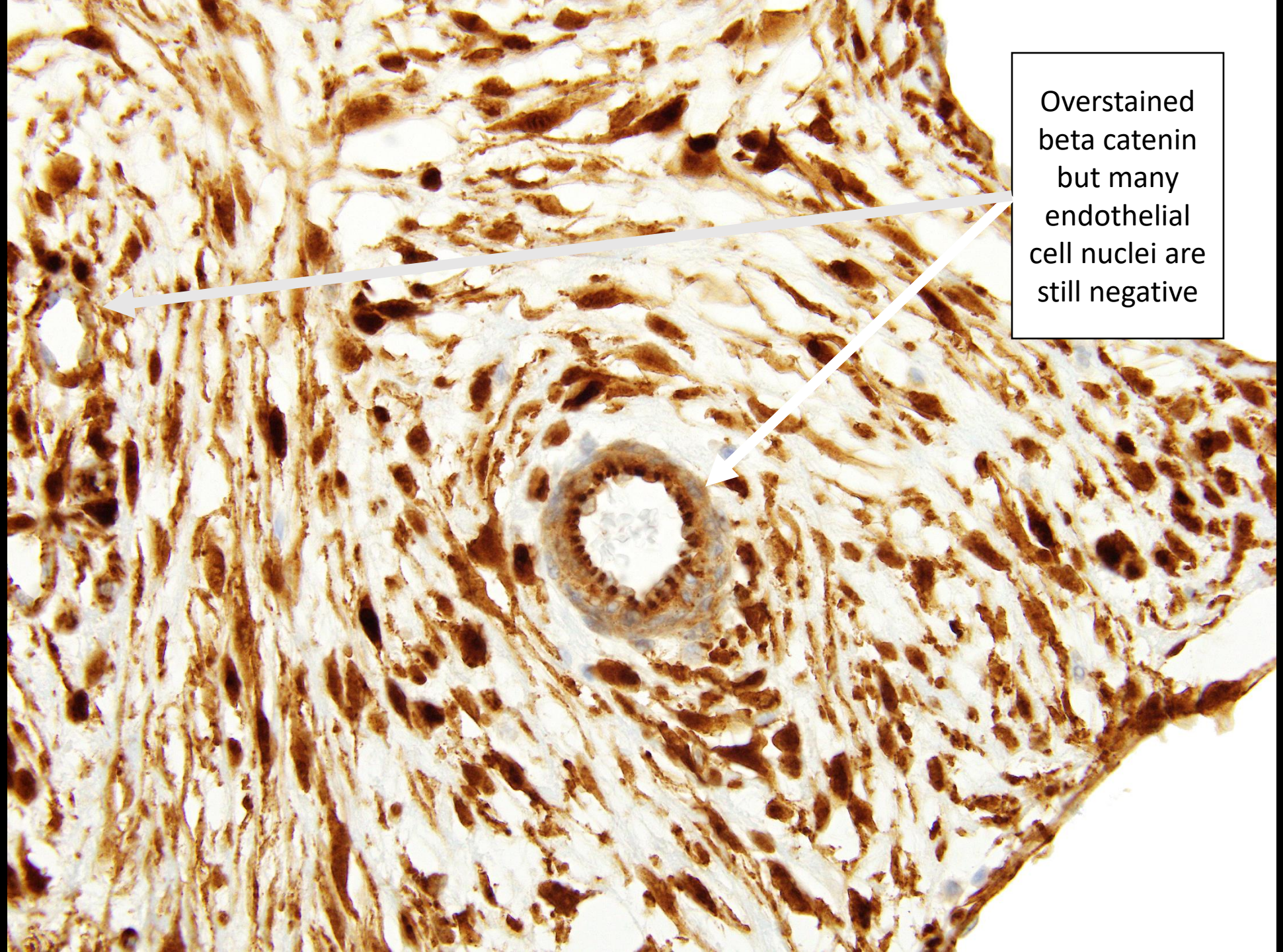
β catenin in Fibromatoses

- Accumulates in nucleus
- NOT detected in GISTs

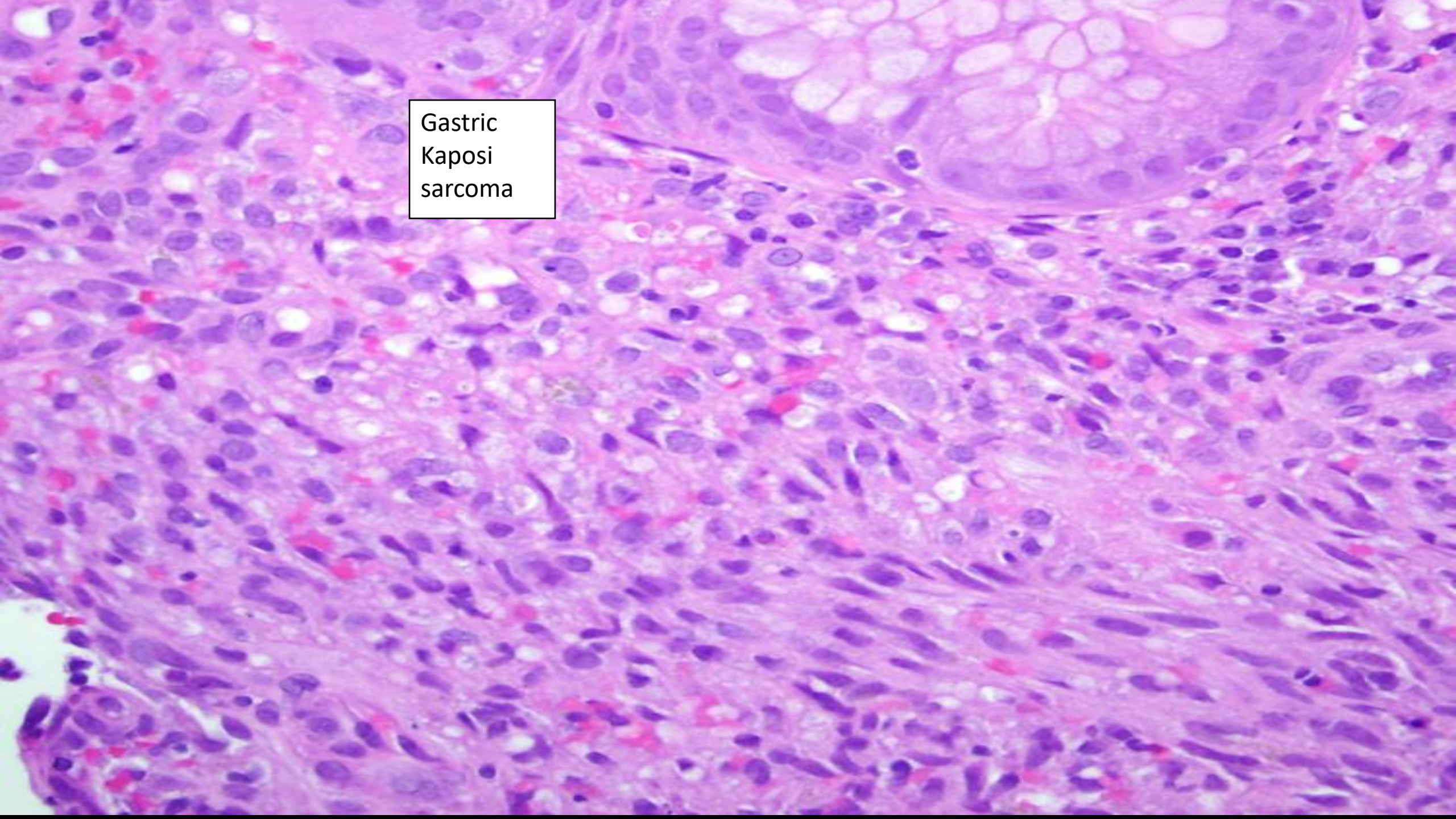
- 1: Montgomery E, Torbenson MS, Kaushal M, Fisher C, Abraham SC. Beta-catenin immunohistochemistry separates mesenteric fibromatosis from gastrointestinal stromal tumor and sclerosing mesenteritis. Am J Surg Pathol. 2002 Oct;26(10):1296-301. PMID: 12360044.
- 2: Bhattacharya B, Dilworth HP, Iacobuzio-Donahue C, Ricci F, Weber K, Furlong MA, Fisher C, Montgomery E. Nuclear beta-catenin expression distinguishes deep fibromatosis from other benign and malignant fibroblastic and myofibroblastic lesions. Am J Surg Pathol. 2005 May;29(5):653-9. PMID: 15832090.

A perfect beta catenin preparation

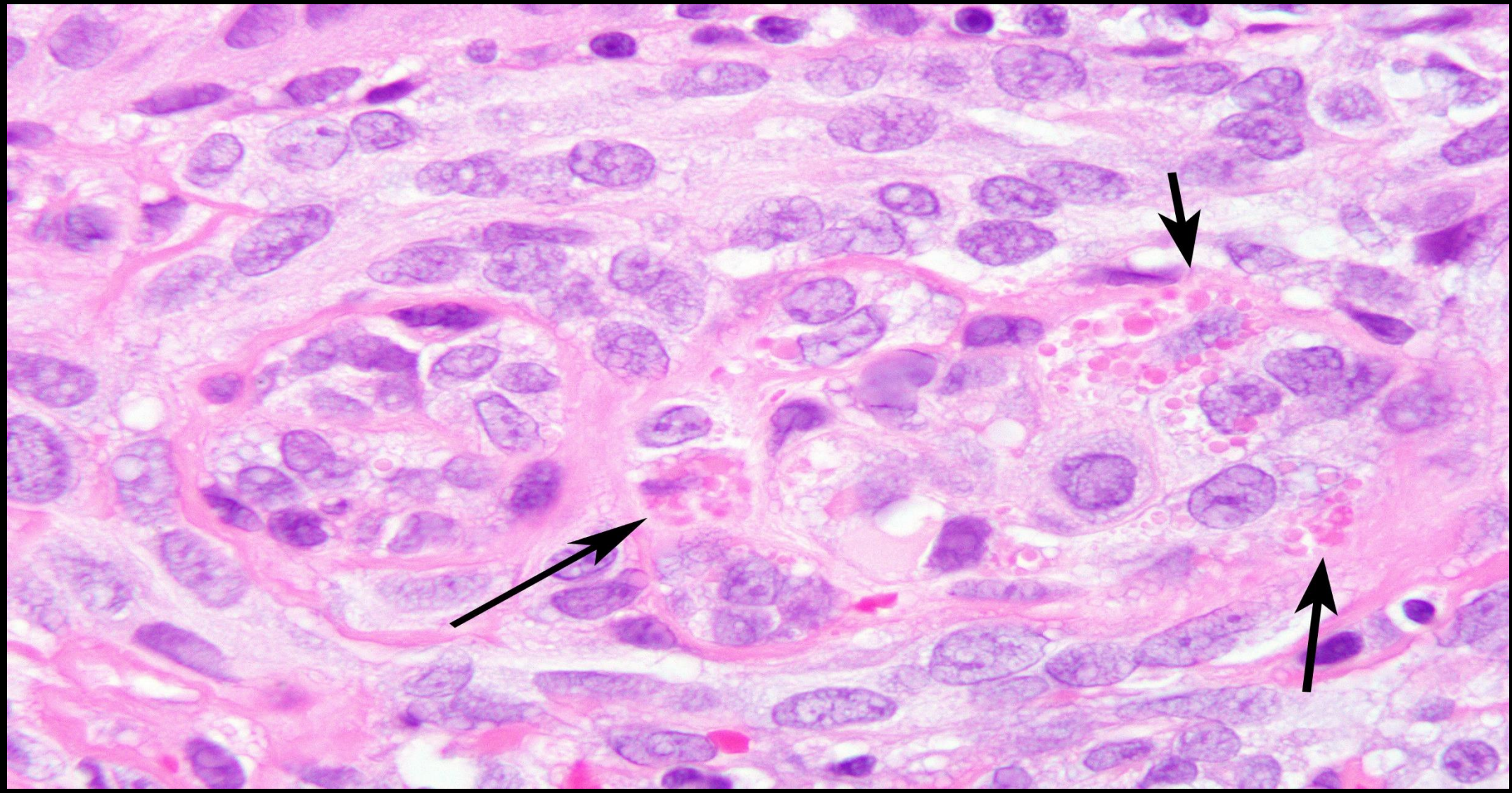


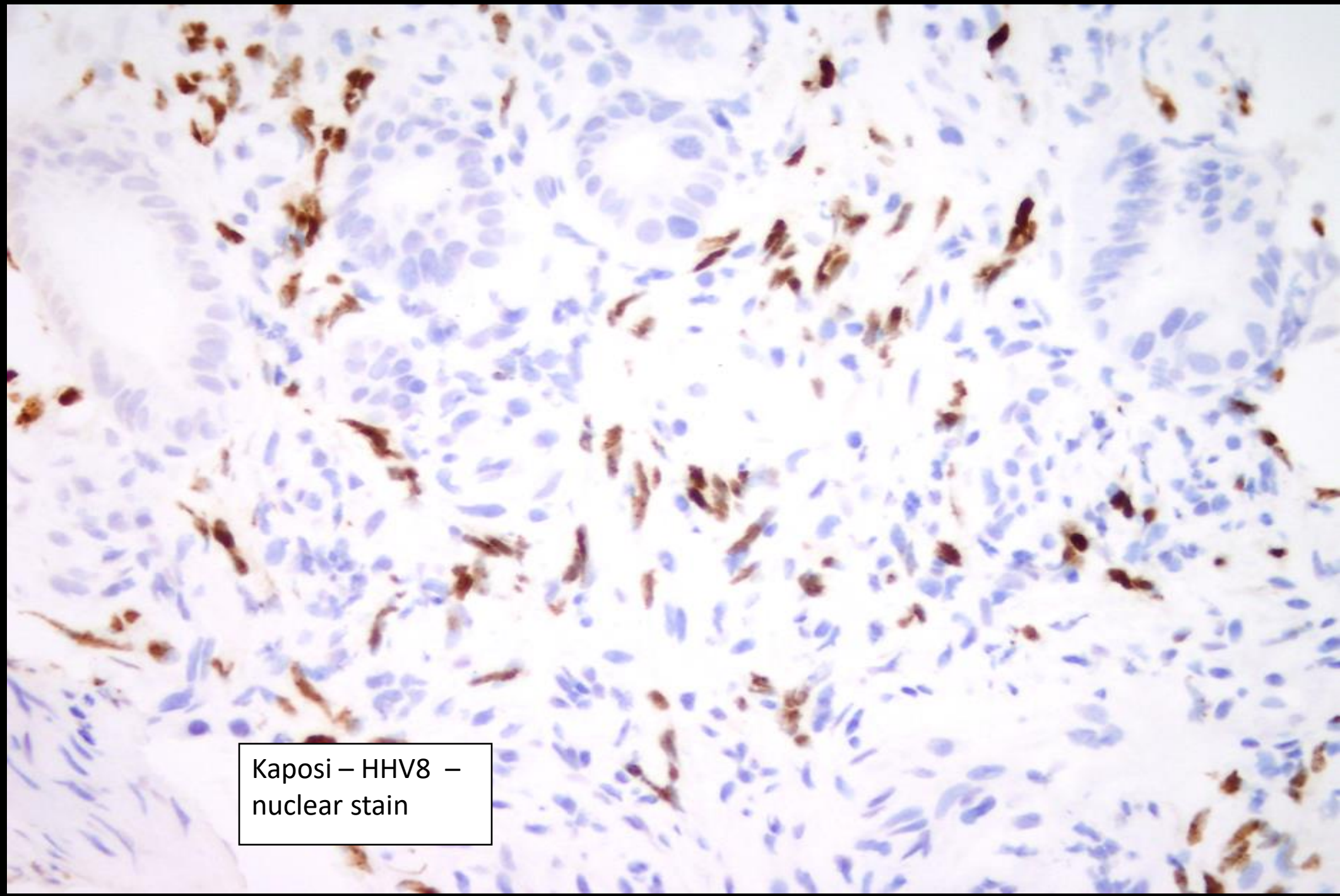

Overstained beta catenin but many endothelial cell nuclei are still negative

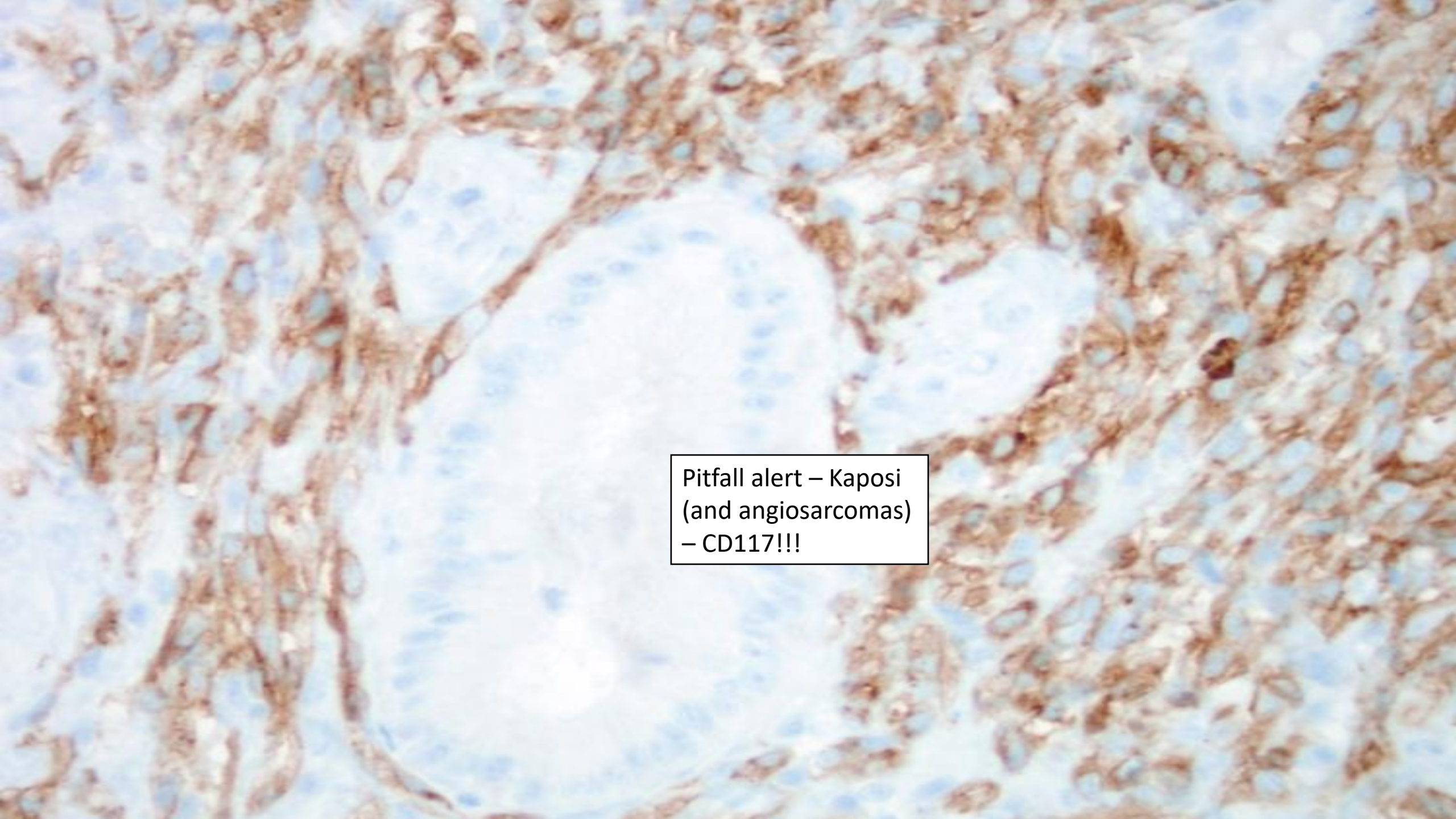
Another immunostaining pitfall

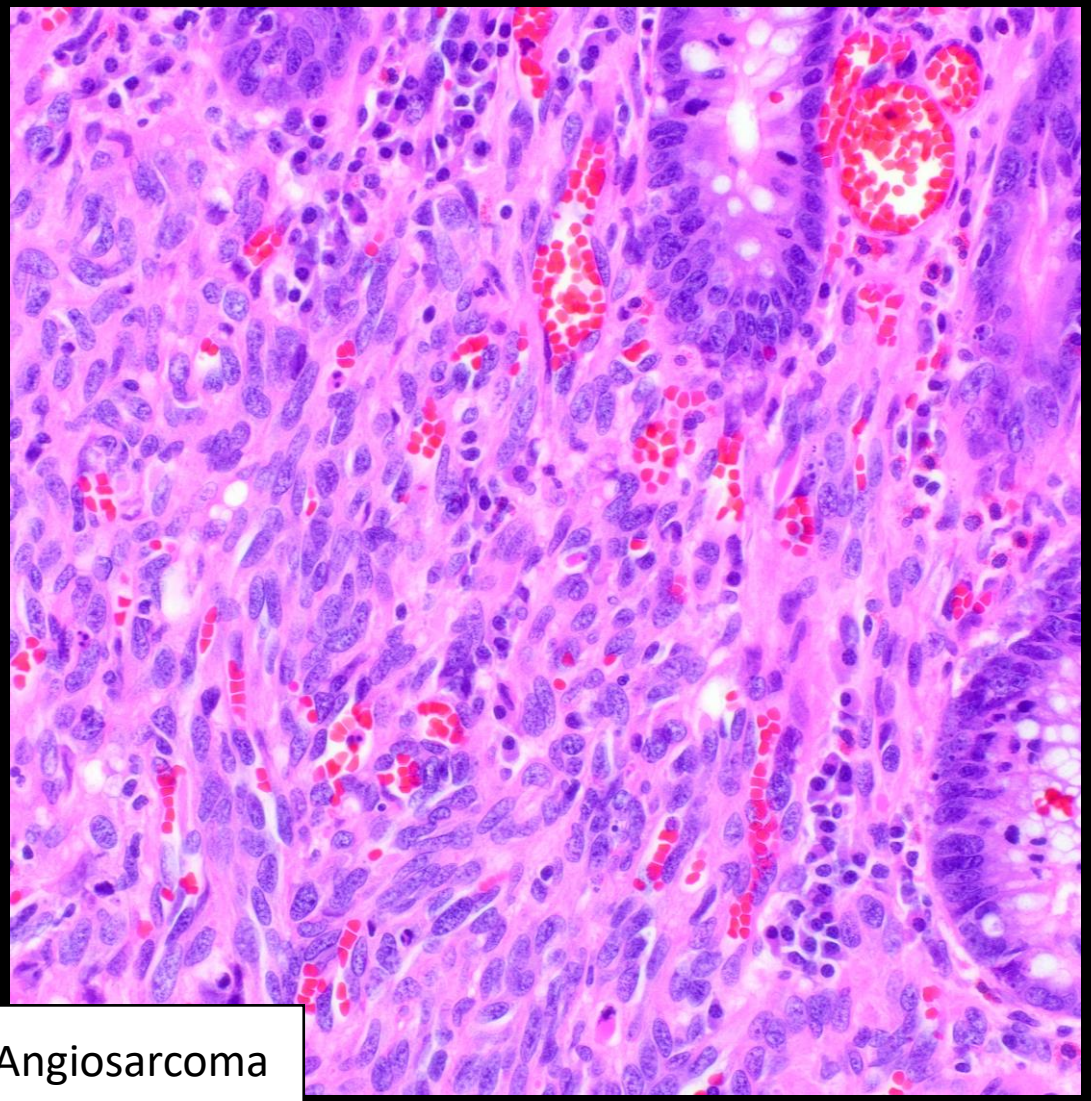

Gastric
Kaposi
sarcoma

Kaposi sarcoma – hyaline globules



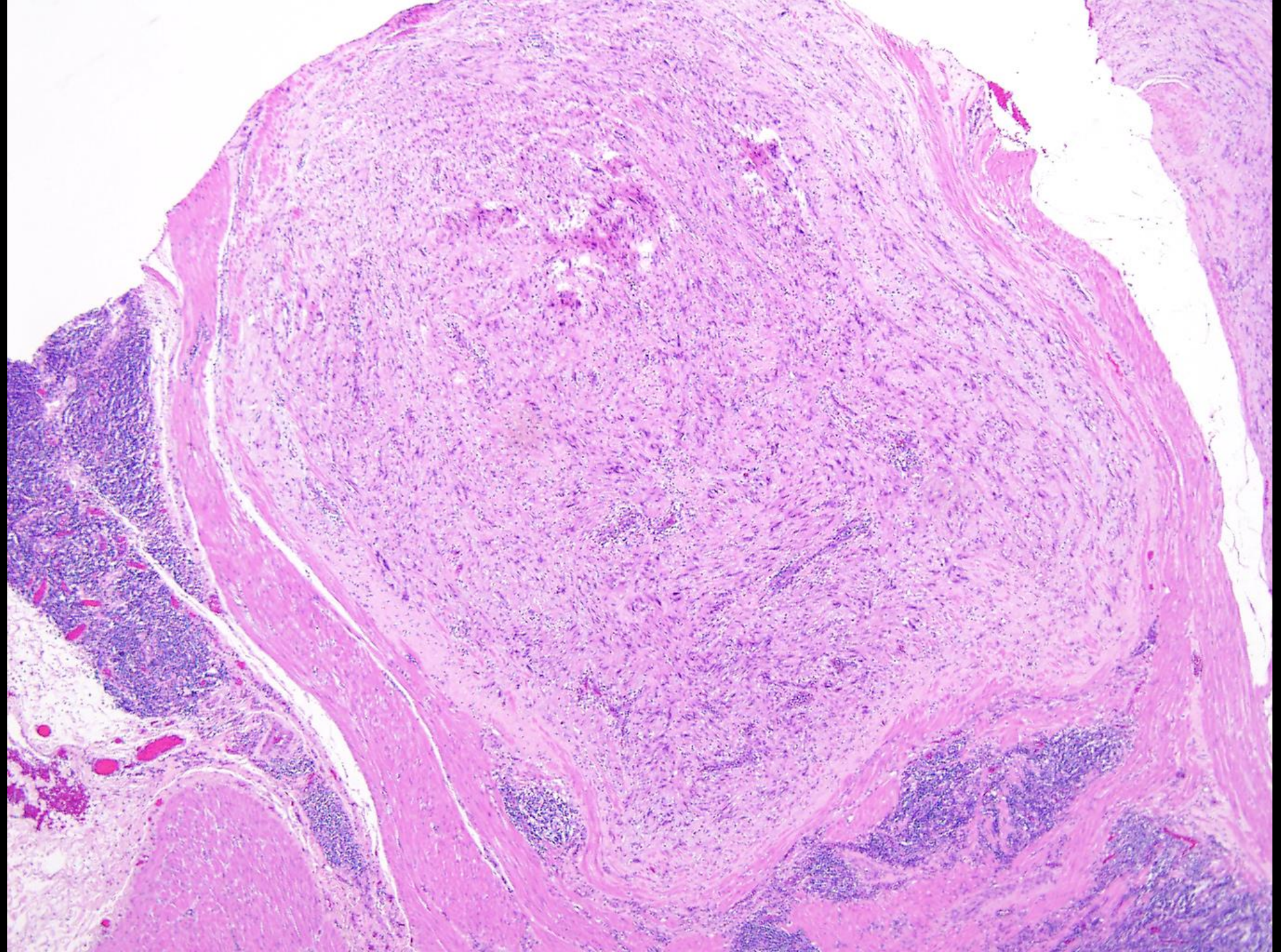

Kaposi – HHV8 –
nuclear stain

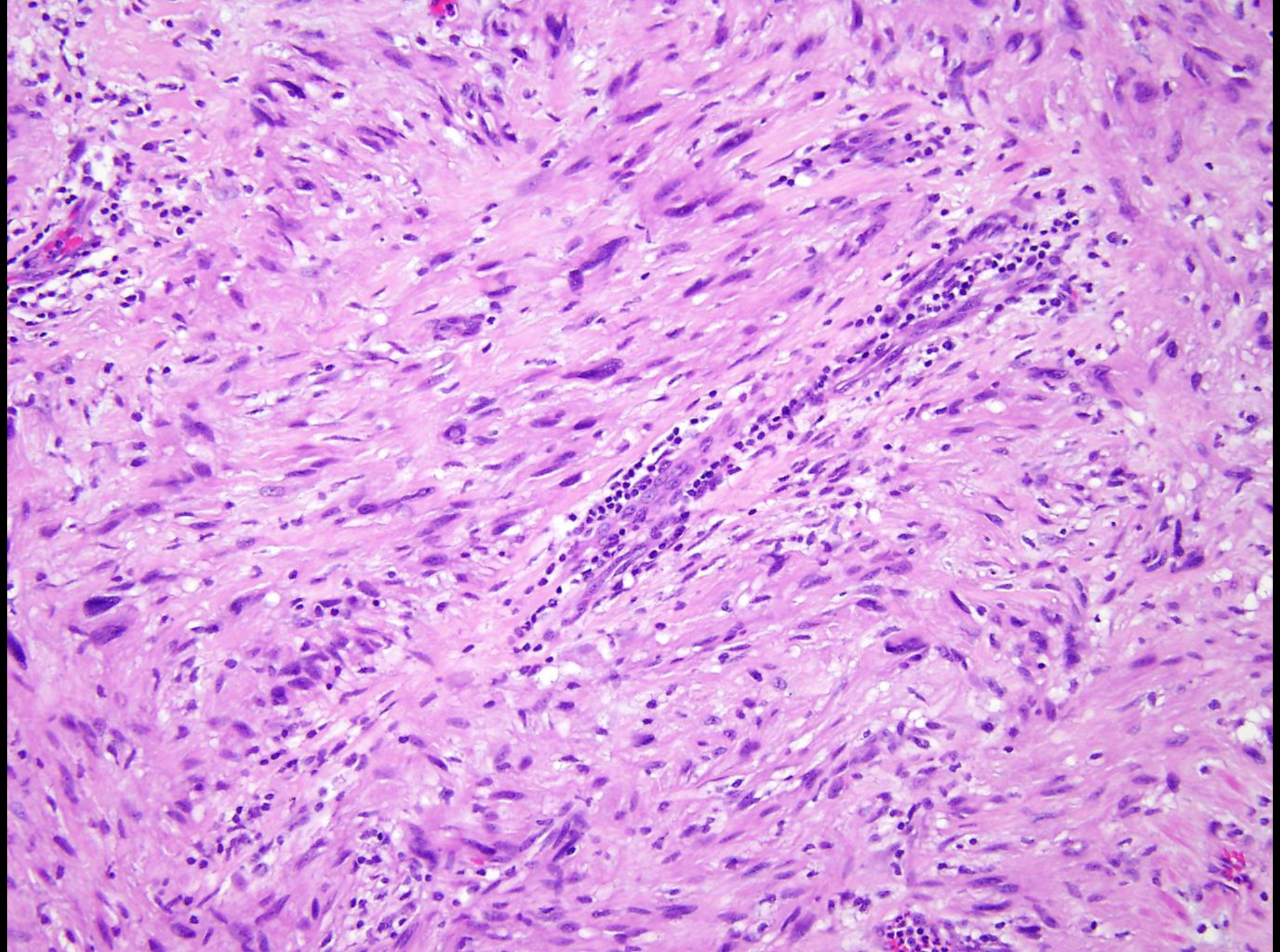

Pitfall alert – Kaposi (and angiosarcomas) – CD117!!!

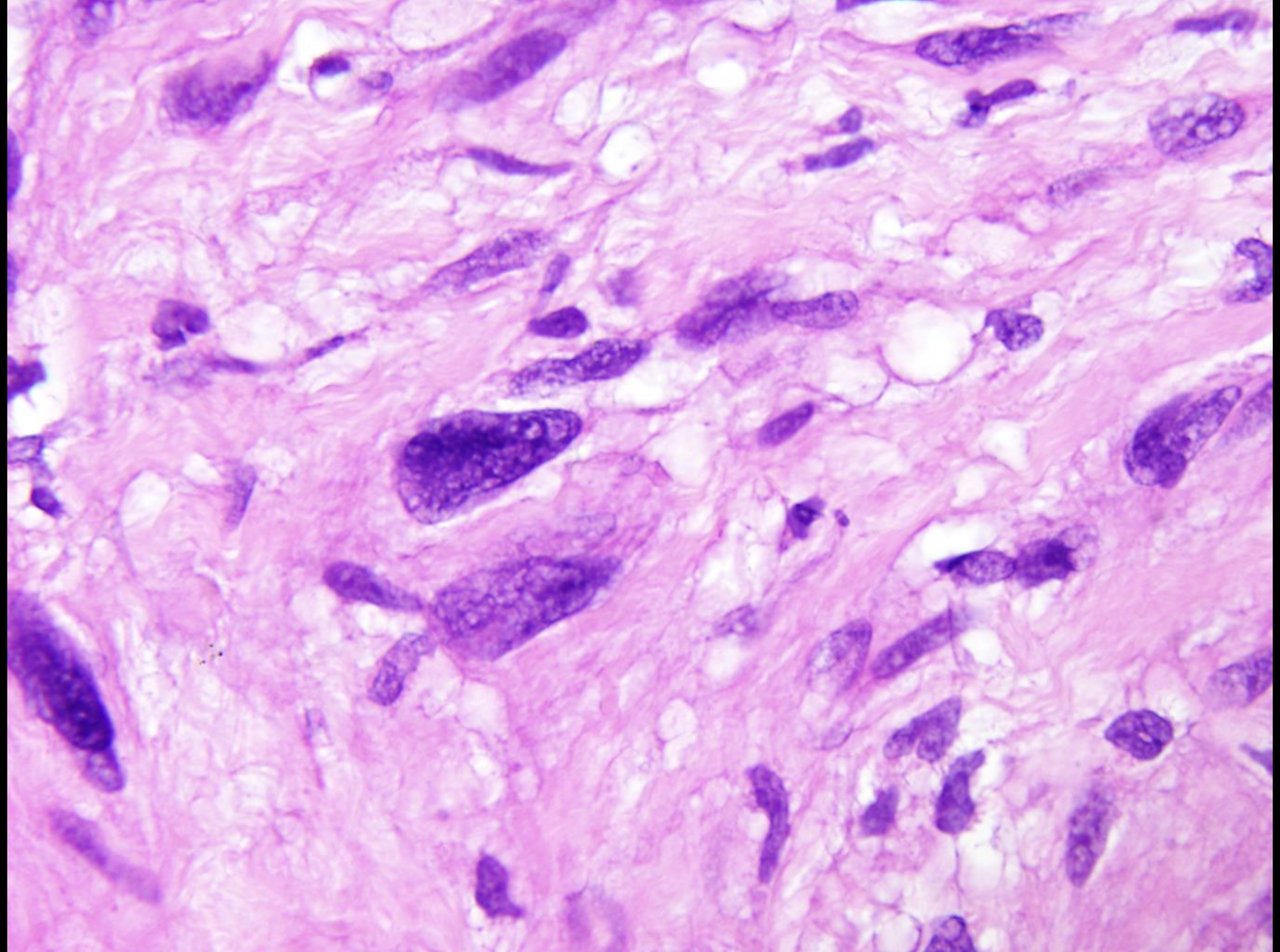


Angiosarcoma

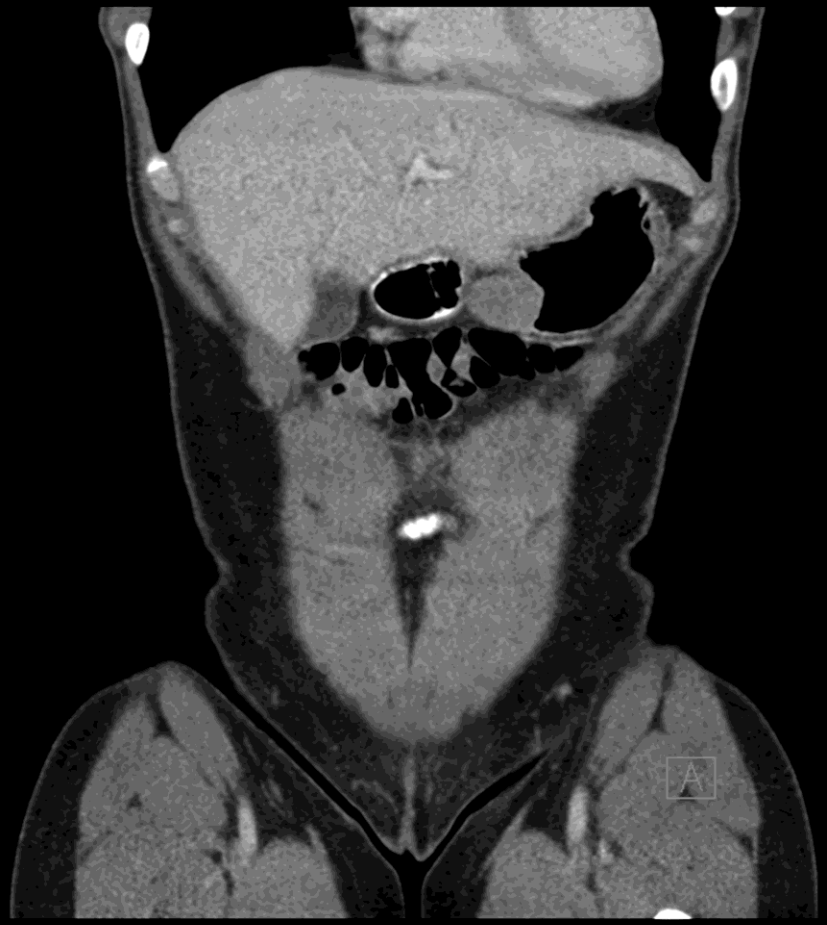
This gastric mass was resected from a 57 year old woman. The surgeon requested *KIT* mutational testing at the time of the operation.

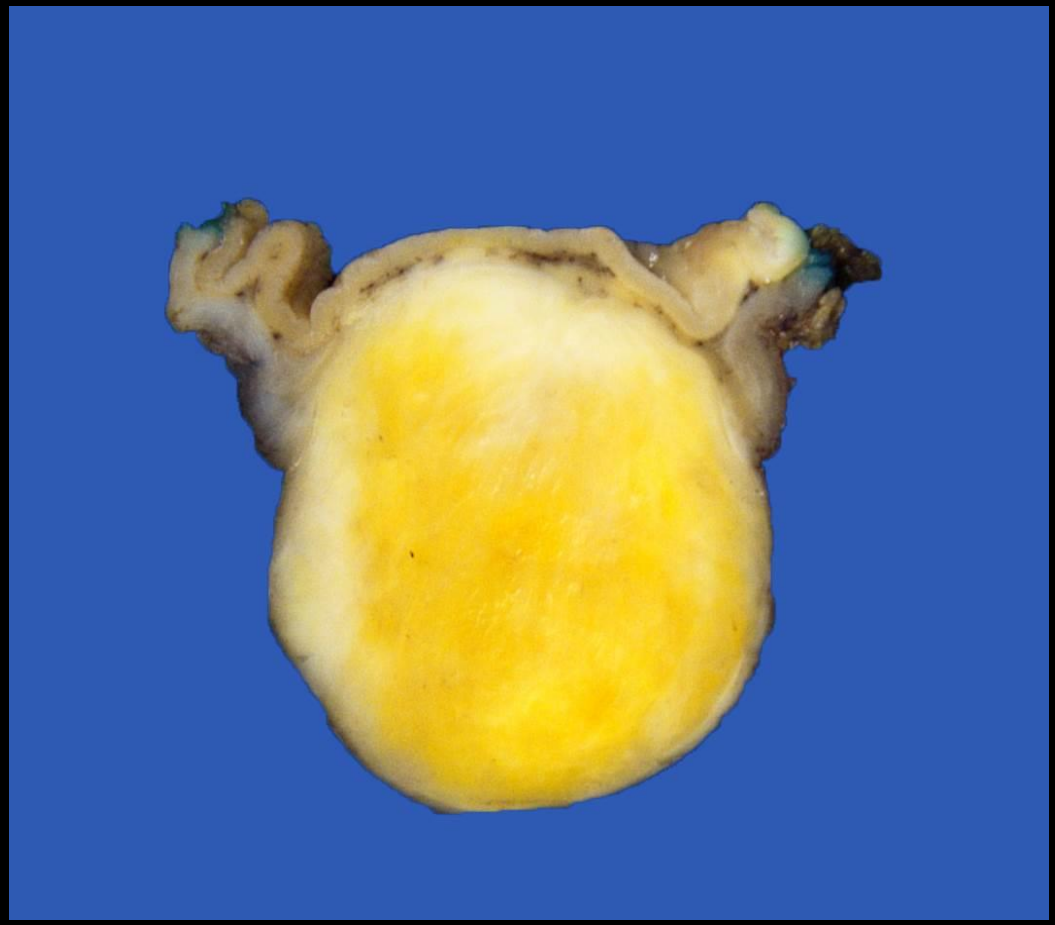






Gastric schwannoma – Arises in Muscularis Propria





GIT “Schwannomas”

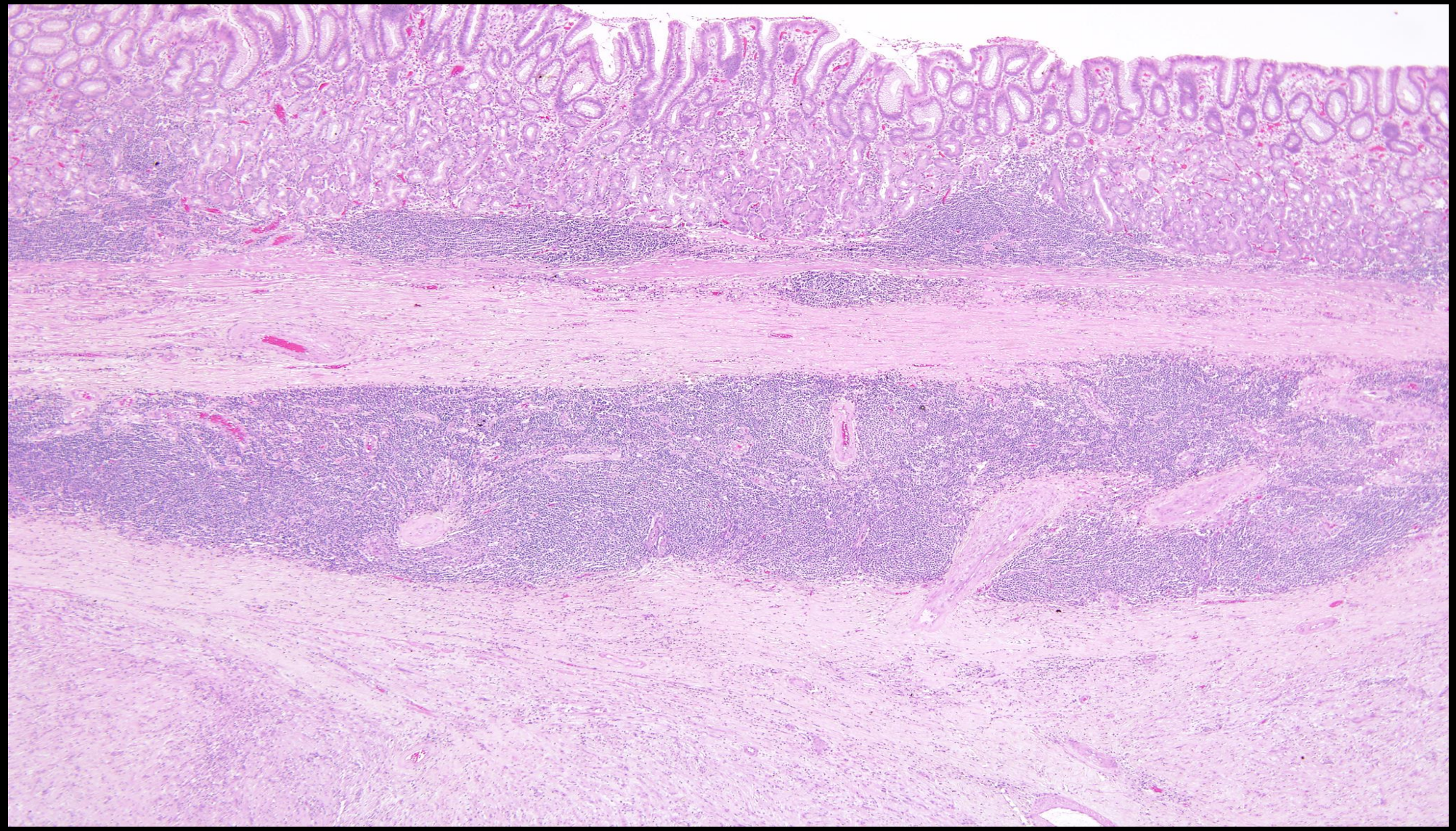
- Most schwannomas occur in the stomach involving submucosa and muscularis propria. They rarely arise in the esophagus or colon.
- Lesions classified as GI schwannomas differ from the conventional somatic soft tissue schwannomas histologically by having peripheral lymphoid cuffs, lacking fibrous capsules or vascular hyalinization, and rarely showing degenerative changes.

