

# “Barrett’s Oesophagus: When it comes to the Pathologist”

## M Priyanthi Kumarasinghe

Pathologist, PathWest, QEII Medical  
Centre  
Clinical Professor, University of Western  
Australia, Perth, WA

[priyanthi.kumarasinghe@health.wa.gov.au](mailto:priyanthi.kumarasinghe@health.wa.gov.au)

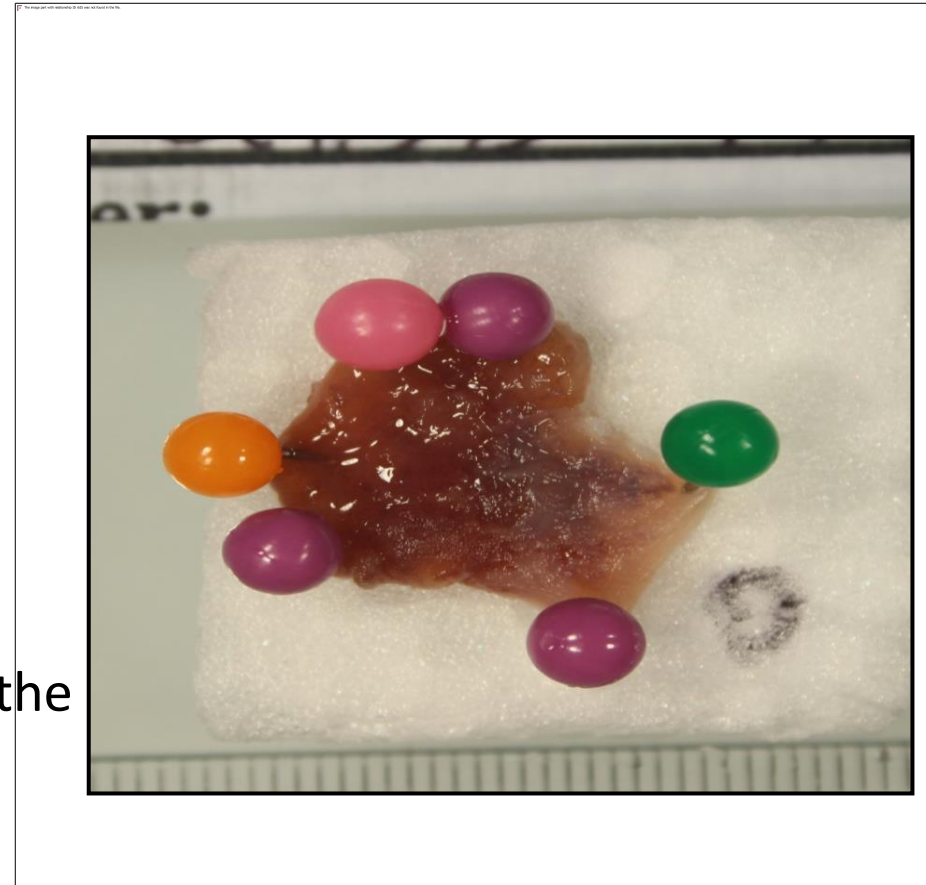


AUSTRALASIAN  
GASTROINTESTINAL  
PATHOLOGY SOCIETY



# Specimen handling

- Mucosa upward, pinned on a cork board/similar firm base by the endoscopist
- Pinning (immediate)
  - Margins do not roll
  - Preserve the tissue size, shape, and orientation
  - Avoid overstretching: tears of the mucosa
- Tumour morphology: provided by the interventional endoscopist (Paris classification)

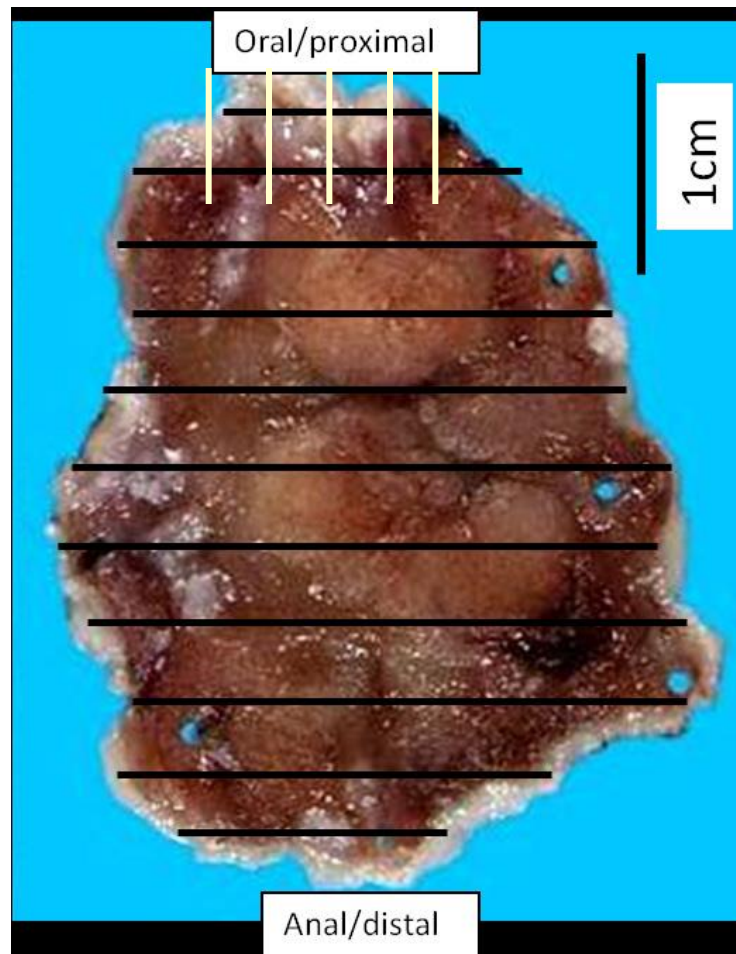


# Specimen handling

- Surgical margins must be appropriately inked
- Single specimen: may be oriented using the designation of O (oral) and A (anal) or P (proximal) and D (distal) marked on the board - ink appropriately to assess designated lateral & deep margins
- Multiple or piecemeal resection (long segment of Barrett)- orientation is often difficult - assessment of lateral margins unhelpful
- Best fixed for at least 12 hours in formalin

# *Specimen dissection:*

- Entire specimen: cut into 2-3 mm (not < 2 mm) parallel slices from end to end
- Record/**photograph**
- Circumferential (lateral) surgical margins: “en face” or perpendicular sections, depending on the size of the specimen & proximity of the lesion/s
- Not more than 4 slices in one block