- Voltaggio L, Murray R, Lasota J, Miettinen M. Gastric schwannoma: a clinicopathologic study of 51 cases and critical review of the literature. Hum Pathol. 2012 May;43(5):650-9. PMID: 22137423; PMCID: PMC3305846.

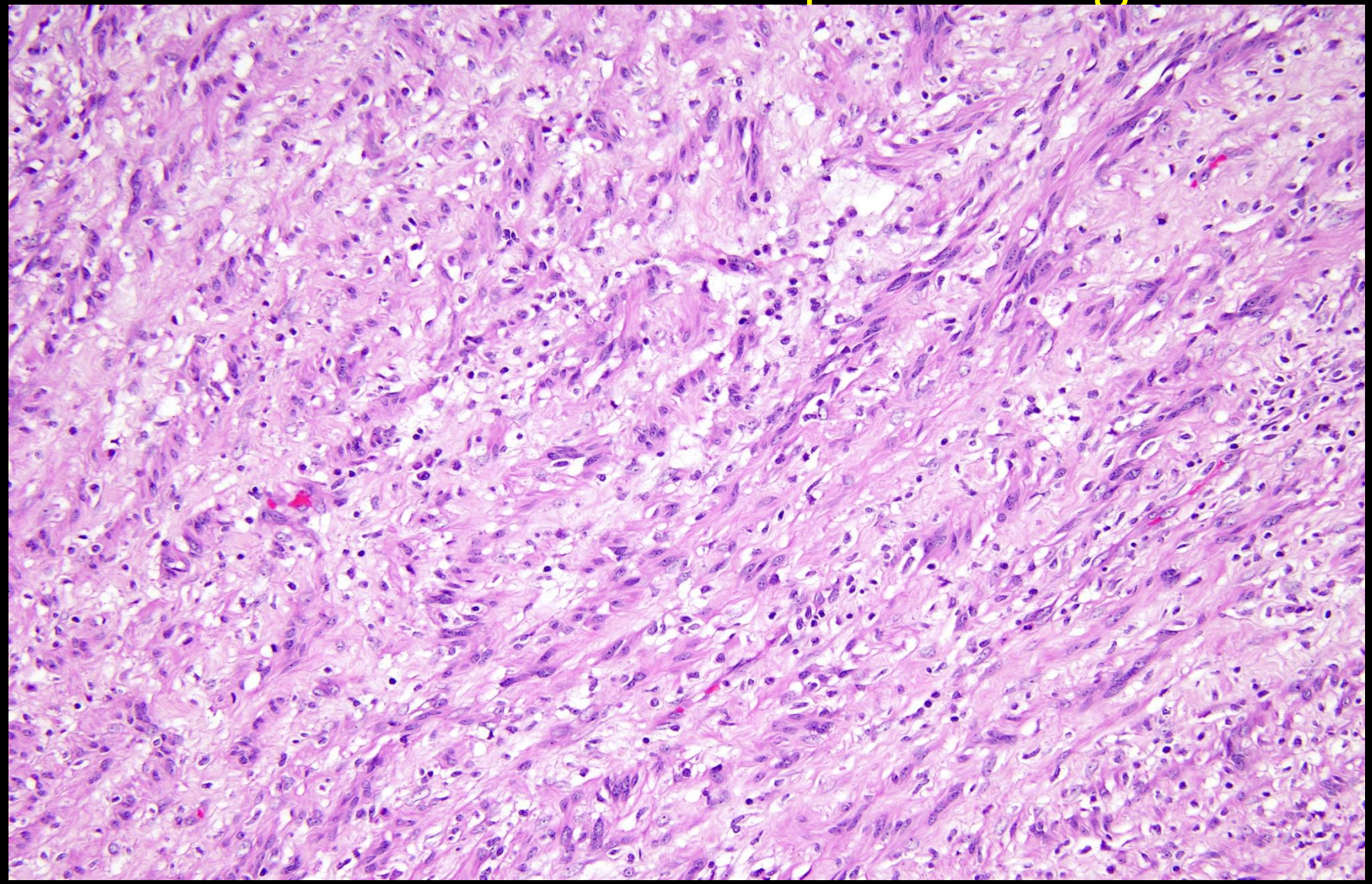
GIT “Schwannomas”

- GI “schwannomas” lack alterations in the *NF2* gene found in many sporadic, conventional schwannomas from other sites.
- Most schwannomas express calretinin – GI “schwannomas” do not

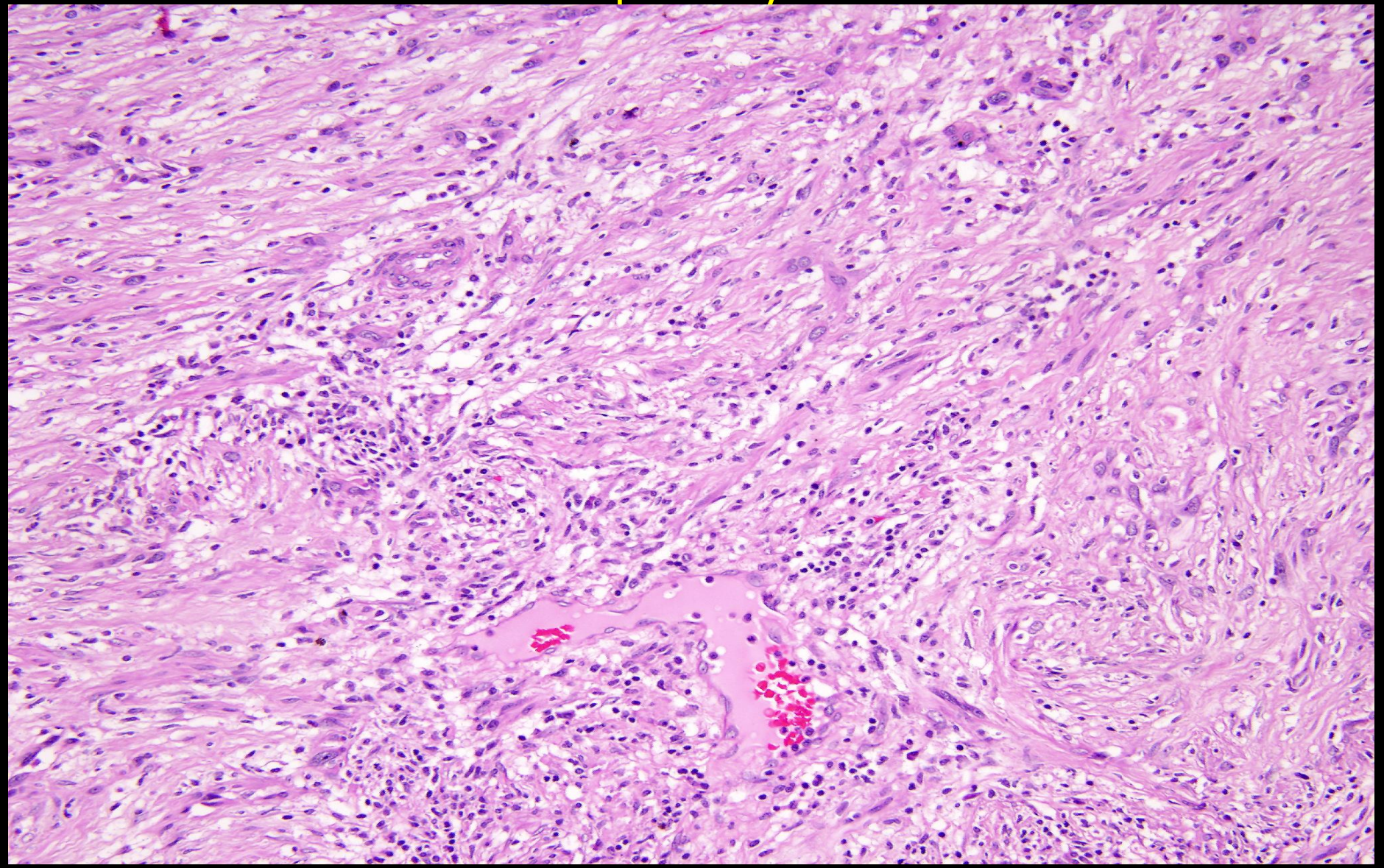
Gastric schwannoma - Thick lymphoid cuff



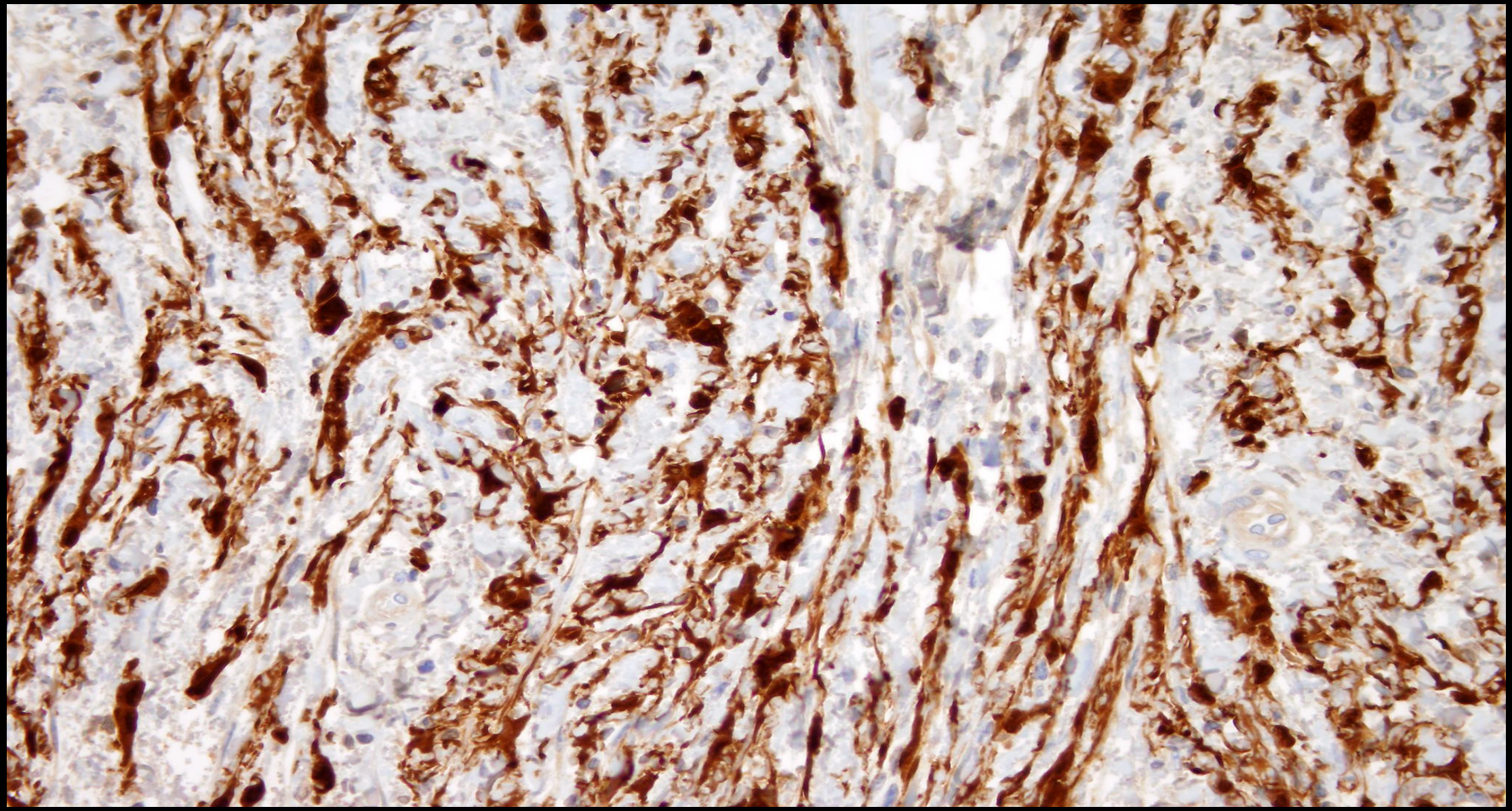
Gastric schwannoma - Sort of palisading



Gastric schwannoma – plenty of inflammation

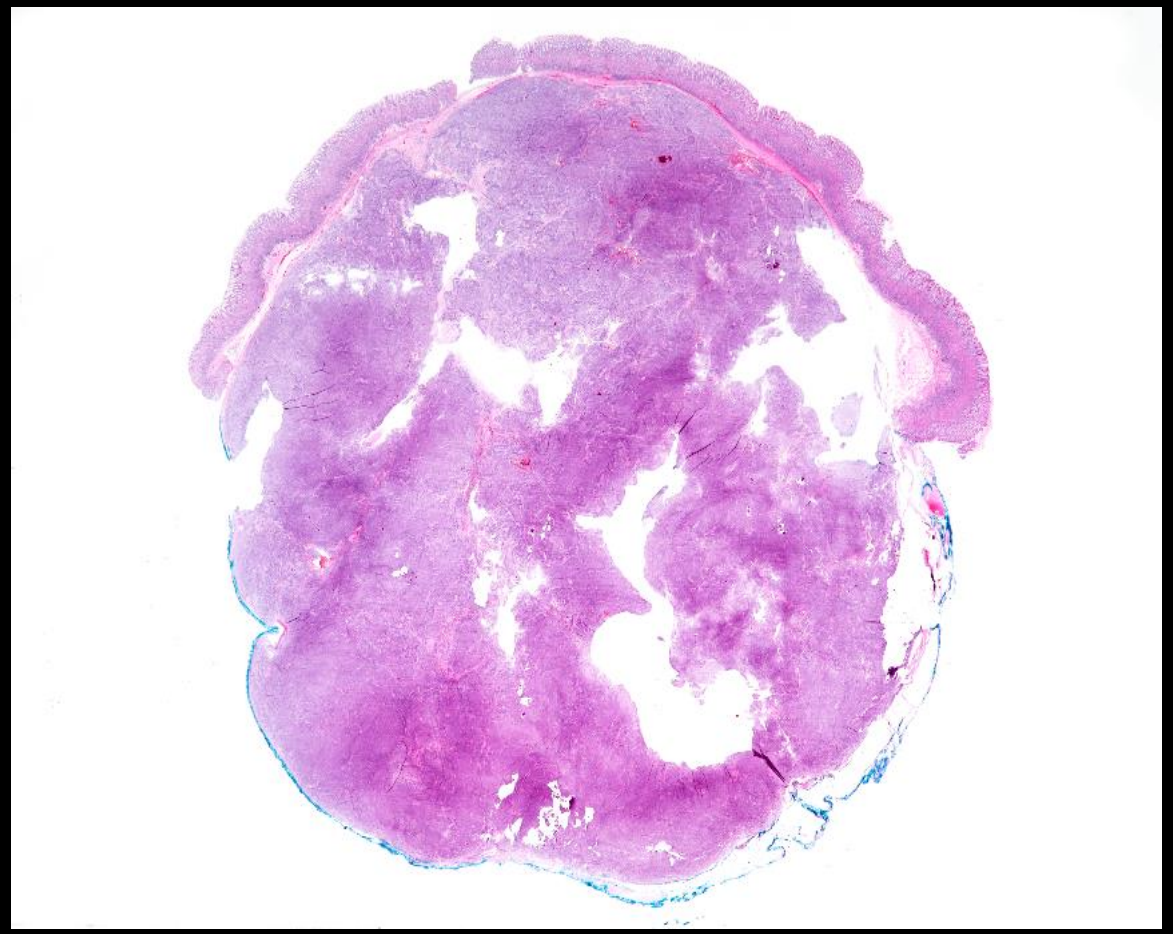


Gastric schwannoma – S100 protein for nervous souls

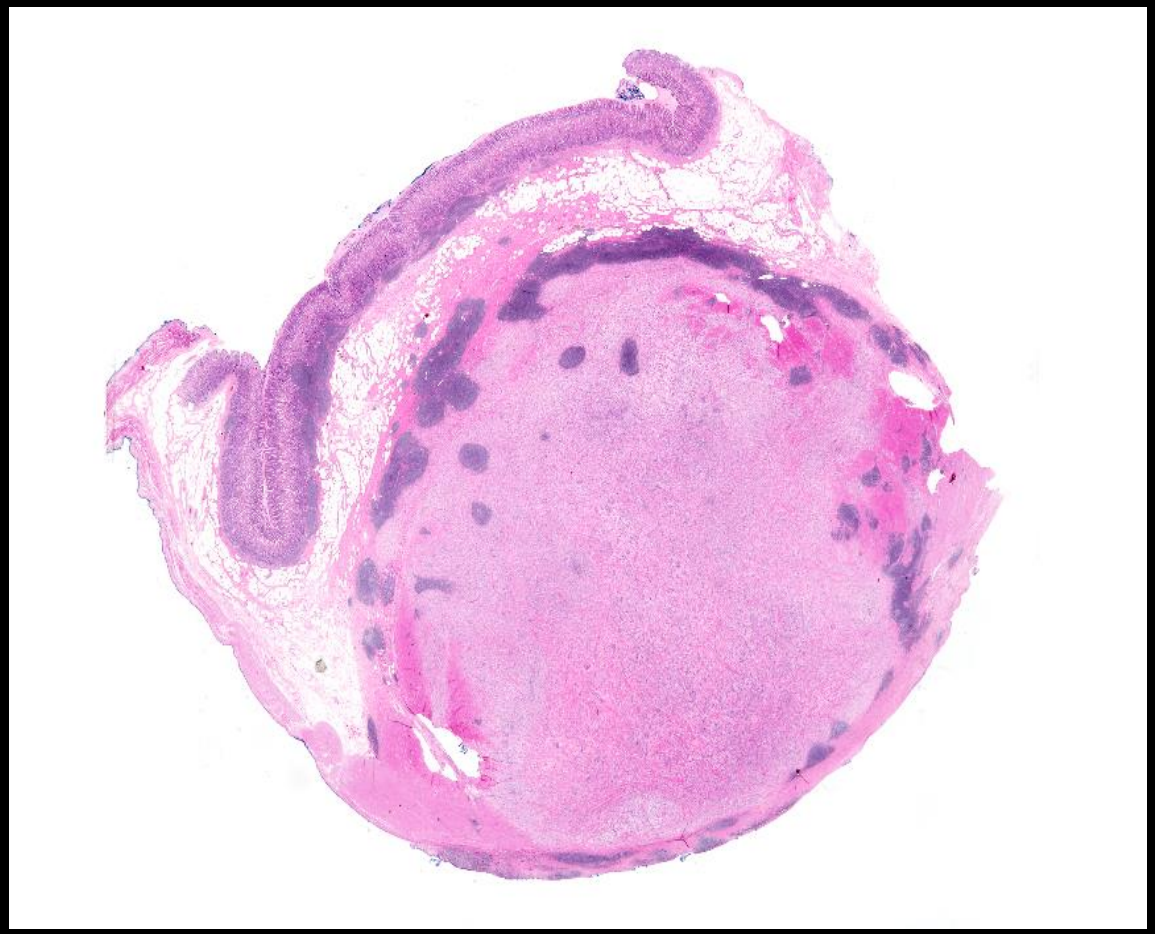


Gastric Beauty Contest

GIST



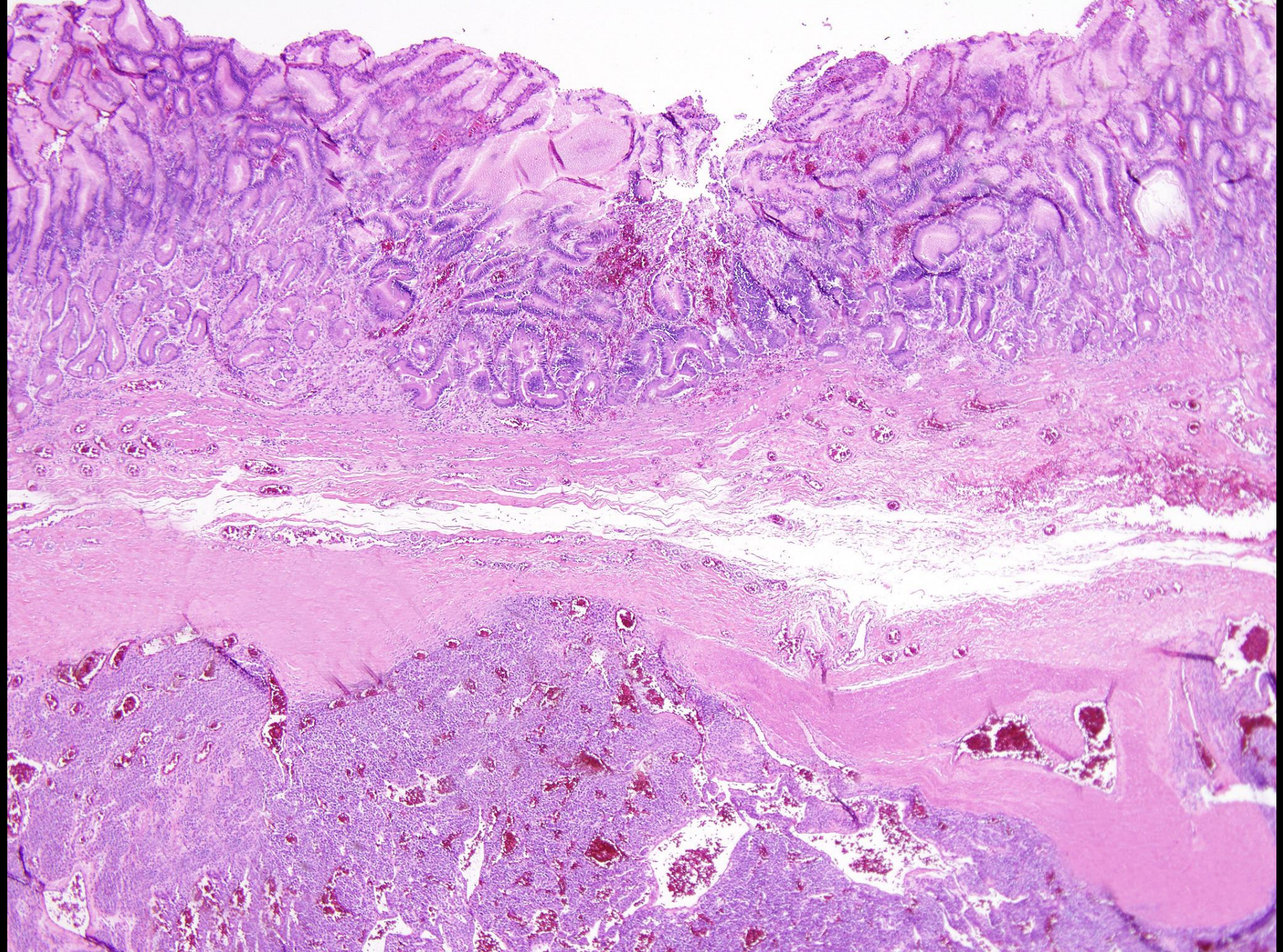
Schwannoma



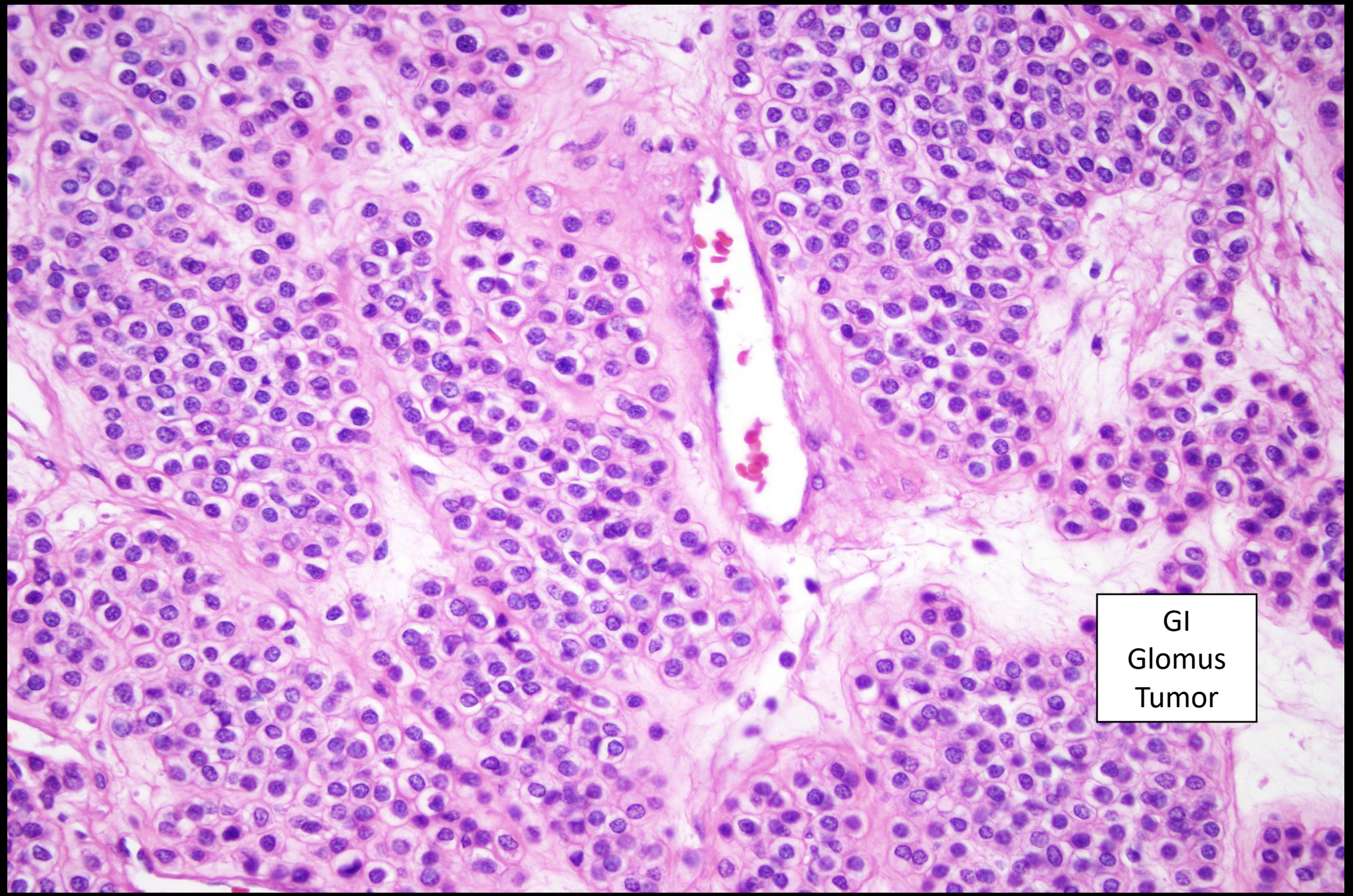
GI Glomus Tumors

- Rare in the GI tract.
- Largest series (AFIP); female predominance, median age at presentation of 55 years.
- Majority in stomach
- May present with severe bleeding producing melena.
- The vast majority behaves in a benign fashion.
- However, some examples are lethal with metastases.
- *Difficult to predict which will have an unfavorable outcome – proposal of ≥ 5cm with ≥2 mitoses/10 hpf as malignant.*
- **Esophageal examples (rare) seem to be aggressive**

- Birkness-Gartman JE, Wangsiricharoen S, Lazar AJ, Gross JM. Oesophageal glomus tumours: rare neoplasms with aggressive clinical behaviour. Histopathology. 2023 Jun;82(7):1048-1055. PMID: 36788021.)
- Papke DJ Jr, Sholl LM, Doyle LA, Fletcher CDM, Hornick JL. Gastroesophageal Glomus Tumors: Clinicopathologic and Molecular Genetic Analysis of 26 Cases With a Proposal for Malignancy Criteria. Am J Surg Pathol. 2022 Oct 1;46(10):1436-1446. PMID: 35703141.

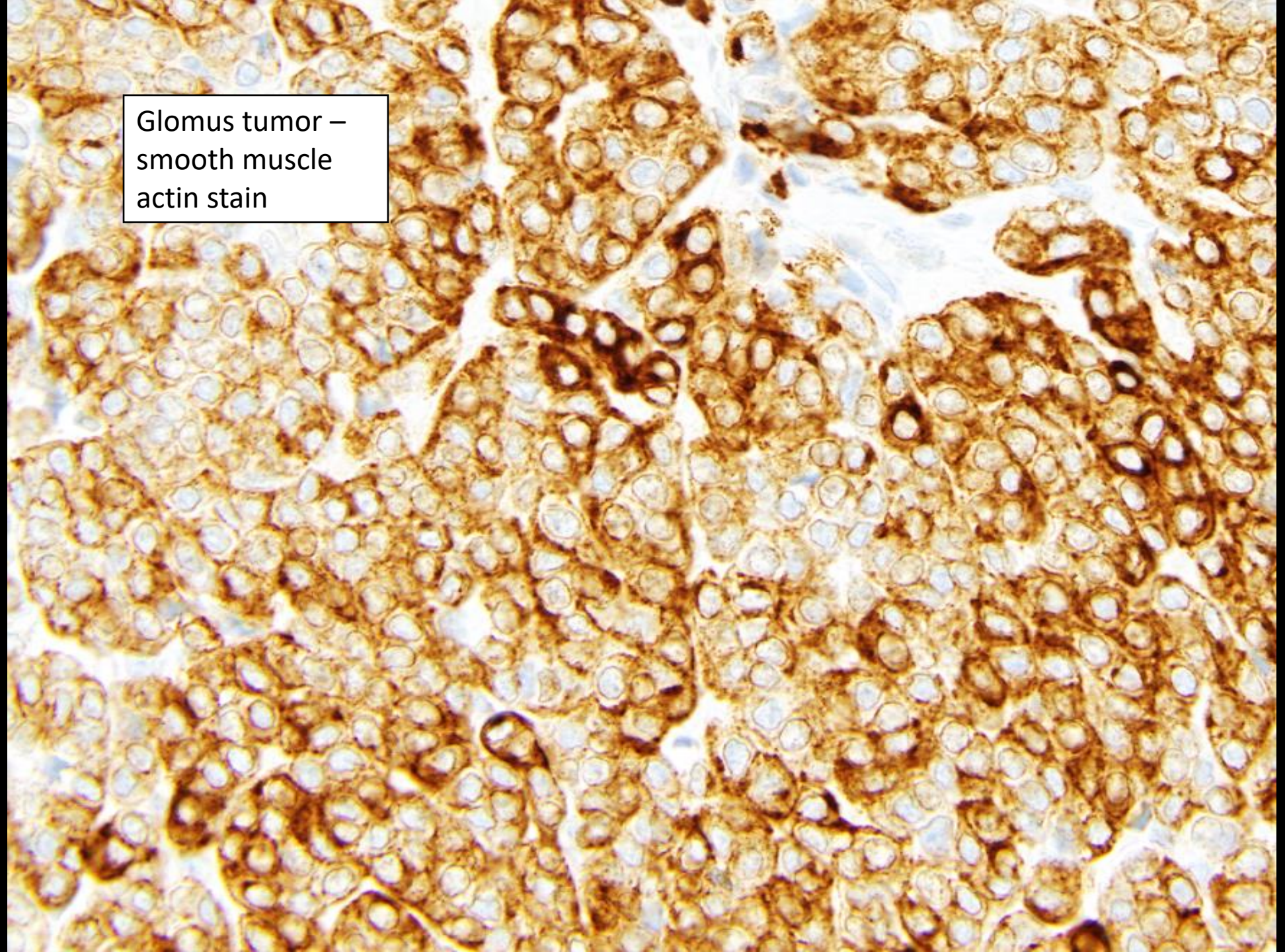


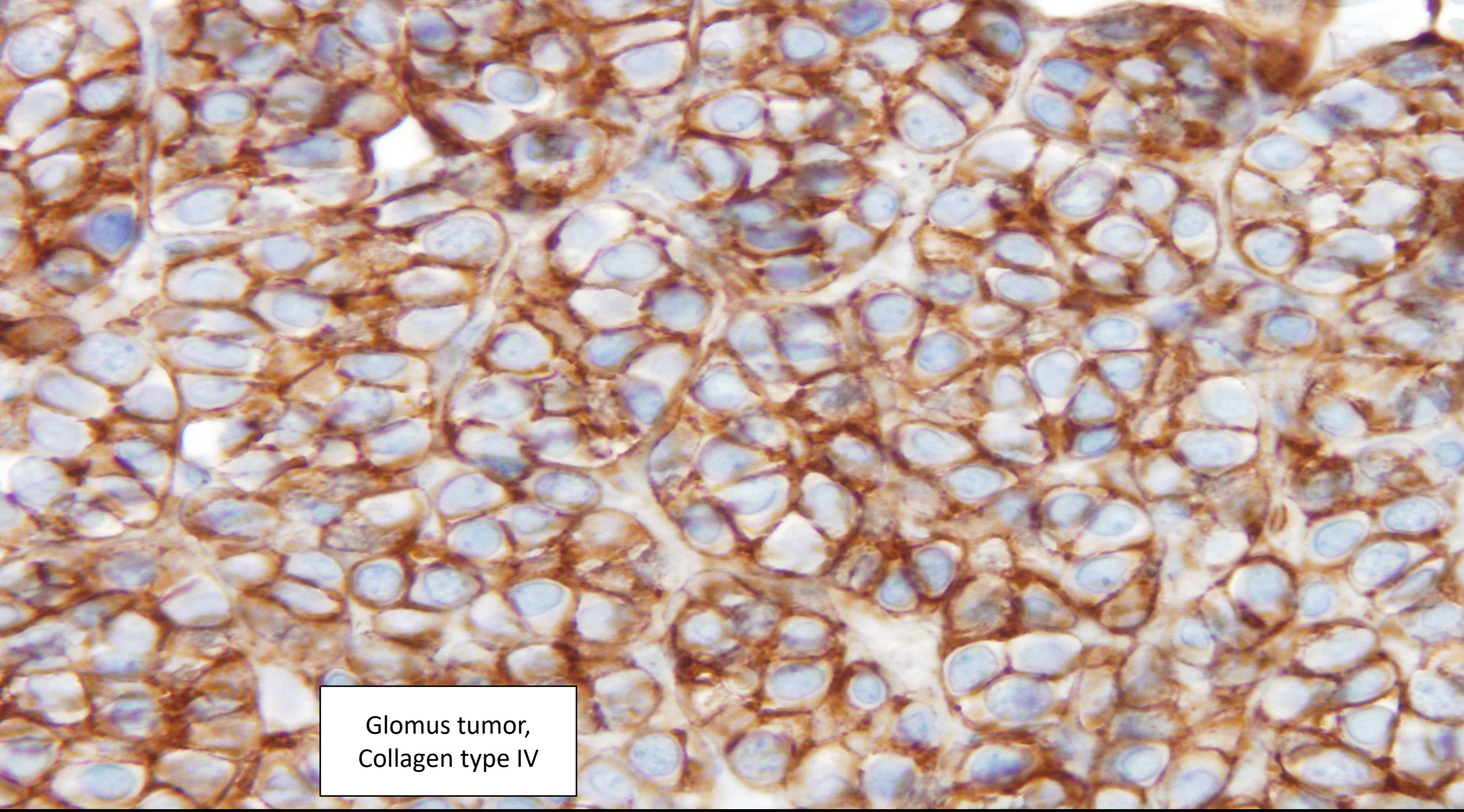
GI Glomus Tumors
Denizens of muscularis propria

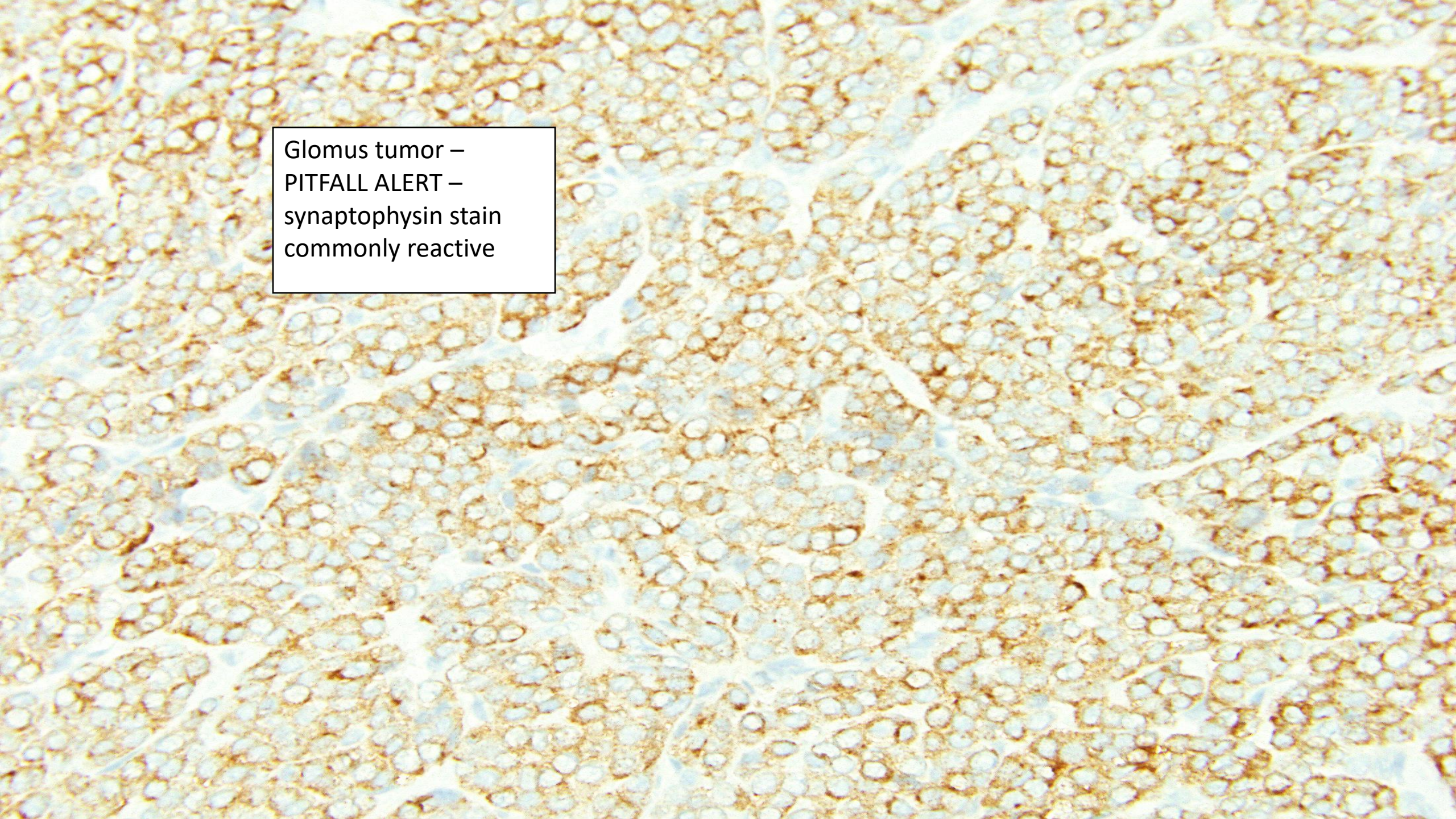

GI
Glomus
Tumor

GI Glomus Tumors, Ancillary Studies

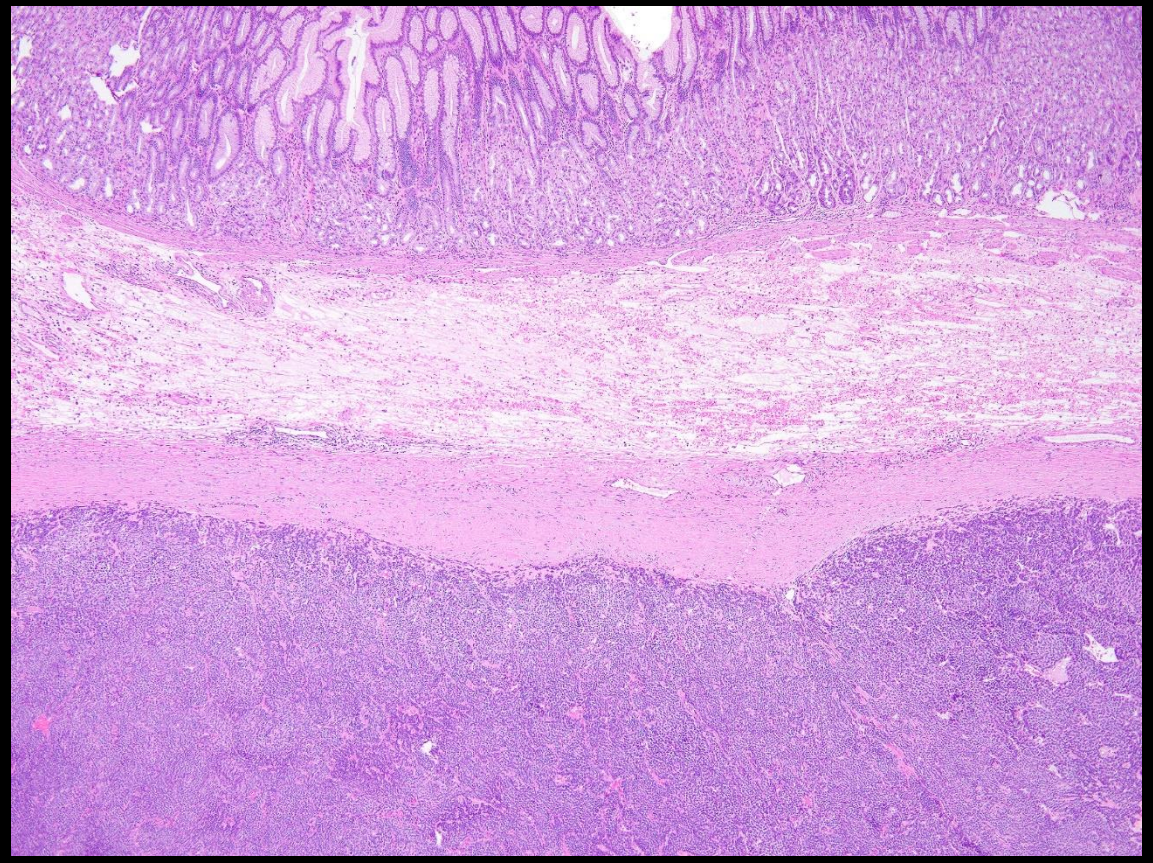
- Express smooth muscle actin, calponin, and h-caldesmon but lack desmin.
- Pericellular net-like positivity is seen with basement membrane proteins (laminin and collagen type IV).
- Some cases have focal CD34.
- No CD117/kit expression – No *KIT* mutations.
- Some cases express synaptophysin but these tumors lack chromogranin and they lack keratin.
- *MIR143::NOTCH* fusion Genes Chromosomes and Cancer 2013; 52:1075

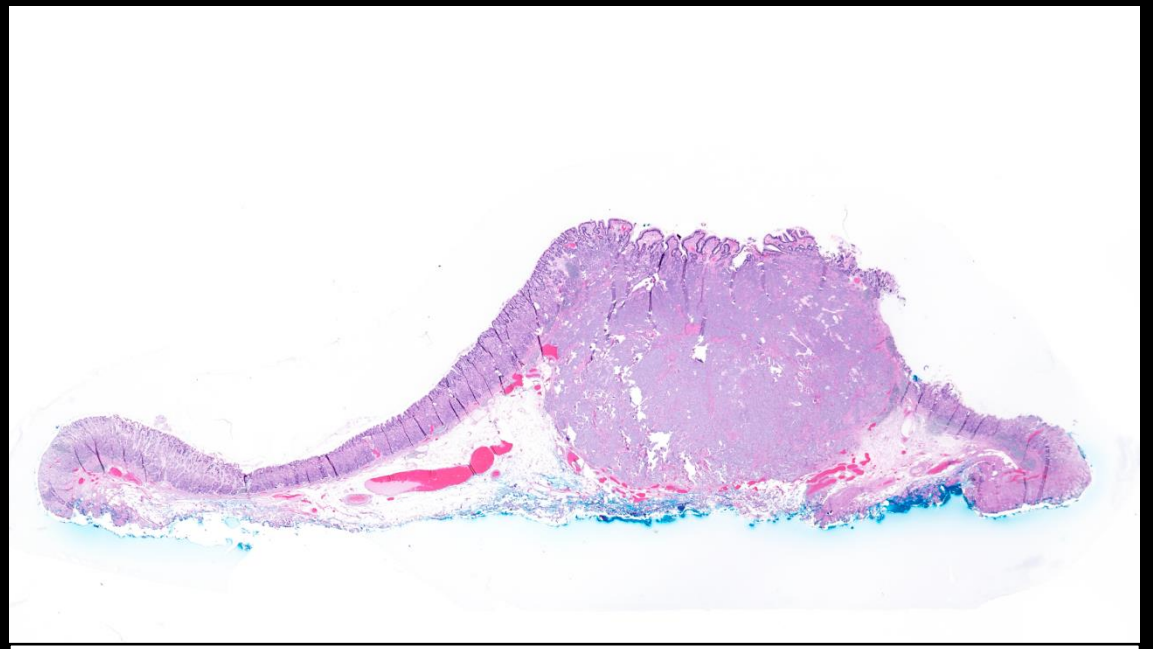

Glomus tumor –
smooth muscle
actin stain


Glomus tumor,
Collagen type IV


Glomus tumor –
PITFALL ALERT –
synaptophysin stain
commonly reactive

Glomus Tumor (L) versus NET (R)





Well differentiated neuroendocrine (carcinoid tumor – lives at the junction of the mucosa and submucosa – this is an endoscopic mucosal resection specimen

Emperor of The Muscularis Propria

GIST –

Stromal tumors of GI tract

of spindle or epithelioid morphology, which are typically immunohistochemically positive for

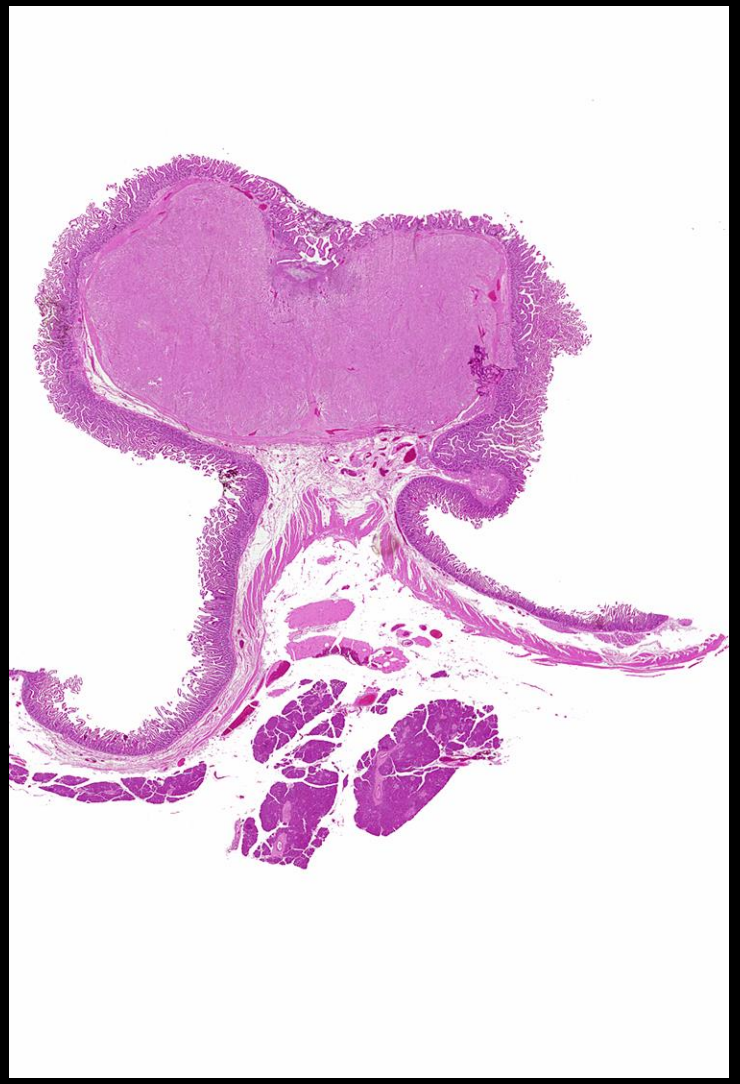
KIT (CD117)

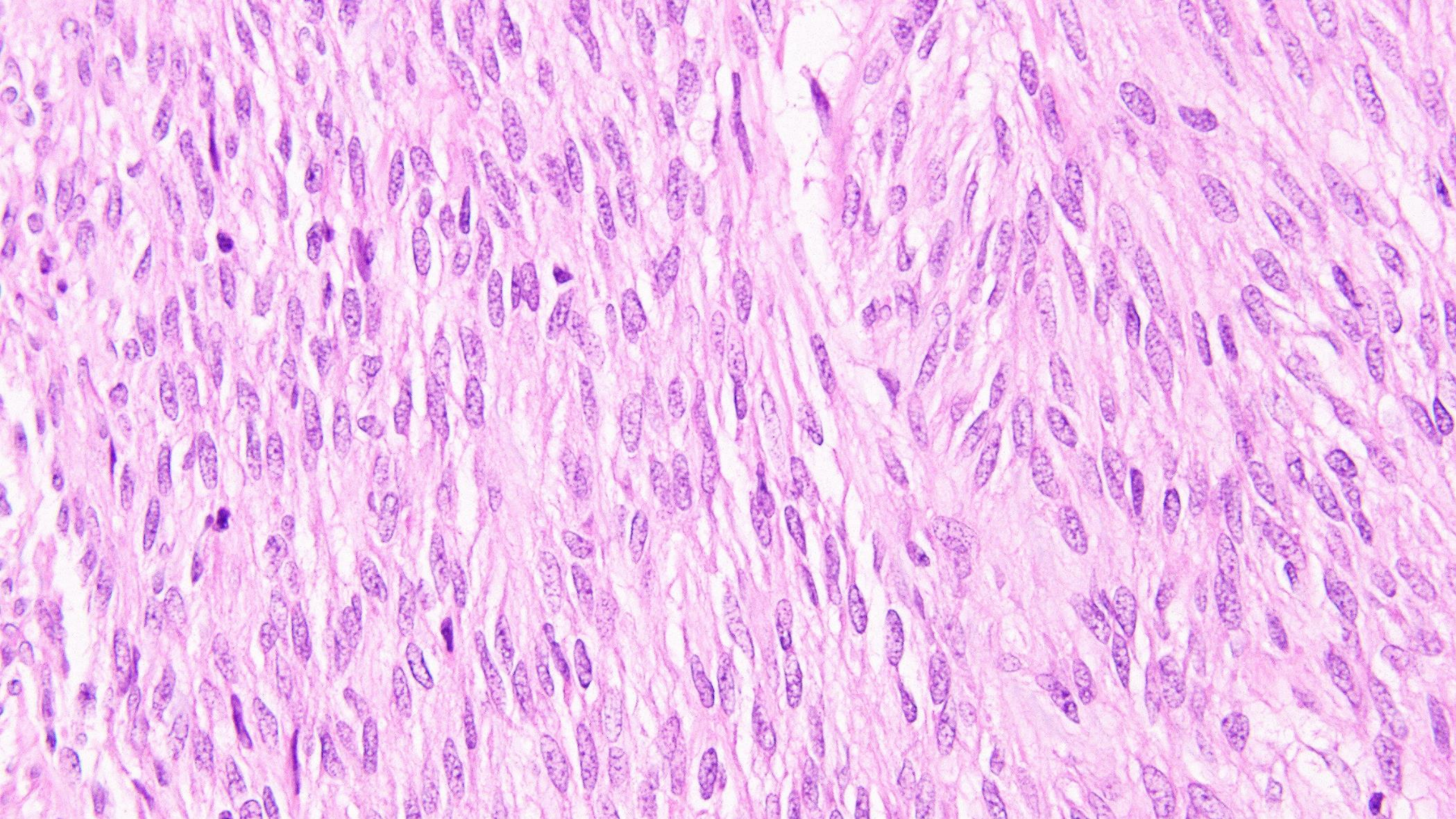
Identical tumors arise in
omentum, mesentery, retroperitoneum

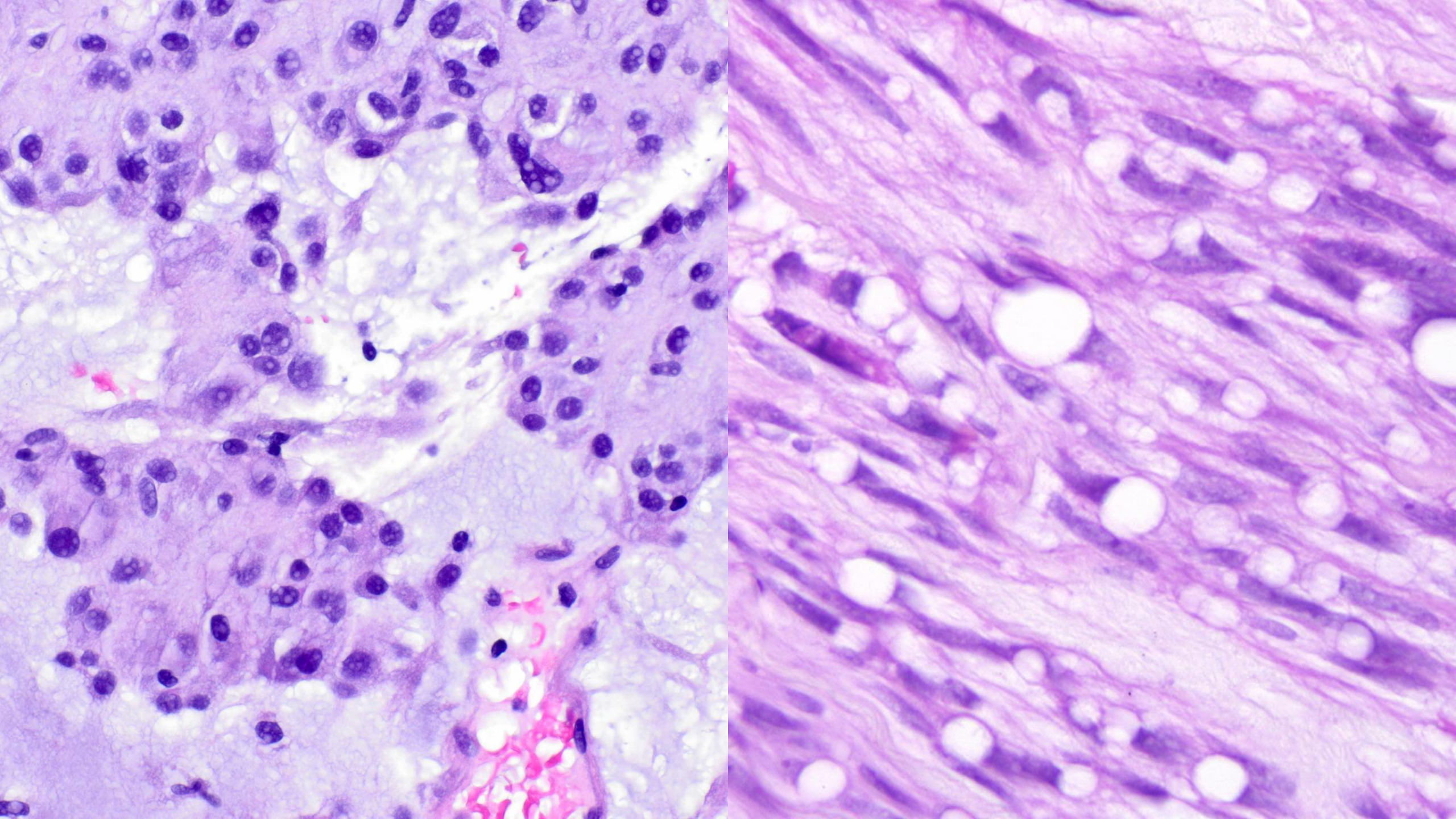
bladder, gall bladder

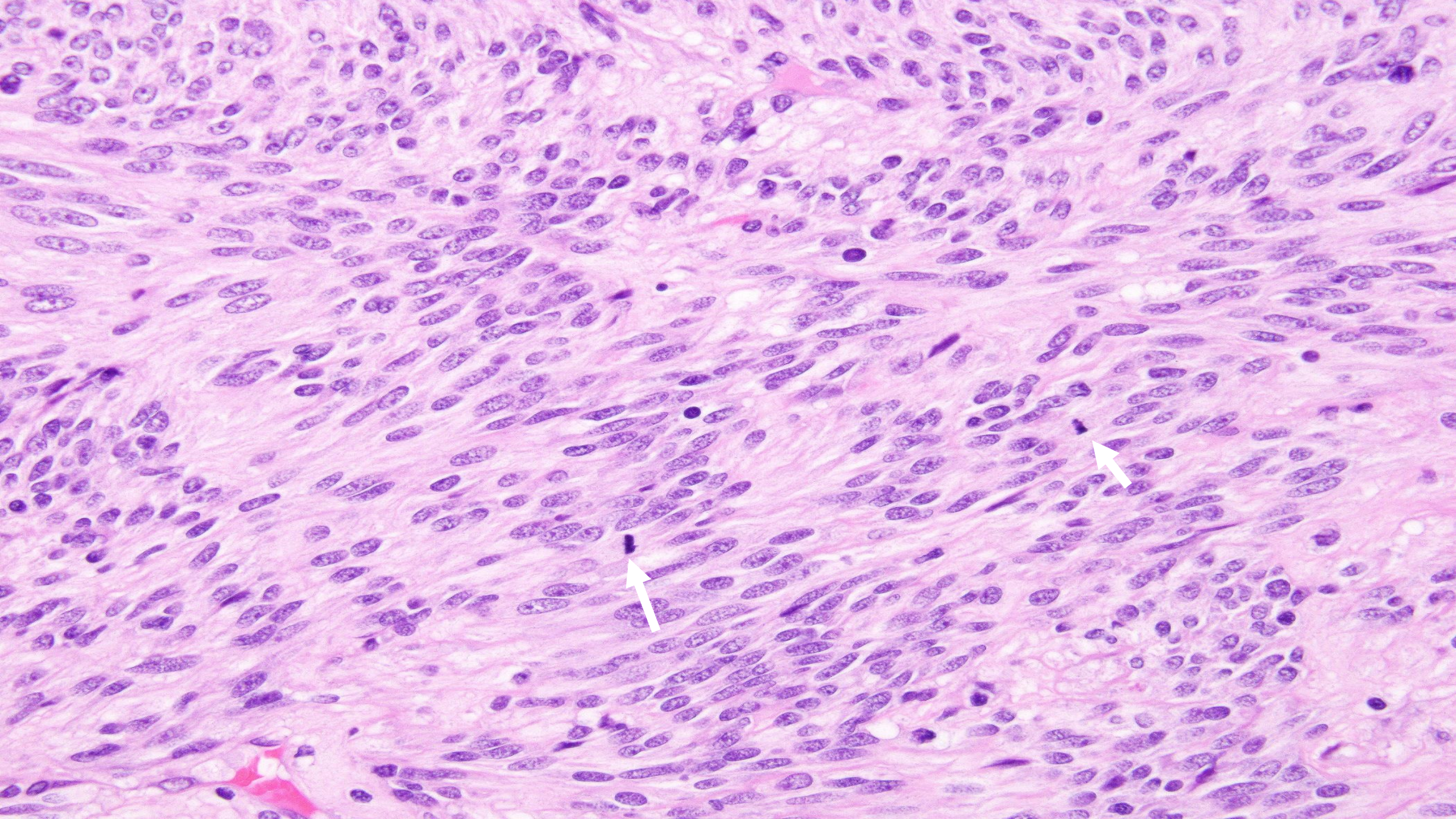
GIST

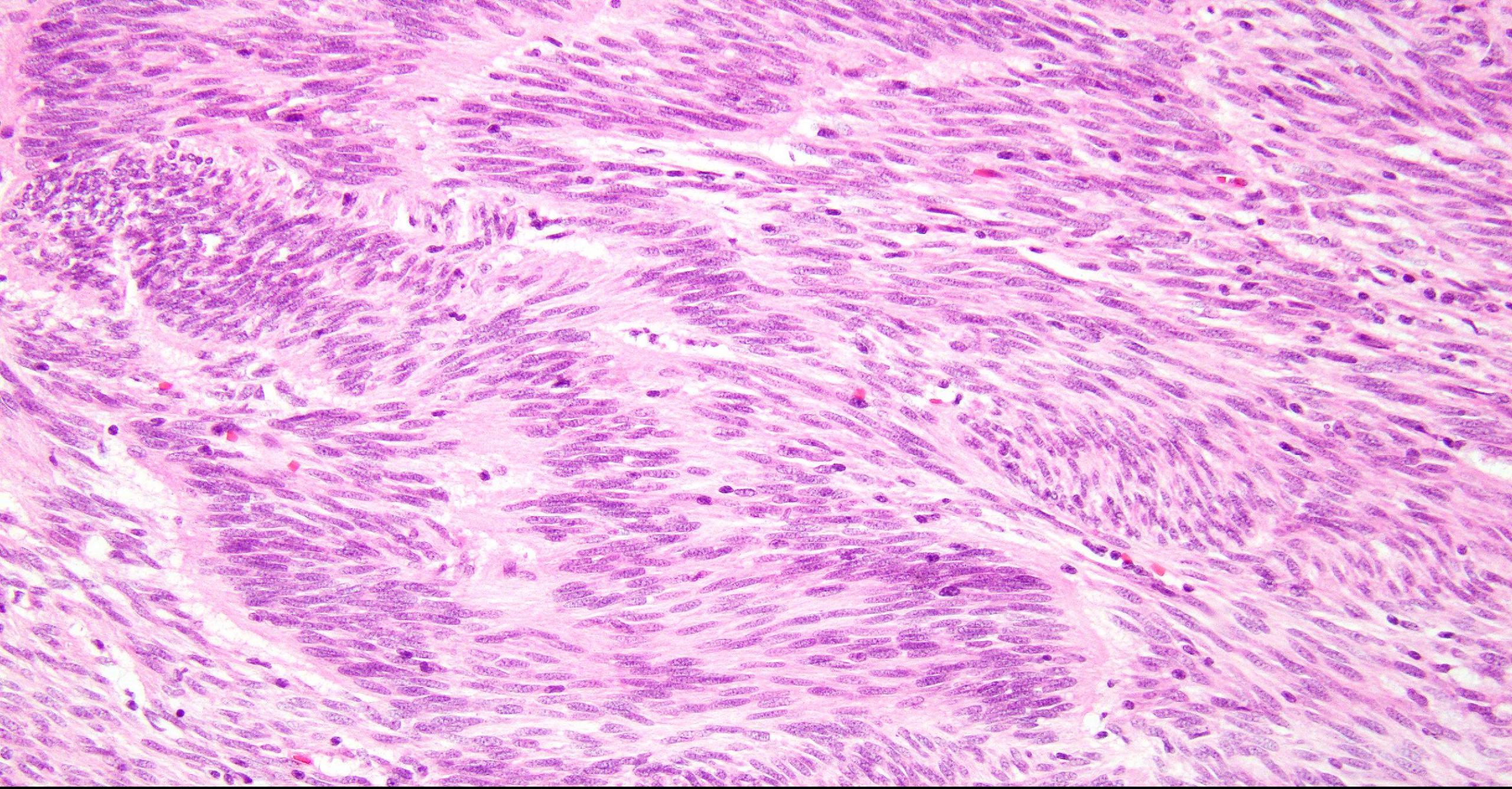
- 5-10% of all sarcomas
- 5,000/yr. in US
- 1% of GI malignancy
- M > F >50 yrs.
- Pain, bleeding, mass
- Incidental
- Metastasis

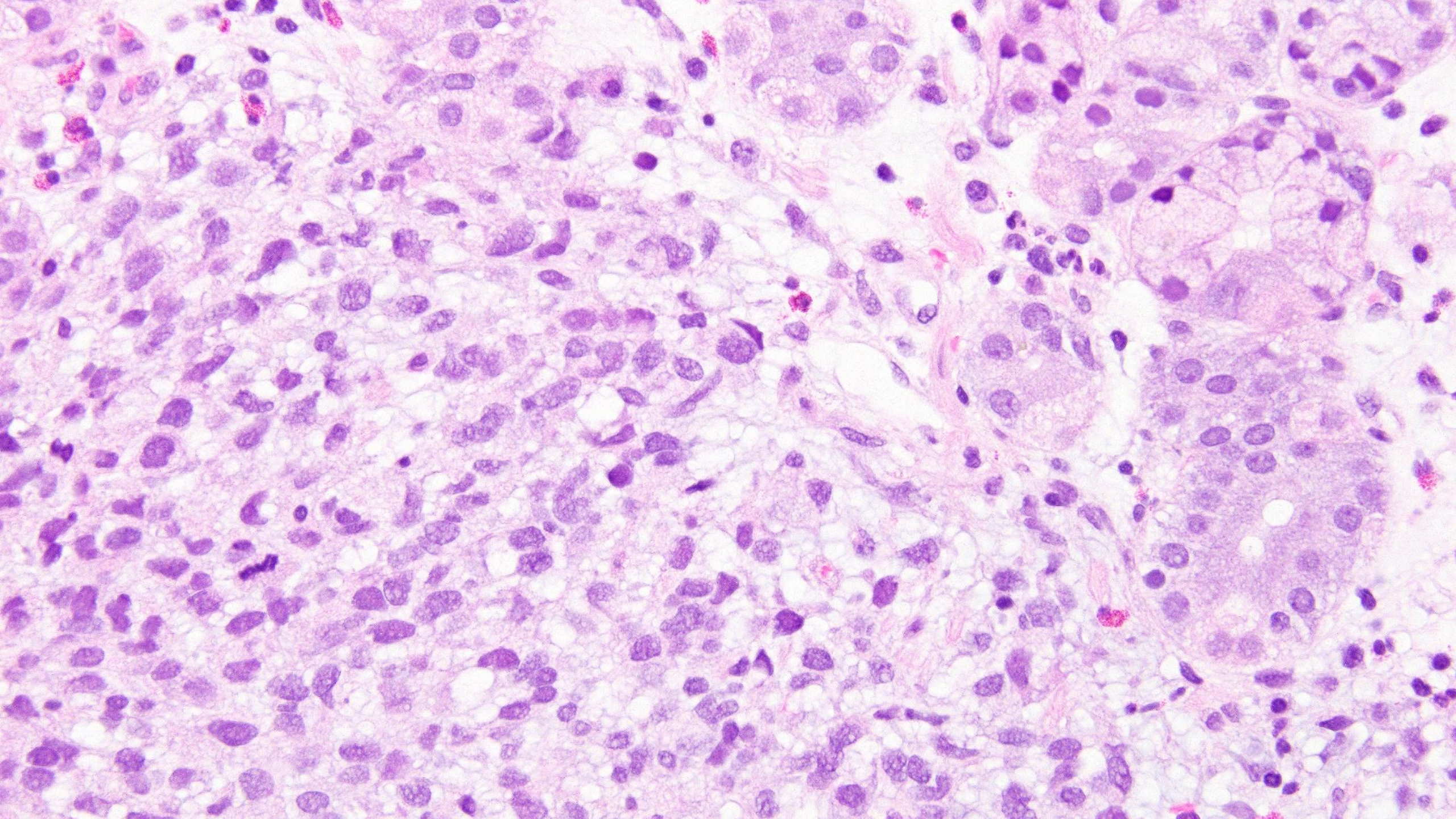




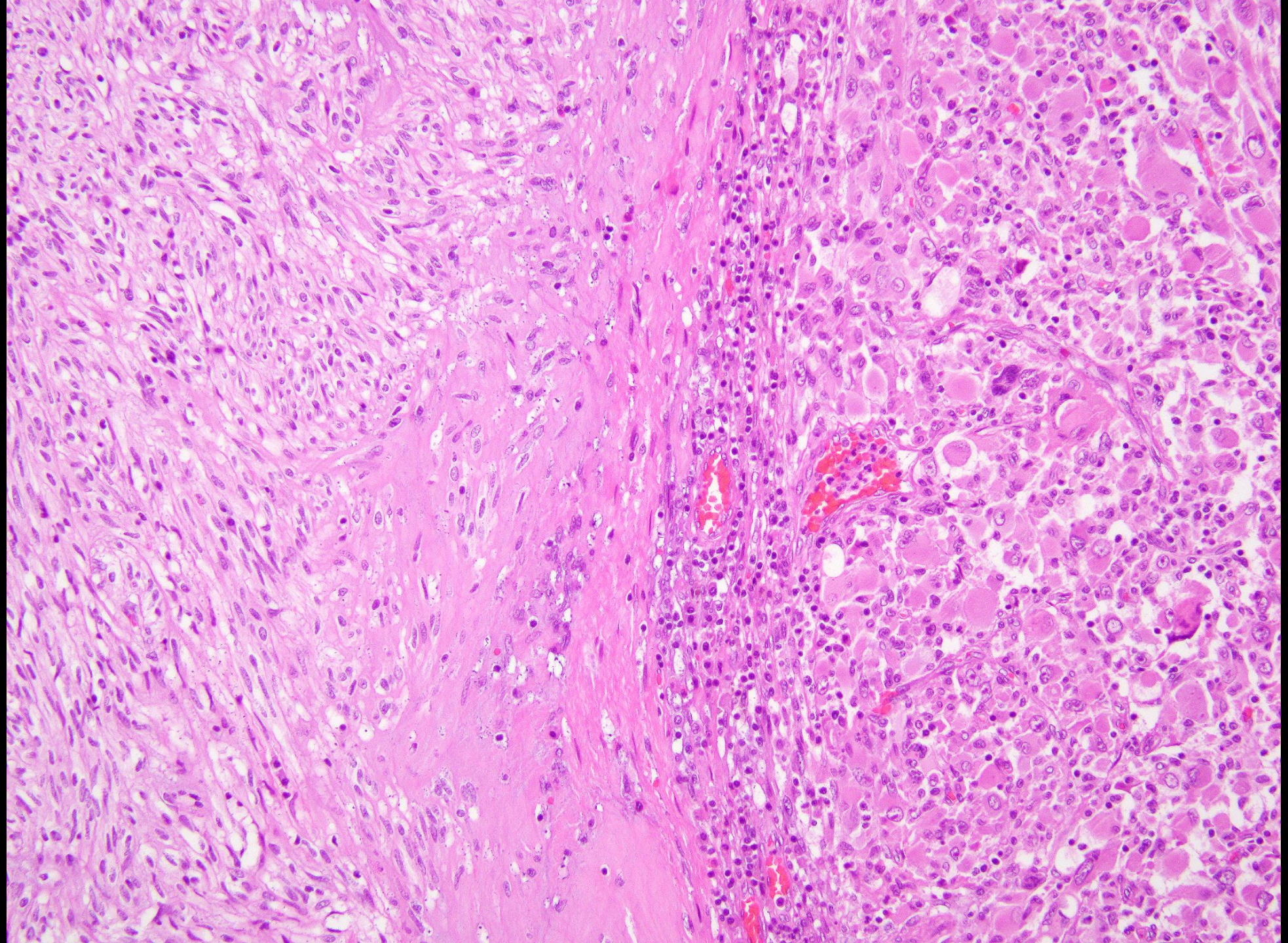






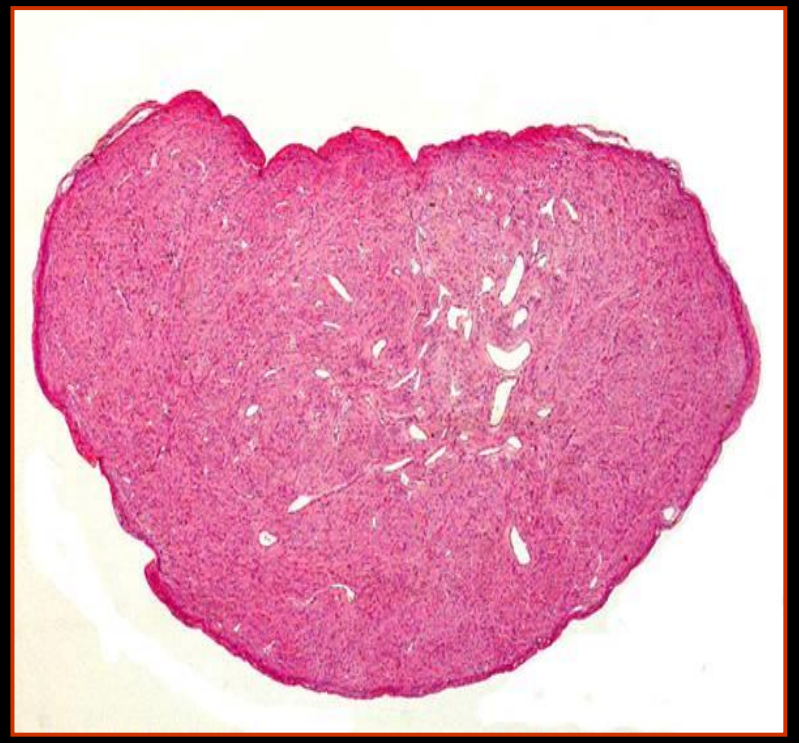


Dedifferentiated GIST



GIST: Associations

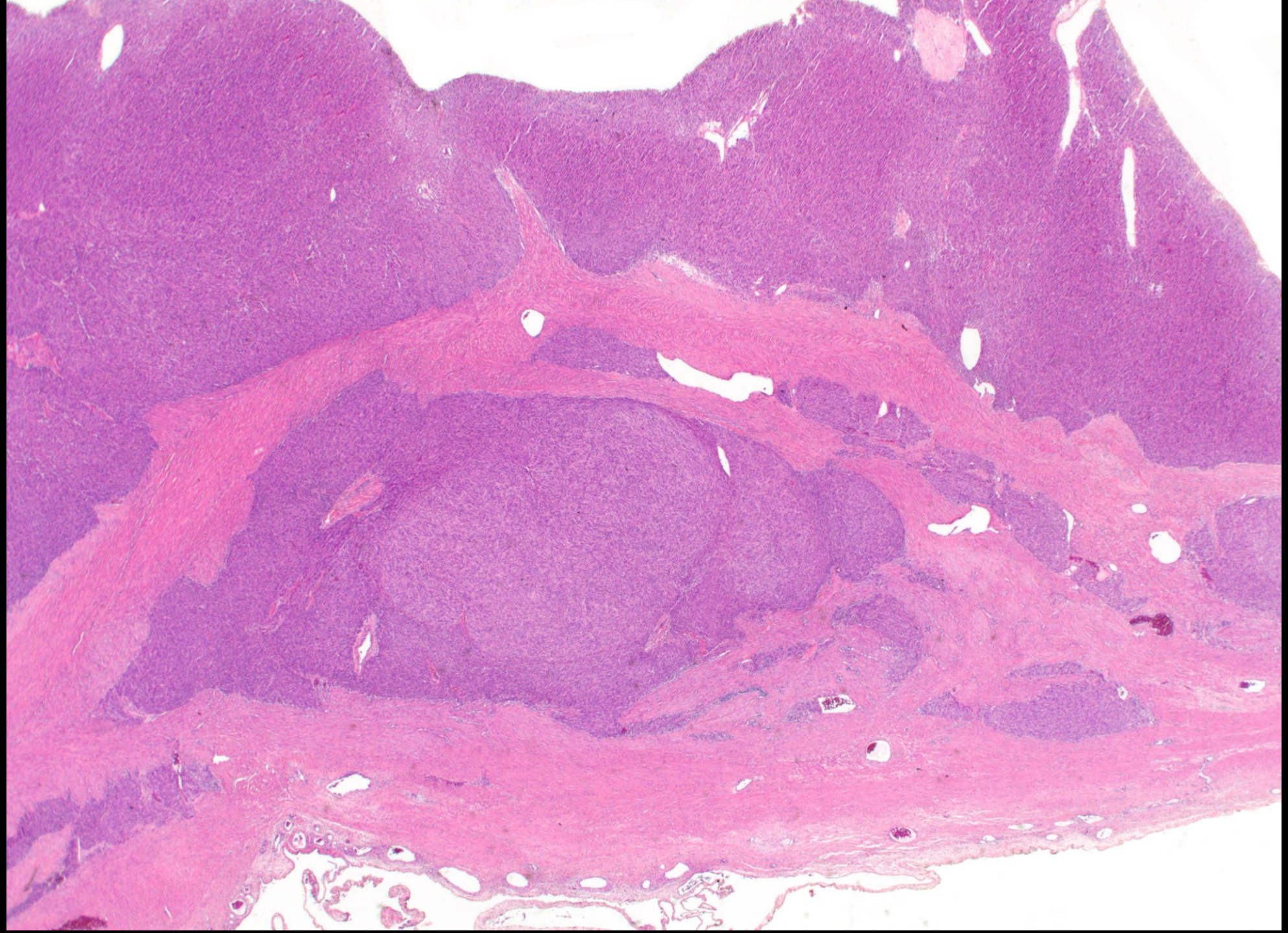
- Familial, multiple
  germline *KIT* mutation (11) or *PDGRFA*
  mutation
- NF-1
  NF-1 product/c-kit interaction [lack *KIT*
  mutations but stain with kit antibodies]
- Carney's triad:
  epithelioid GIST
  paraganglioma
  pulmonary chondroma

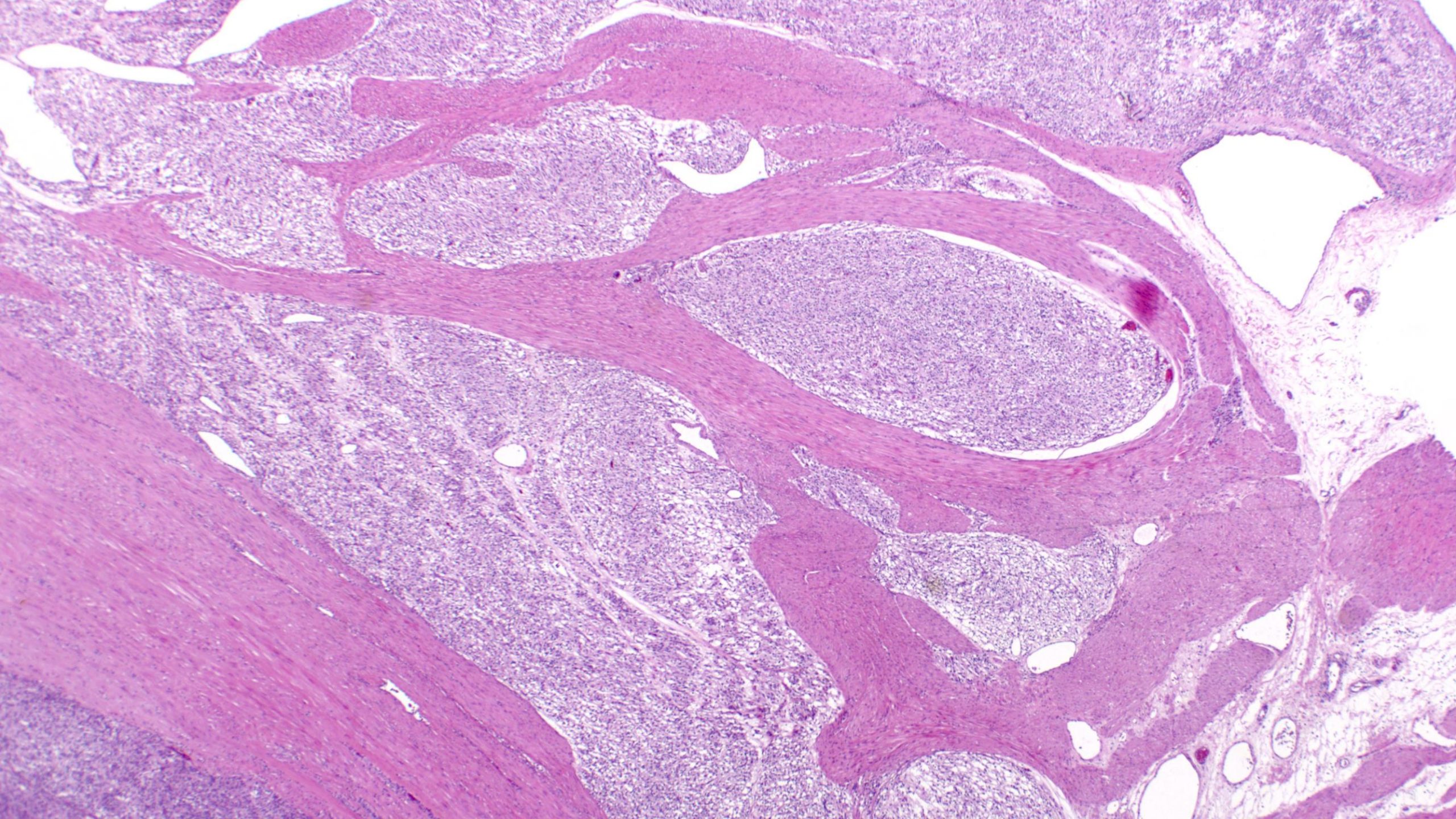


Family of *KIT* wild type GISTS – All Stain With KIT/DOG1 Immunostains

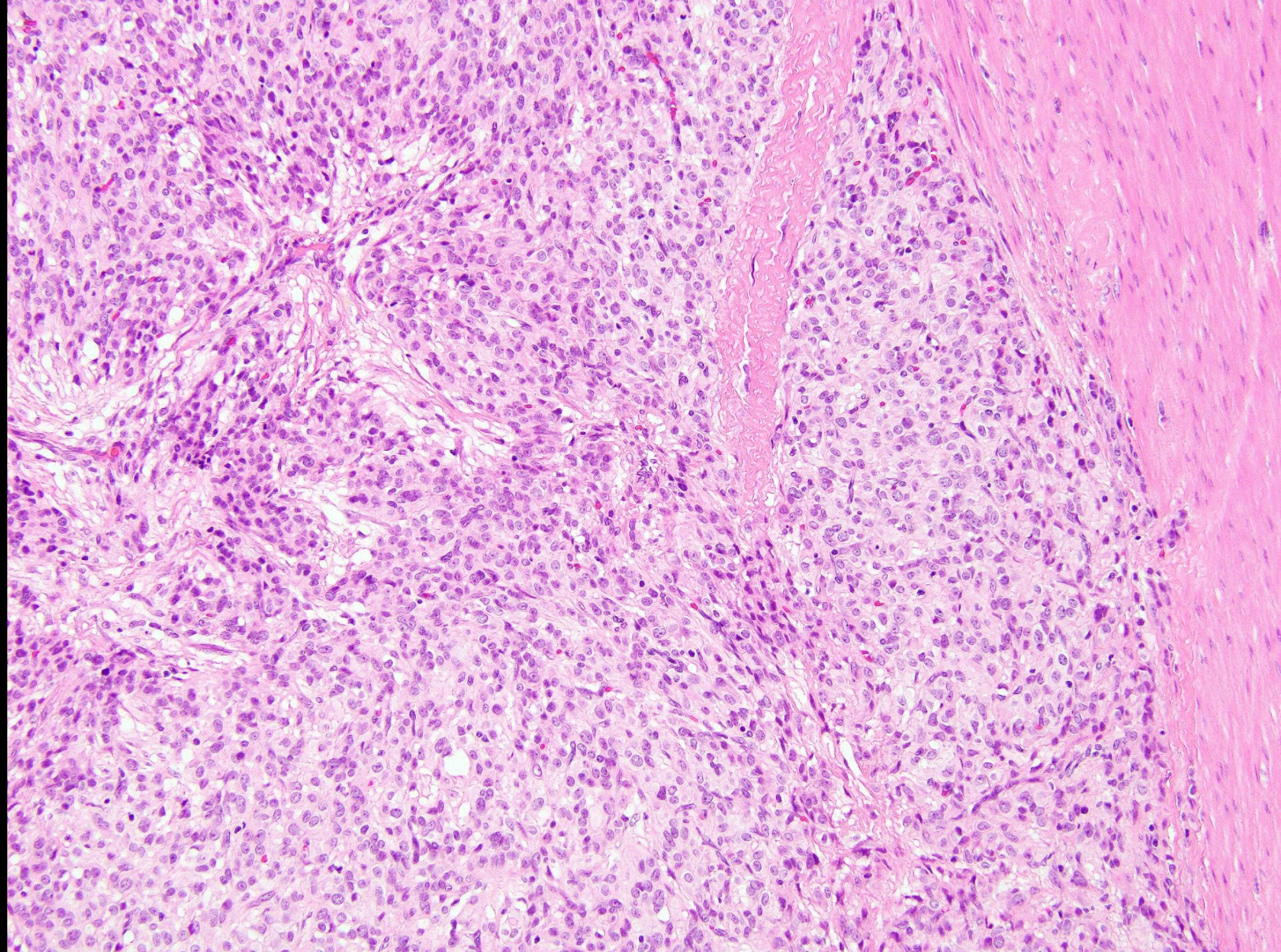
- NF1-associated
- Succinate dehydrogenase deficient ones:
  - About 7% of all GISTS (one study says 15% - referral bias)
  - Most pediatric cases
  - Gastric location
  - Often epithelioid with plexiform growth; LN mets; indolent course; no response to imatinib
  - Associated with Carney triad (GIST, paraganglioma, pulmonary chondroma – promotor methylation of *SDH* genes), Carney-Stratakis syndrome (GISTs and paraganglioma; affected families with germline mutations in either *SDHB, SDHC* or *SDHD*)