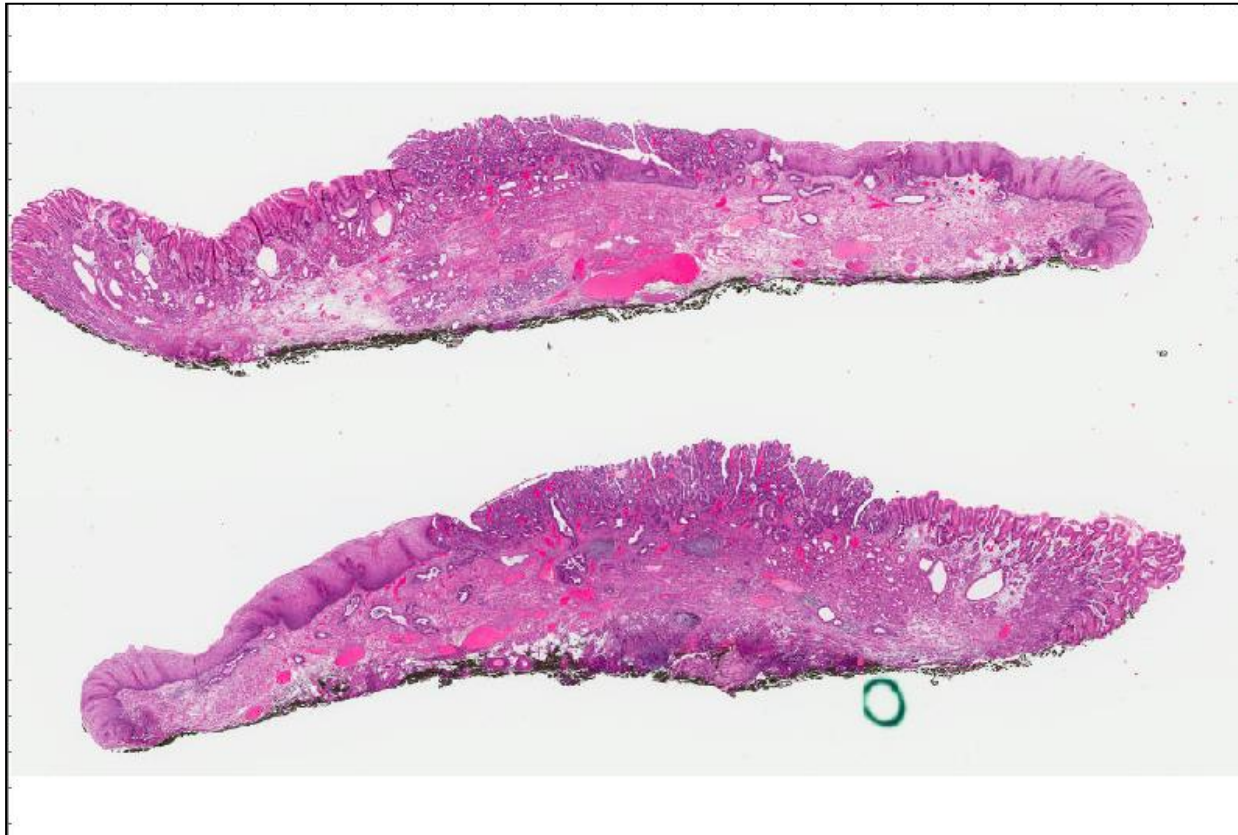


# ER specimen in 3 slices



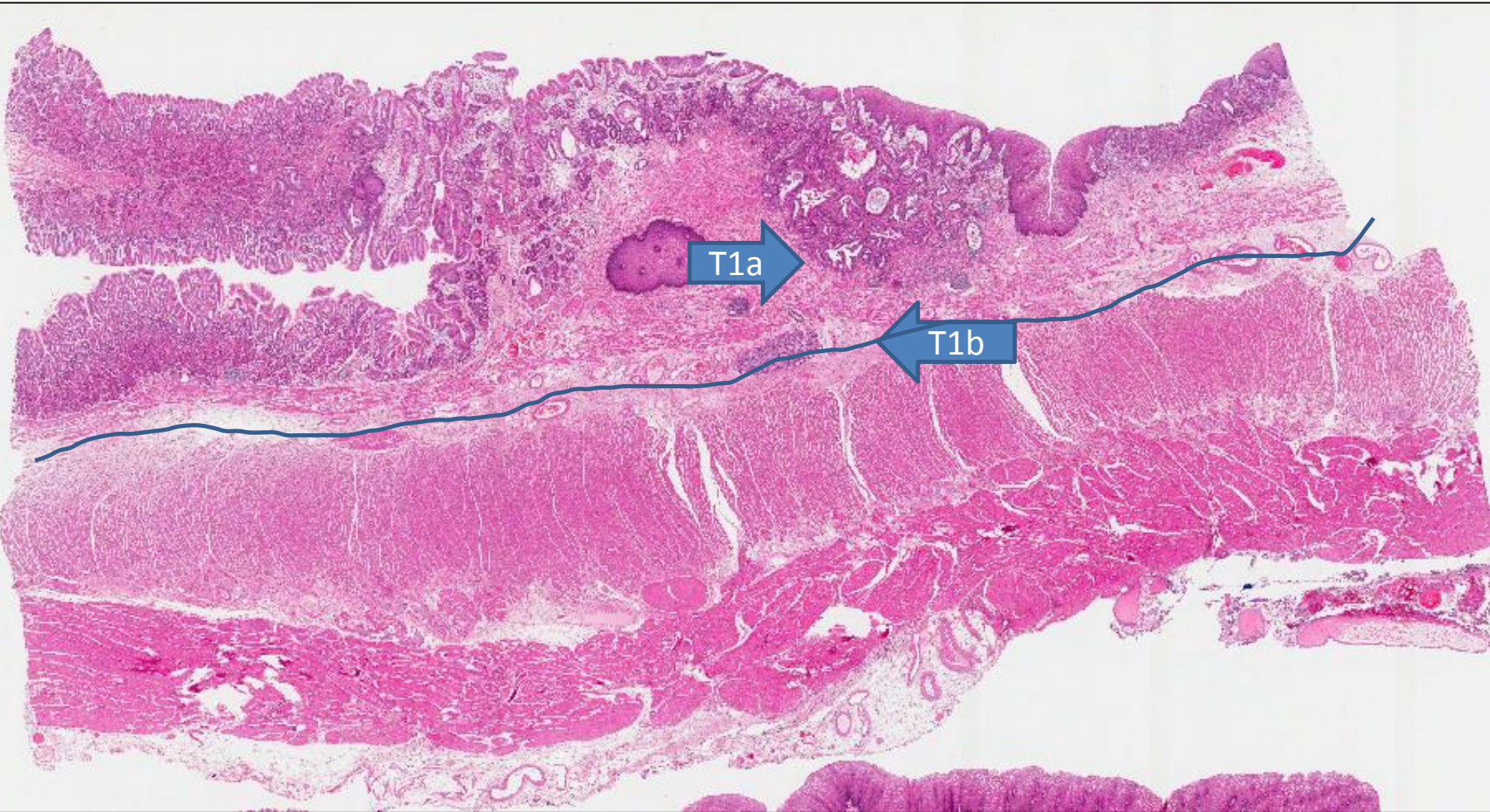
# ER sections

- Mucosa
- MM
- SM (often not the entire depth)





# ER: Therapy of choice for IEN and (visible) T1a lesions



# ER : Pathology

- Intraepithelial neoplasia (IEN): *majority are for high grade IENs*
- Early carcinomas (PT1)
- Barrett mucosa/CLM only: Repeat resections or mucosa surrounding the lesion

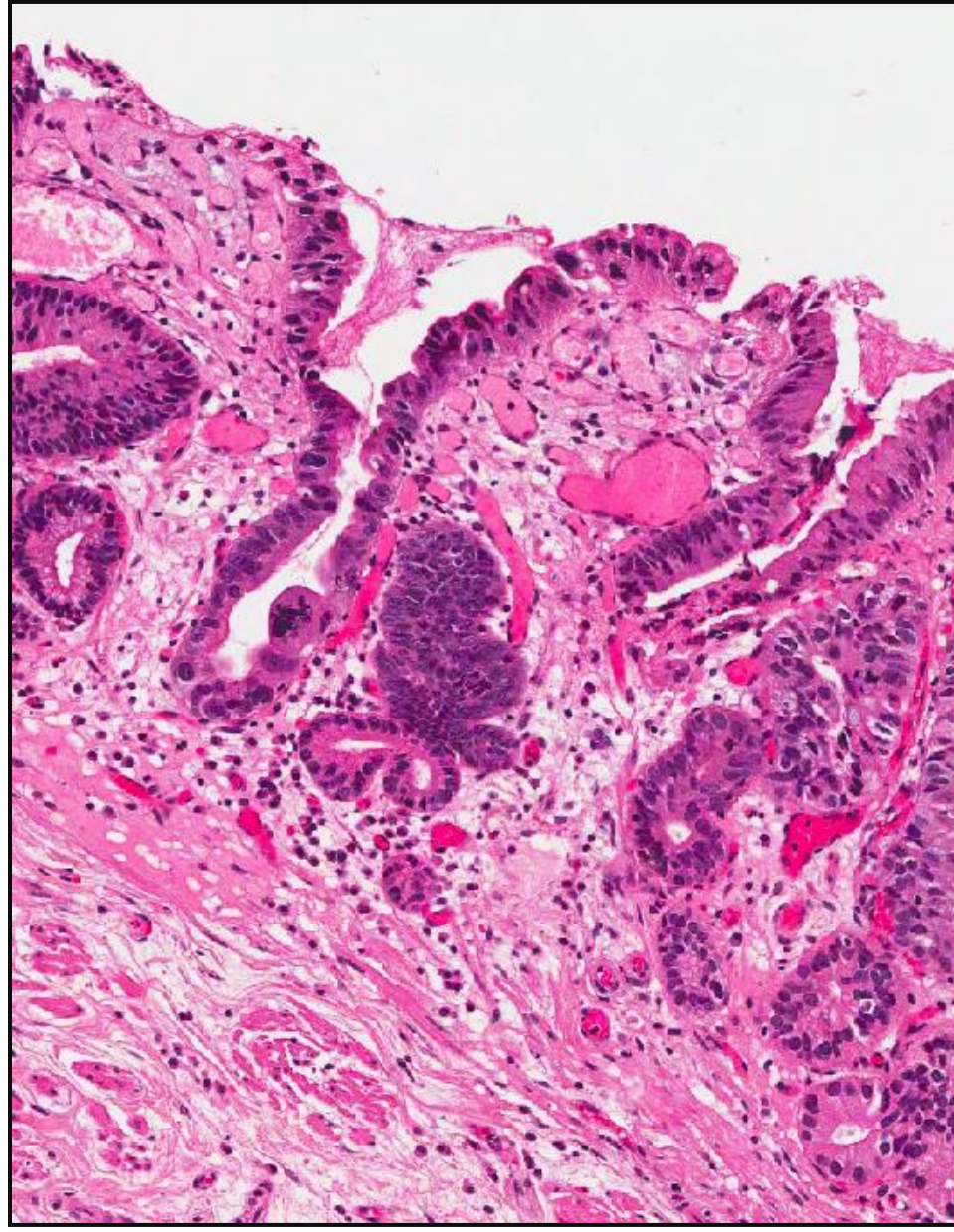
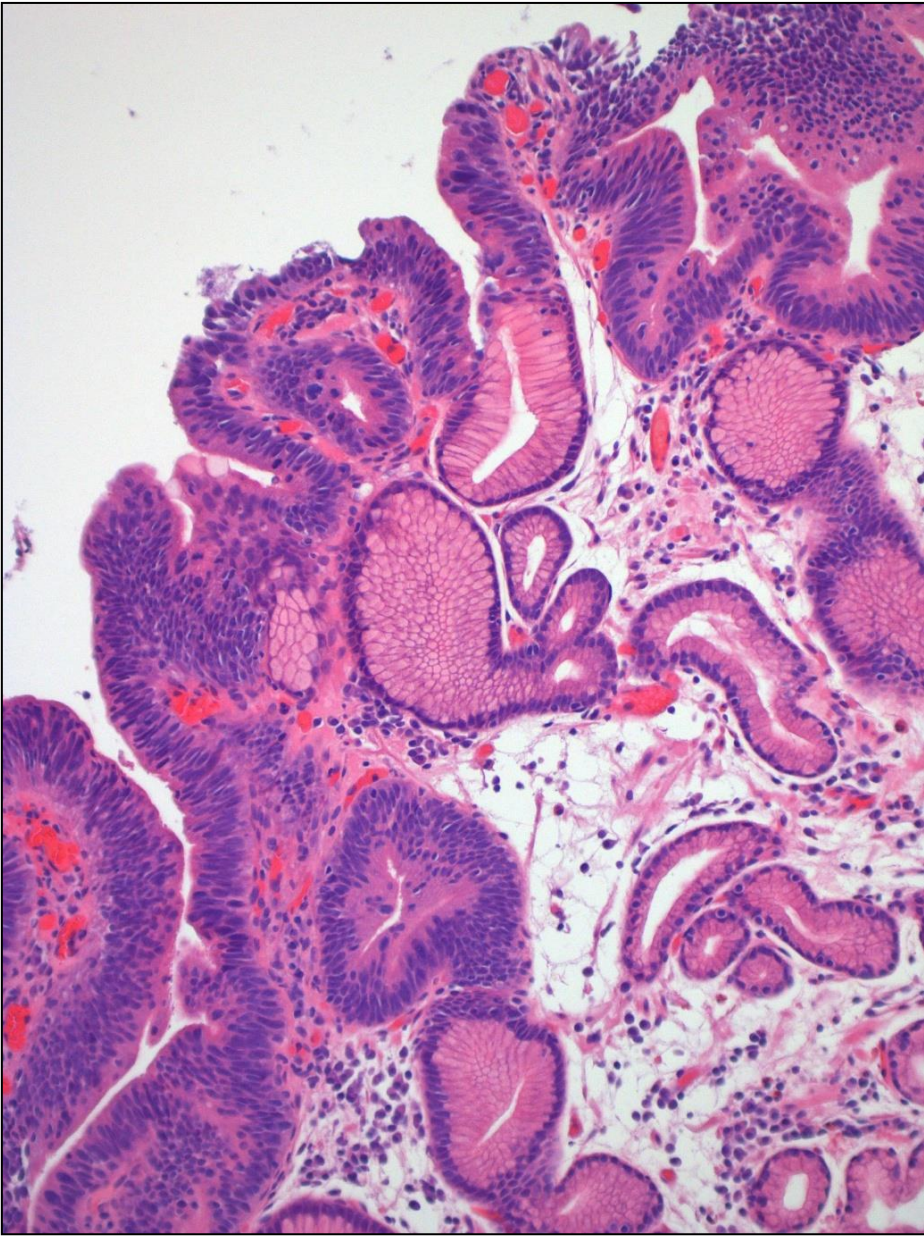
# ***Intraepithelial neoplasia (IEN)/dysplasia***