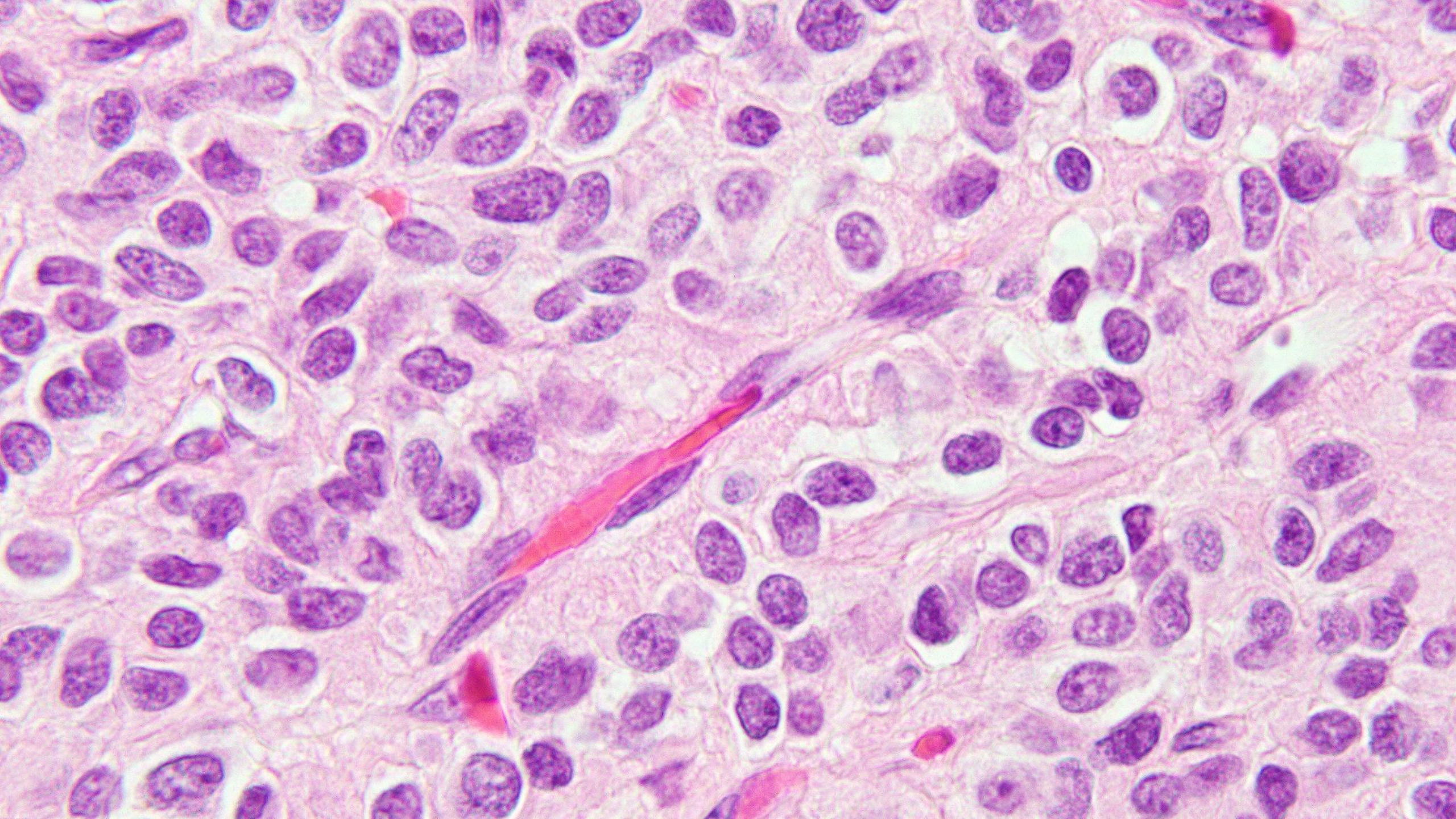
Succinate dehydrogenase deficient GIST
Plexiform pattern



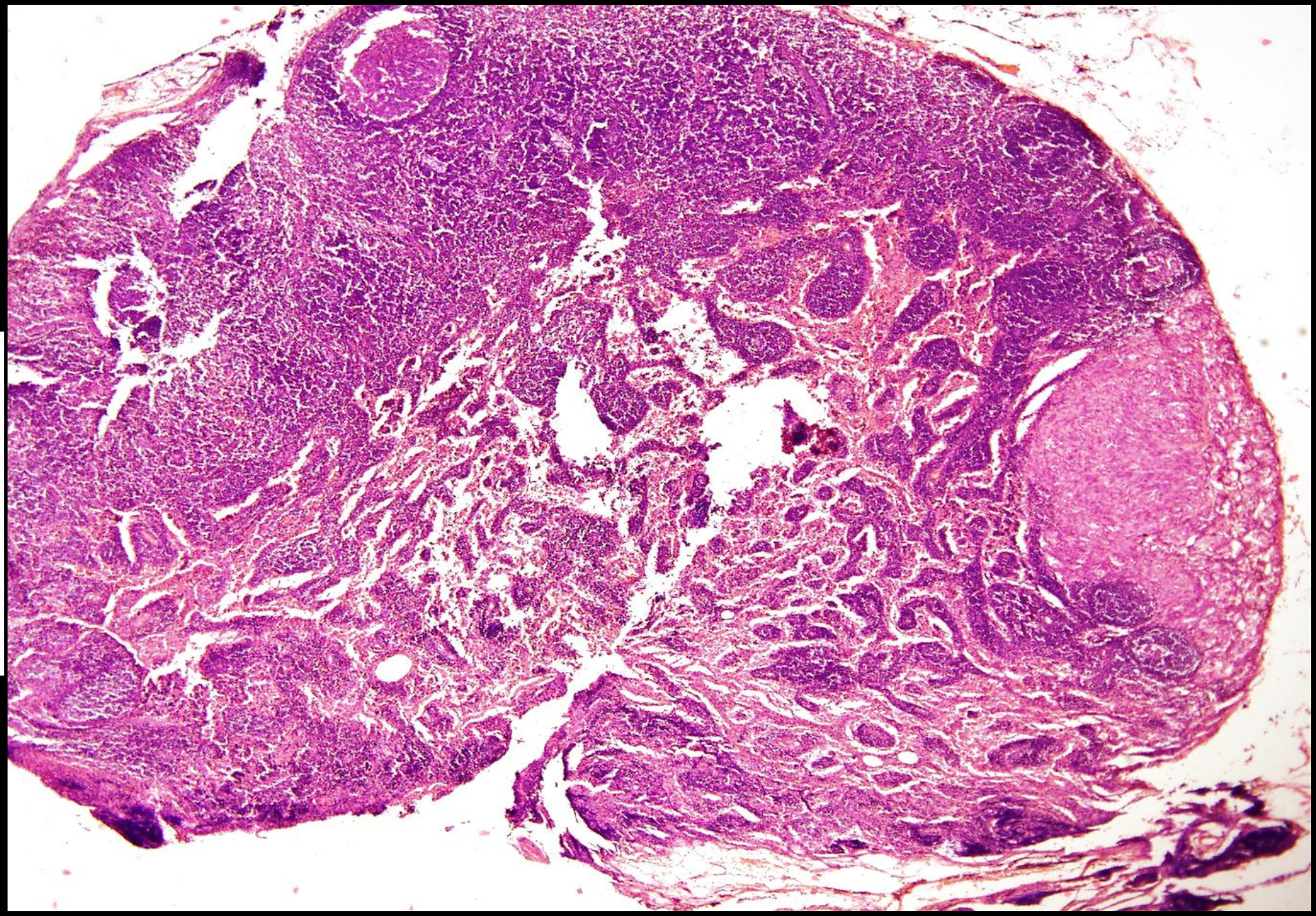


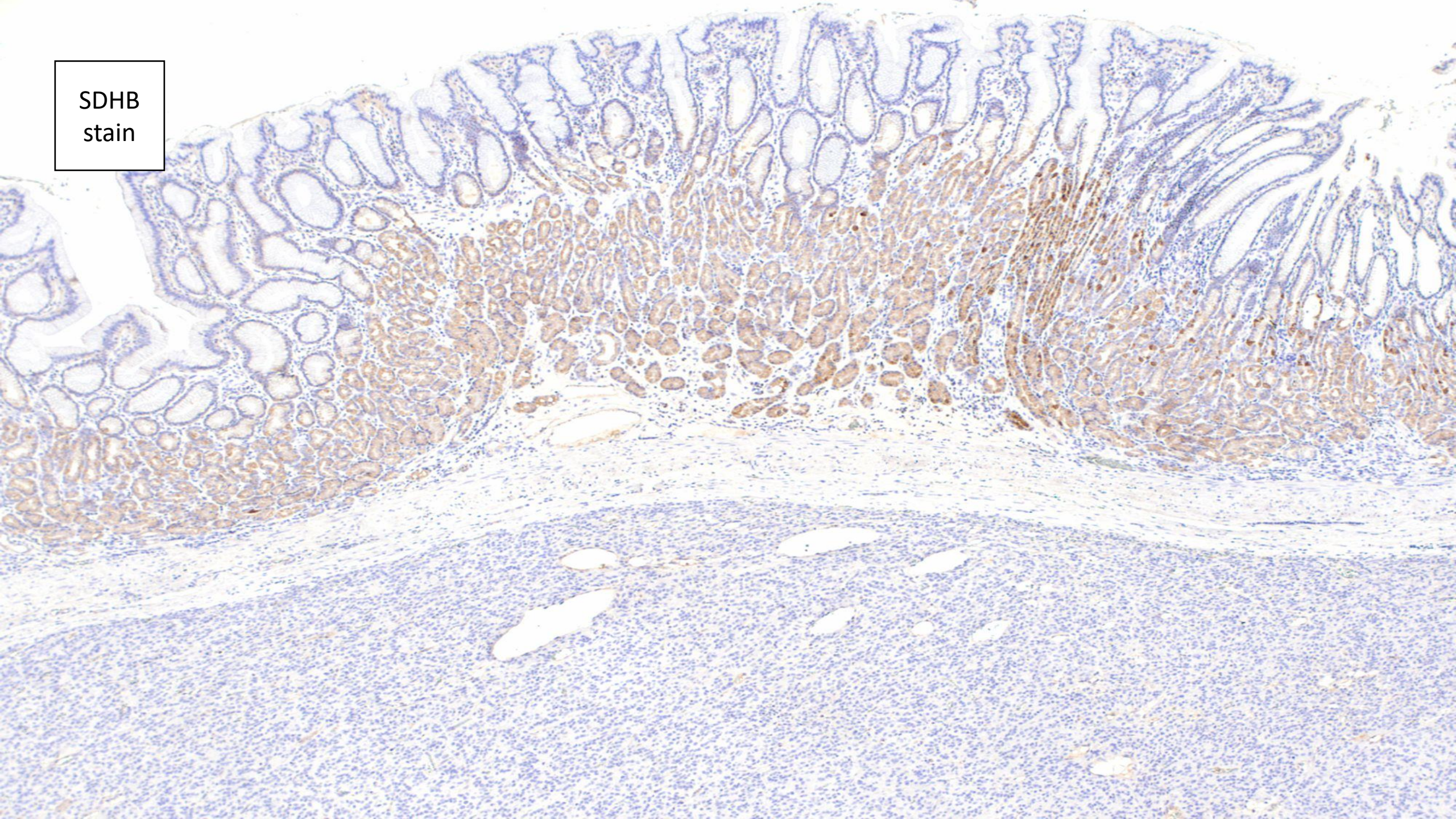
Succinate dehydrogenase deficient GIST; Epithelioid morphology

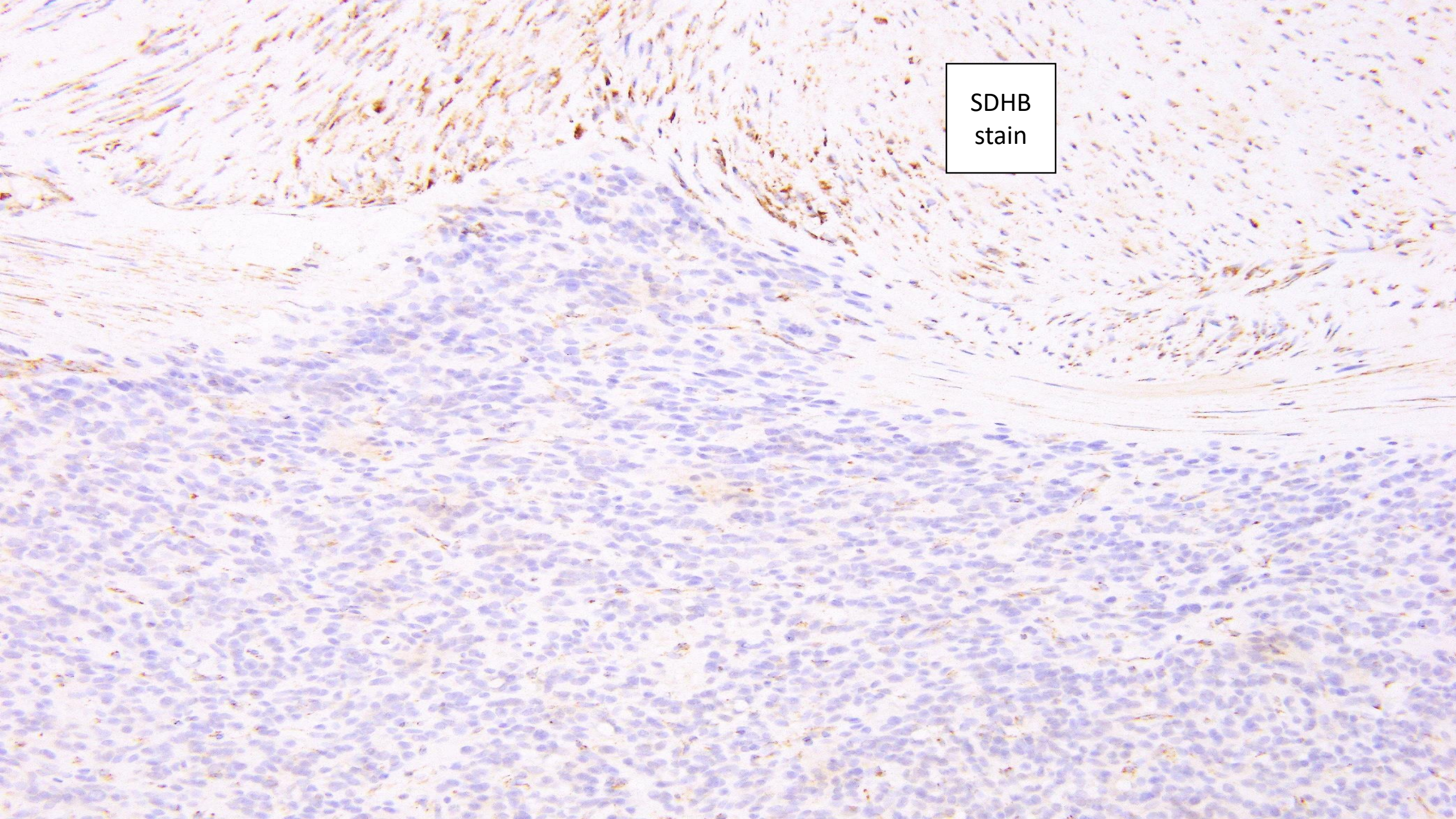




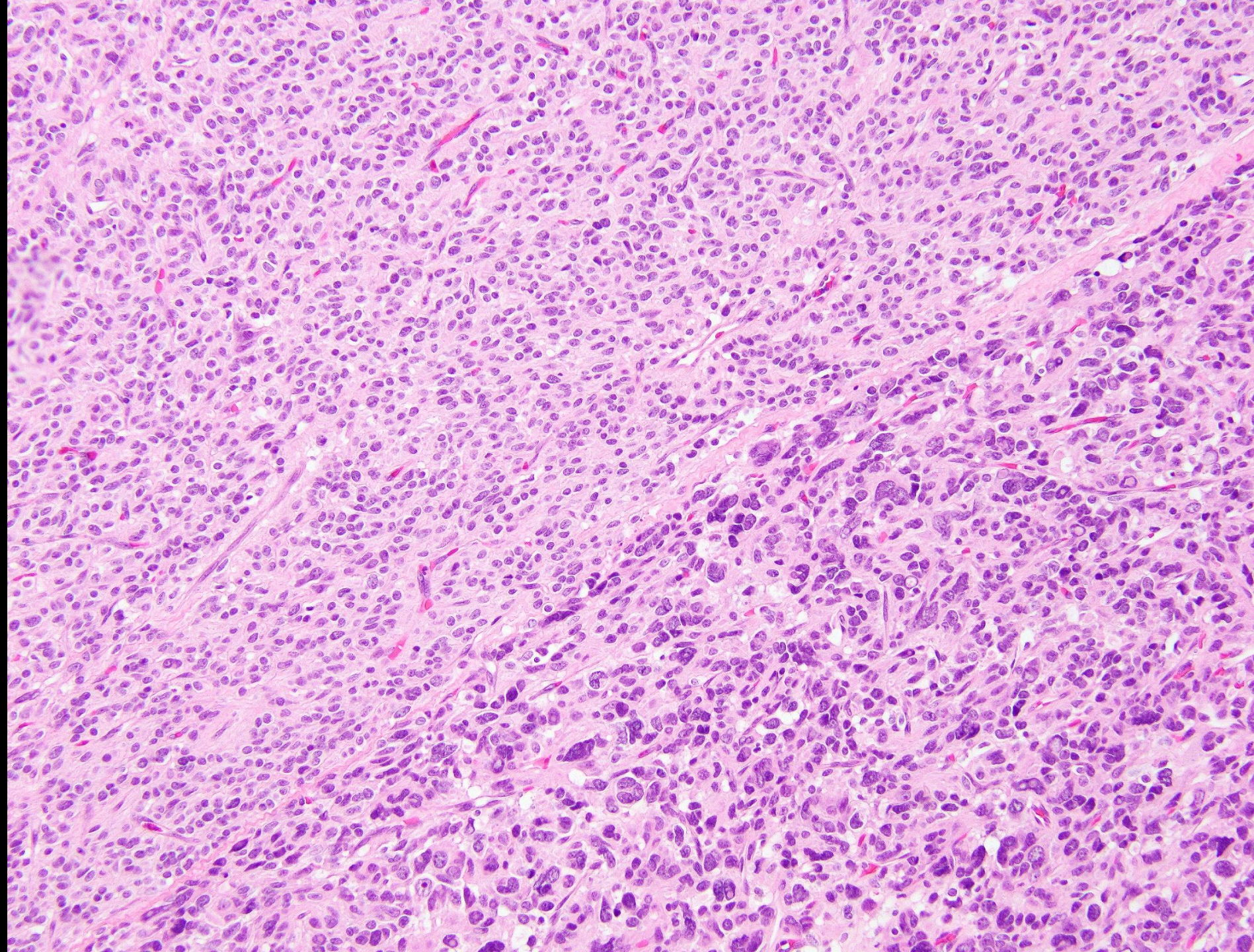
Succinate dehydrogenase deficient GIST – spread to lymph nodes but indolent behavior

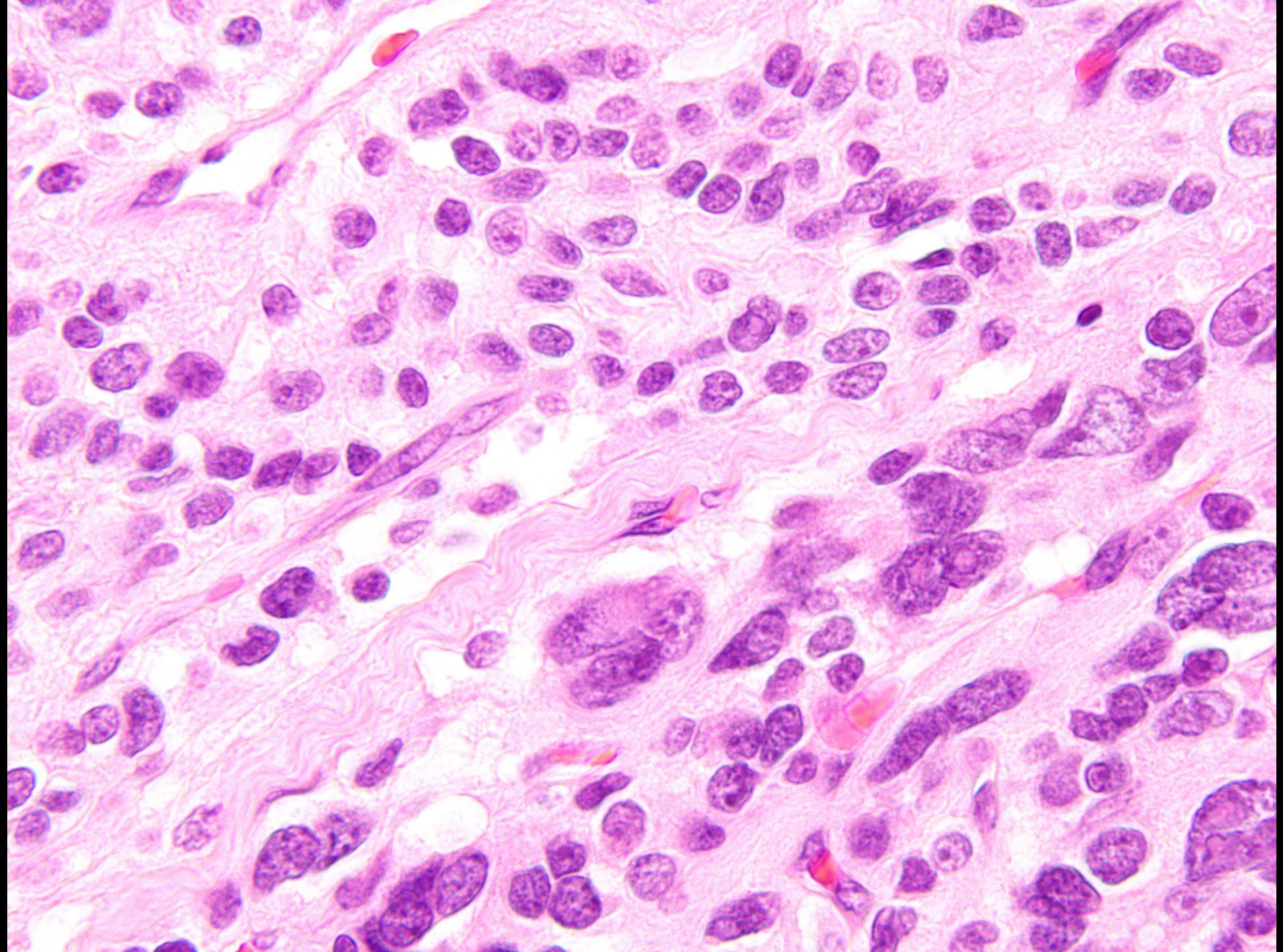



SDHB
stain


SDHB
stain

Succinate dehydrogenase deficient GIST – some have bizarre nuclei or plasmacytoid features





More SDH deficient tumors

- Renal cell carcinoma with characteristic morphology (weird flocculent cytoplasmic inclusions)
- Pheochromocytoma/ paraganglioma

Something submucosal

Inflammatory Fibroid Polyp (IFP)

- First described by J Vaněk
- 6 lesions, all in stomach (antrum/pylorus-5)

Vaněk J. Gastric submucosal granuloma with eosinophilic infiltration. *Am J Pathol* 1949;**25**;397-411.

IFP

- Present term coined in early 1950's

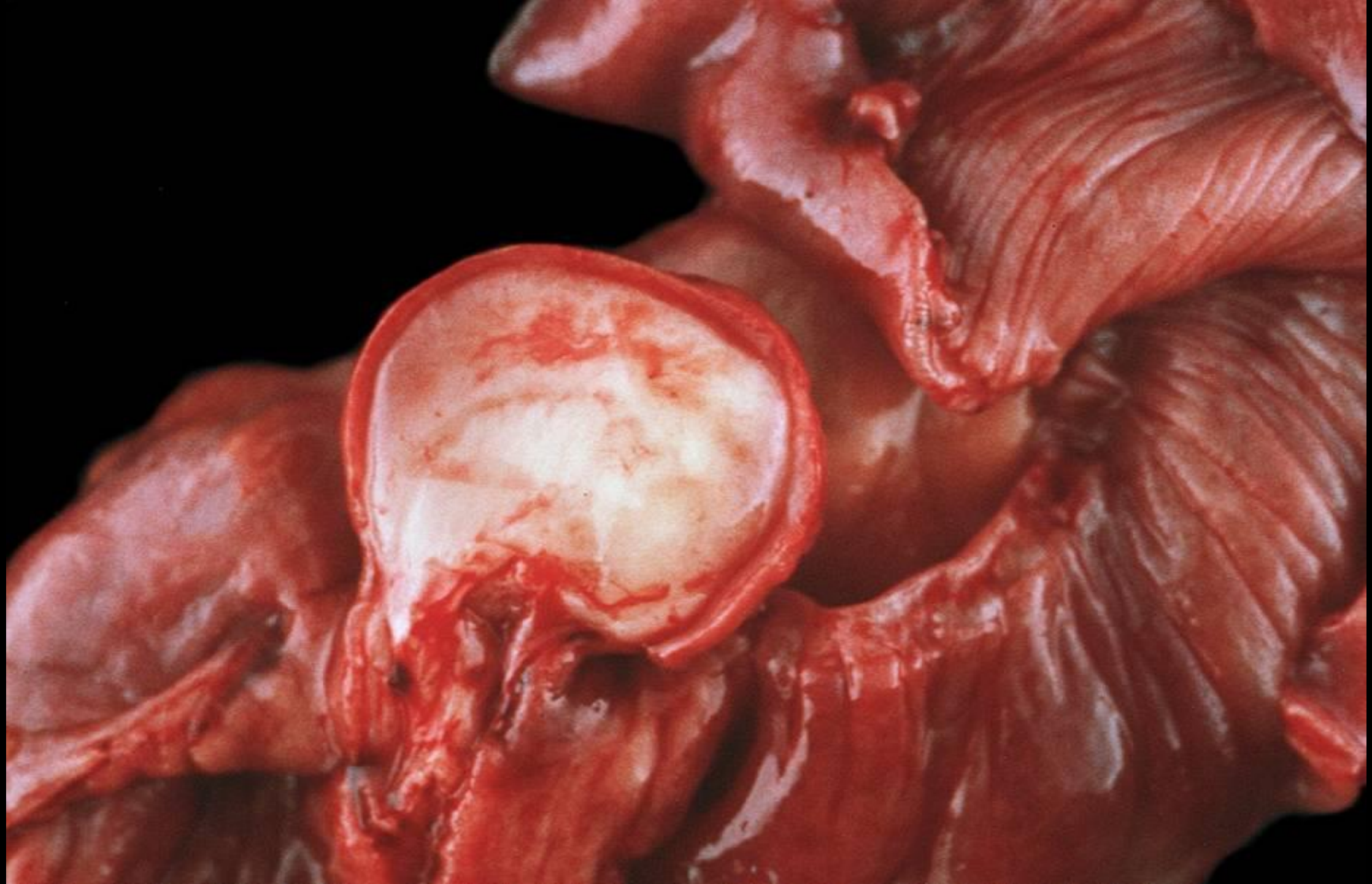
Helwig E, Ranier A. Inflammatory fibroid polyps of the stomach. *Surg Gynecol Obstets* 1953;**96**;355-67.

IFP Location

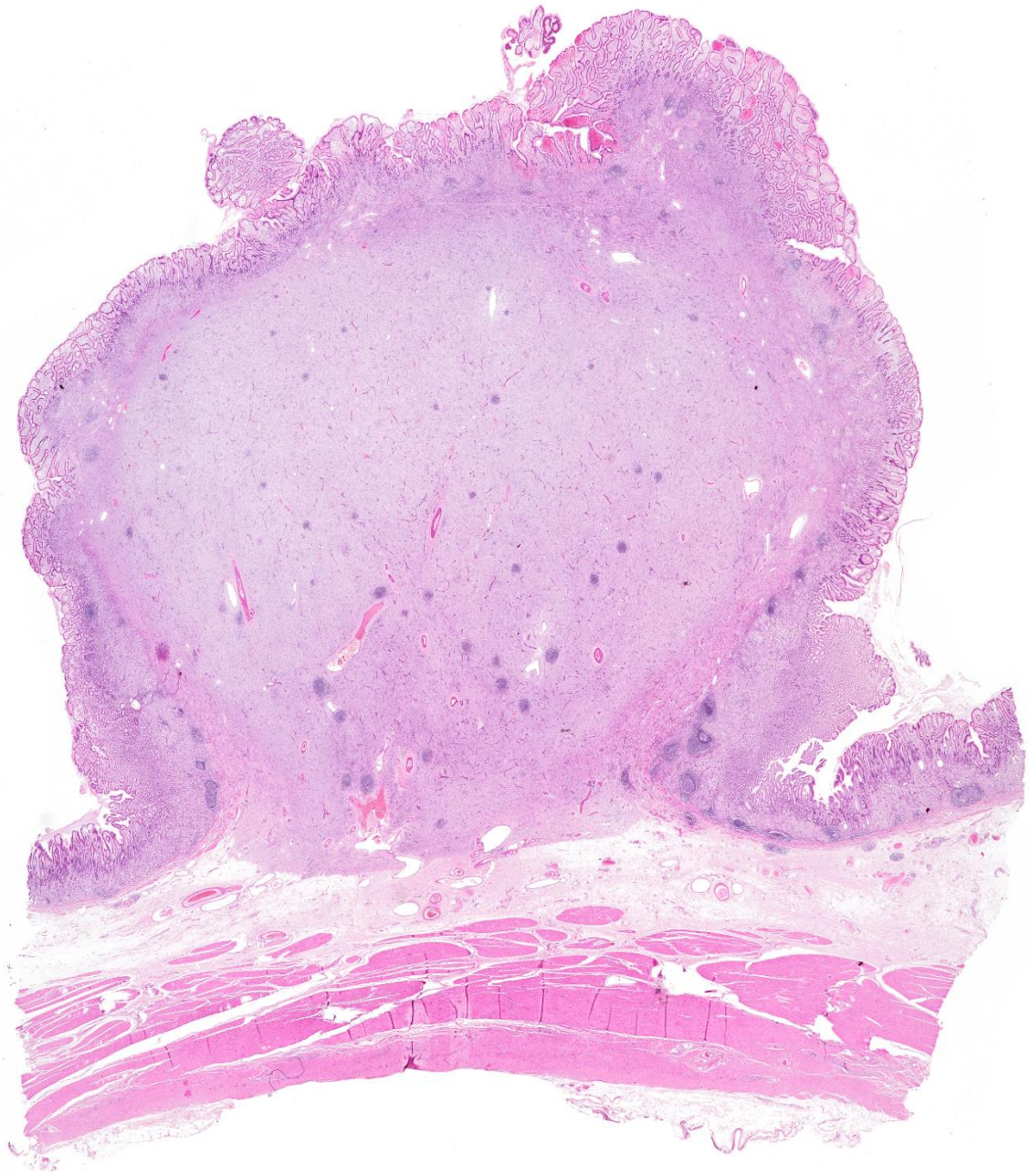
- Vast majority in stomach
- @1% of all gastric polyps (once fundic gland polyps removed from the mix)
- Nearly always in adults (60-80yrs)

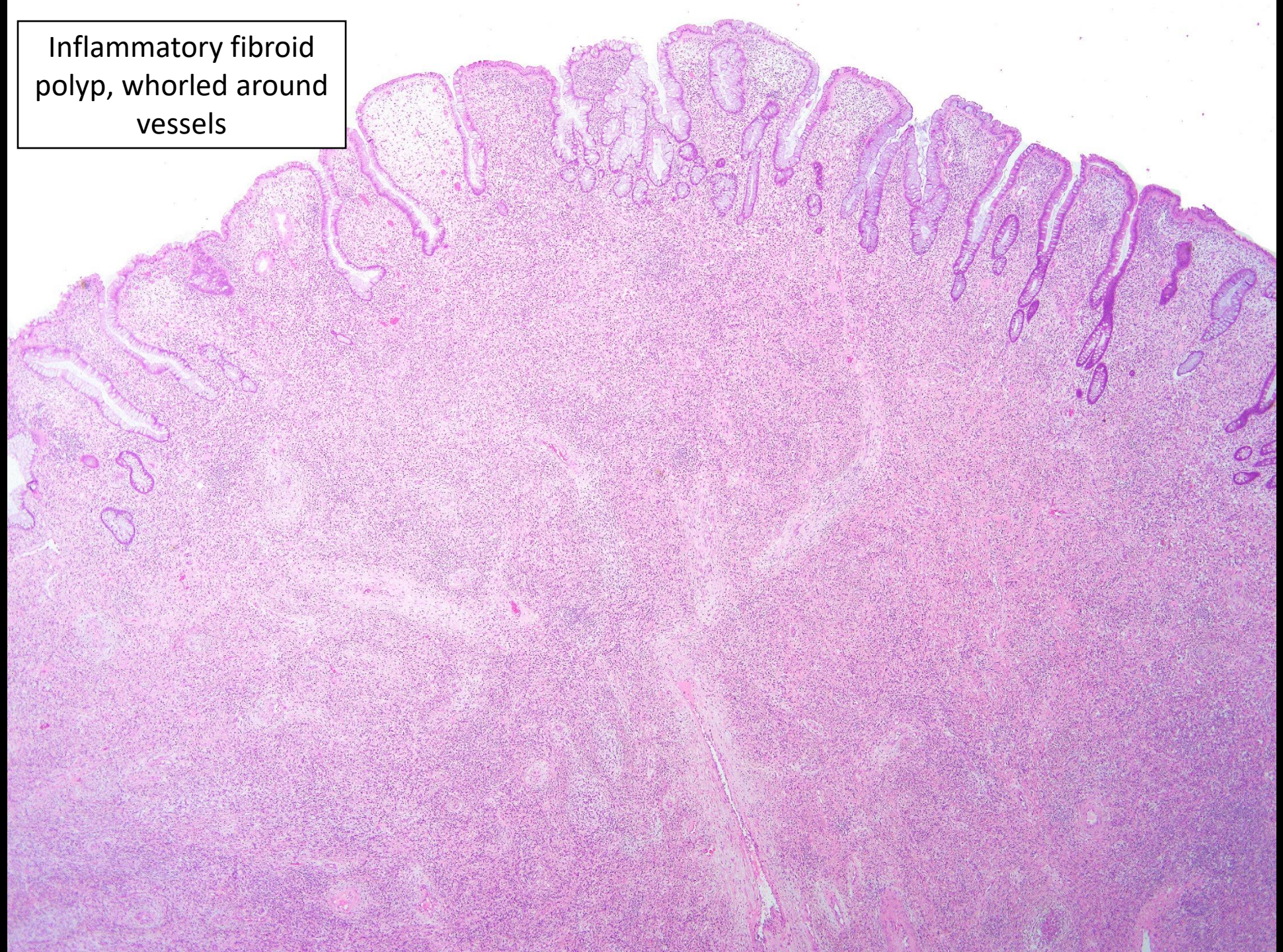
IFP- Endoscopic Appearance

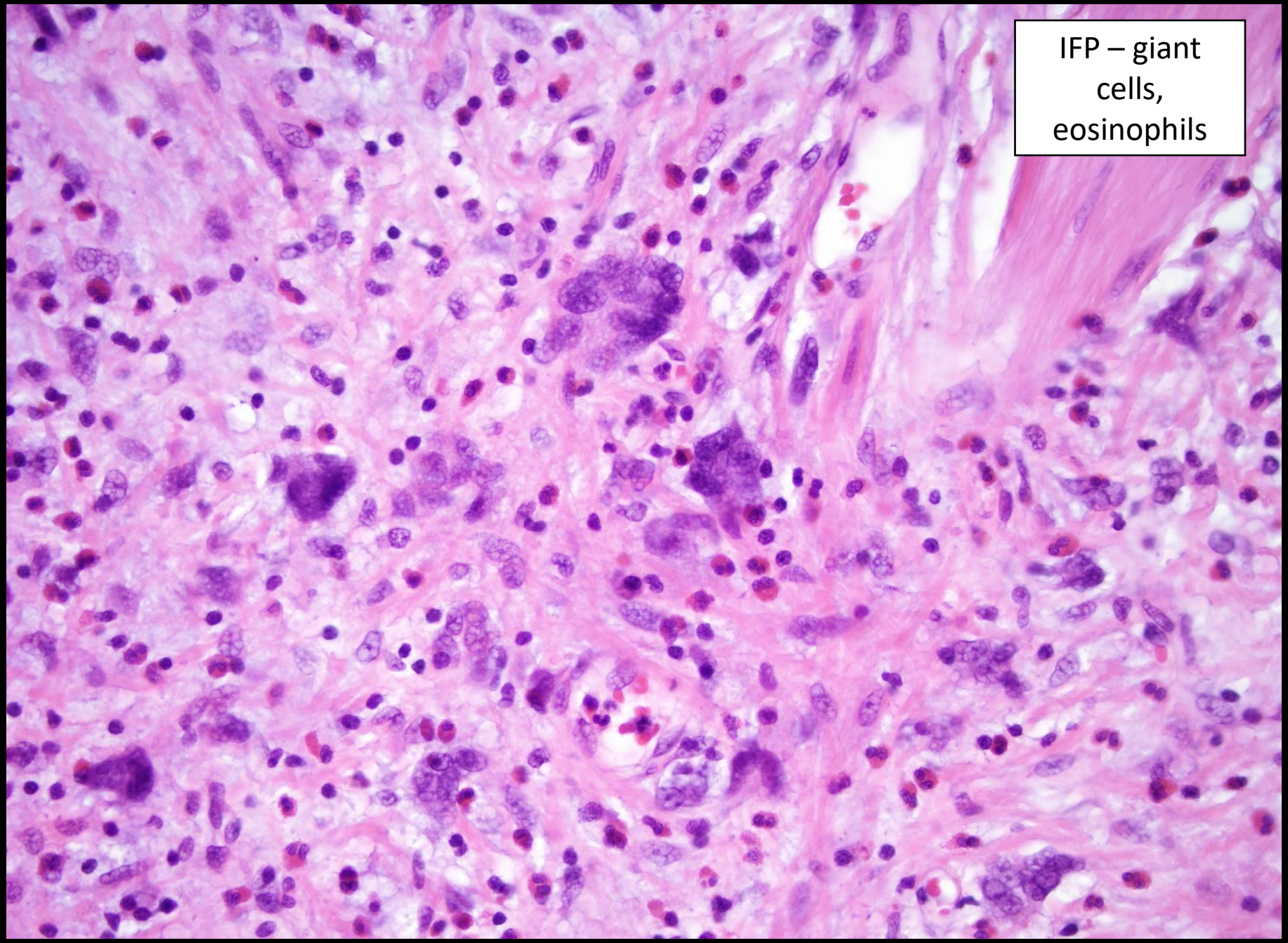
- Smooth submucosal lesions
- Surface ulceration/erosion in about 1/3 of cases
- Presentation is site specific

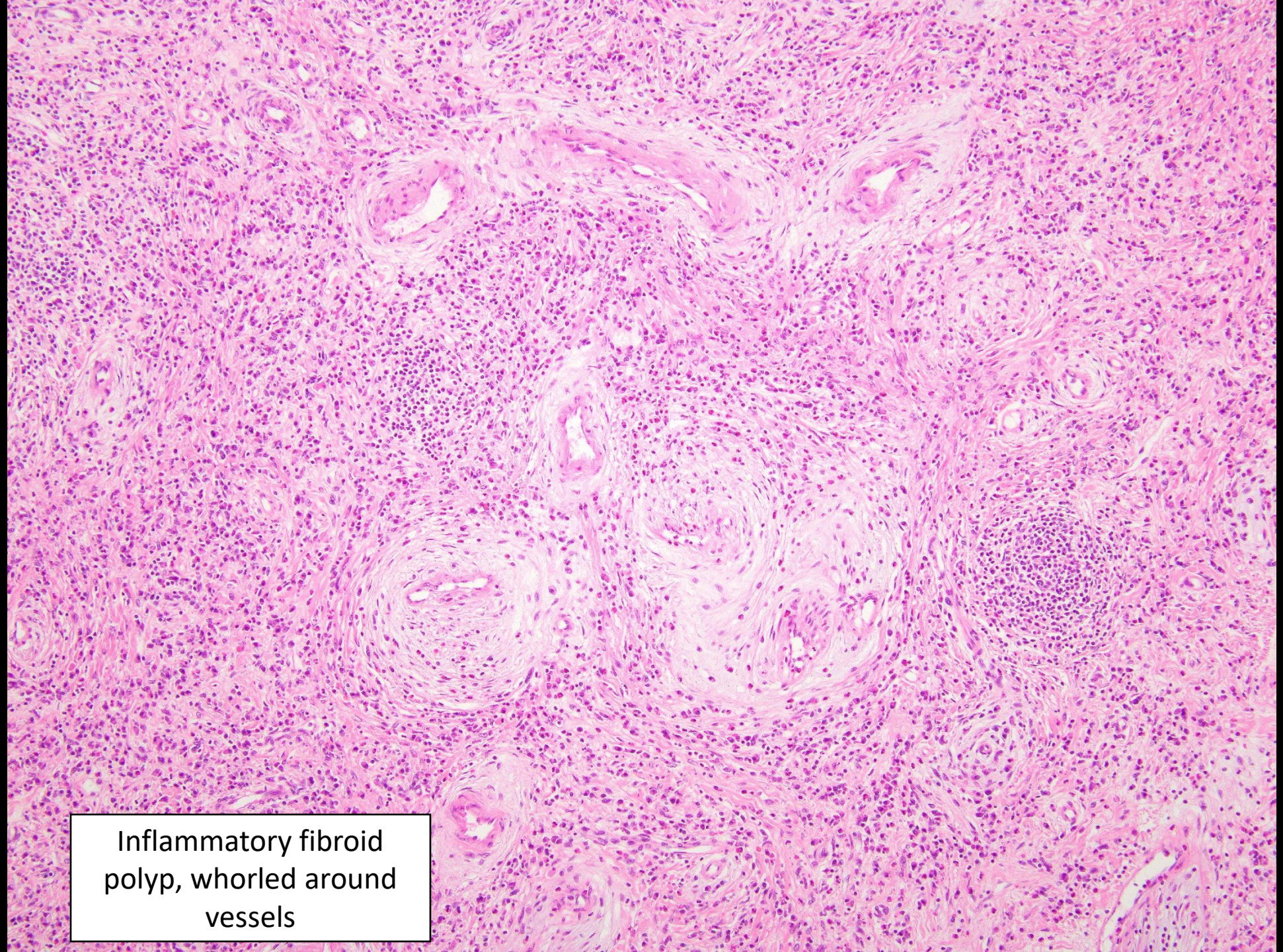


Gastric inflammatory fibroid polyp – note the characteristic submucosal location




Inflammatory fibroid polyp, whorled around vessels


IFP – giant cells, eosinophils


Inflammatory fibroid polyp, whorled around vessels

IFP- Pathogenesis

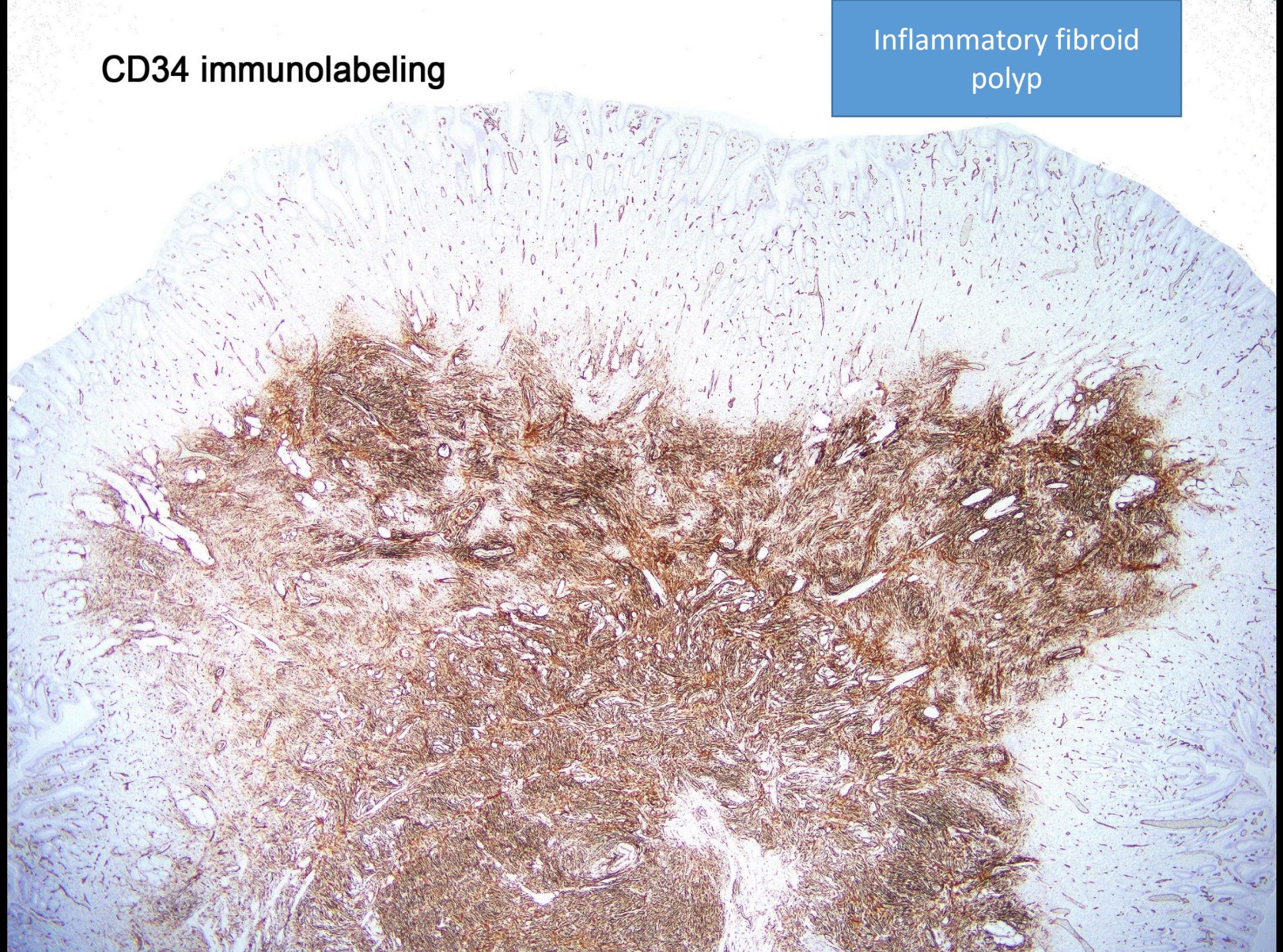
- Believed reactive in past – now known to have *PDGFRA* mutations (just like some GISTs – but ALWAYS benign)

IFP- Immunohistochemistry

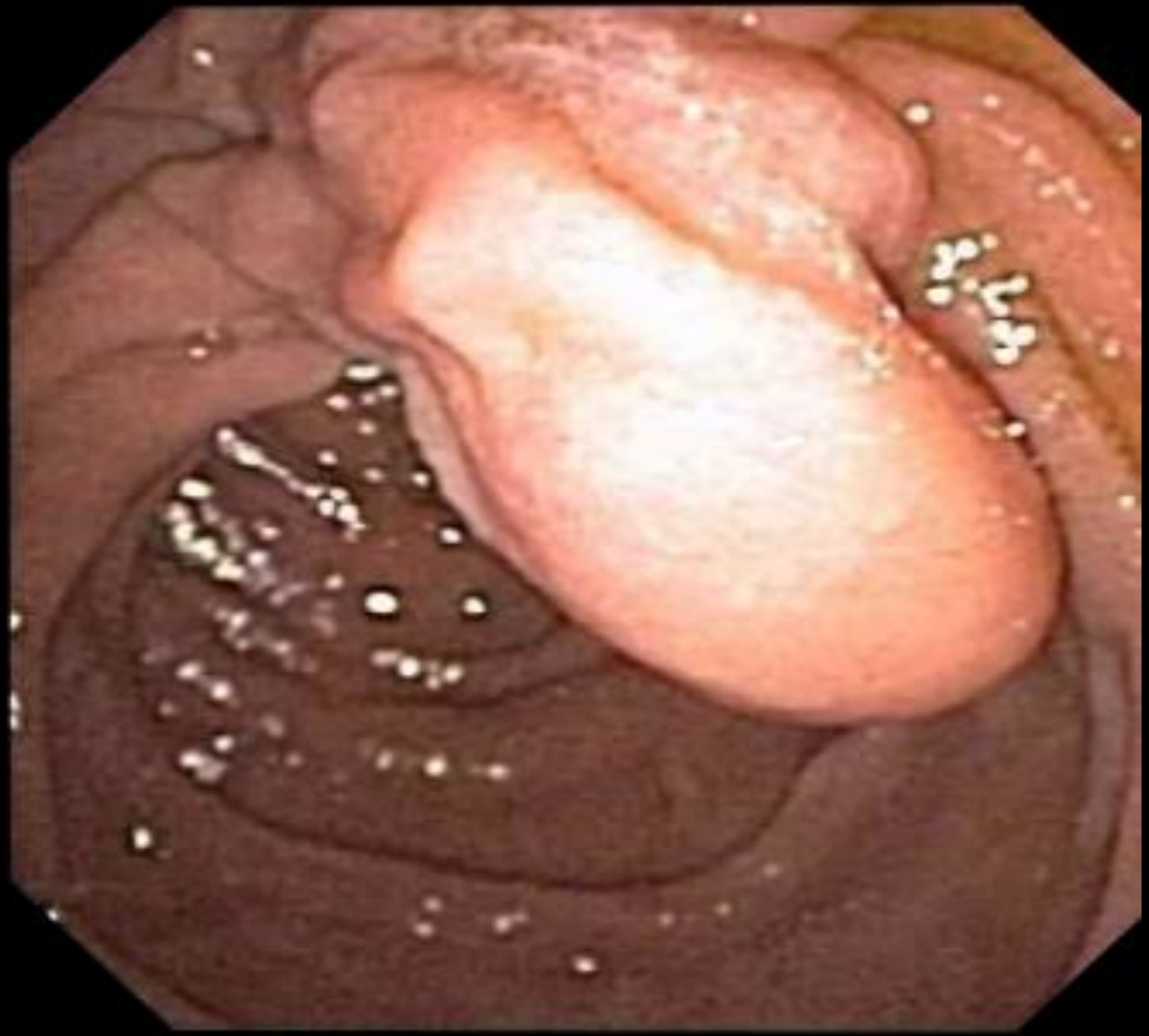
- Fibroblastic/myofibroblastic
- Variable actin, negative S100
- Consistent CD34 (less striking in large tumors)
- NO CD117/KIT or DOG1

CD34 immunolabeling

Inflammatory fibroid polyp



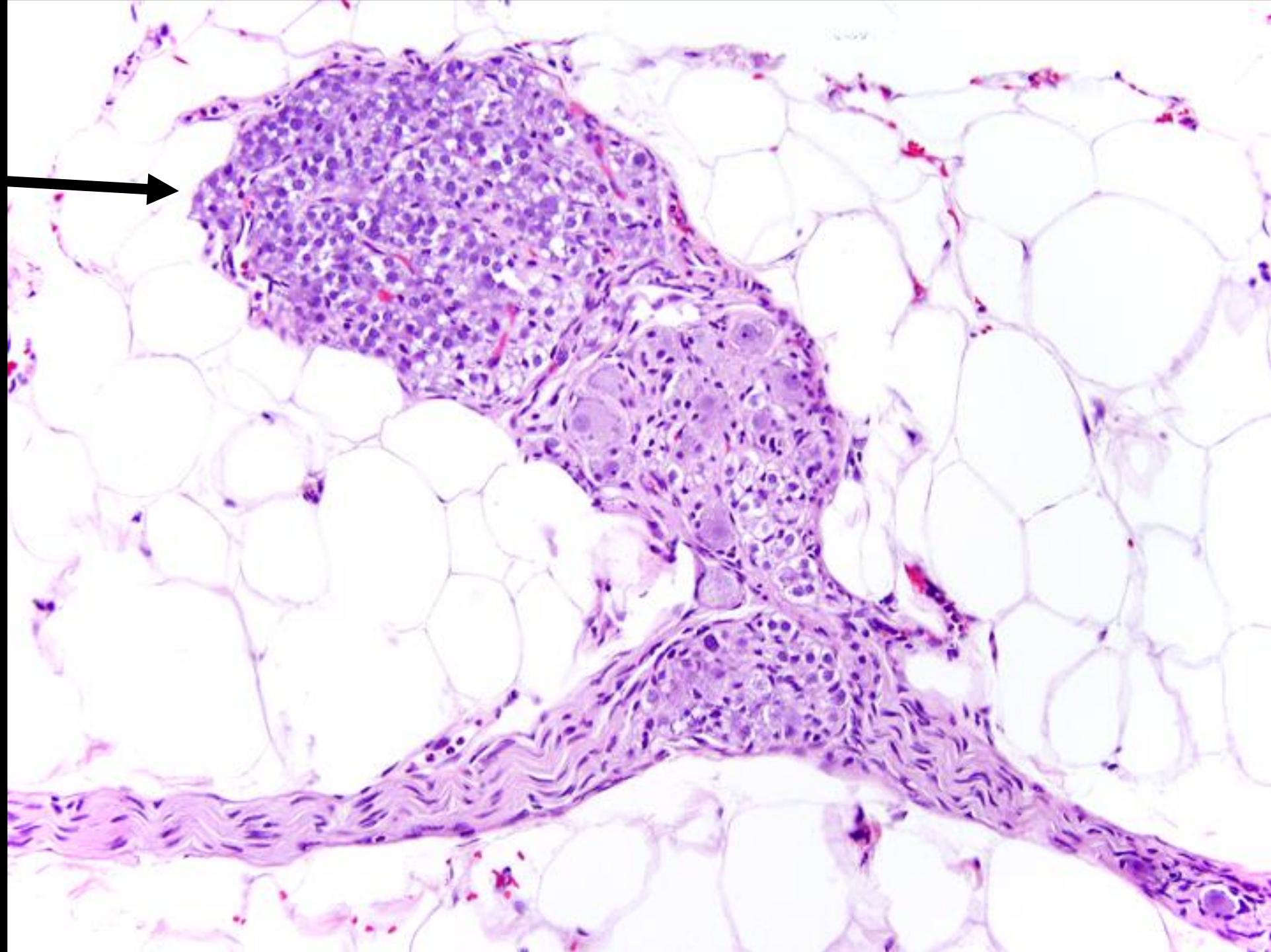
Gangliocytic Paraganglioma

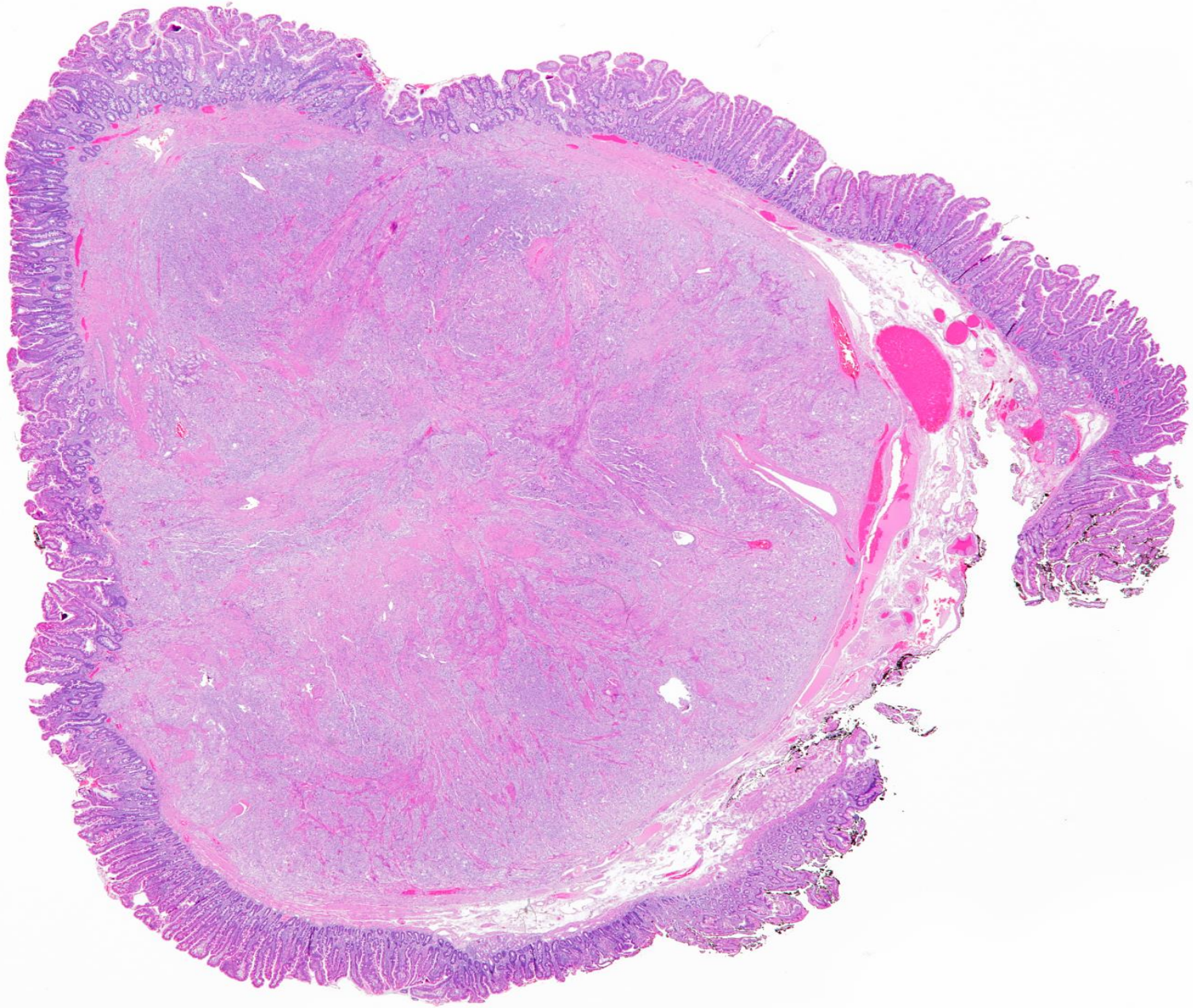


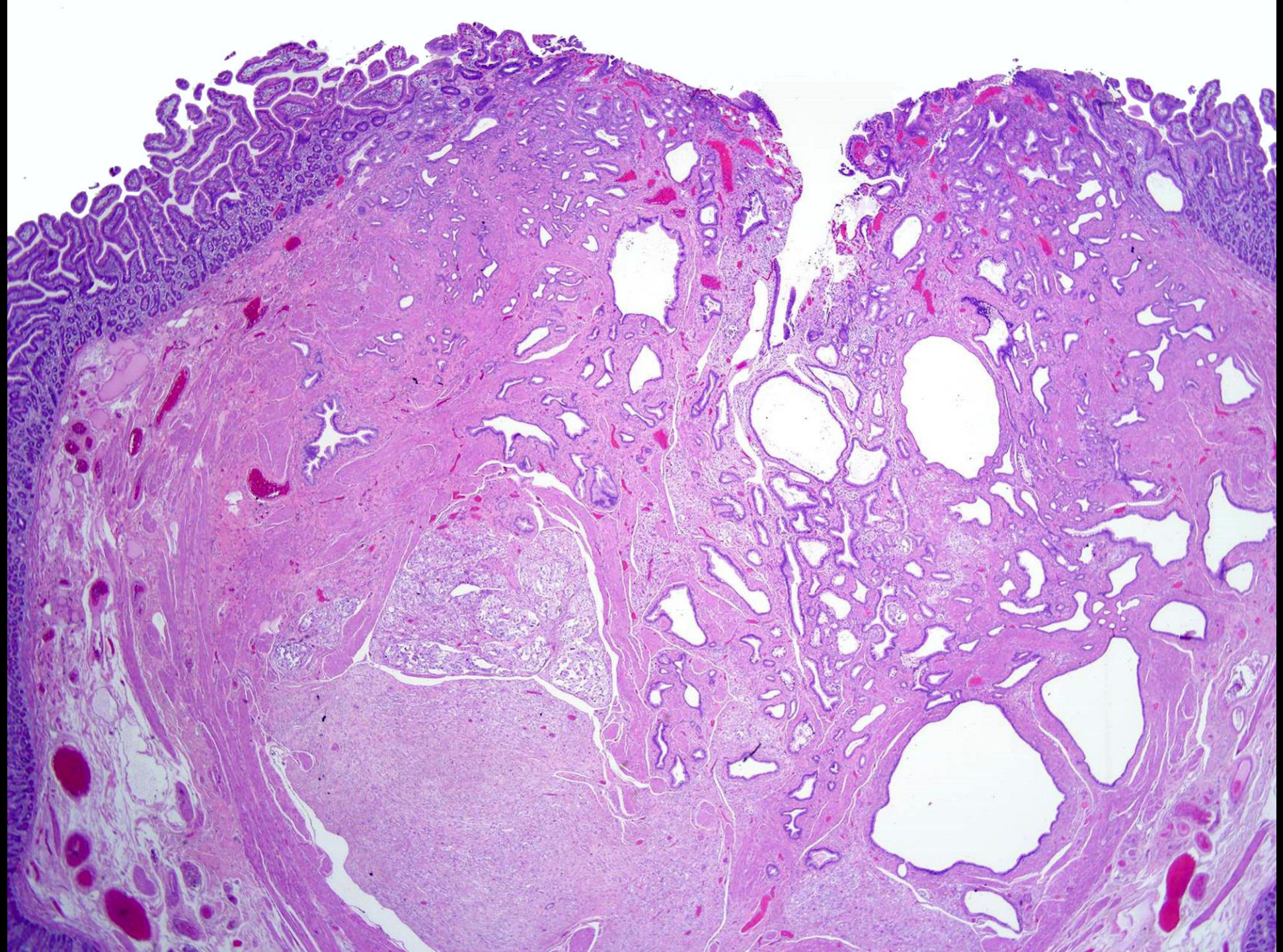
Gangliocytic Paraganglioma, Histology

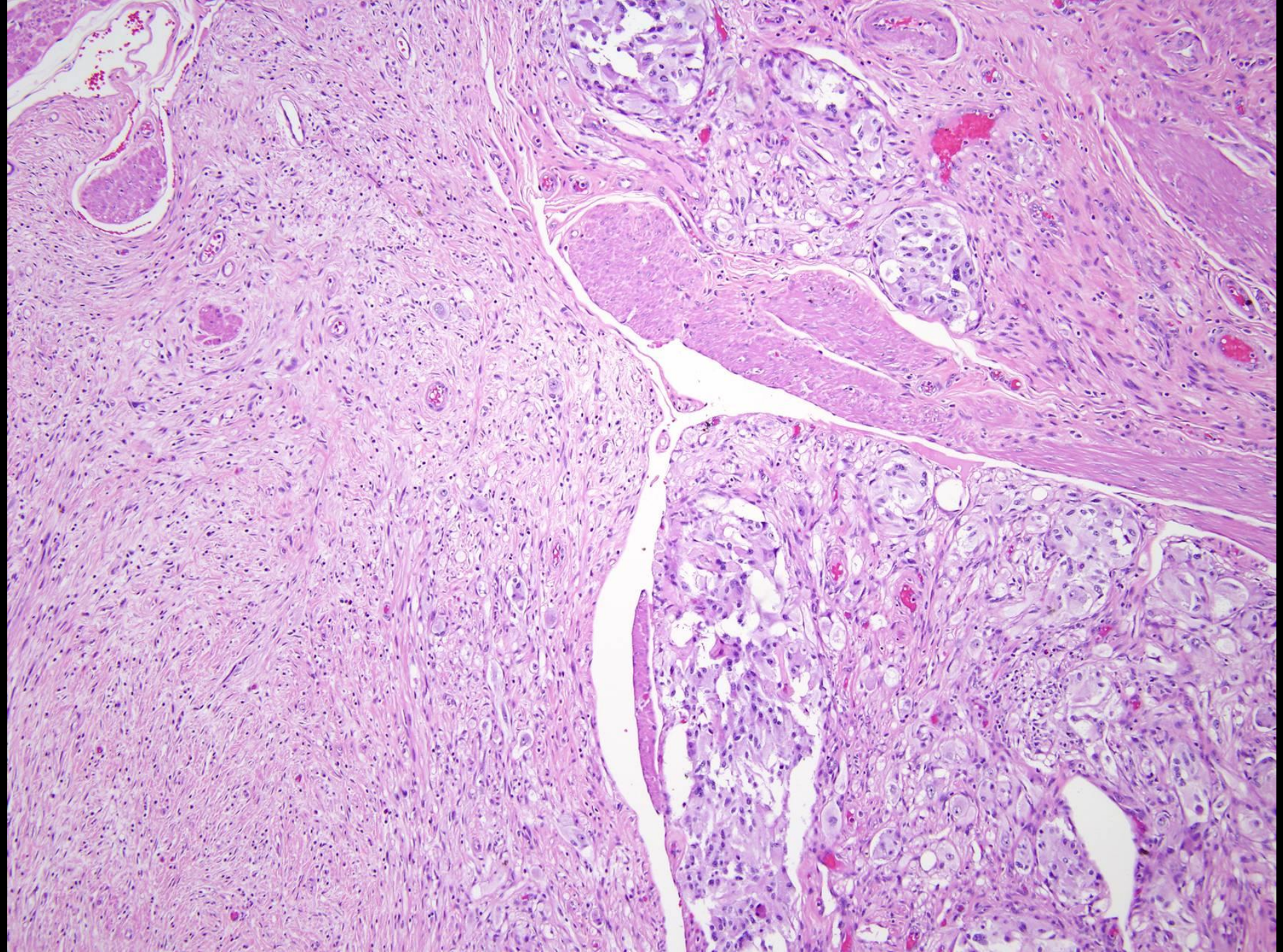
- Triphasic (in variable proportions)
- 1) spindle cells with the appearance of nerve sheath cells
- 2) ganglion-like cells
- 3) epithelioid cells arranged in nests (“endocrine” pattern), trabeculae or papillary structures.

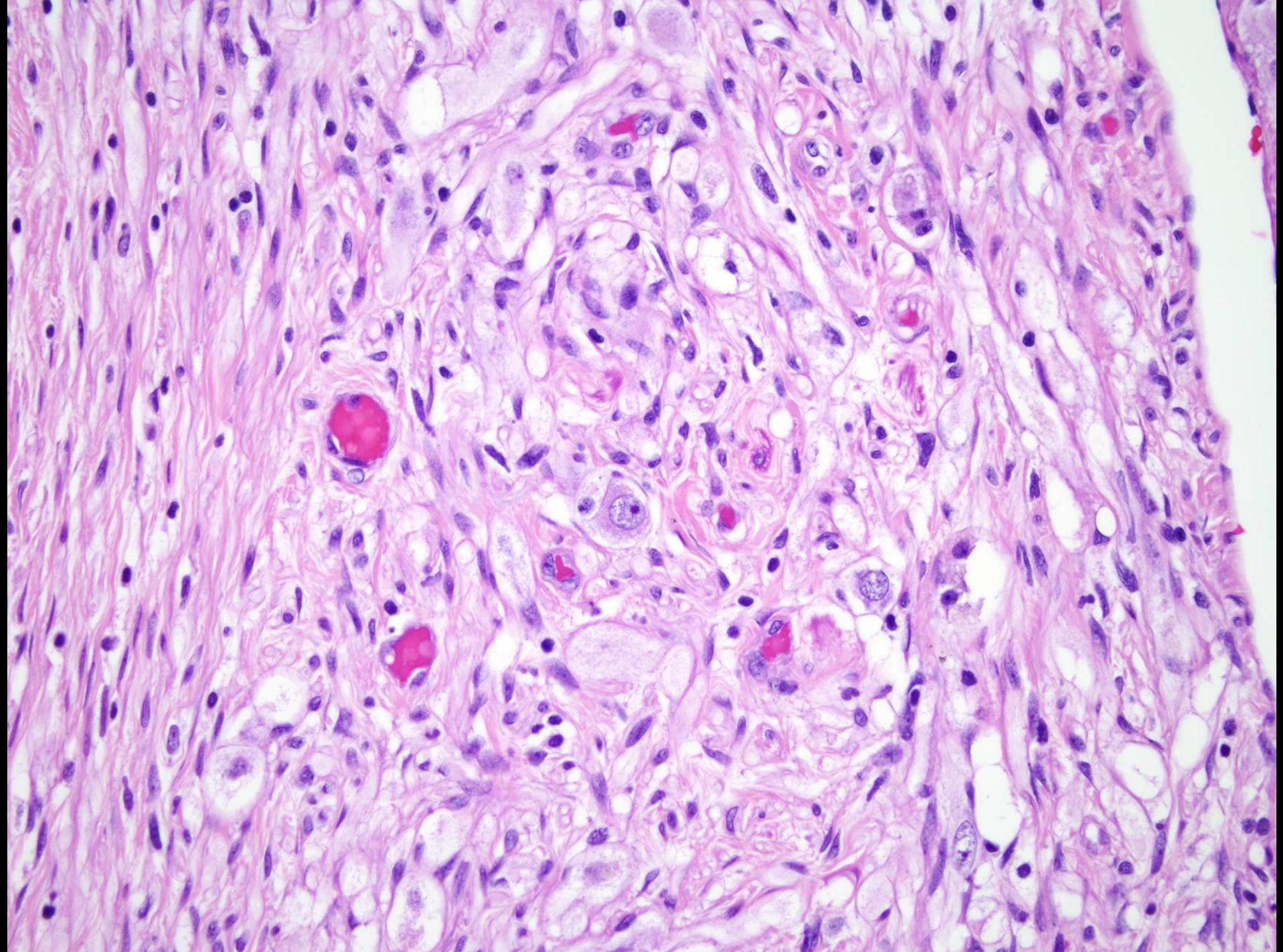
This is a paraganglion

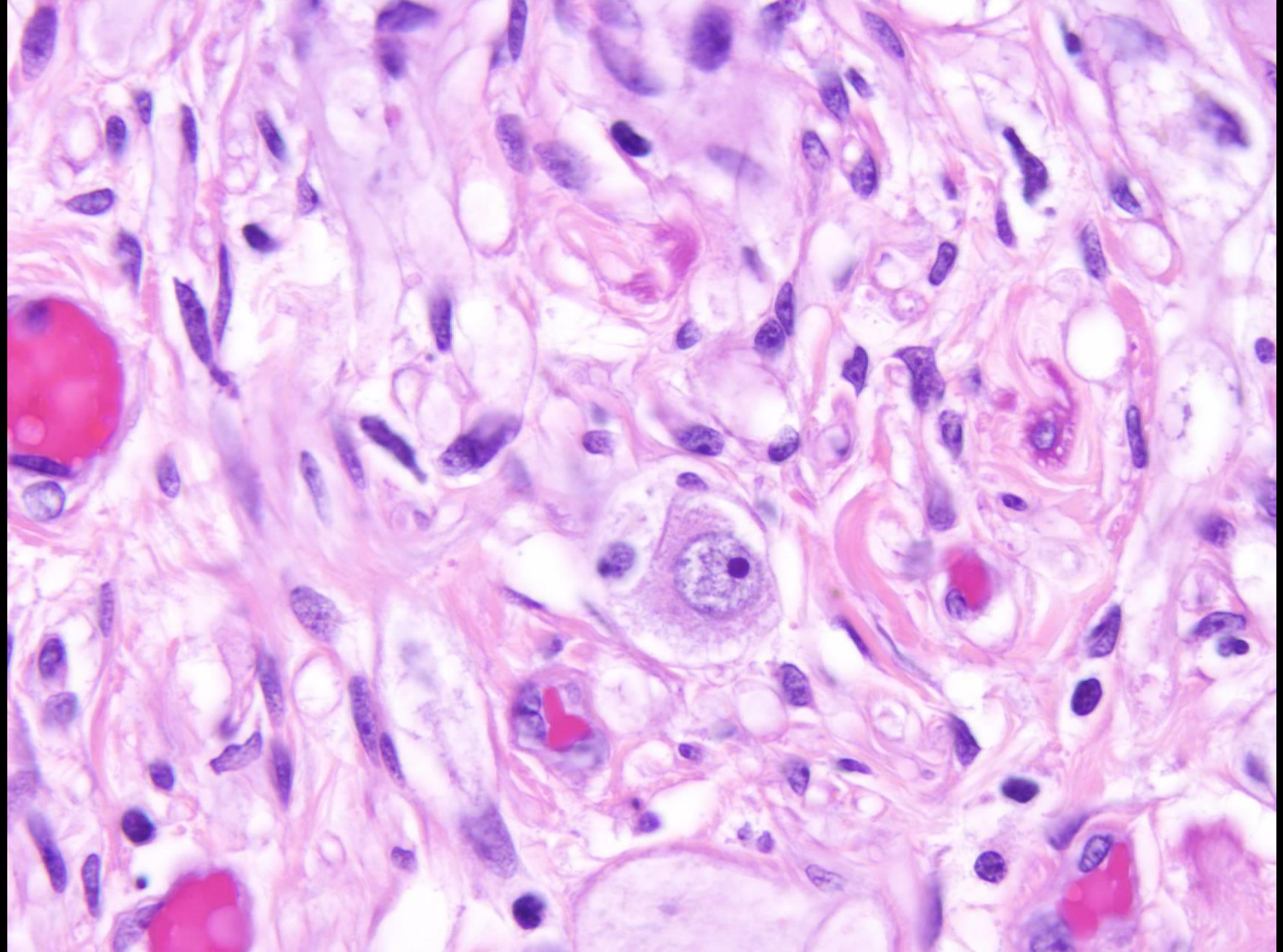


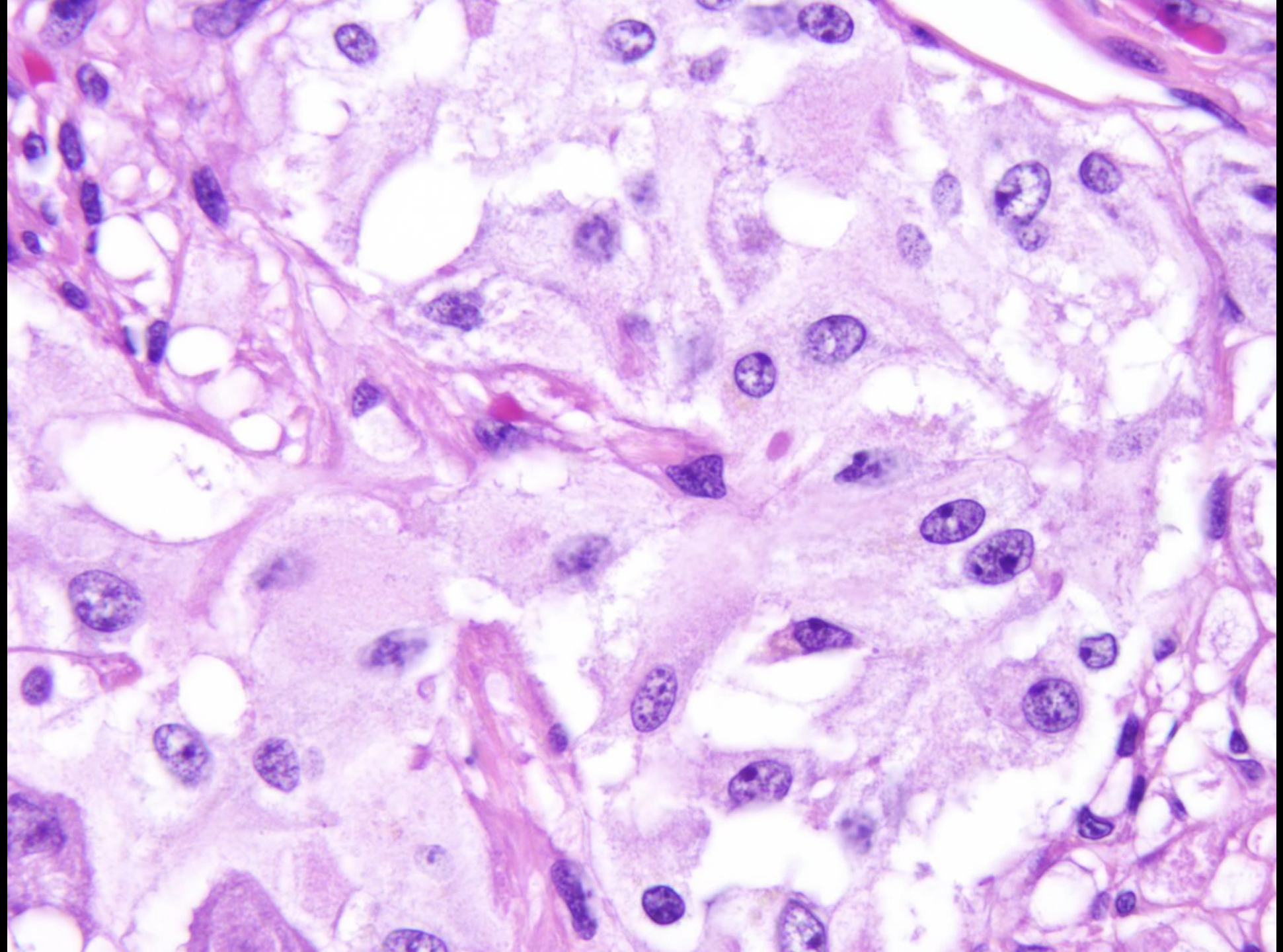










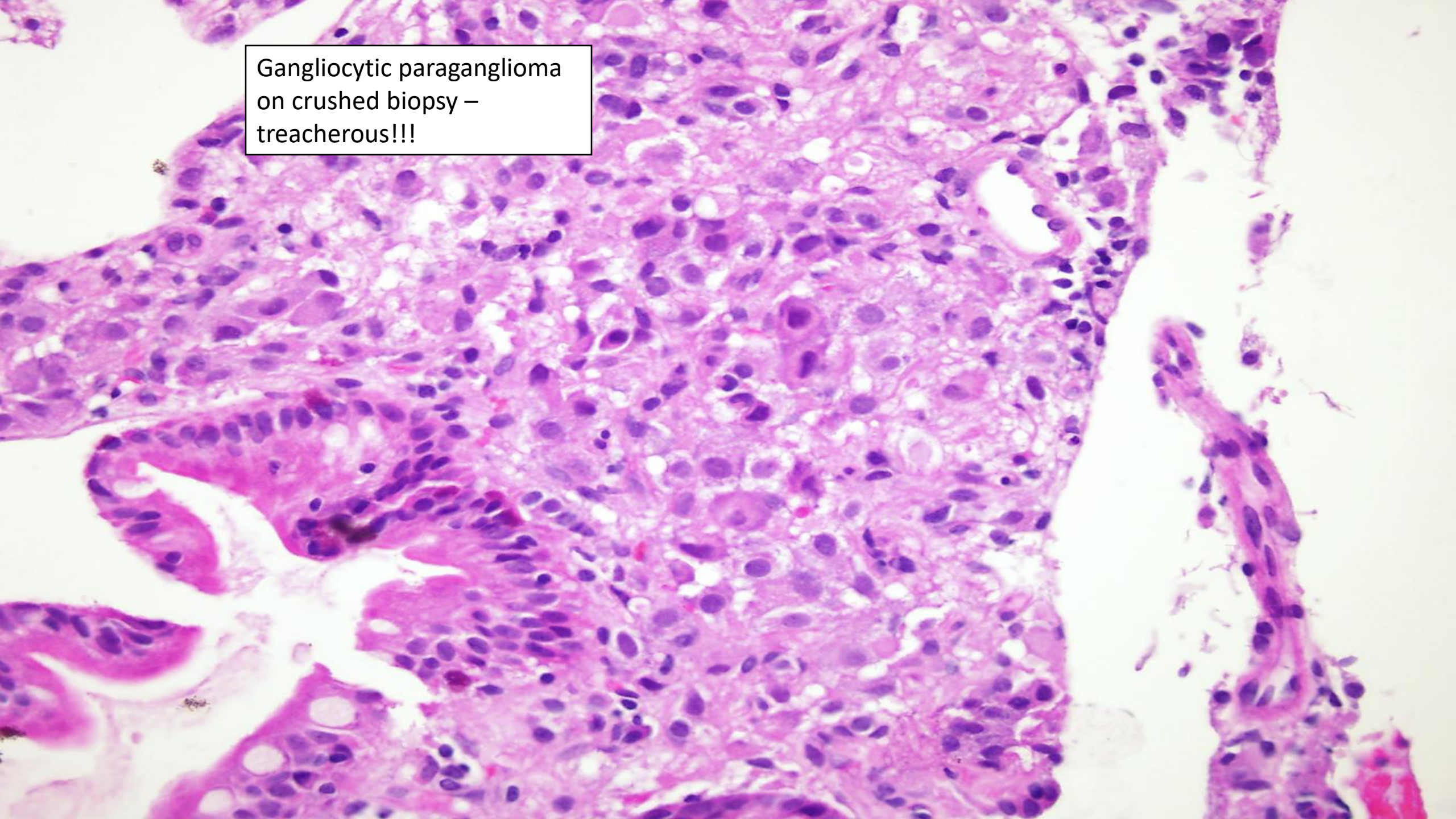


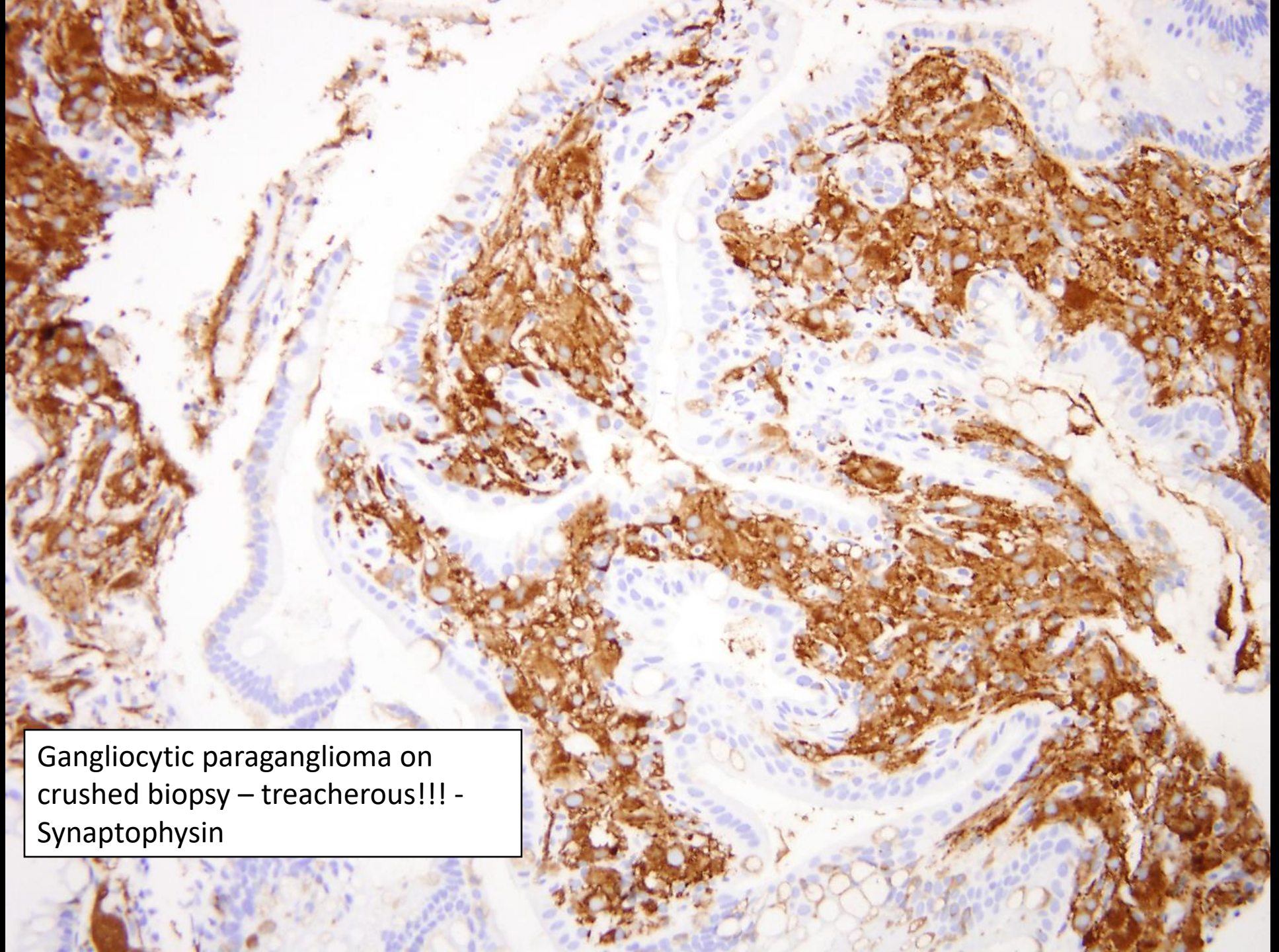
Gangliocytic Paraganglioma, Immunohistochemistry