## ***Microscopic assessment***

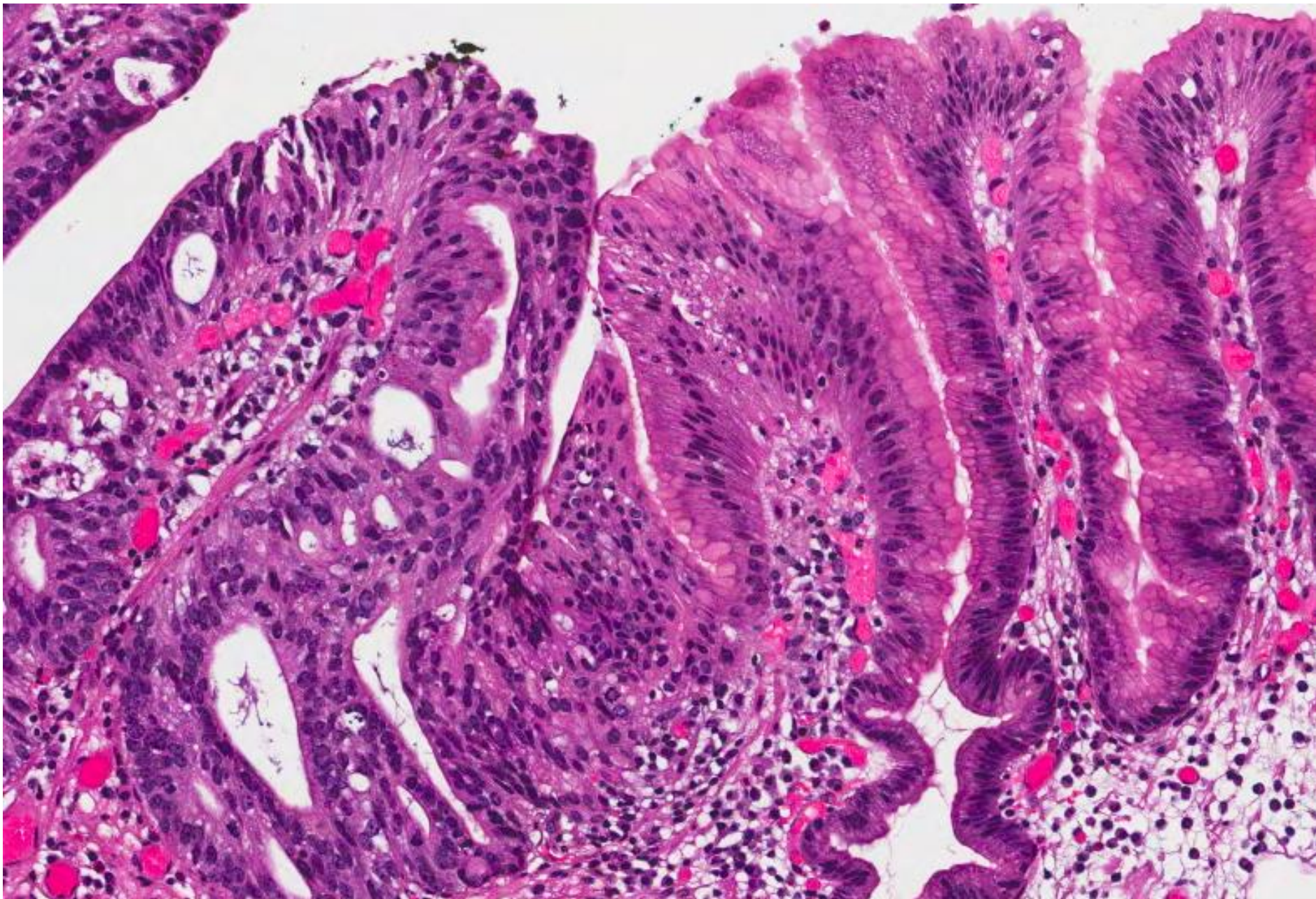
- *Confirm IEN*
- *Histologic grade (AGPS 2015, Sydney)*
- *Lateral margins when appropriate*