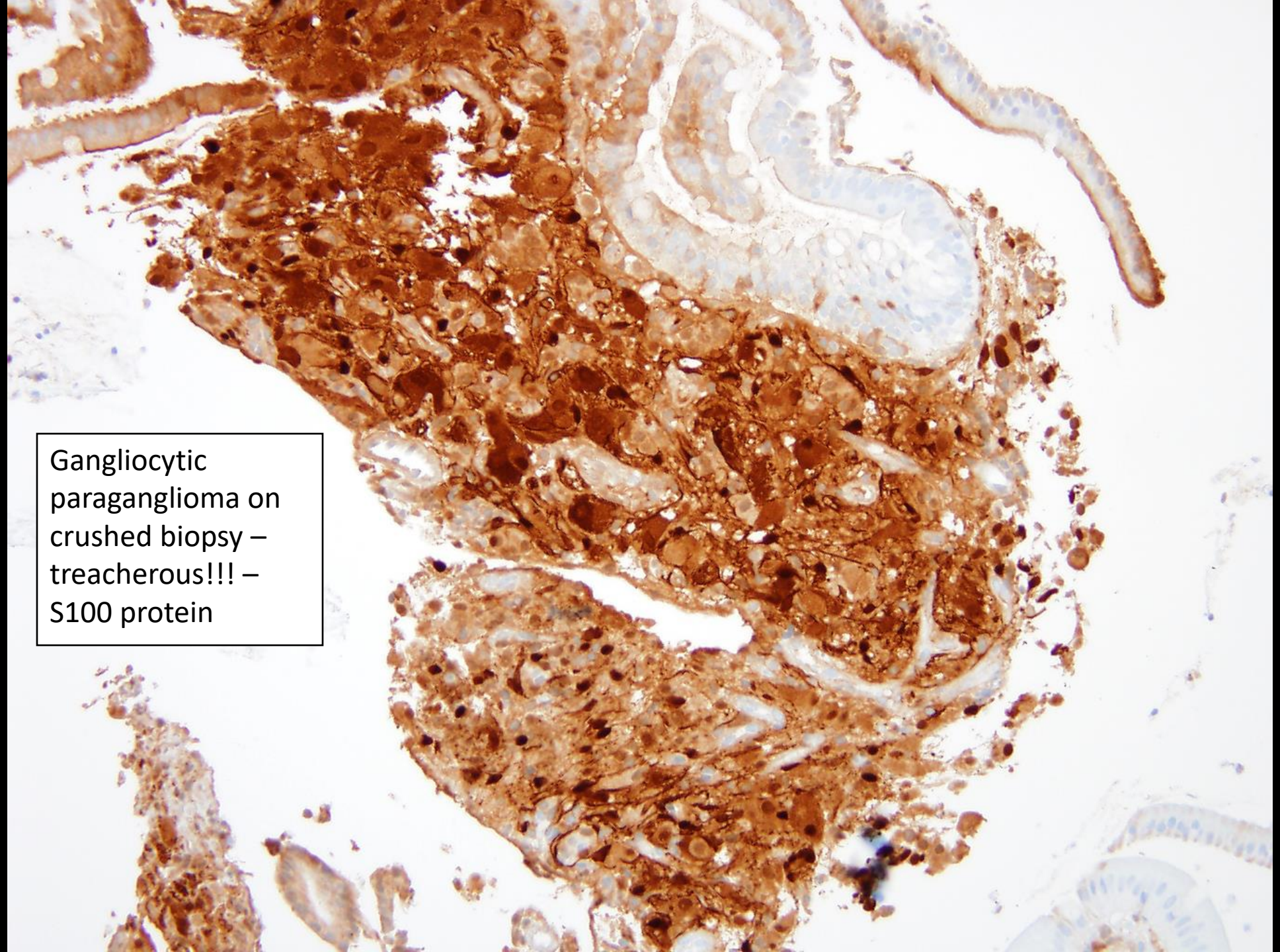
- S100 protein in spindle and “supporting/ sustentacular” cells.
- About half of cases display keratin in the epithelioid cells.
- Synaptophysin in ganglion-like cells
- Neuron specific enolase staining in all three cell types.
- A variety of hormones demonstrated in various fractions of gangliocytic paragangliomas (somatostatin, human pancreatic polypeptide, serotonin, gastrin, glucagon, insulin, and vasoactive intestinal peptide).

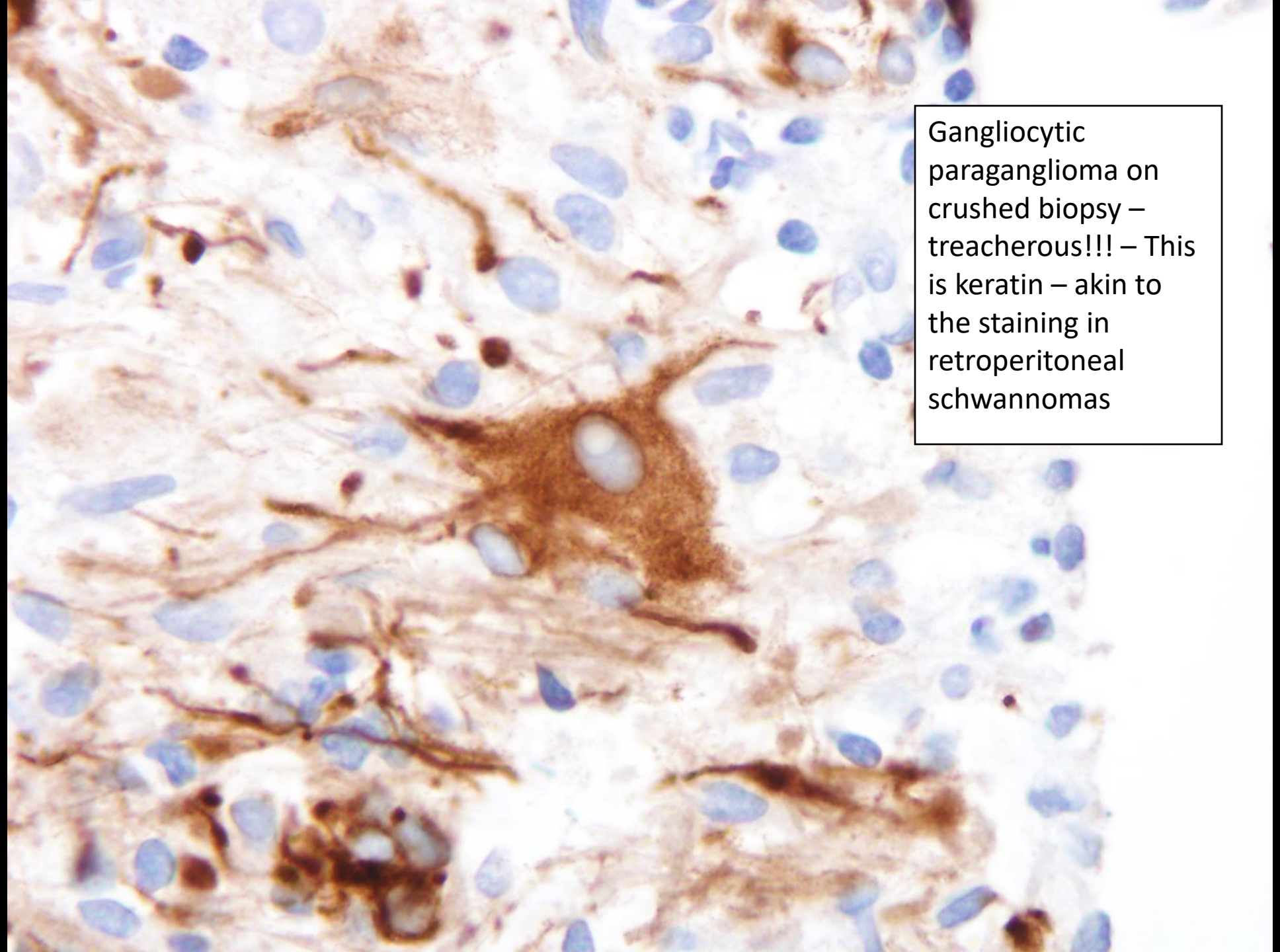
Gangliocytic Paraganglioma

- Vast majority in duodenum in adult patients (average age, about 54 years).
- Rare examples in jejunum or even the pylorus.
- The typical presentation - abdominal pain, gastric outlet obstruction, or bleeding.
- Most sporadic; reported association with neurofibromatosis.
- Typically centered in the submucosa with minor extensions into the mucosa, 3-4 cm with a soft yellowish cut surface, infiltrative borders.
- Benign in the majority of cases.
- Rare reports of regional metastases – single reported tumor-associated death


Gangliocytic paraganglioma on crushed biopsy – treacherous!!!


Gangliocytic paraganglioma on crushed biopsy – treacherous!!! - Synaptophysin

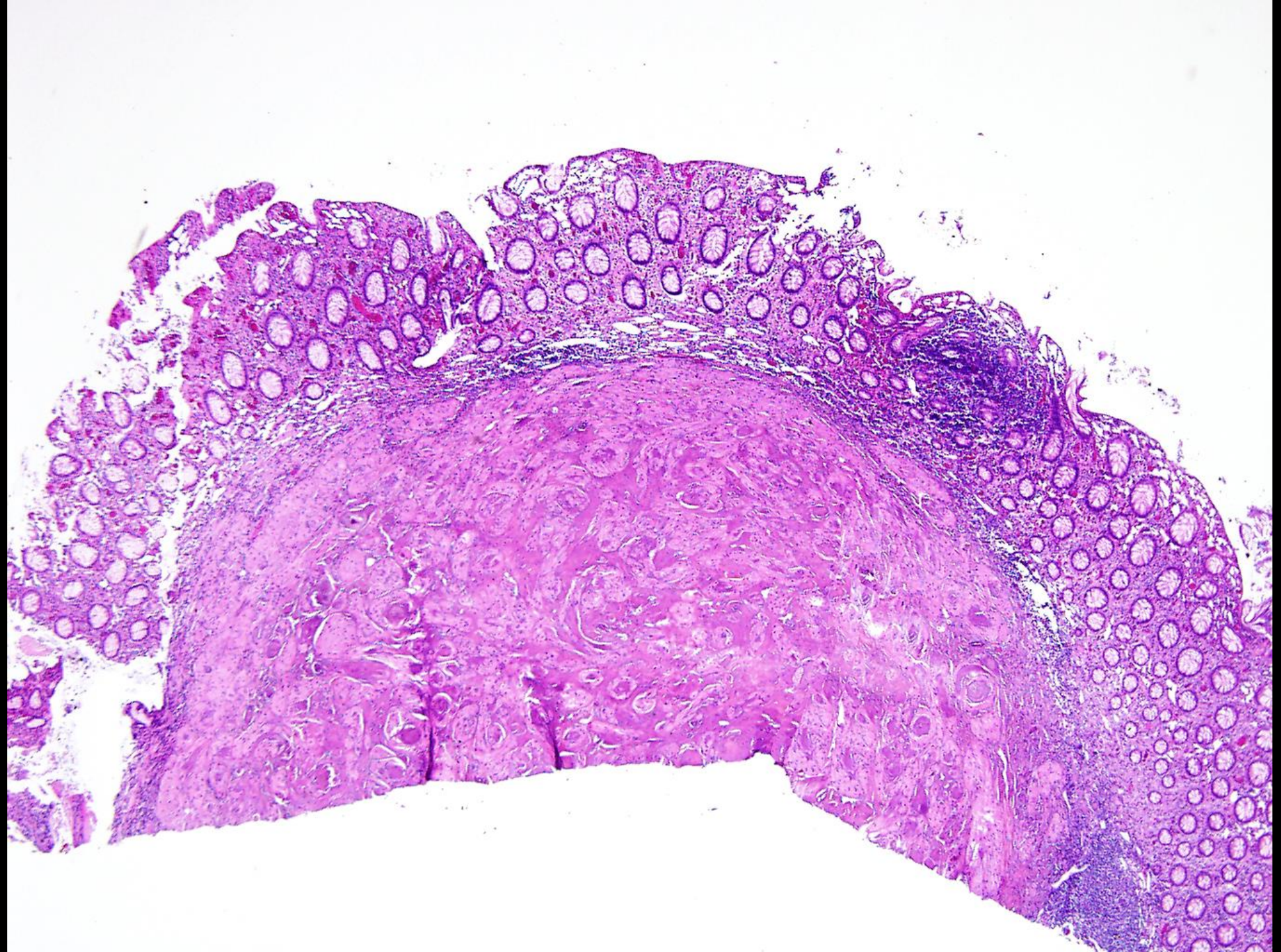

Gangliocytic paraganglioma on crushed biopsy – treacherous!!! – S100 protein

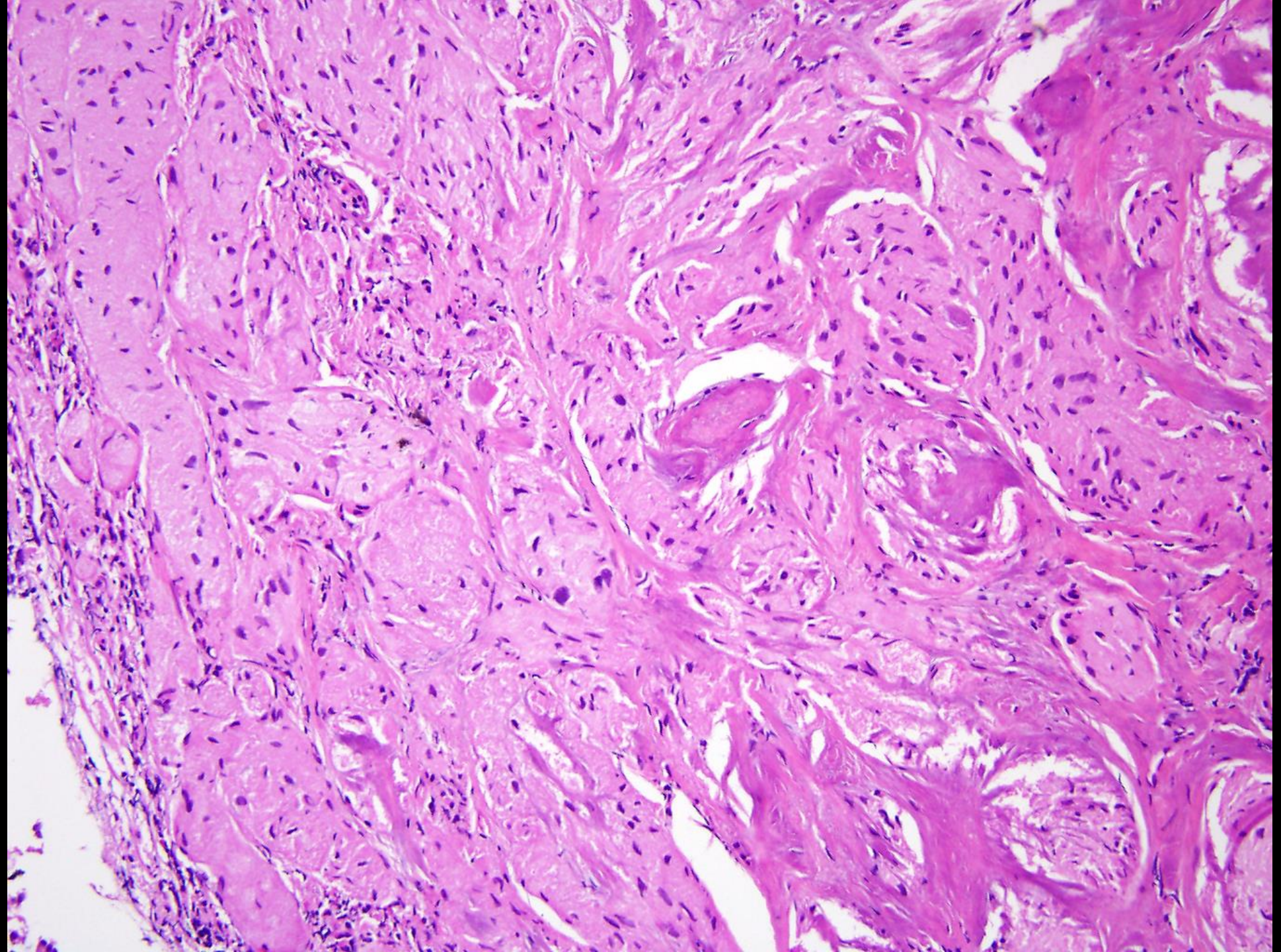


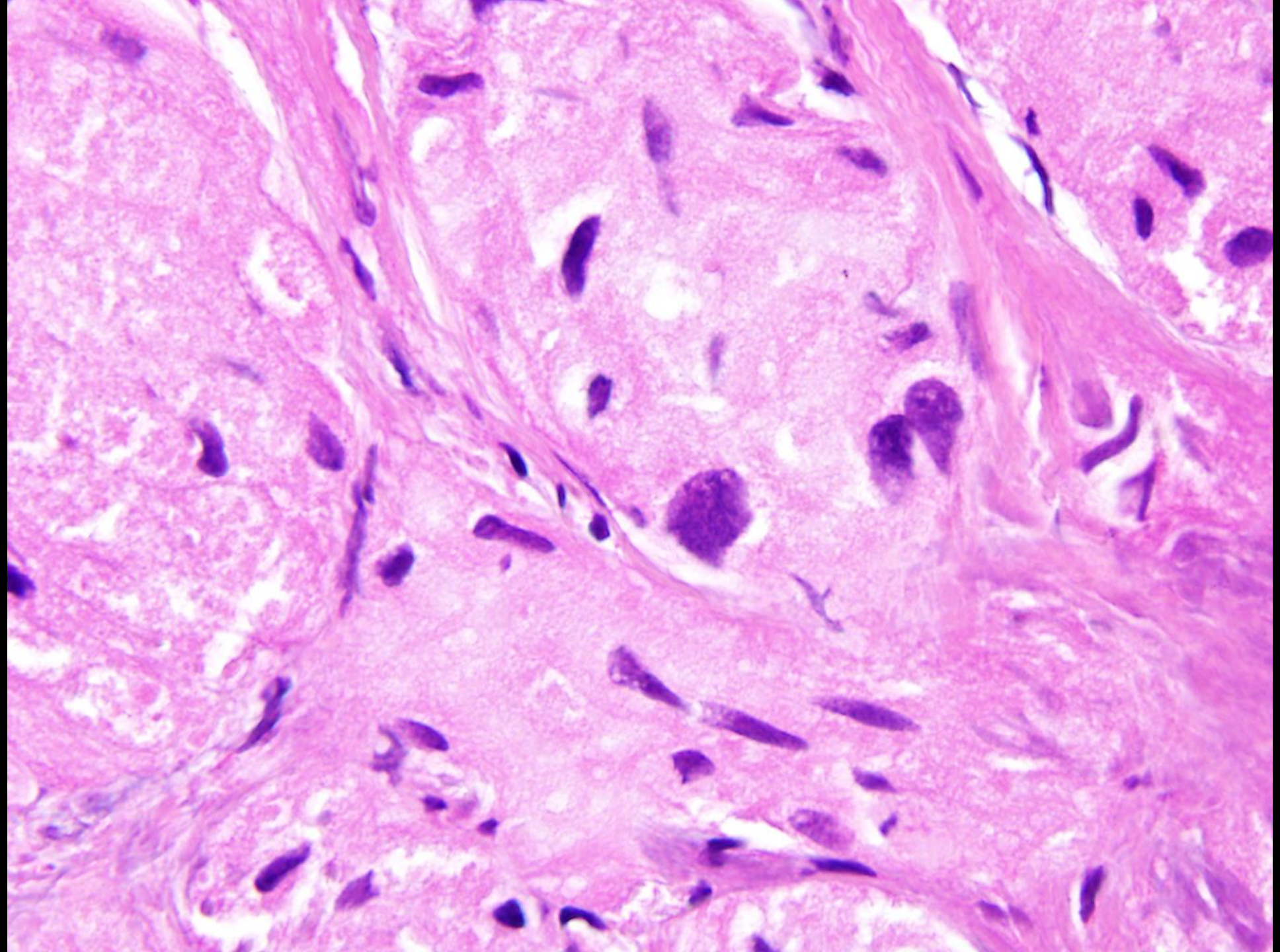
Gangliocytic paraganglioma on crushed biopsy – treacherous!!! – This is keratin – akin to the staining in retroperitoneal schwannomas

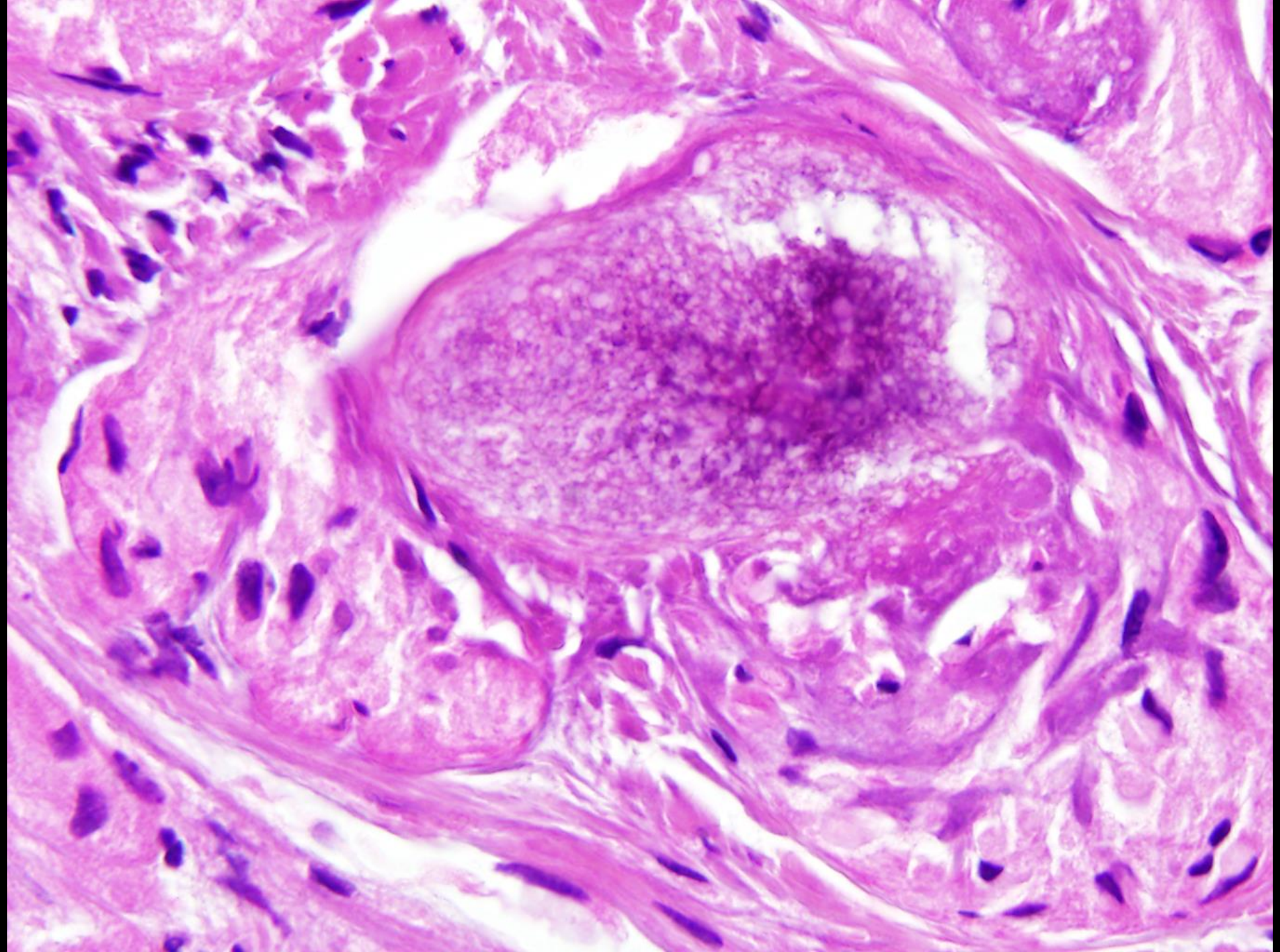
Some mucosal nerve sheath tumors

A cecal polyp found at the time of screening colonoscopy.





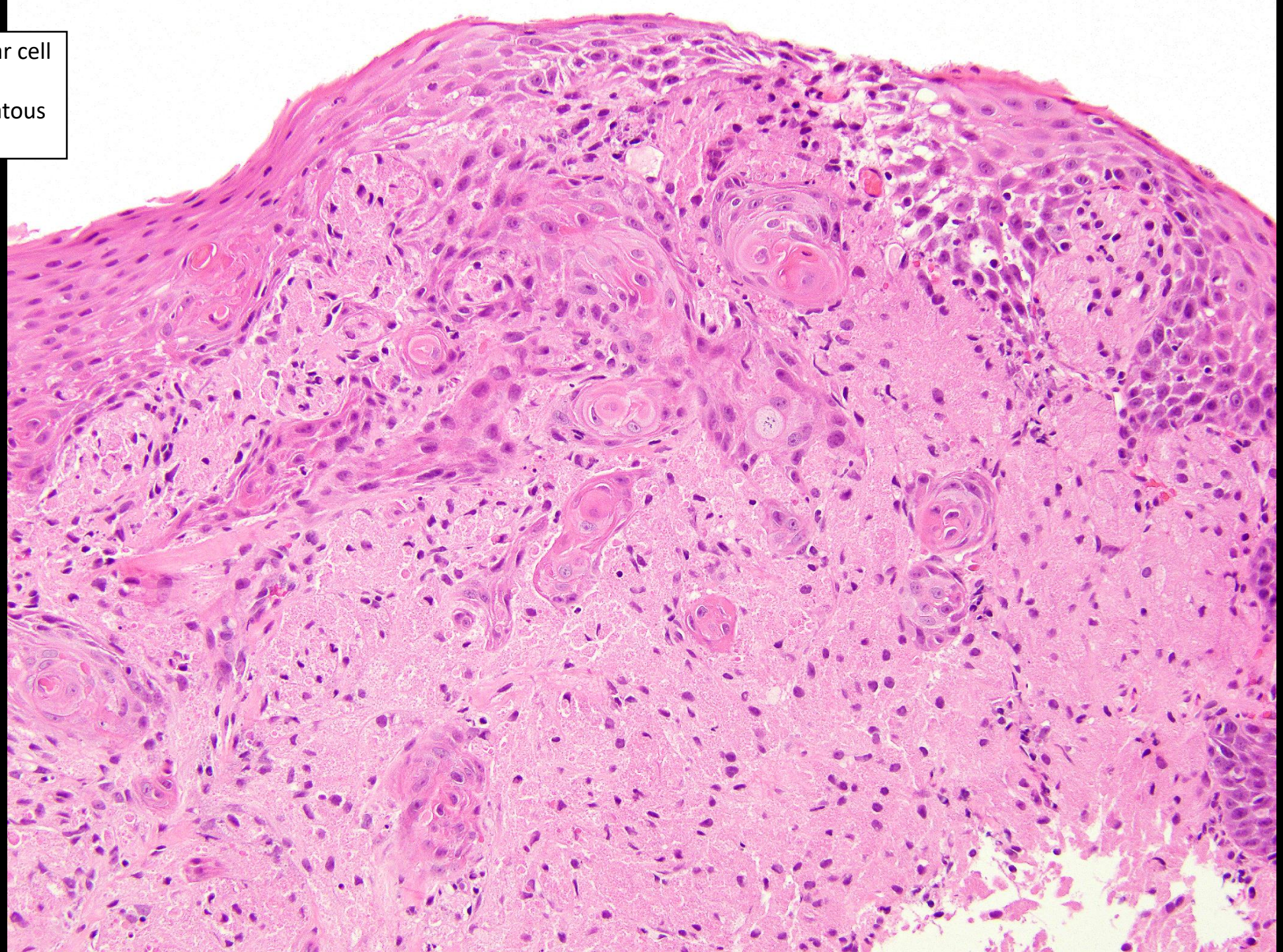


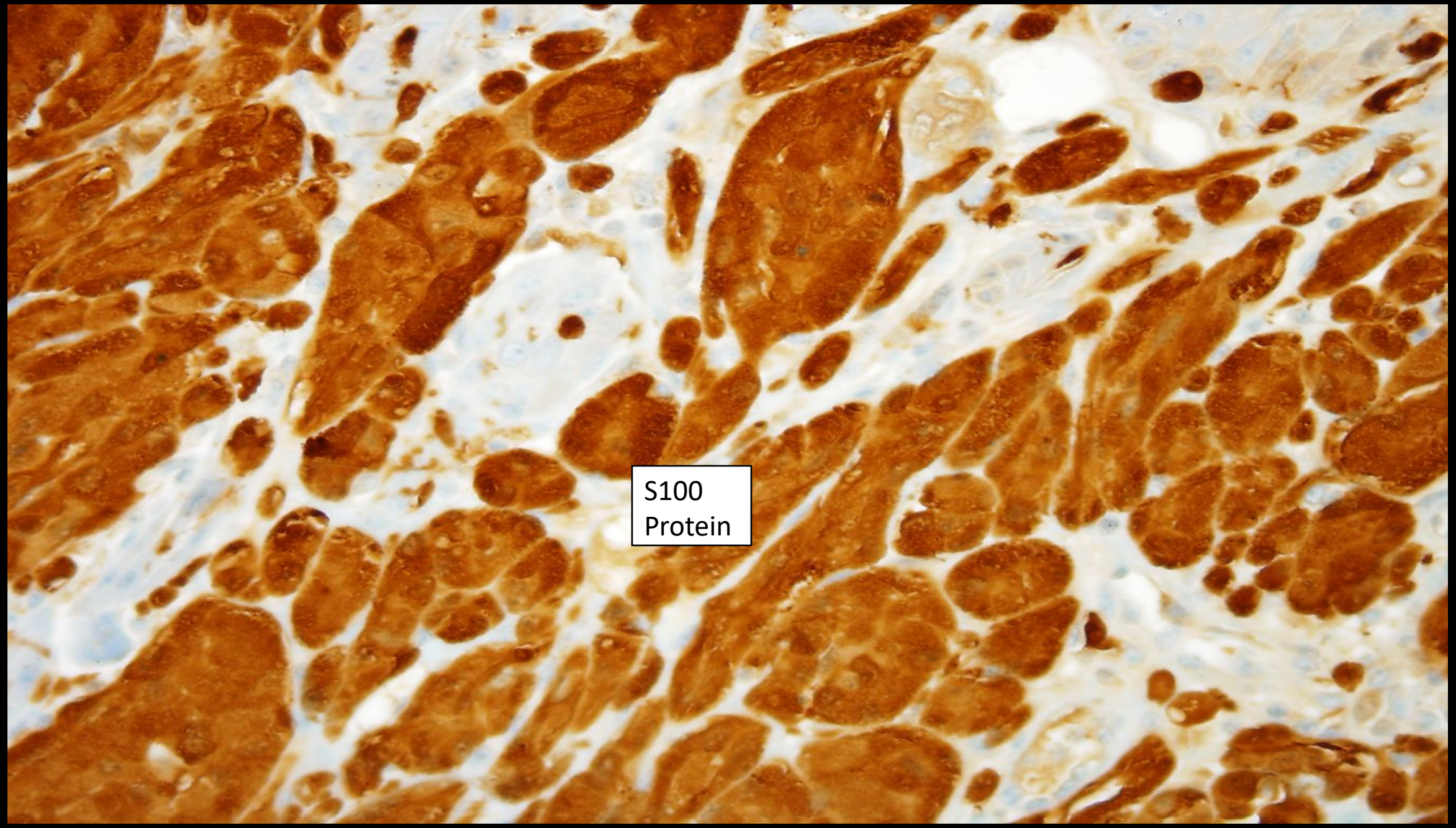


Colon Granular Cell Tumor

- Most GI tract granular cell tumors are in esophagus (or anus)
- Rare colon examples
- Tend to be on right side and often have large nuclei, mineralization, can recur as difficult to totally remove
- No CONVINCING malignant examples reported to date in colon – rare in esophagus

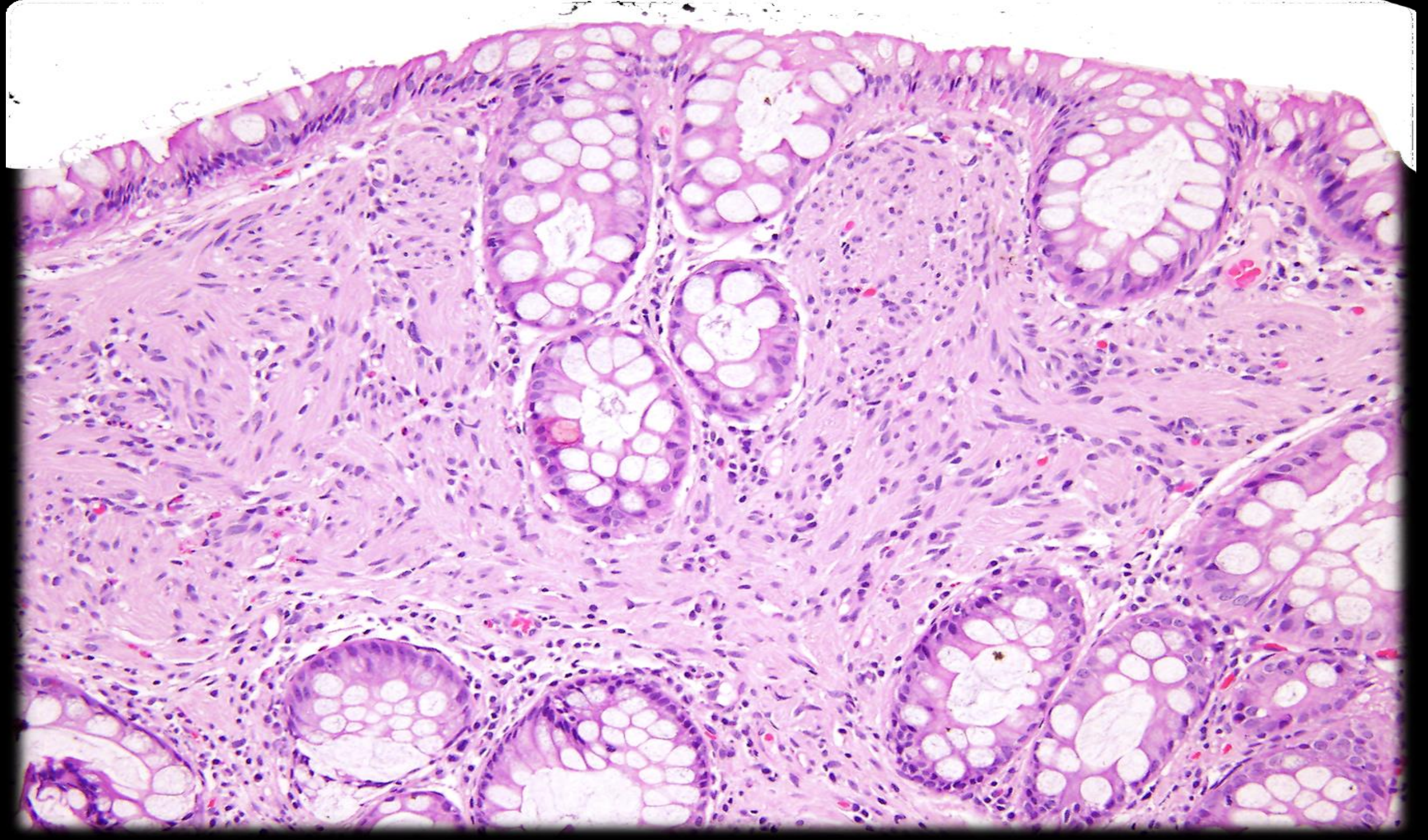
Esophageal granular cell tumor with striking pseudoepitheliomatous hyperplasia