*Deep margins : not applicable as lesions are mucosal only*

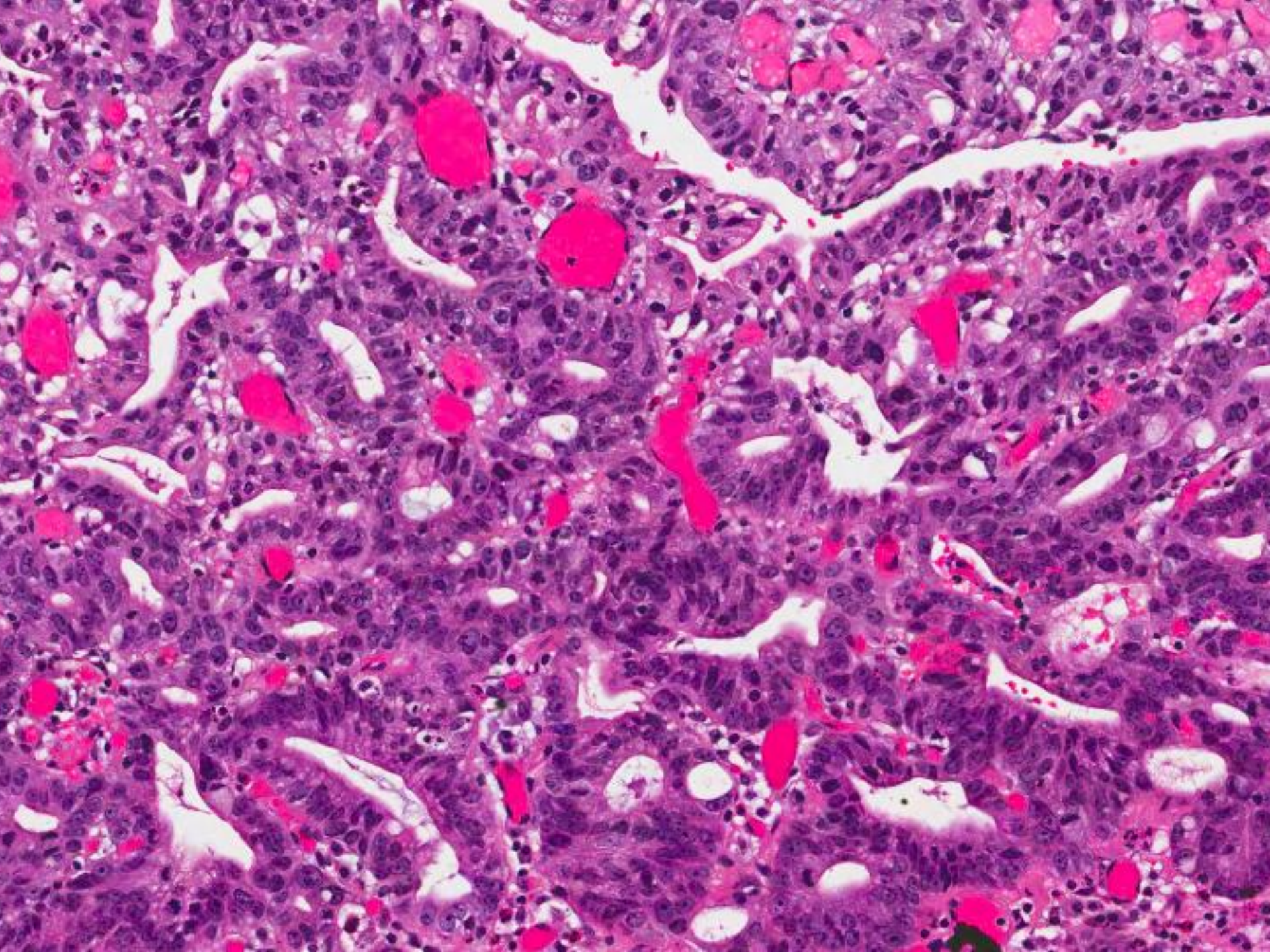




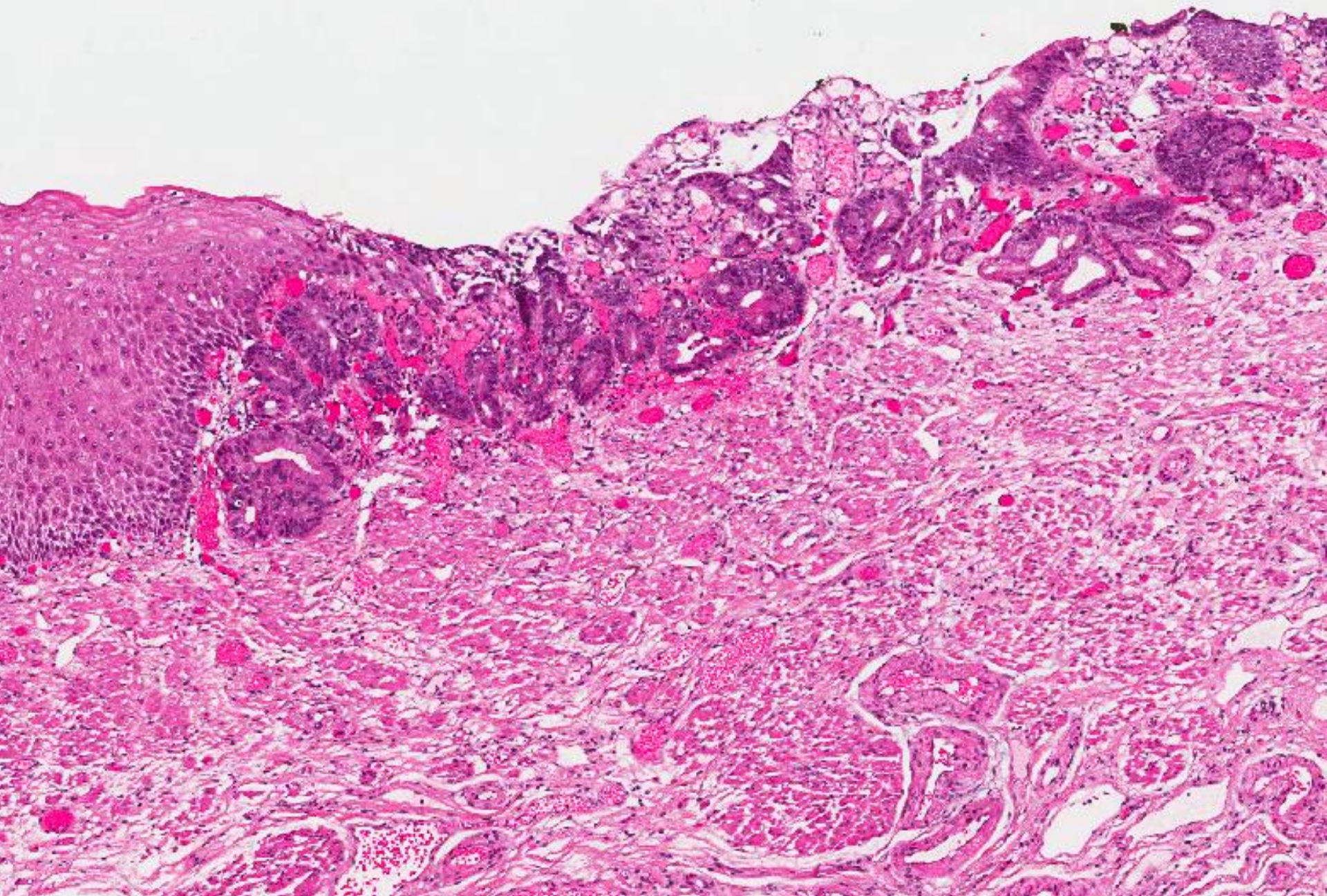




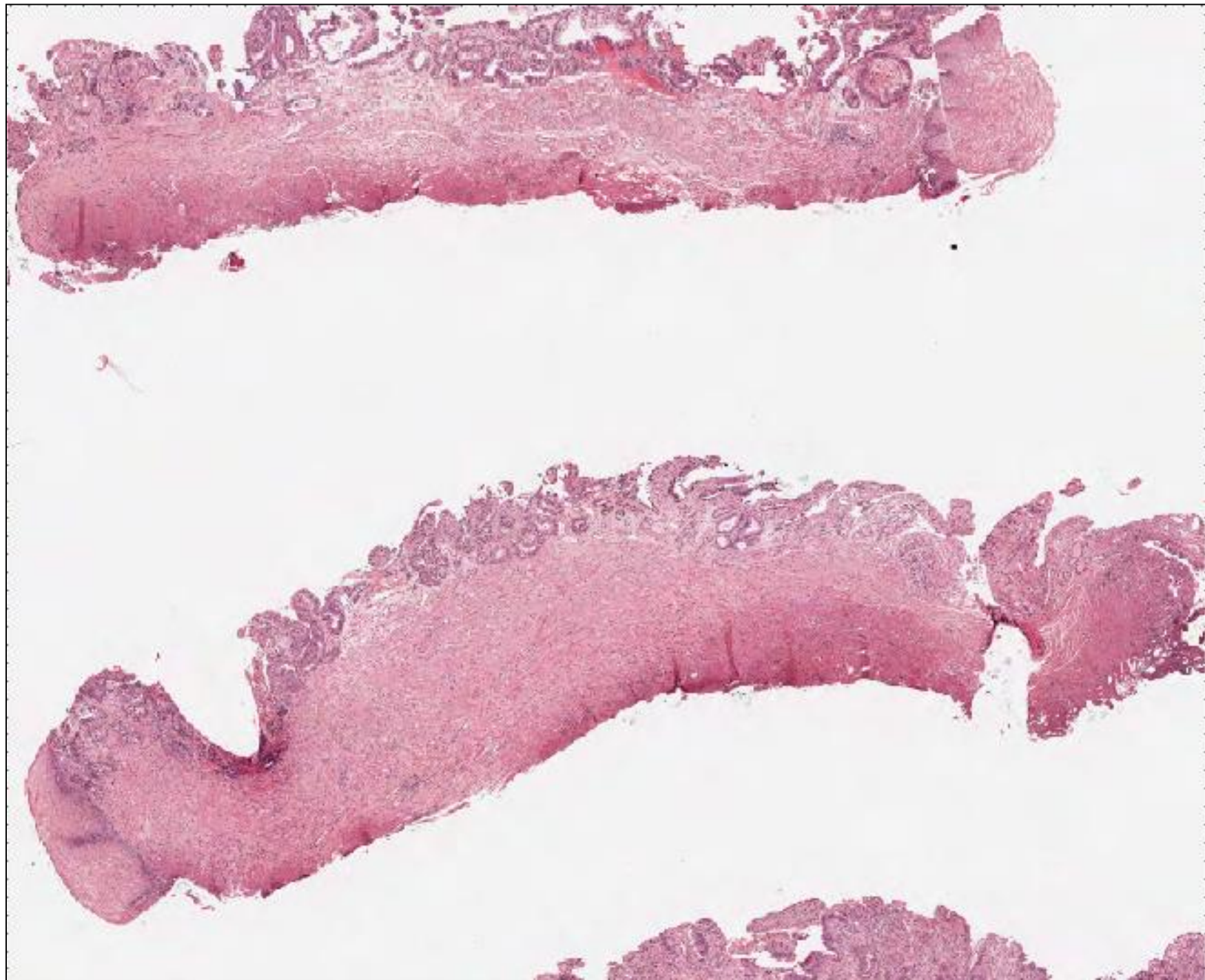












# Invasive carcinoma

## *Microscopic assessment*

- Confirmation of invasive carcinoma: invasion into lamina propria or beyond
- **Depth of invasion**
- **Degree of differentiation**
- **Presence or absence of lymphovascular invasion**
- **Margin status**

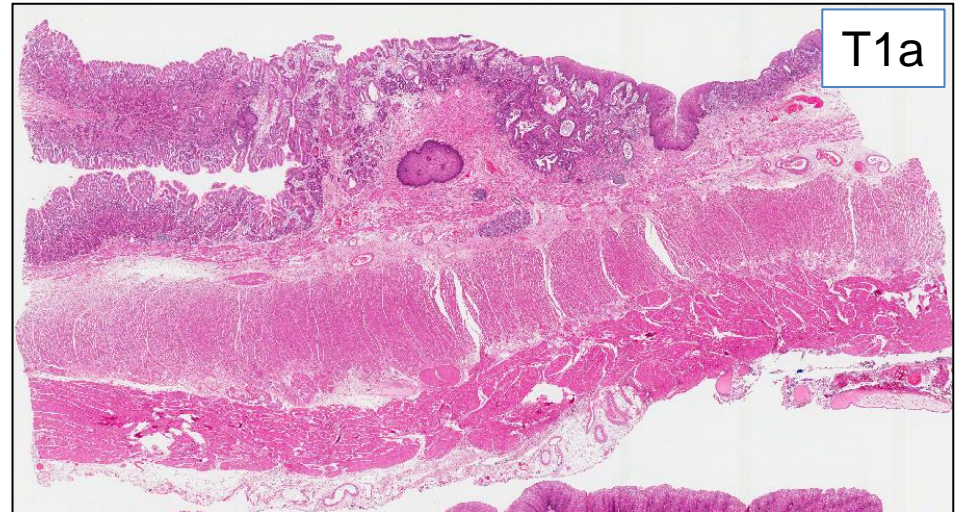
These features dictate further management

- *tumour budding/size*

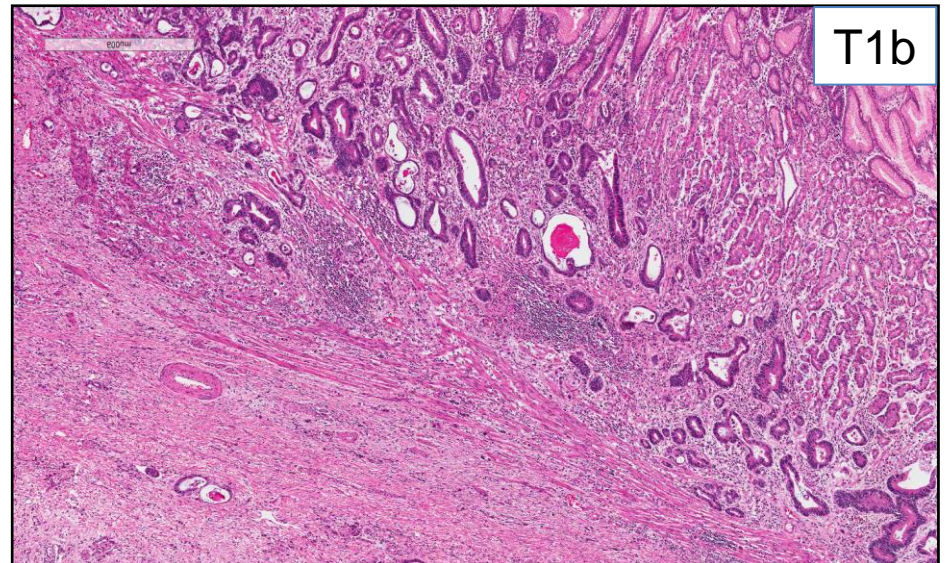


# T1 carcinoma (AJCC)

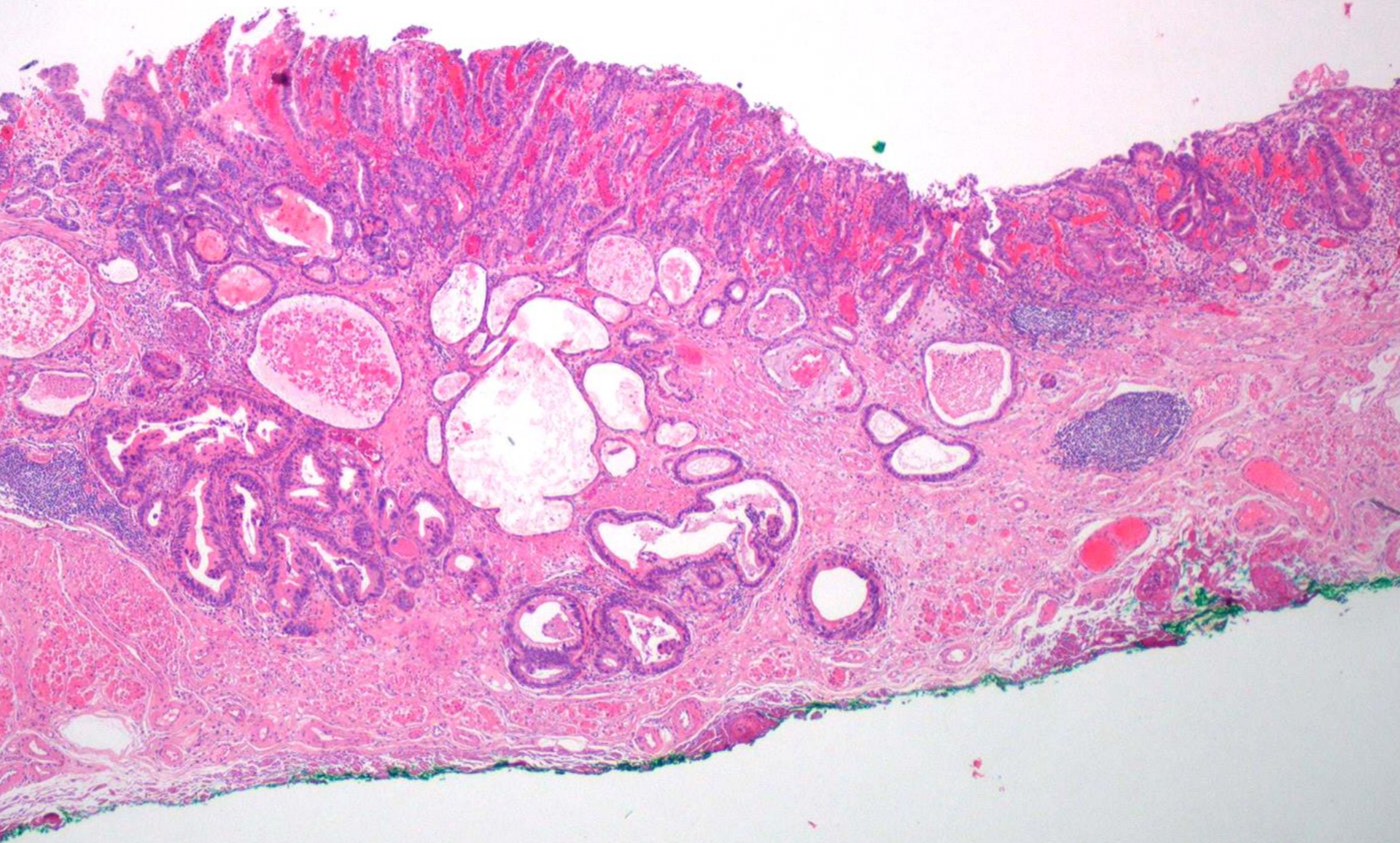
- T1a – Invade lamina propria or **muscularis mucosae**