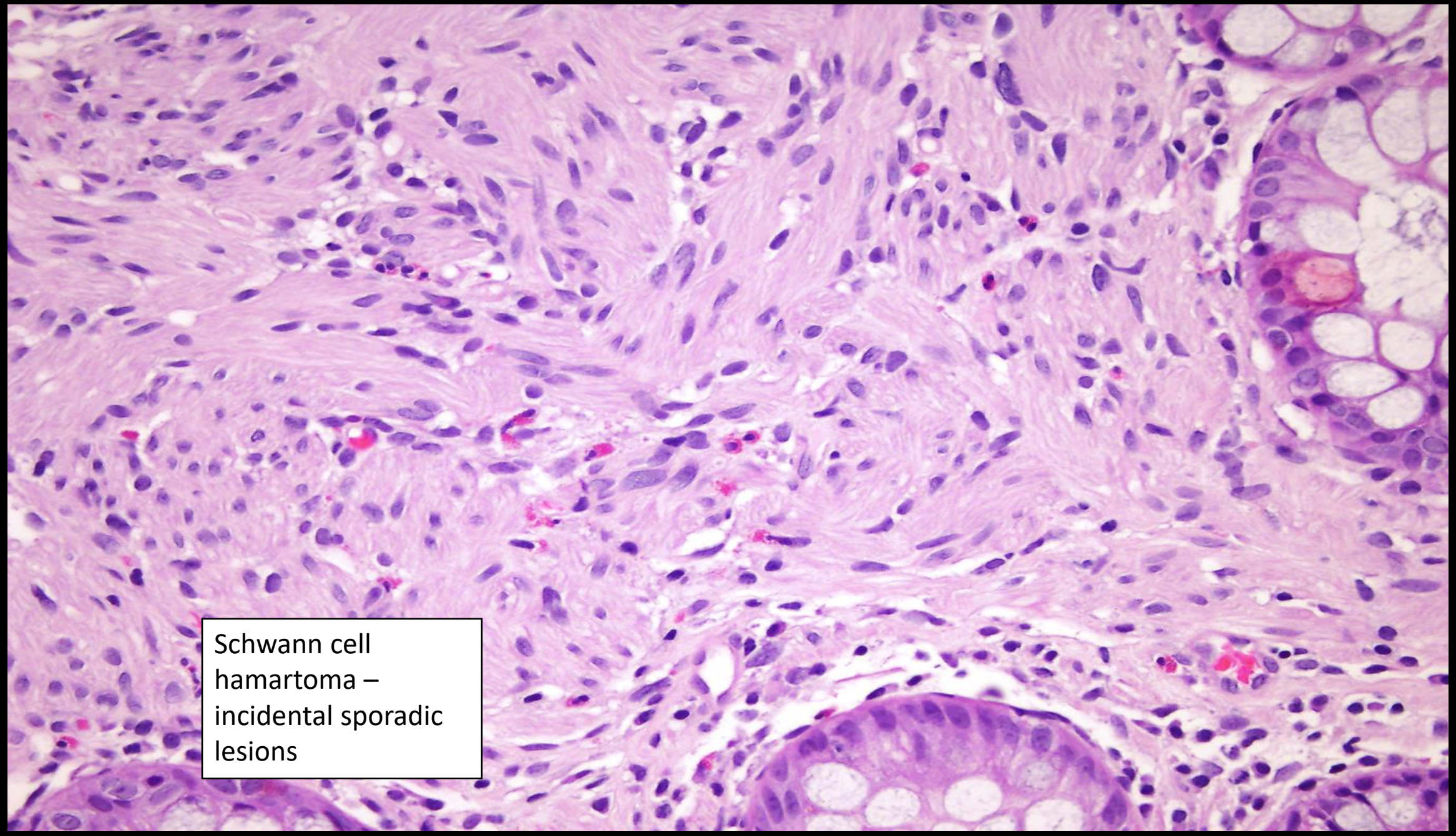


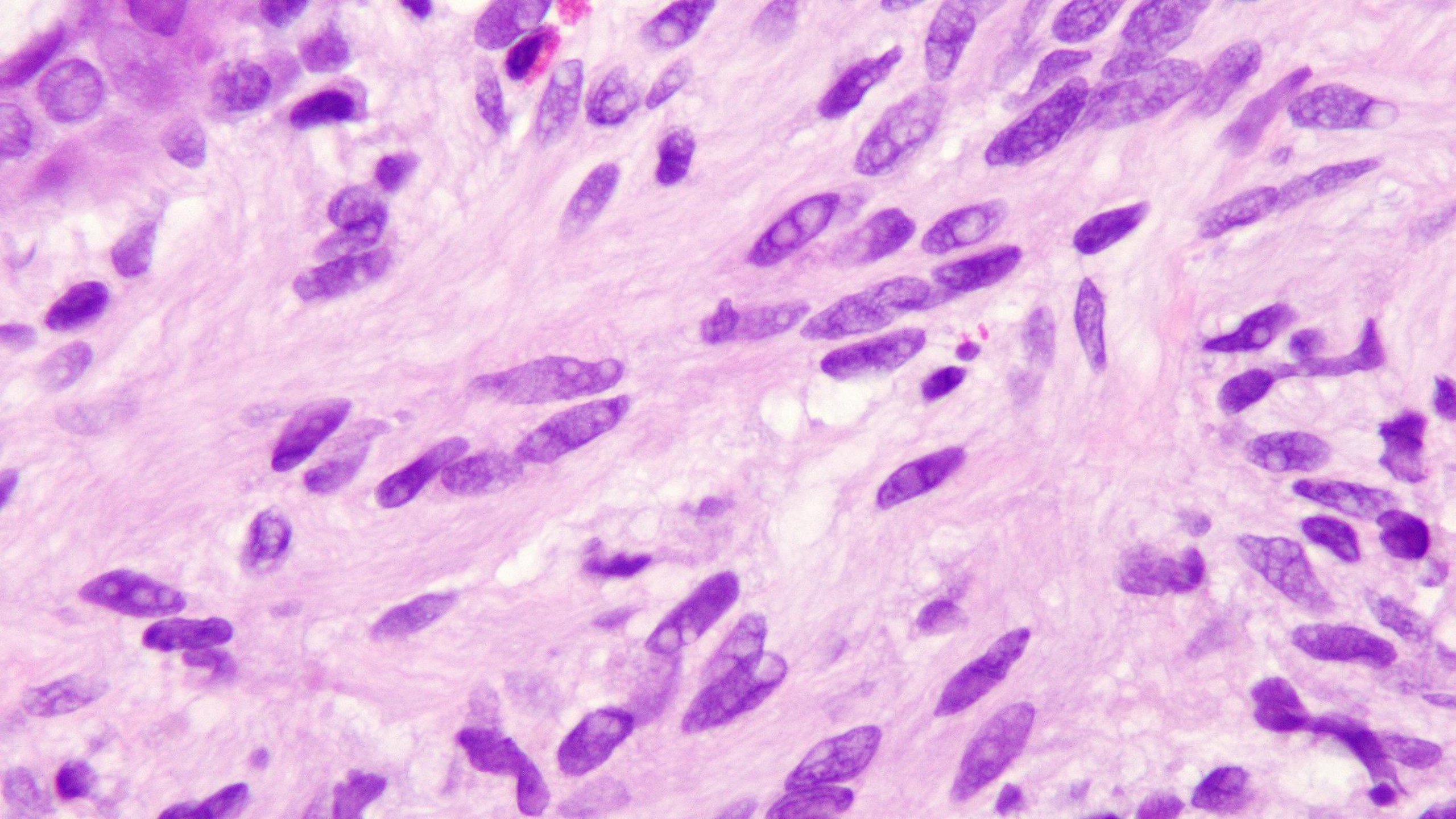

S100
Protein

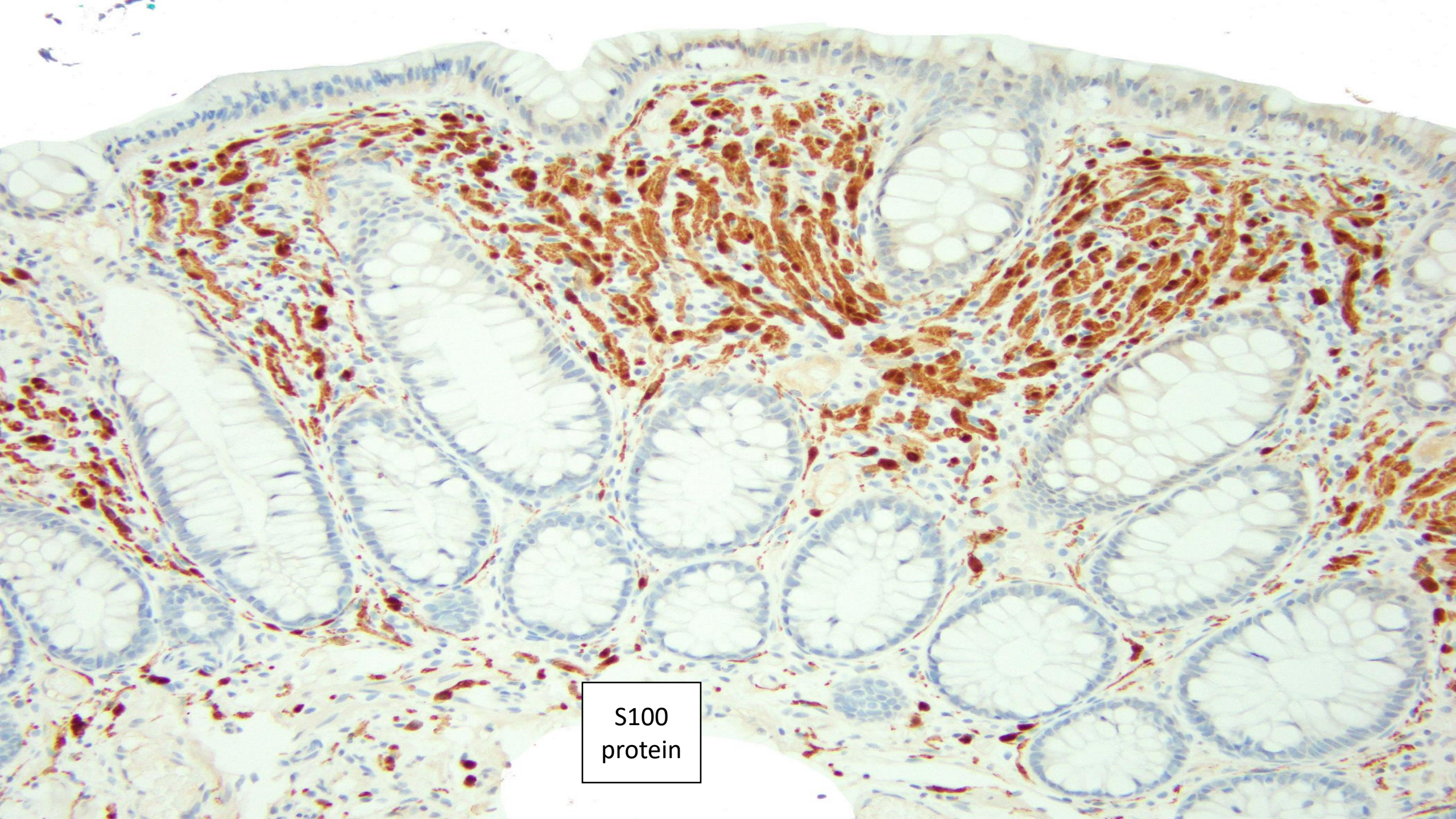
“Schwann Cell Hamartoma”

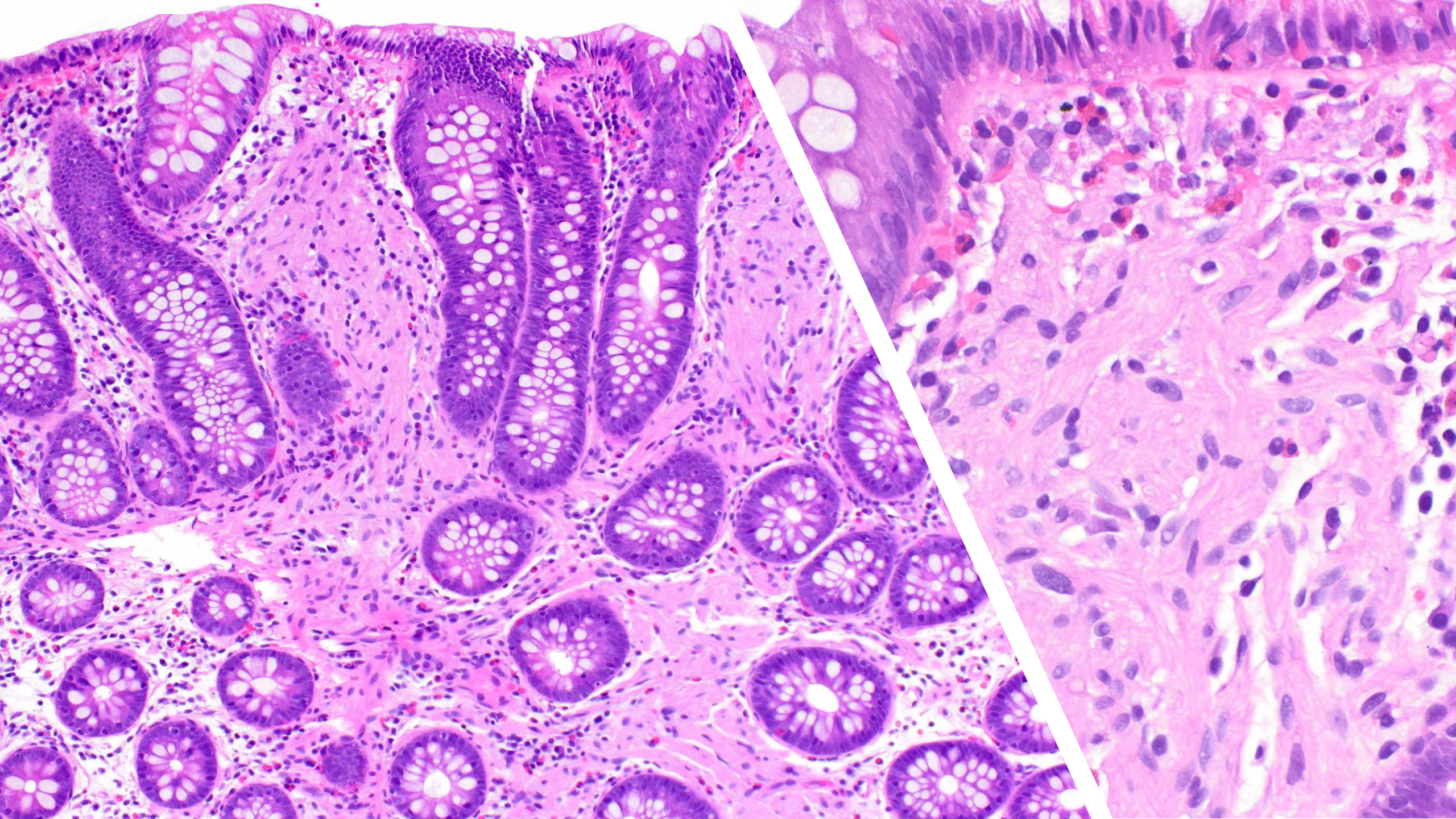
Gibson JA, Hornick JL. Mucosal Schwann cell "hamartoma": clinicopathologic study of 26 neural colorectal polyps distinct from neurofibromas and mucosal neuromas. Am J Surg Pathol. 2009 May;33(5):781-7.




Schwann cell hamartoma – incidental sporadic lesions




S100
protein



Cowden/PTEN Hamartoma Syndrome

World Health Organization criteria for Cowden syndrome. One or more pathognomonic criteria or two or more major or minor criteria.

Pathognomonic criteria

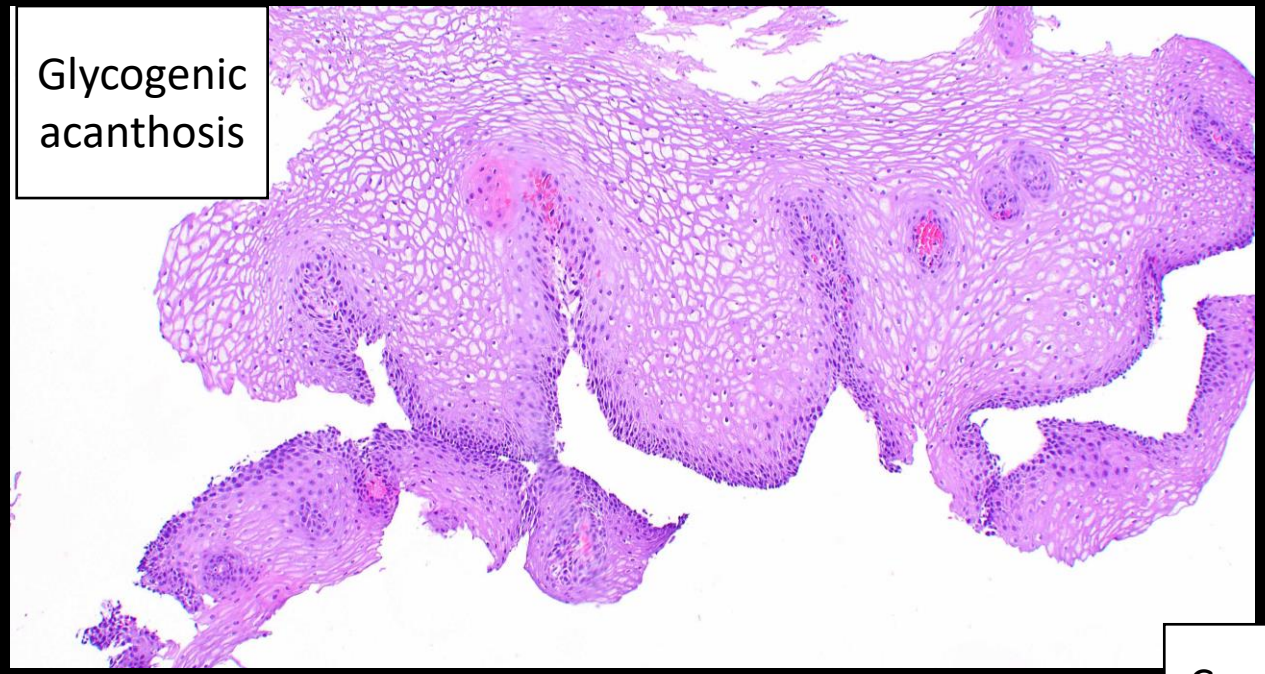
Adult L'hermitte-Duclos disease (cerebellar tumors)
Mucocutaneous lesions (facial trichilemmomas), acral keratoses, papillomatous papules)
Mucosal lesions
Autism spectrum disorder

Major criteria

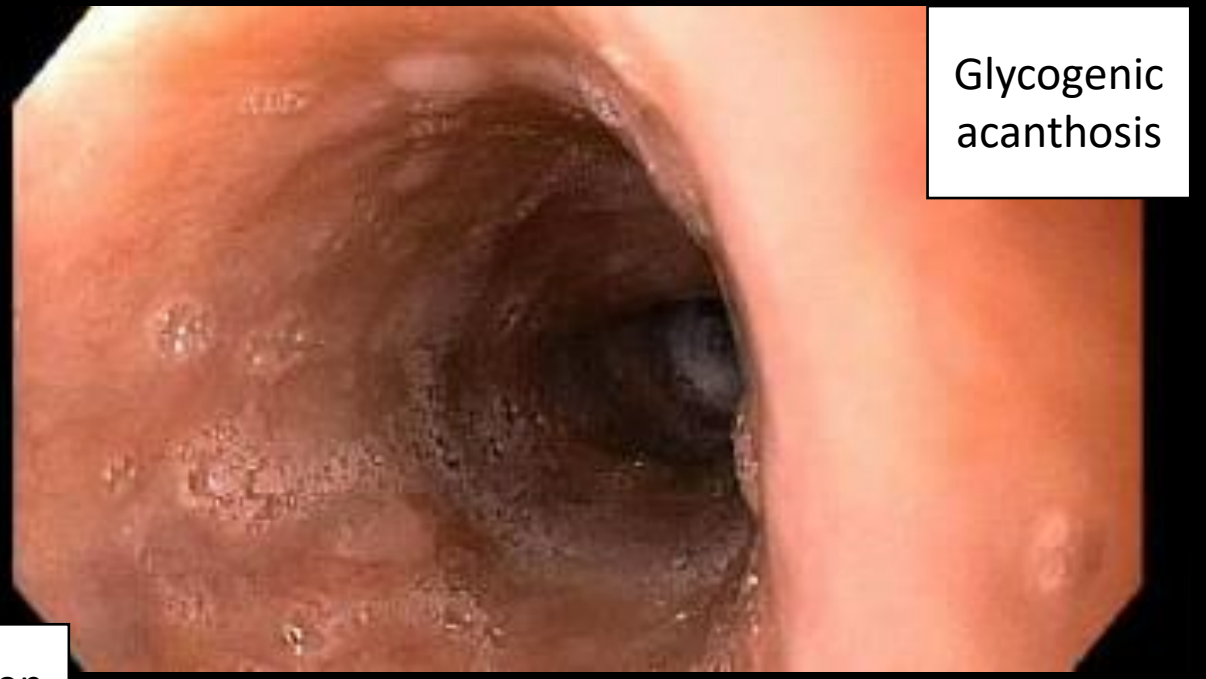
Breast cancer
Non-medullary thyroid cancer
Megalocephaly
Endometrial carcinoma
Mucocutaneous lesions (trichilemmoma- at least one biopsy proven, multiple palmoplantar keratoses, multifocal cutaneous facial papules, macular pigmentation of glans penis
Multiple gastrointestinal hamartomas or ganglioneuromas

Minor criteria

Other thyroid lesions (follicular adenoma, multinodular goiter)
Single gastrointestinal hamartoma or ganglioneuroma
Fibrocystic breast disease
Lipomas
Fibromas
Genitourinary tumors – especially renal cell carcinoma
Genitourinary malformation
Uterine leiomyomas
Autism spectrum disorder

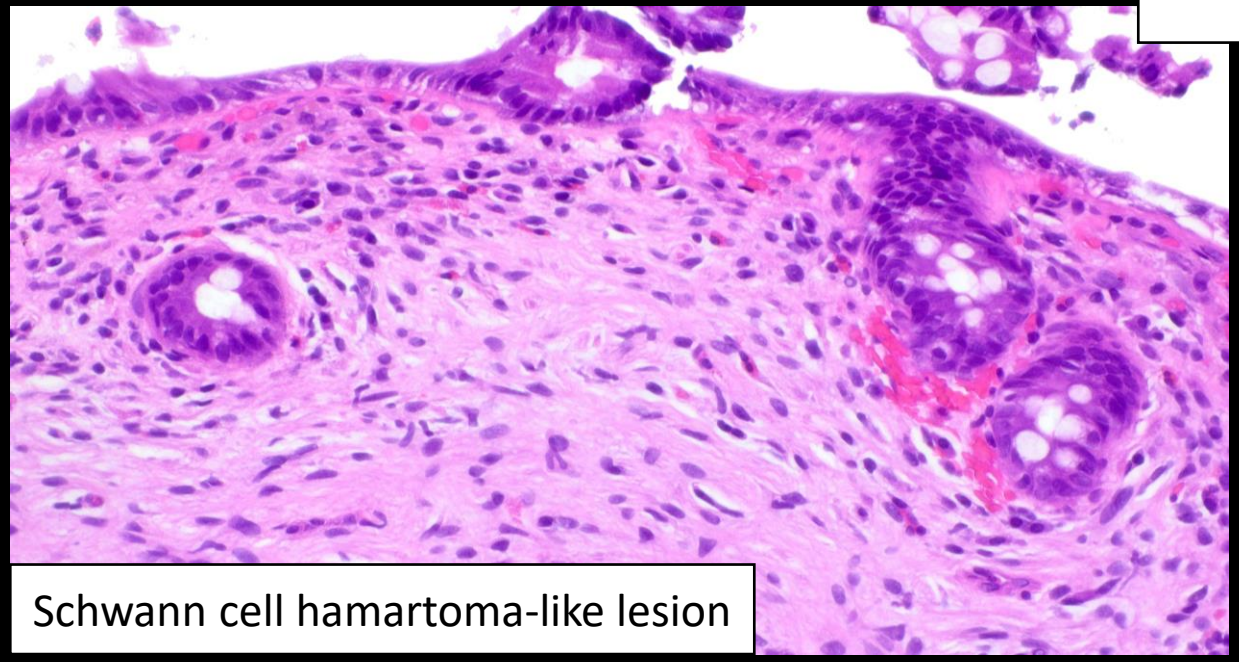


Glycogenic acanthosis

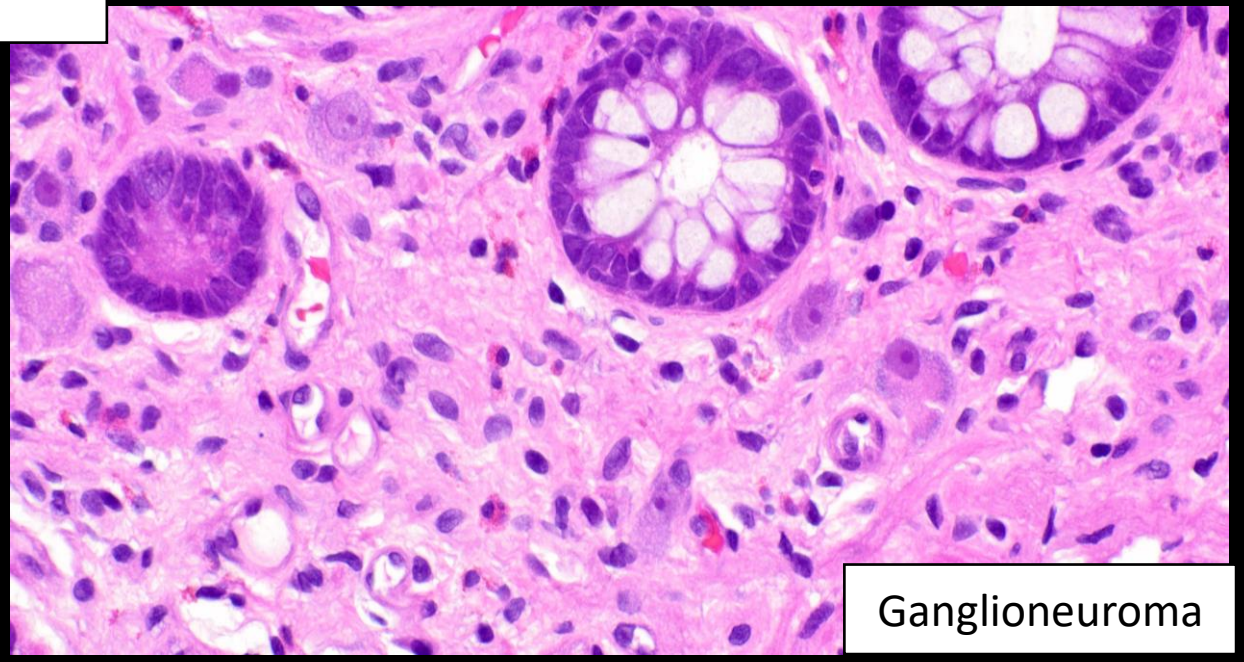


Glycogenic acanthosis

Cowden

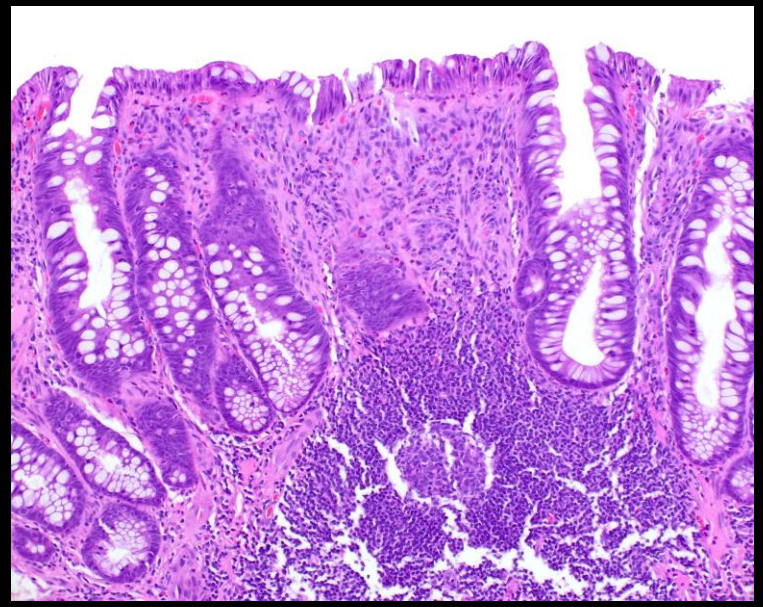


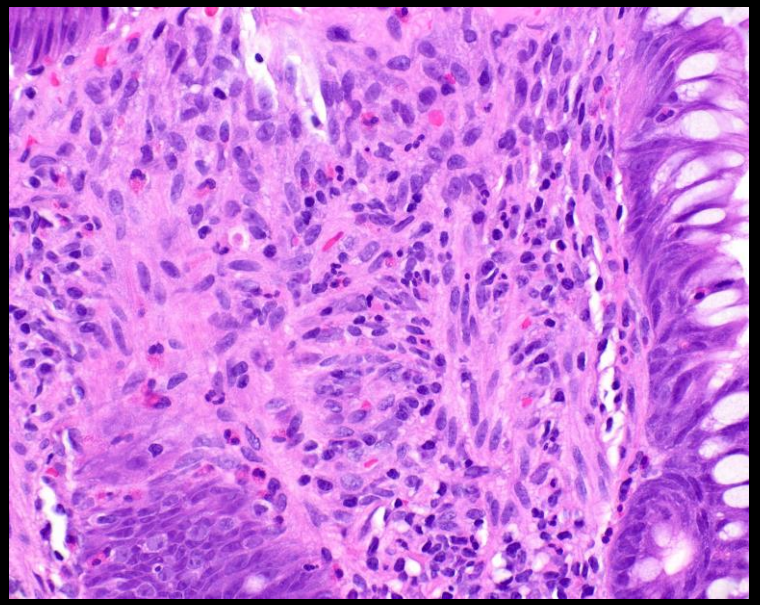
Schwann cell hamartoma-like lesion

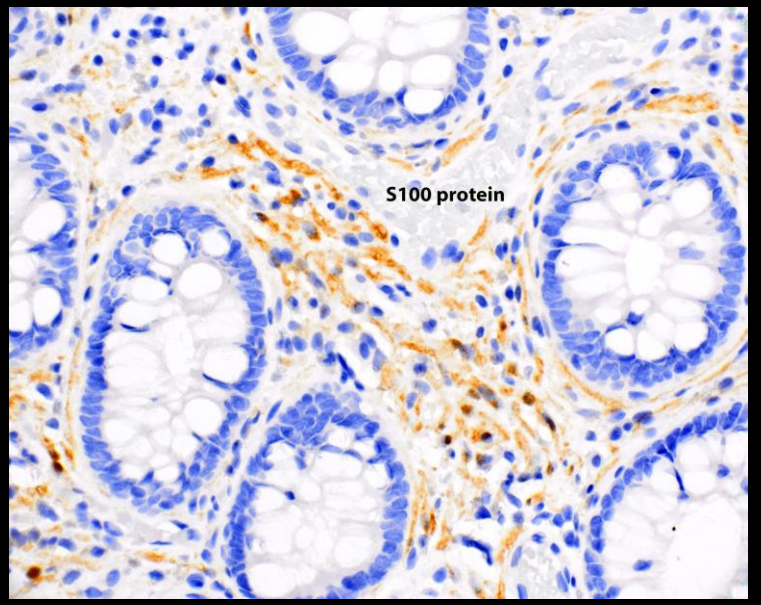


Ganglioneuroma

Cowden-Associated Neural Lesion

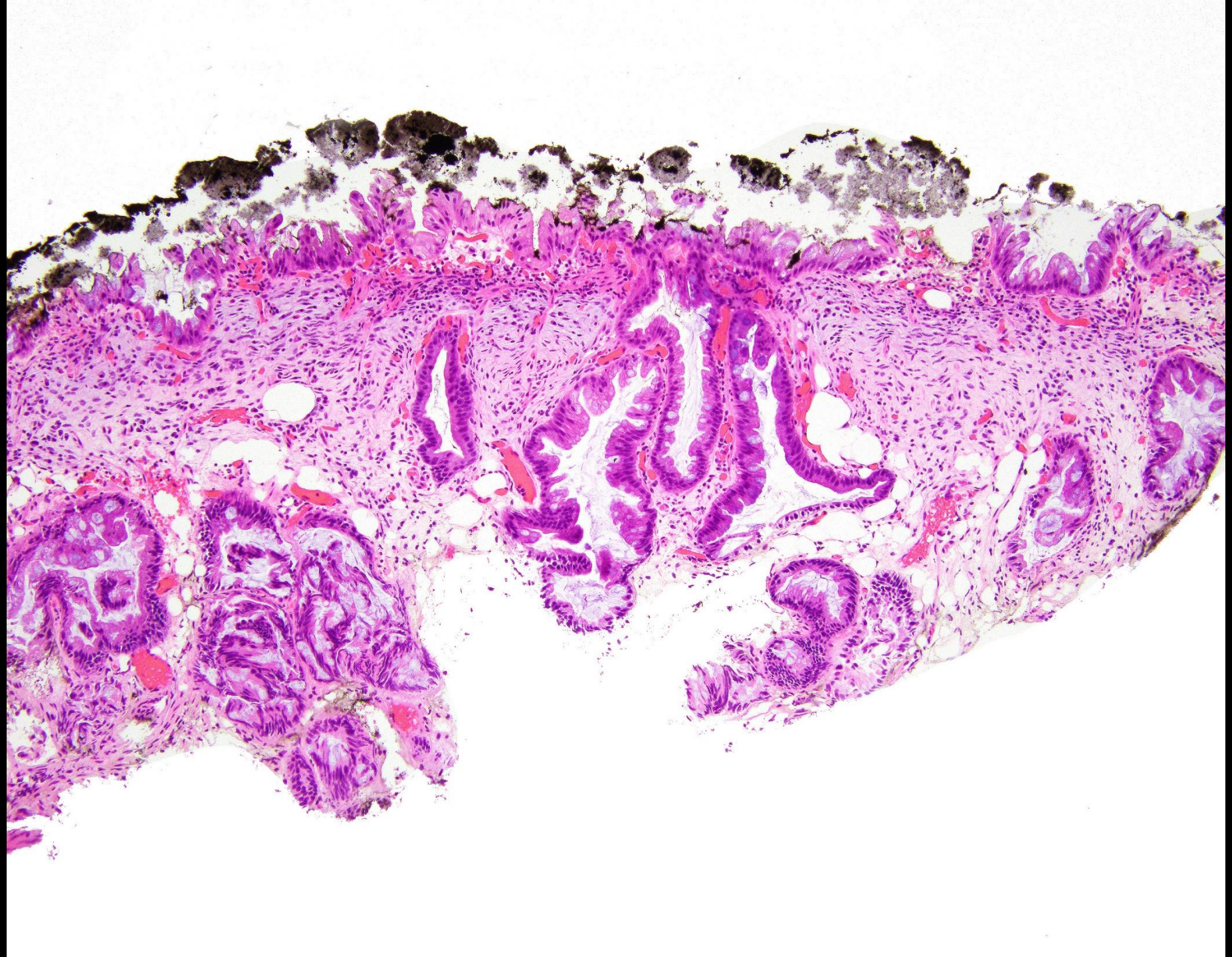


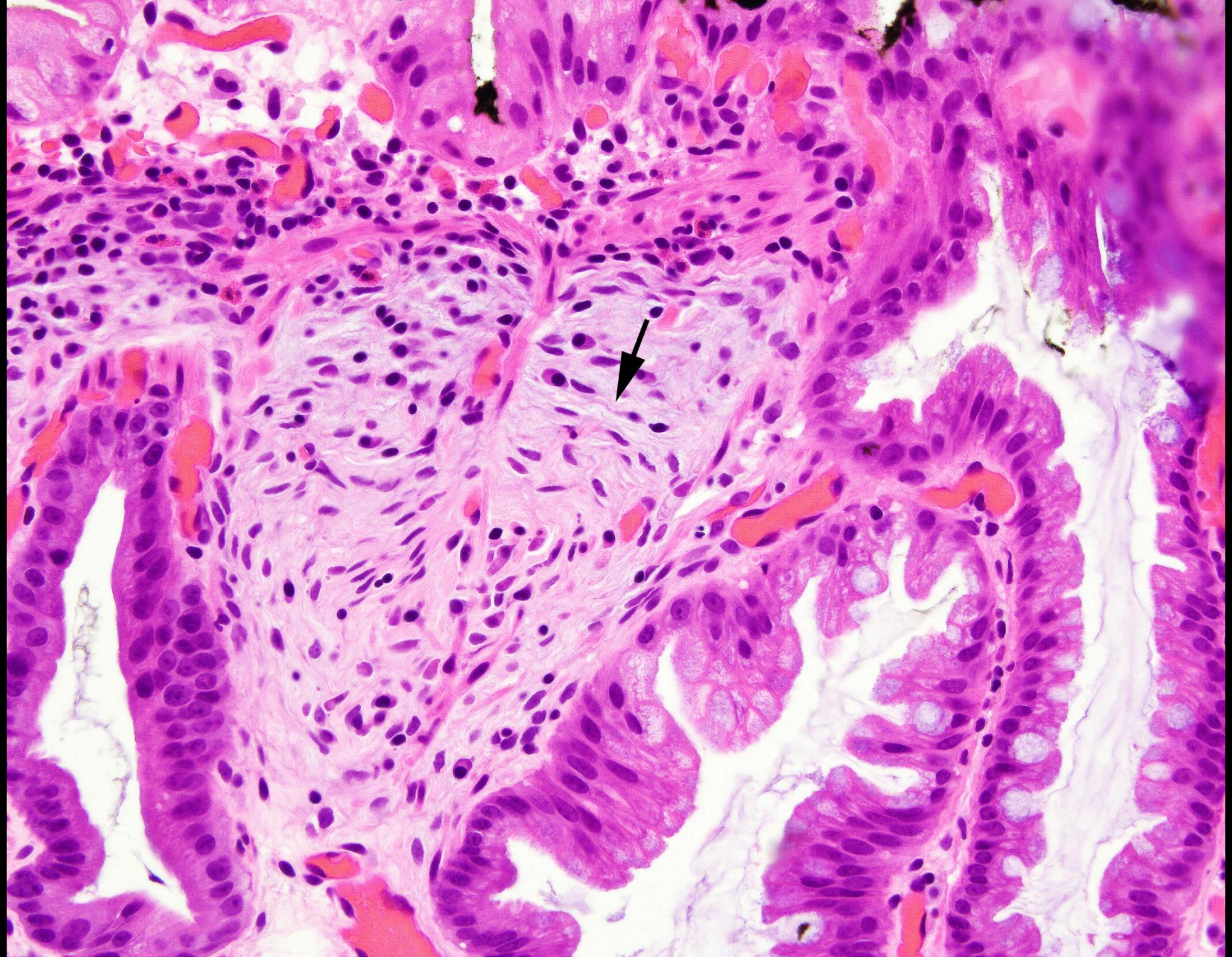


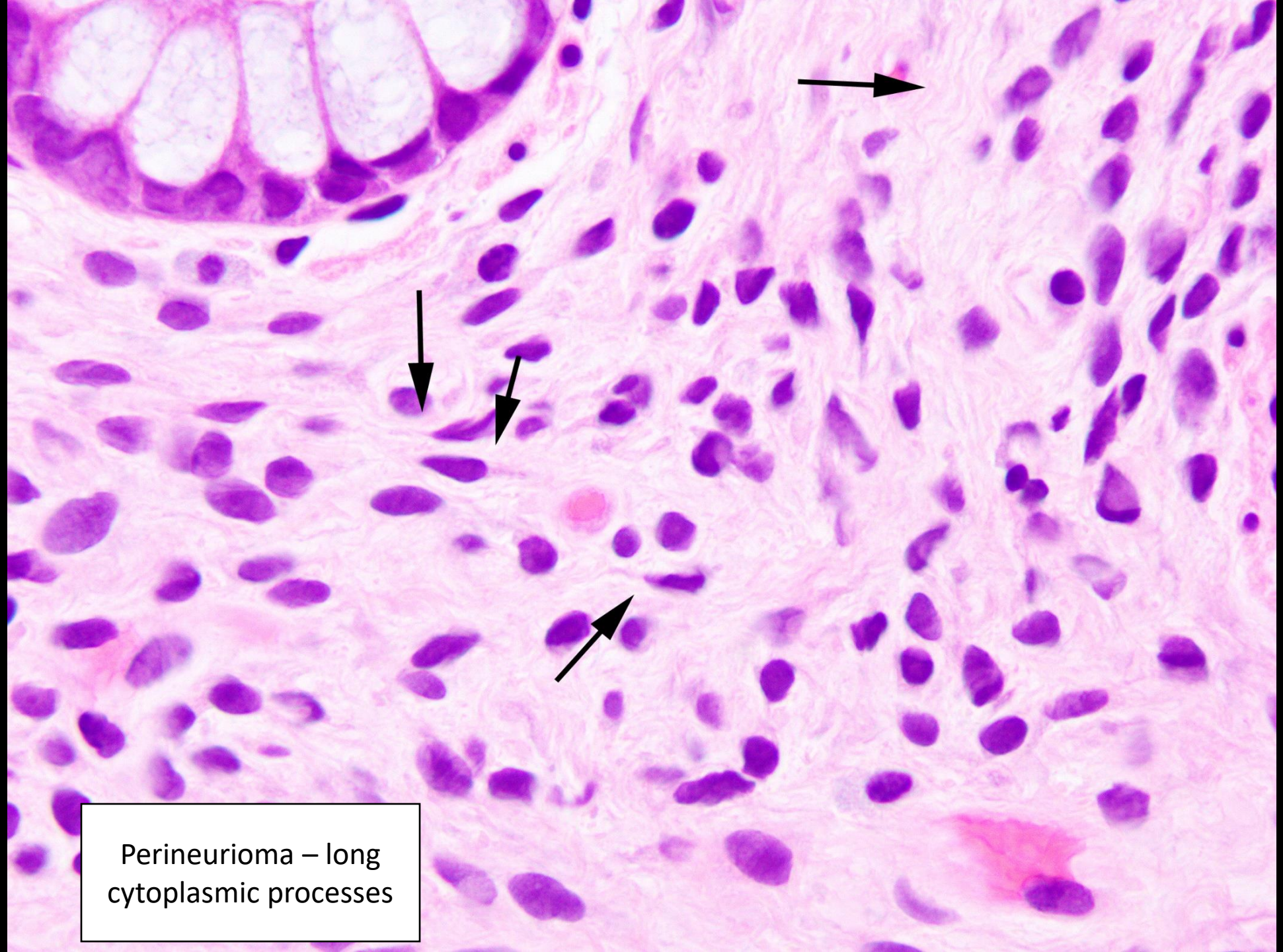


Benign fibroblastic polyps of the colon/perineurioma

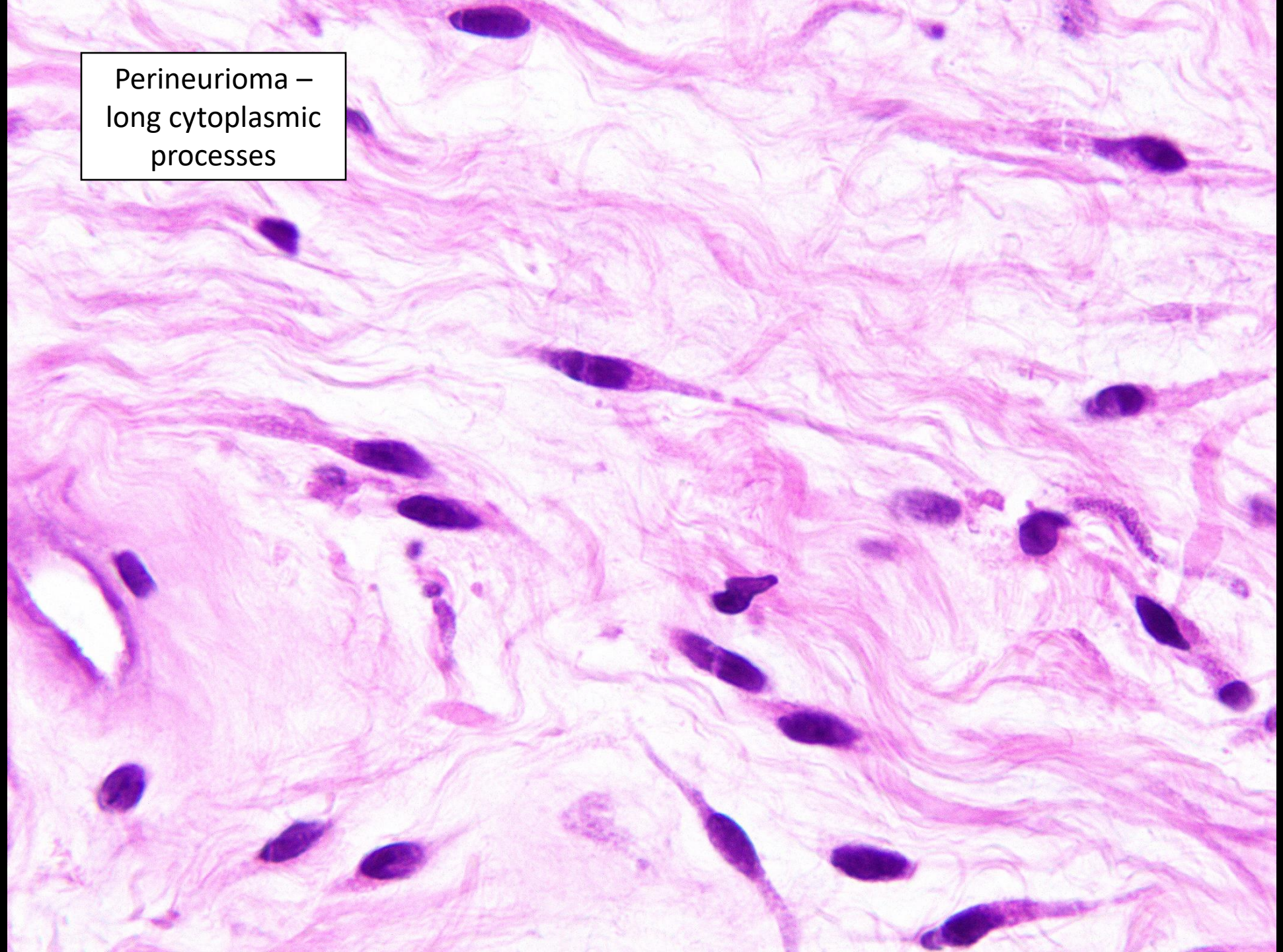
- Incidental -detected in adult patients undergoing screening colonoscopy.
- Lamina propria - Some intimately admixed with serrated polyps.
- Lack CD31, S-100, CD117/c-kit, Bcl-2, and desmin.
- A few have focal SMA and CD34.
- **Same lesions with EMA/ glut1/ claudin 1 can be regarded as "perineurioma"**