- T1b - Invade **submucosa**

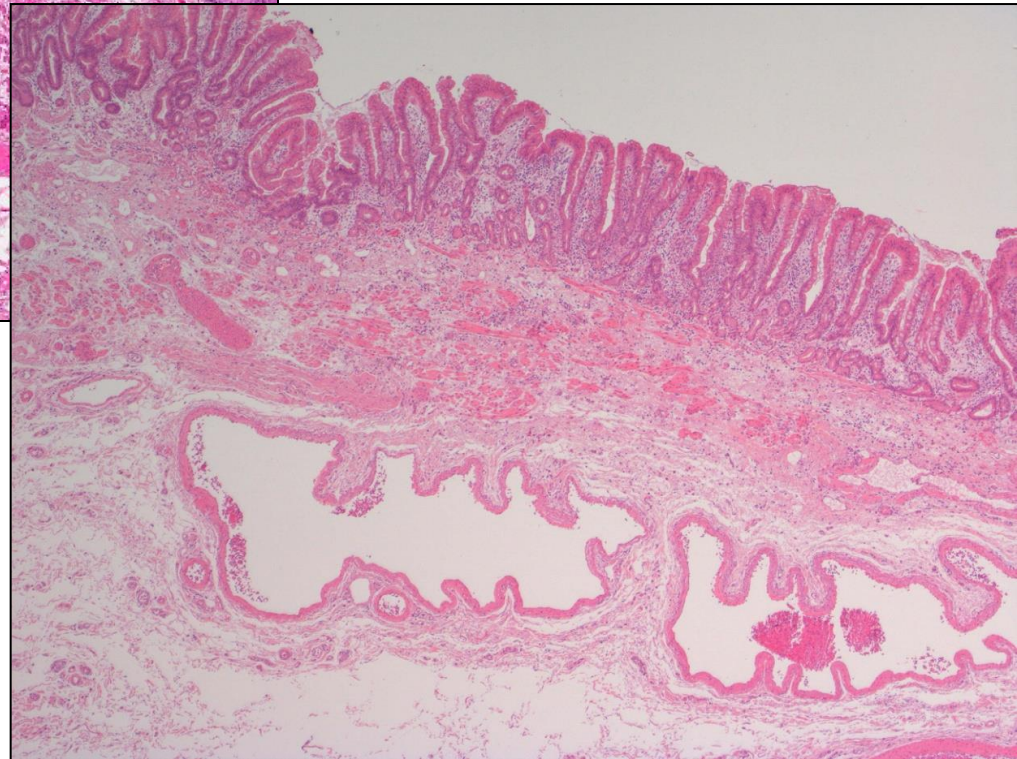
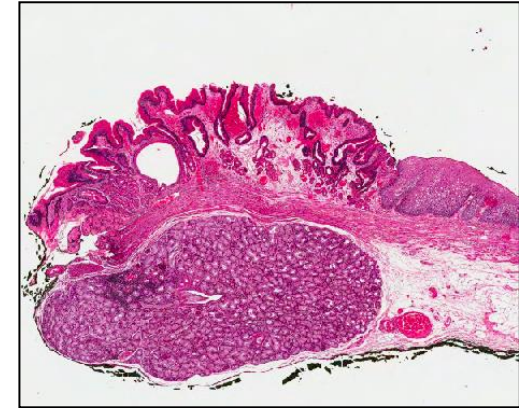
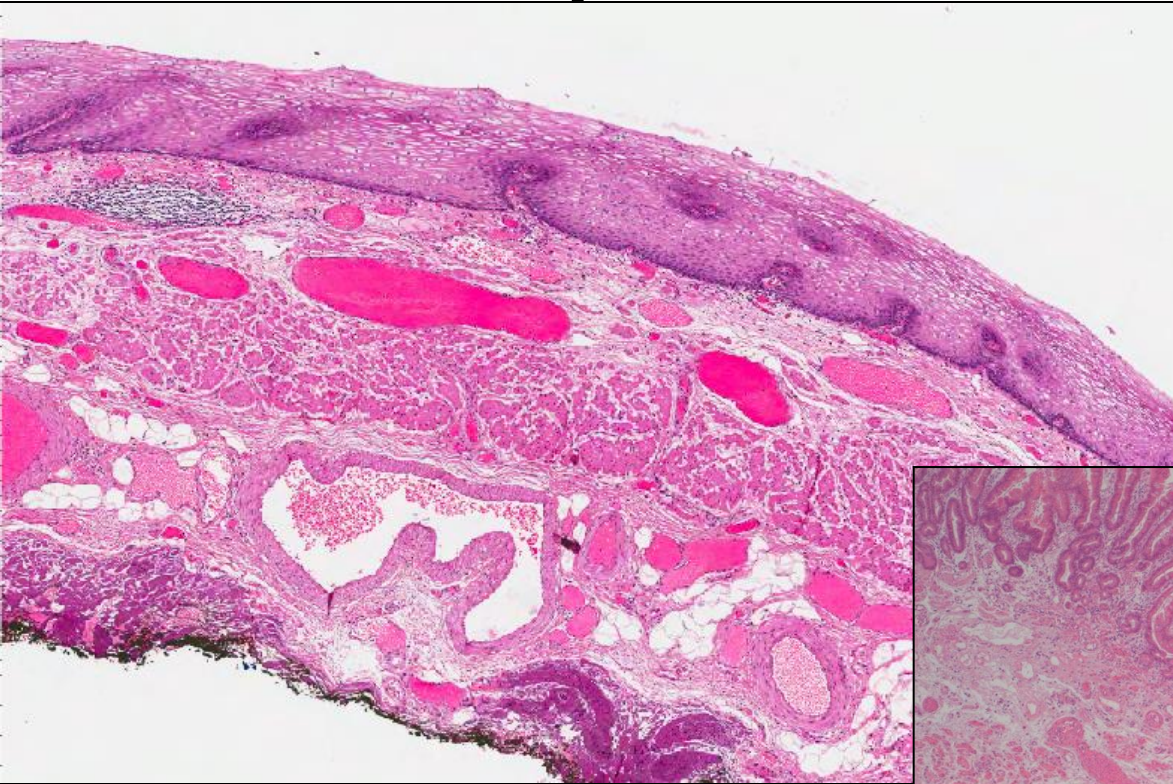