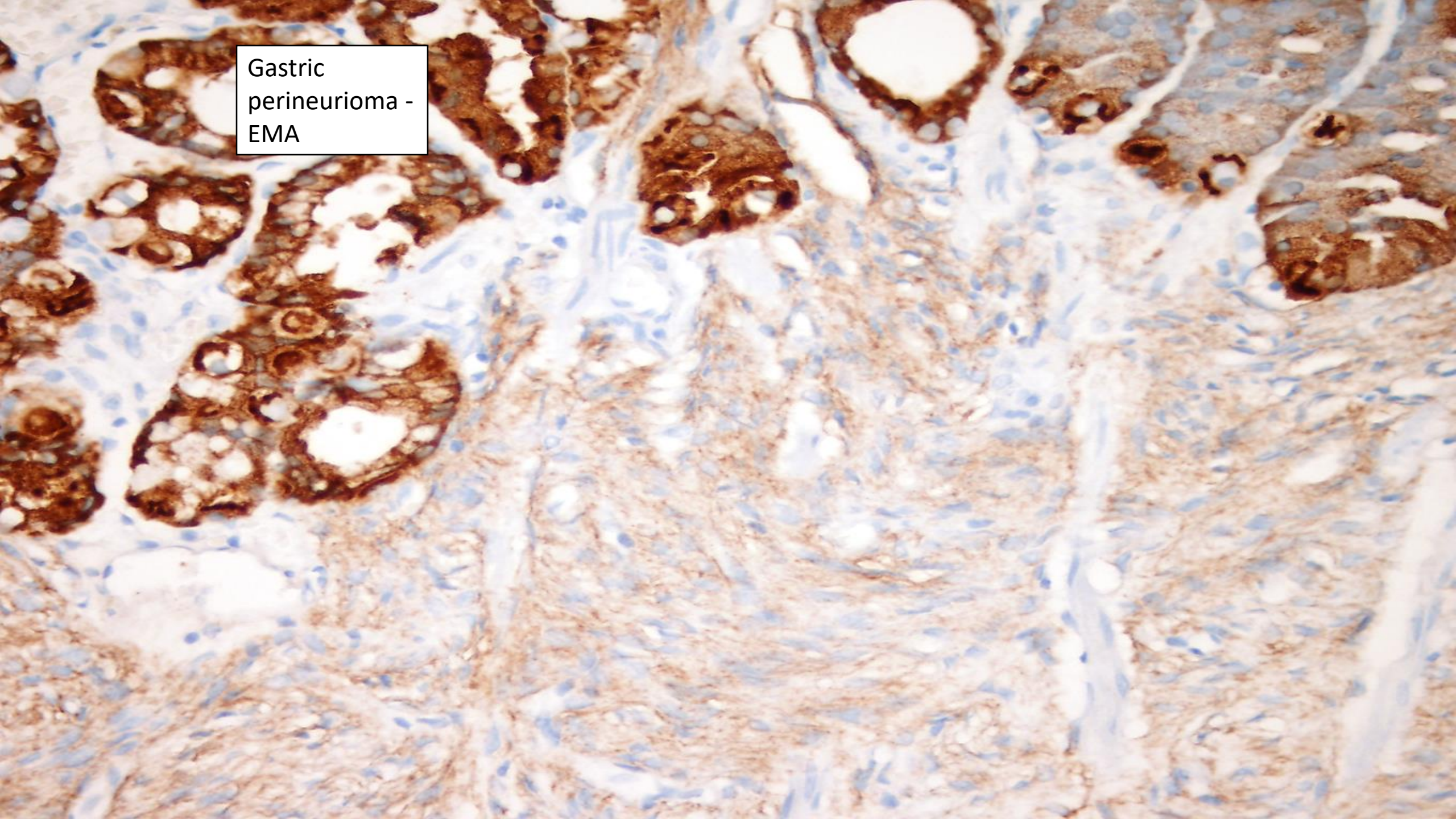


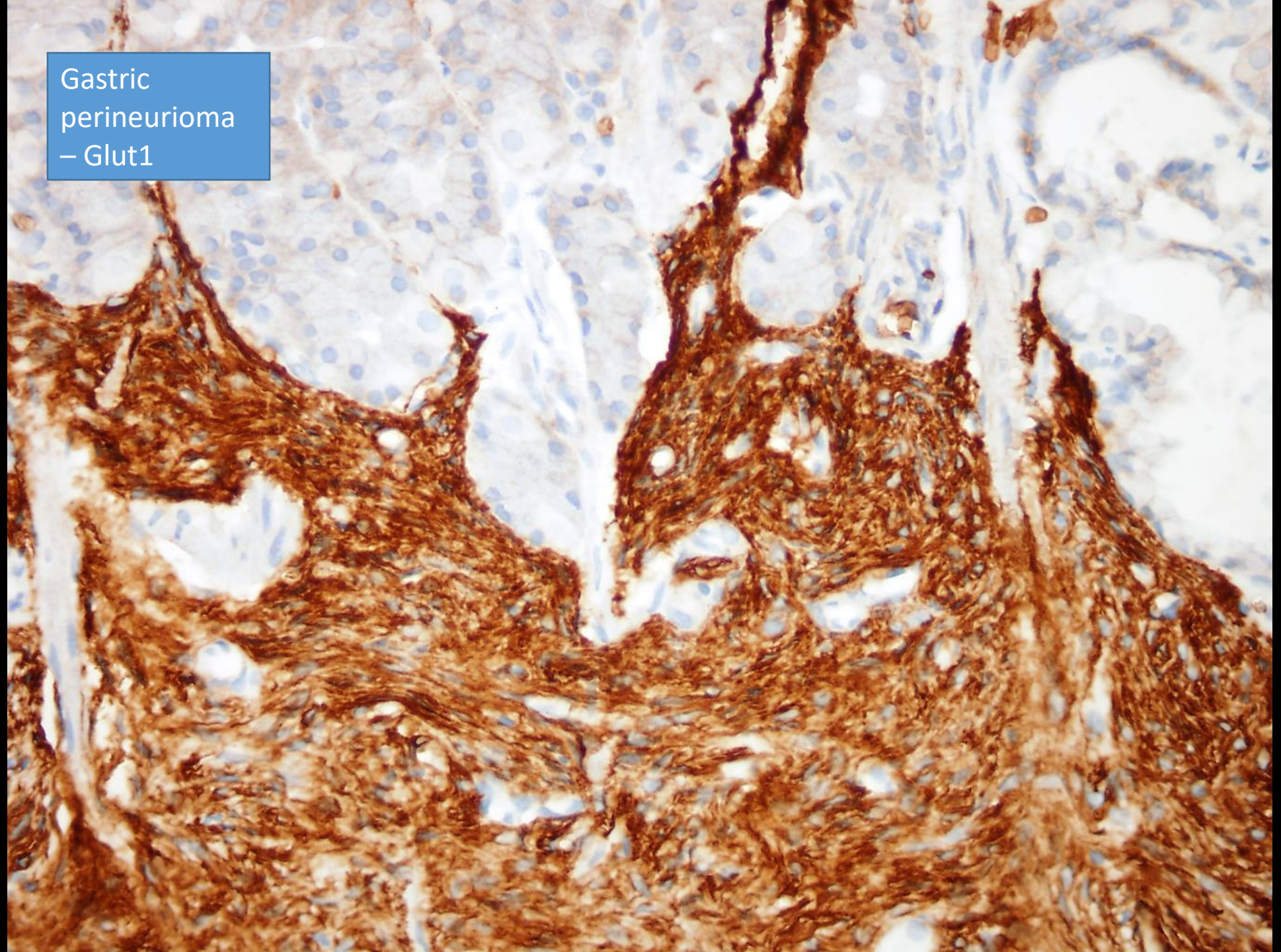


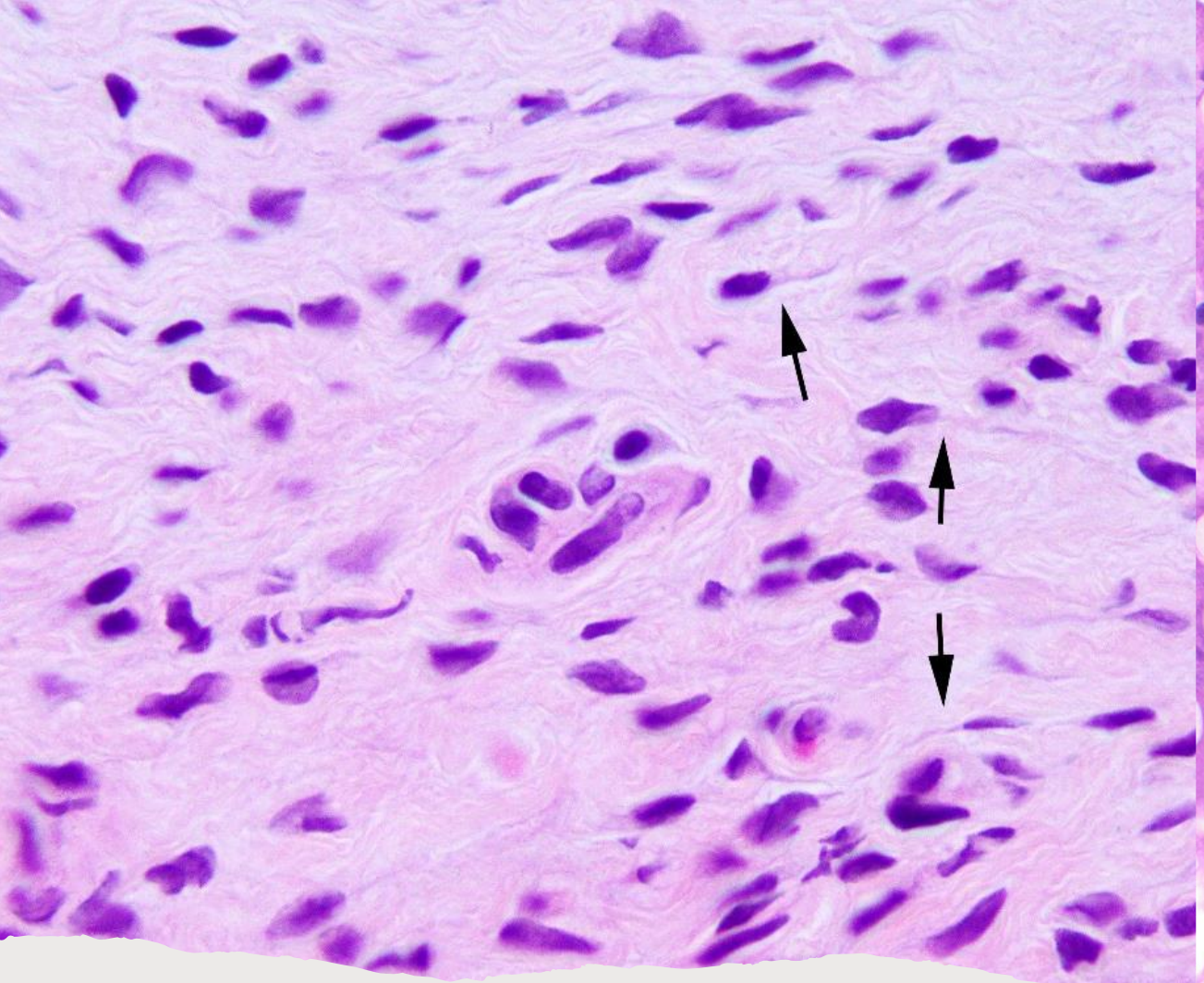


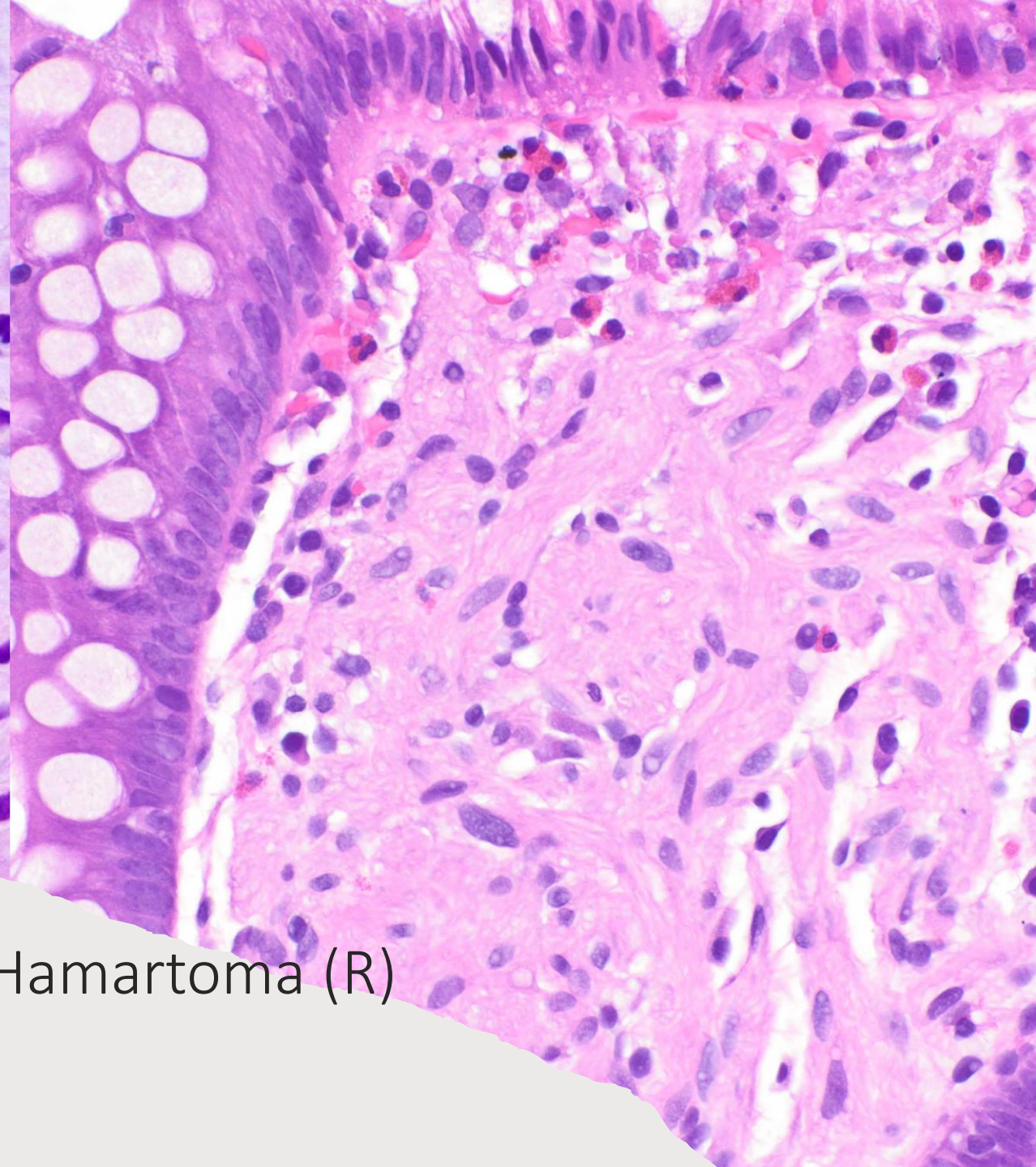
Perineurioma – long cytoplasmic processes


Perineurioma –
long cytoplasmic
processes


Gastric perineurioma - EMA


Gastric perineurioma – Glut1

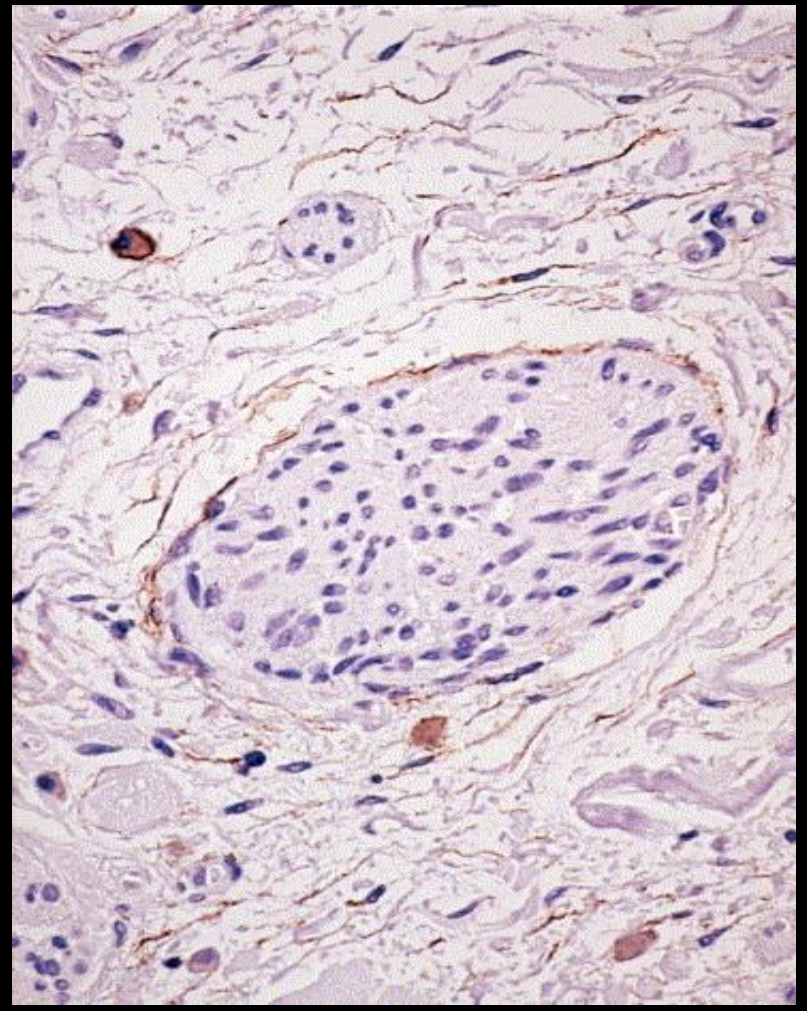


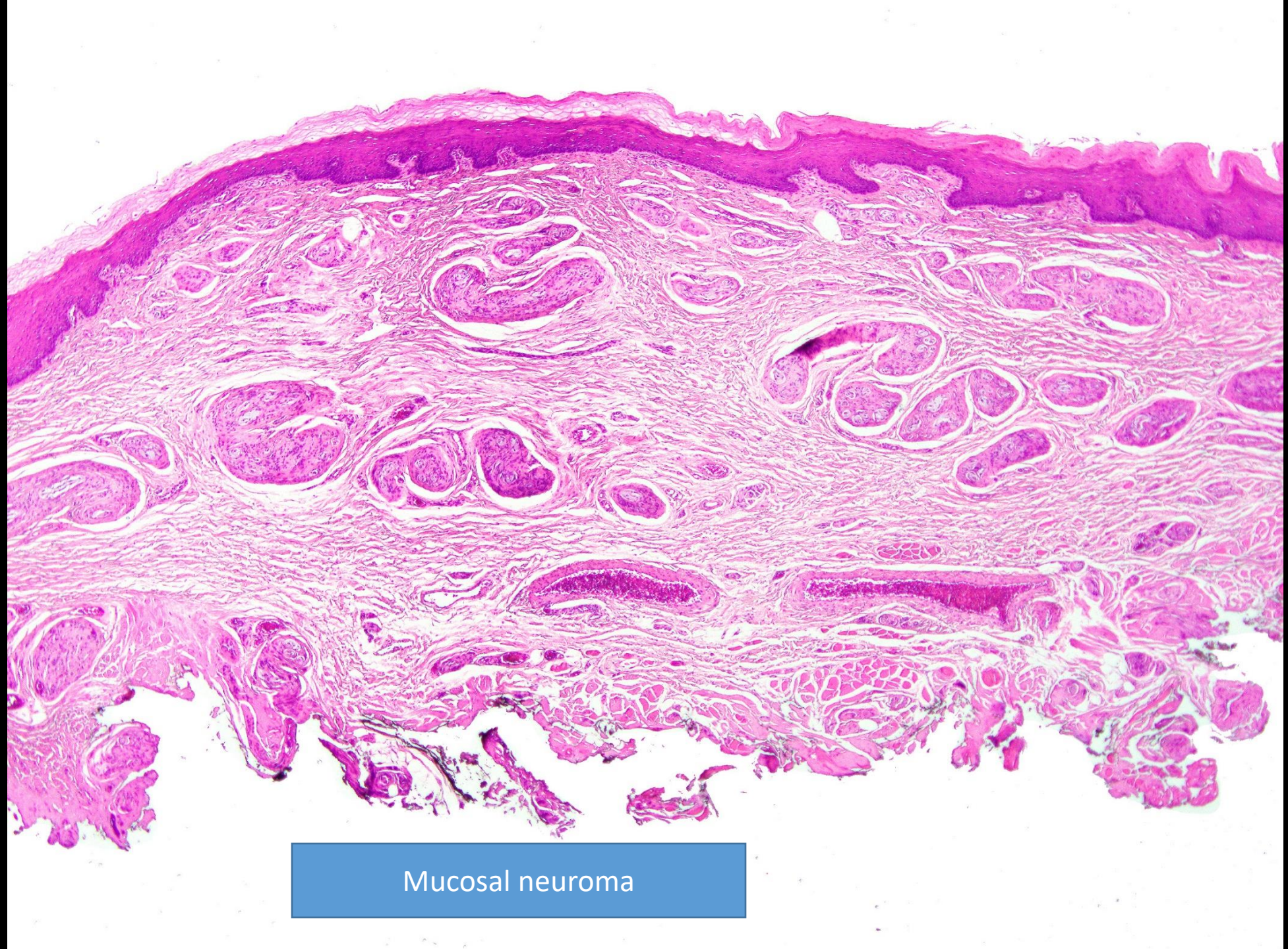


Perineurioma (L) v Schwann Cell Hamartoma (R)

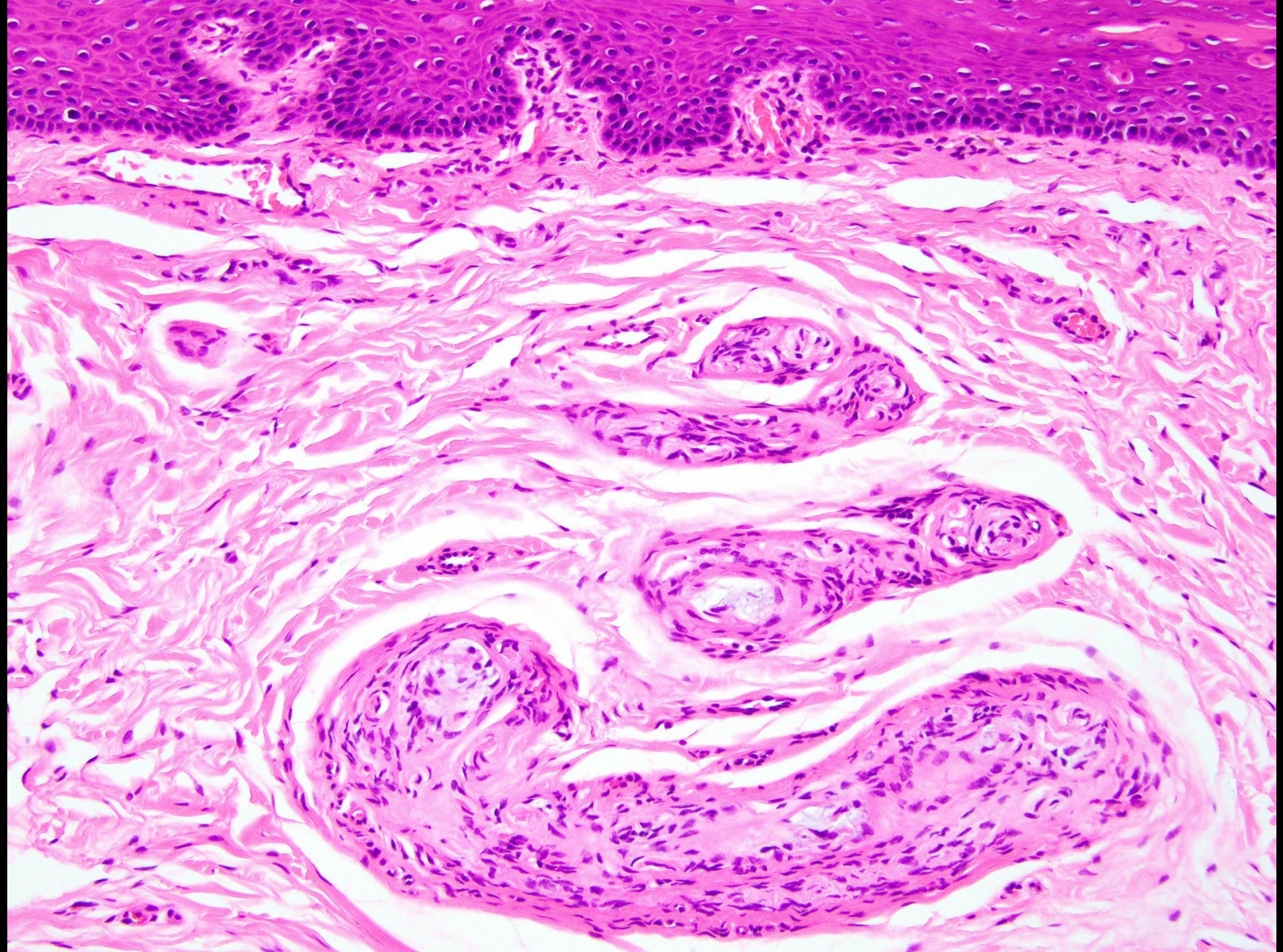
Mucosal Nerve Sheath Lesions

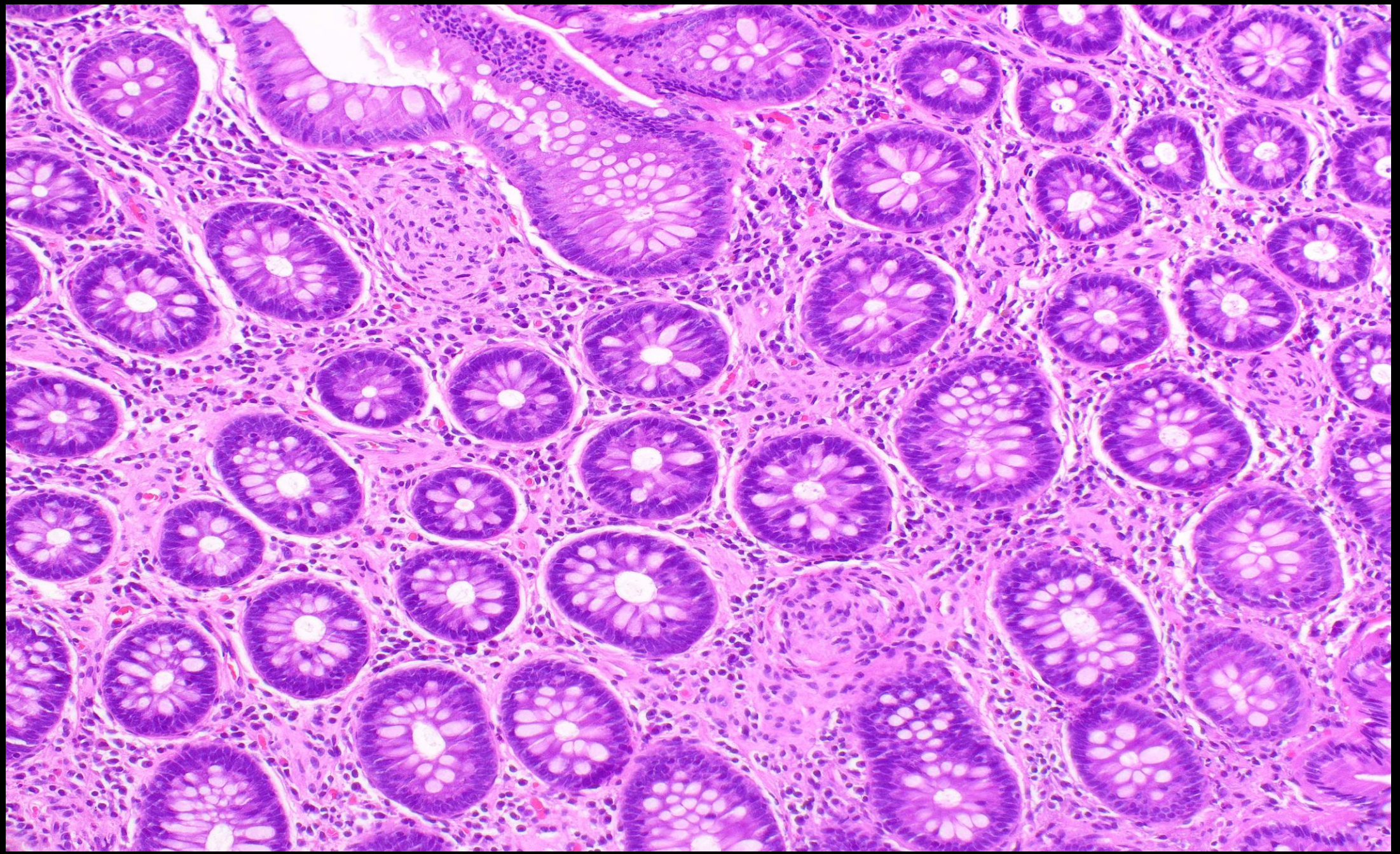
- Benign
- No need to worry about GIST – if is extension from a GIST it will look ugly
- Differ from “Mucosal neuromas” of MEN2B – medullary thyroid carcinoma, pheochromocytoma, neuromas/ganglioneuromas

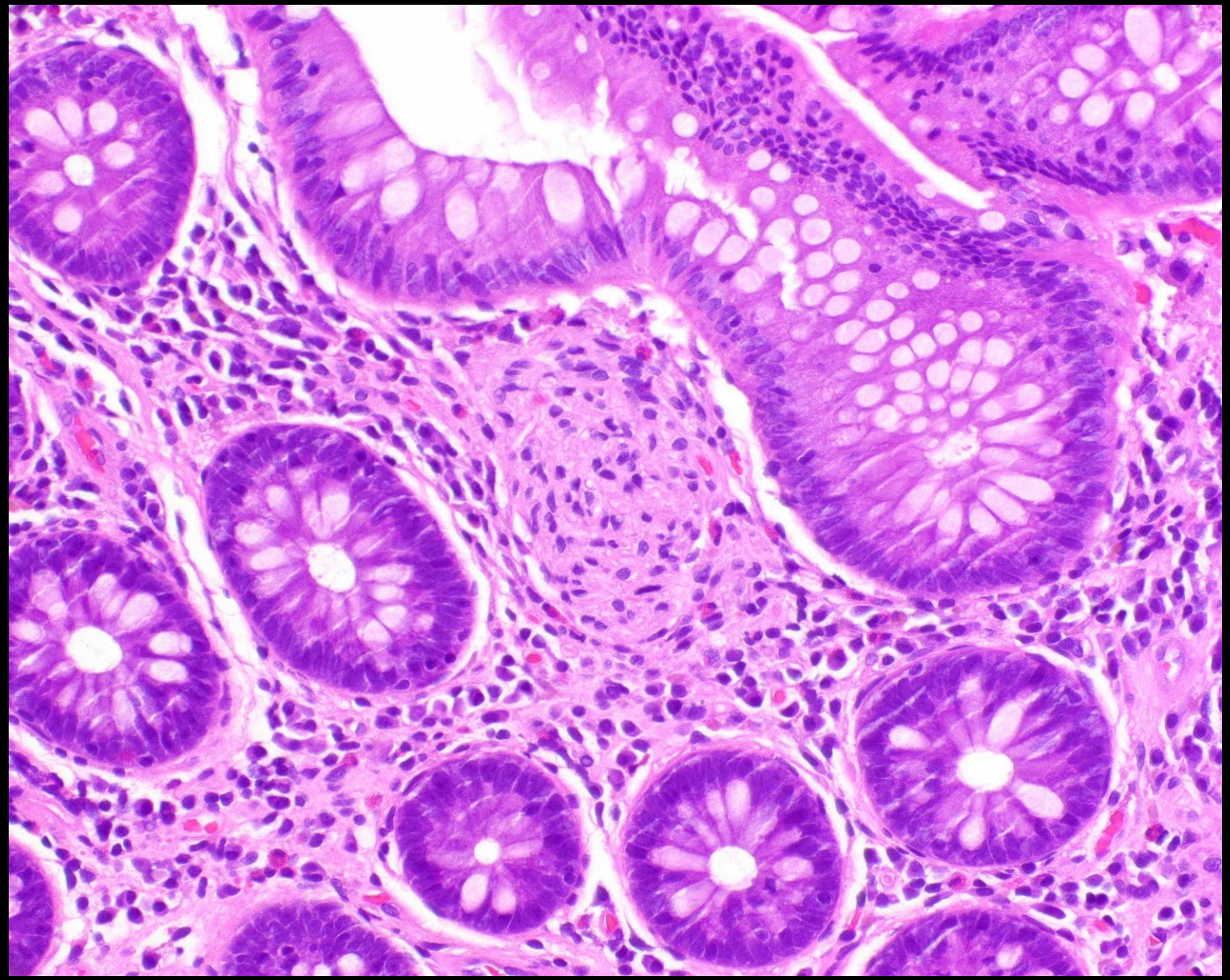


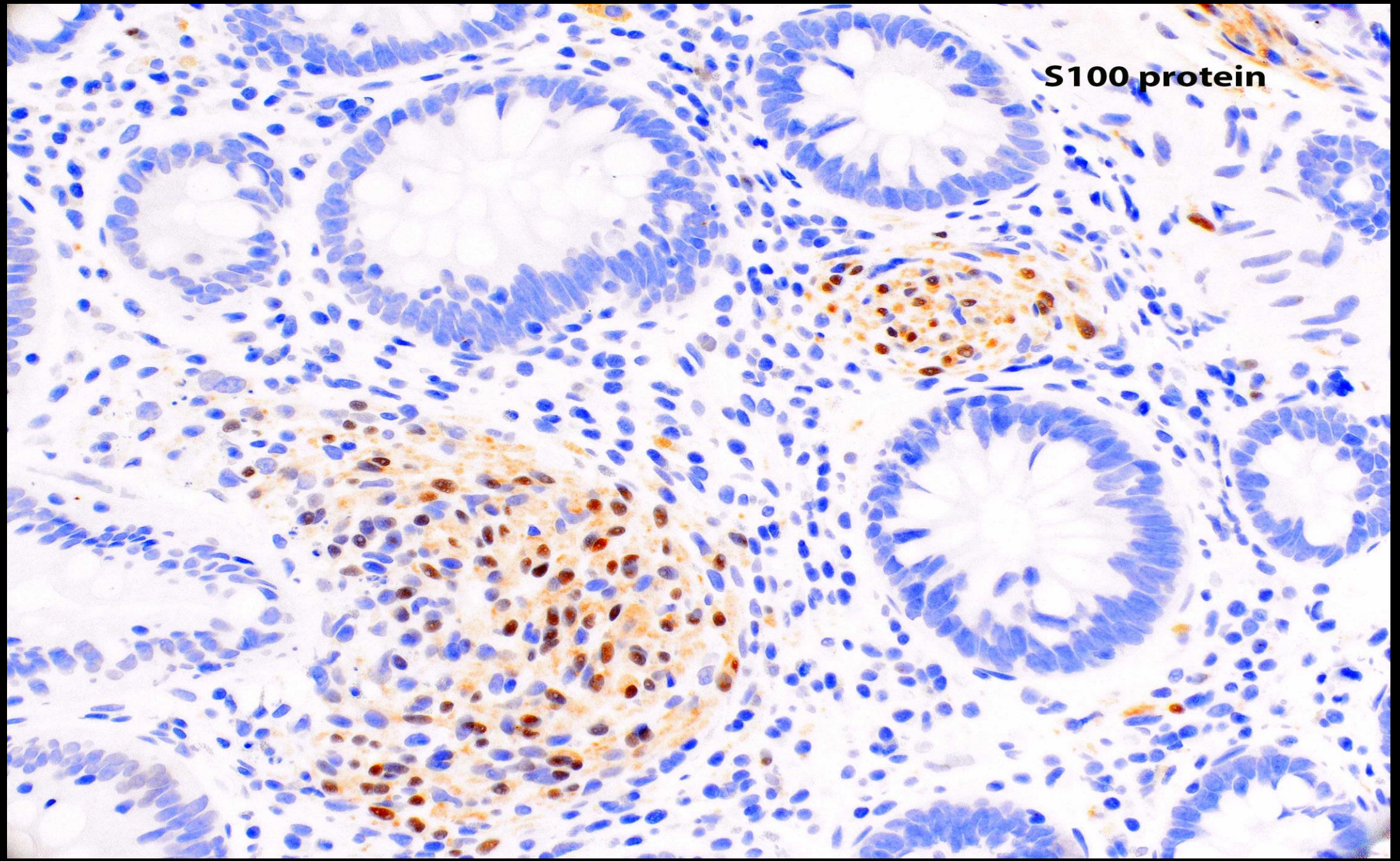


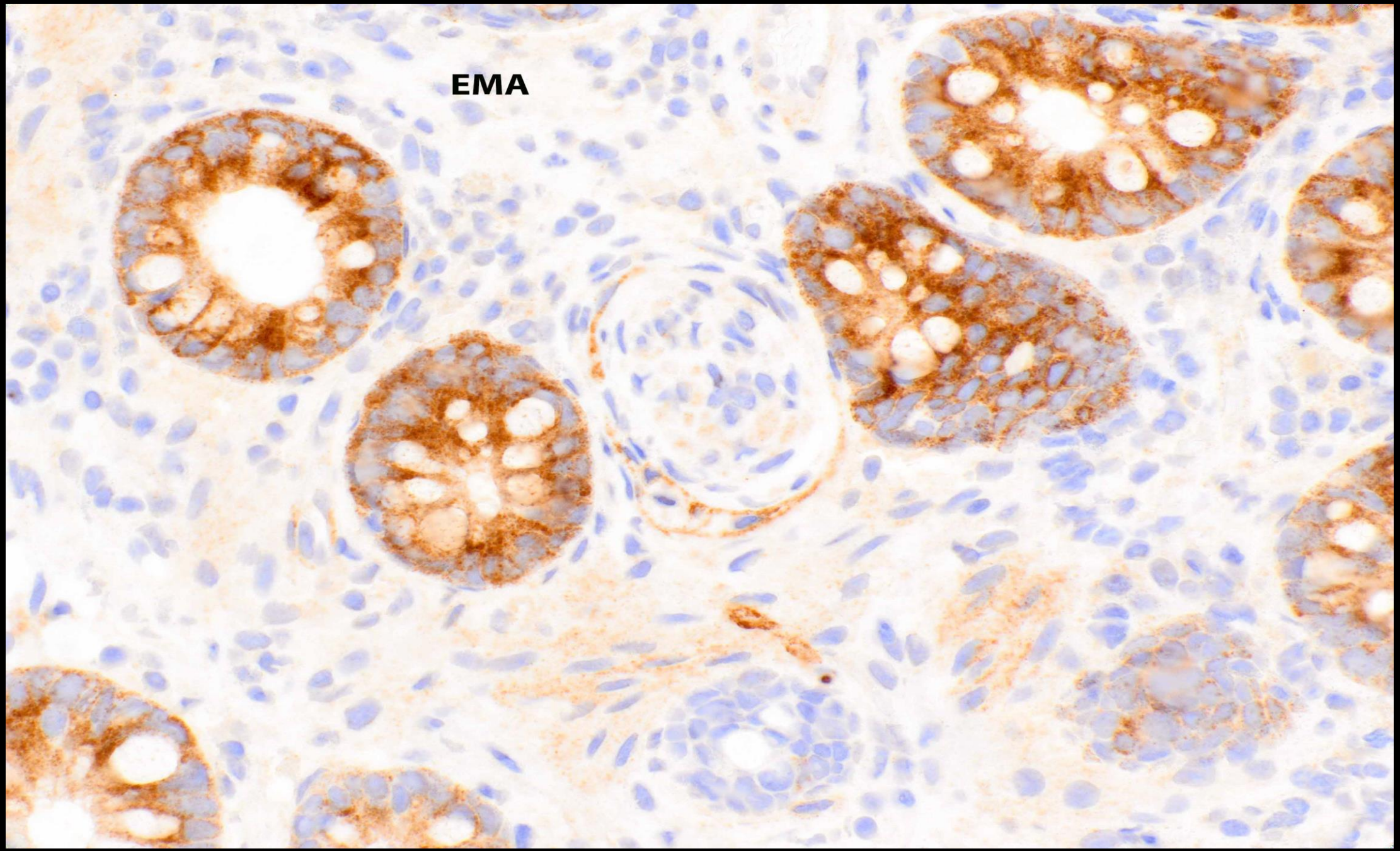
Mucosal neuroma








S100 protein


EMA

GI Mesenchymal Tumors

- We have covered a lot
- Remember the importance of the layers in diagnosing GI mesenchymal neoplasms
- Most are “H&E diagnoses”
- Sometimes a little immunohistochemical staining can reassure us!


GIST AVE.