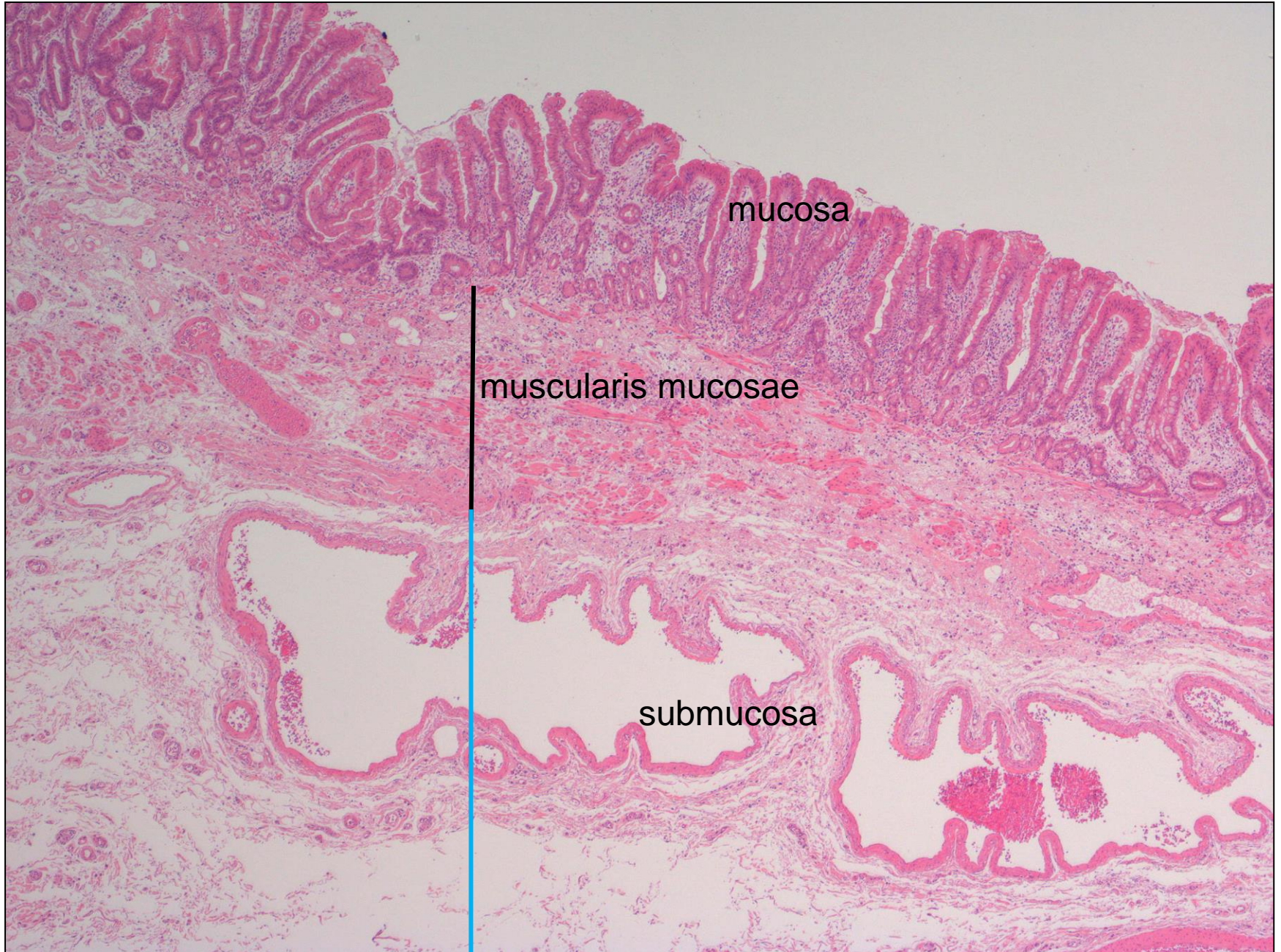




# Muscularis mucosae in Barrett mucosa: Duplicated and distorted





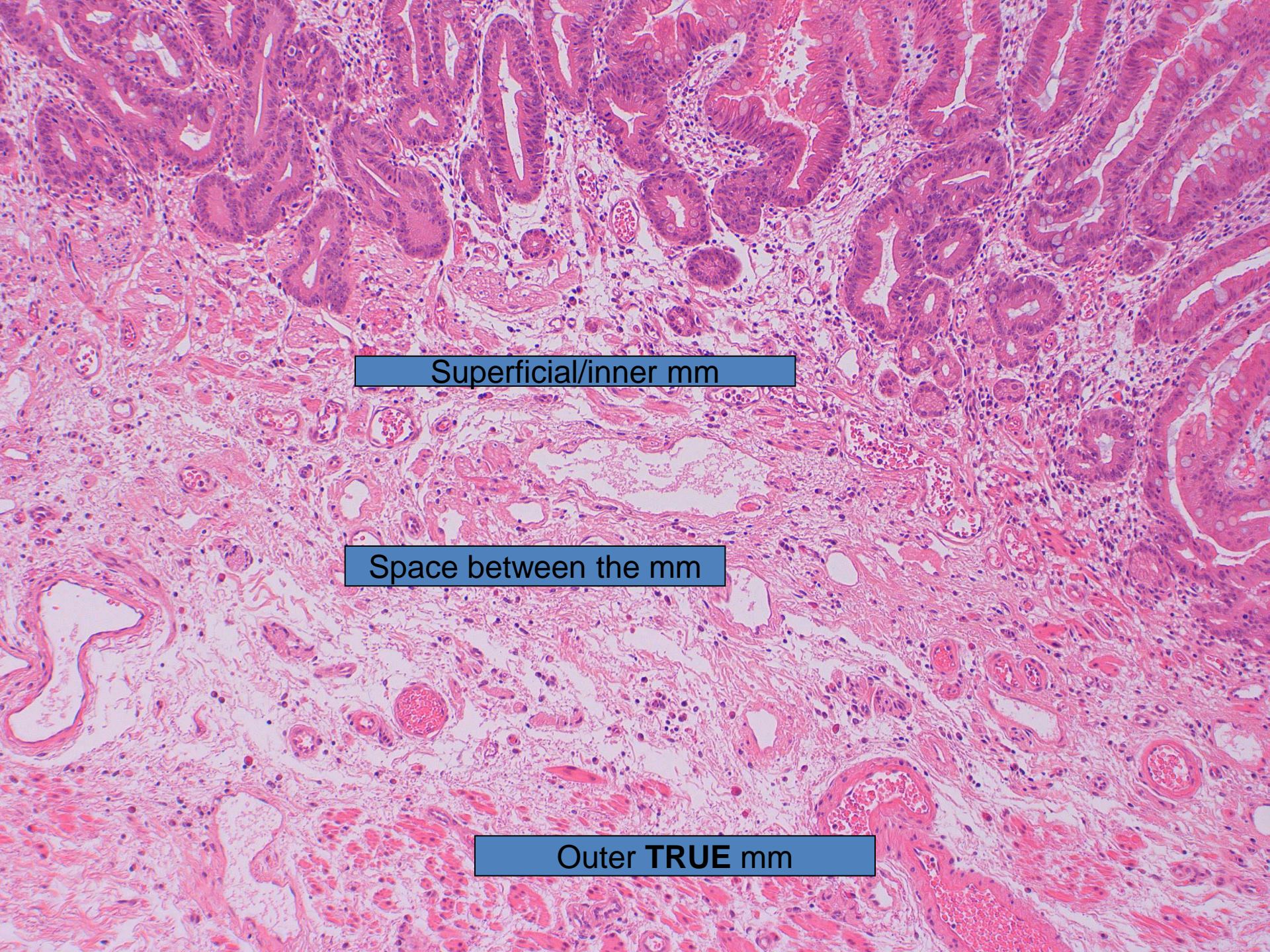


mucosa

muscularis mucosae

submucosa



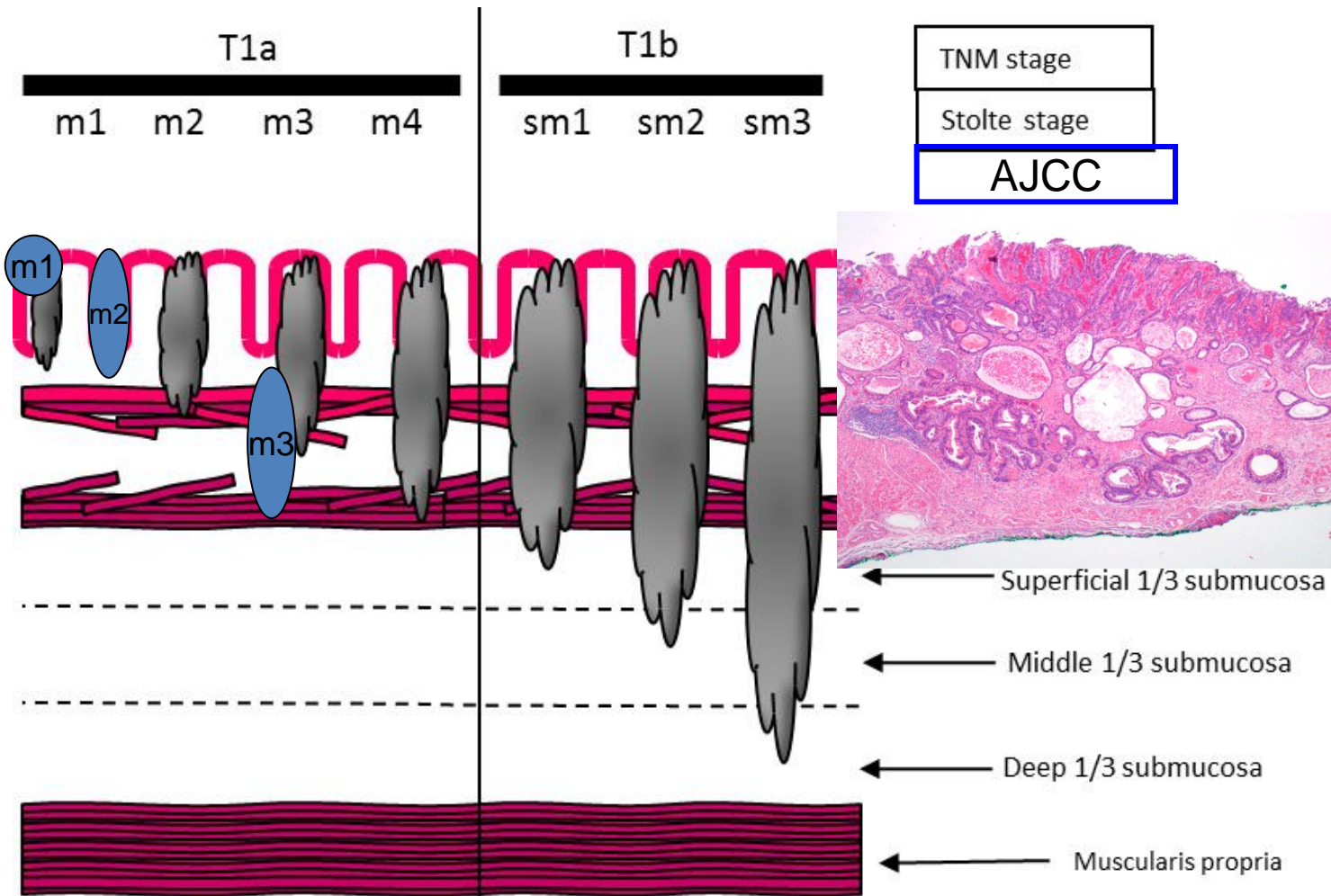


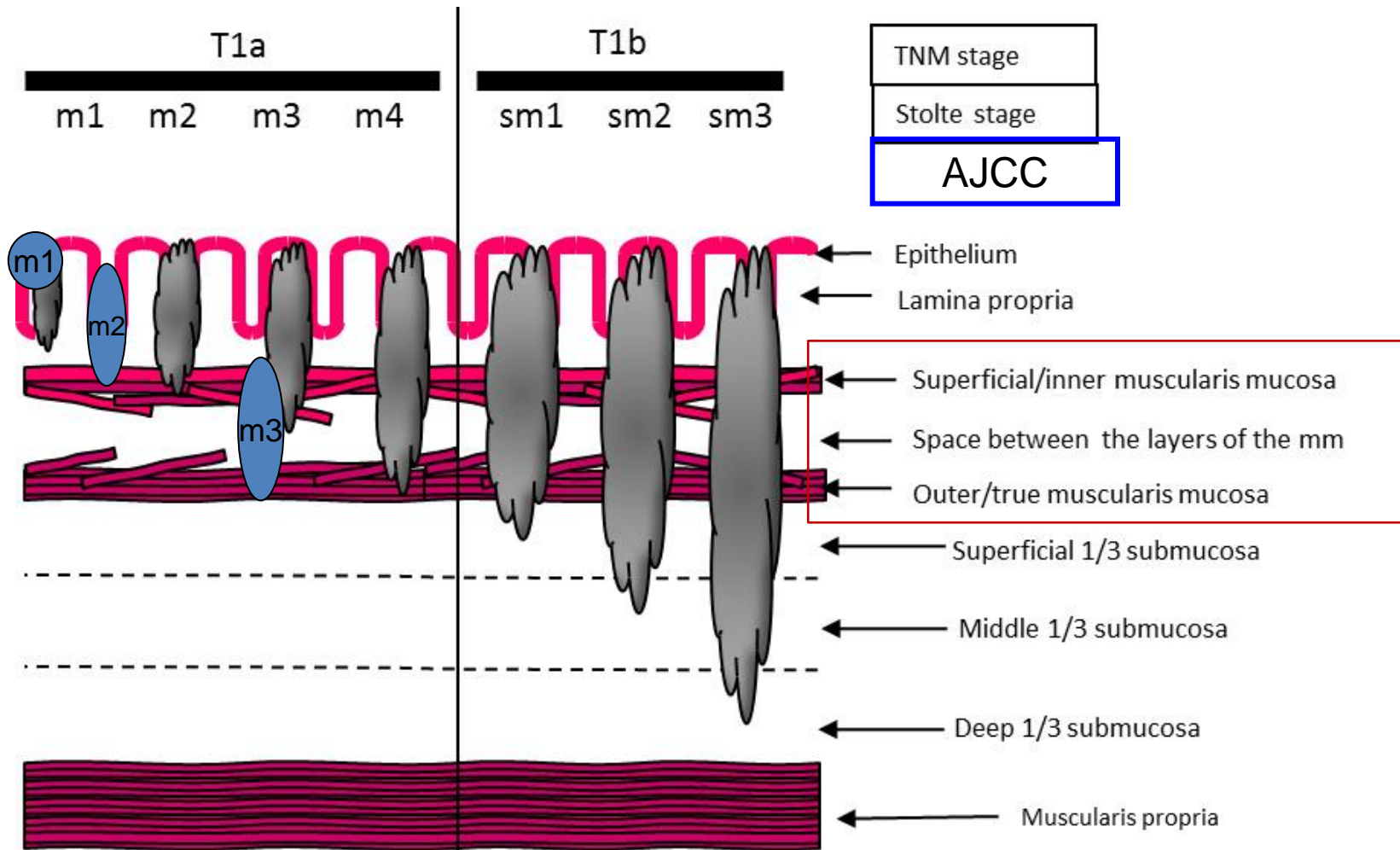
Superficial/inner mm

Space between the mm

Outer **TRUE** mm







# Further subdivision of mm invasion

## 2 methods

AJCC: T1a is sub-divided to m1-m3 (**3 tiered**)

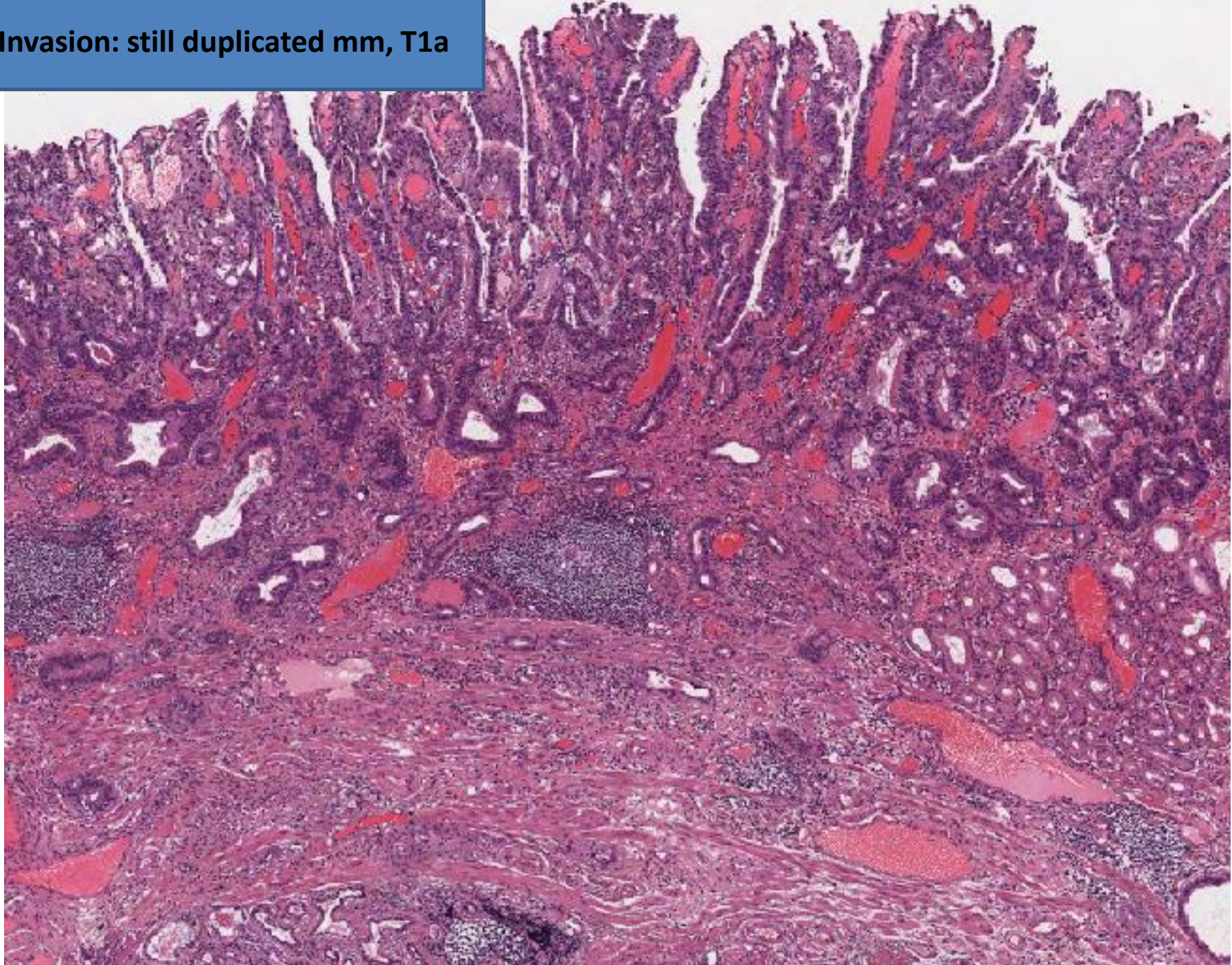
- m1- in situ
- m2 - into the lamina propria
- m3 – into the muscularis mucosae

**Stolte: T1a is sub-divided as m1-m4 (4 tiered)**

- m1 - into the lamina propria
- m2 - into the superficial/inner muscularis mucosae
- m3 - into the space between the layers of the mm
- **m4 - into the outer/true mm**



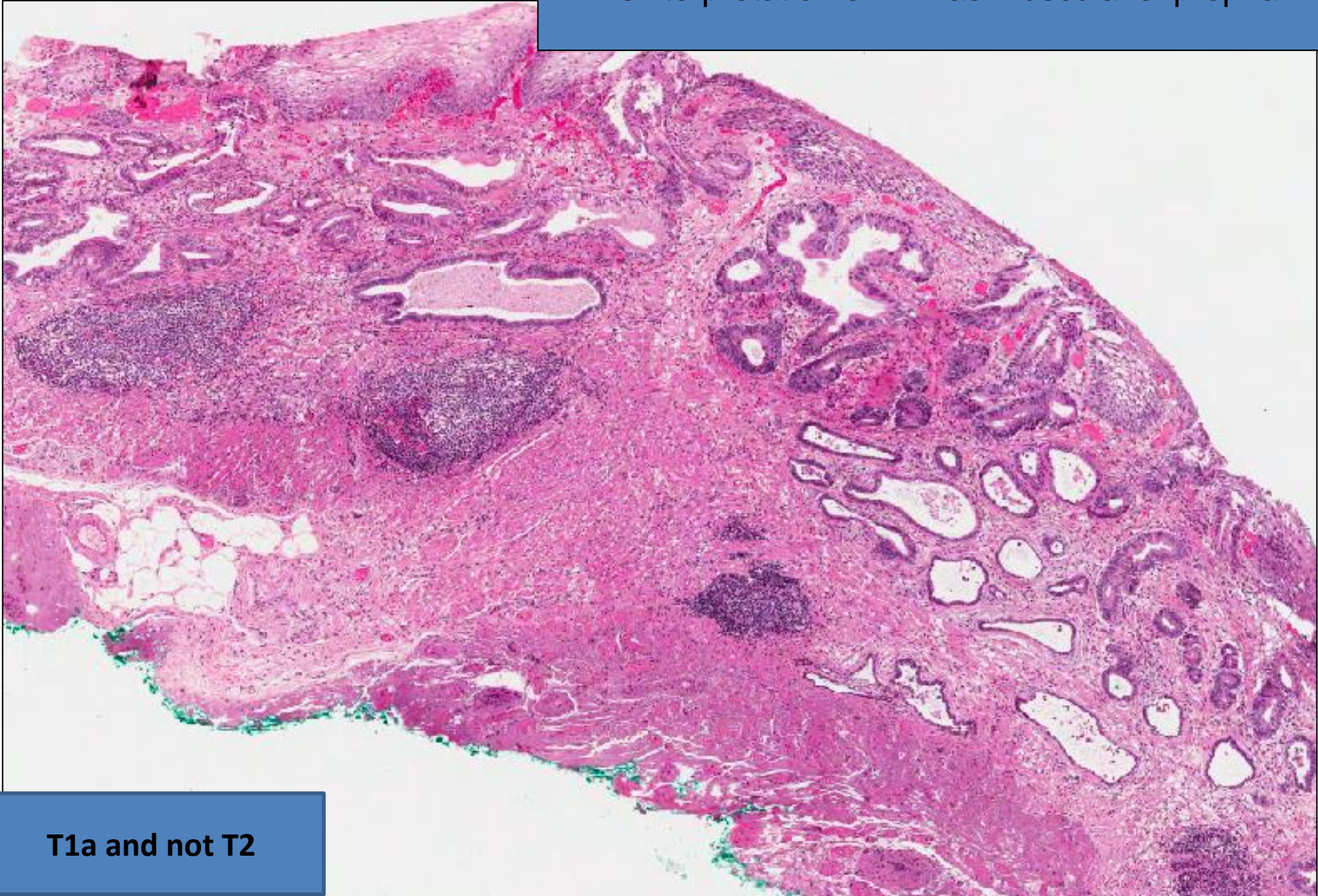
**Invasion: still duplicated mm, T1a**





# Misinterpretation of invasion of layers of mm

Misinterpretation of mm as muscularis propria



T1a and not T2



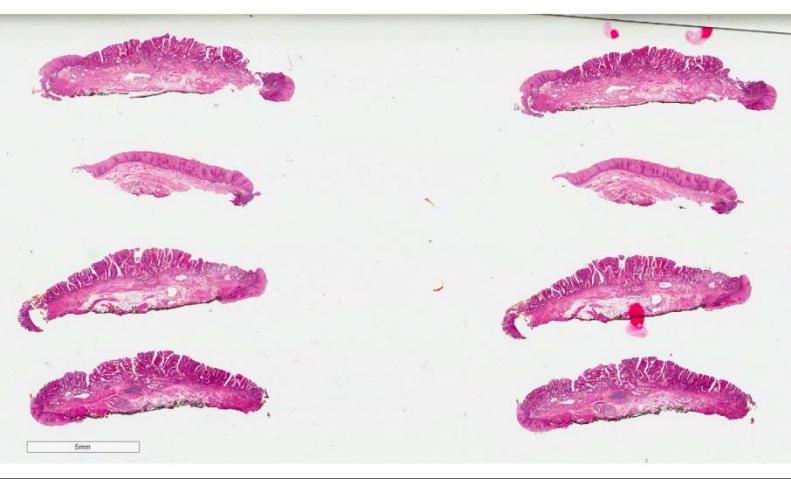
T1 and not T2



Misinterpretation of mm as muscularis propria!

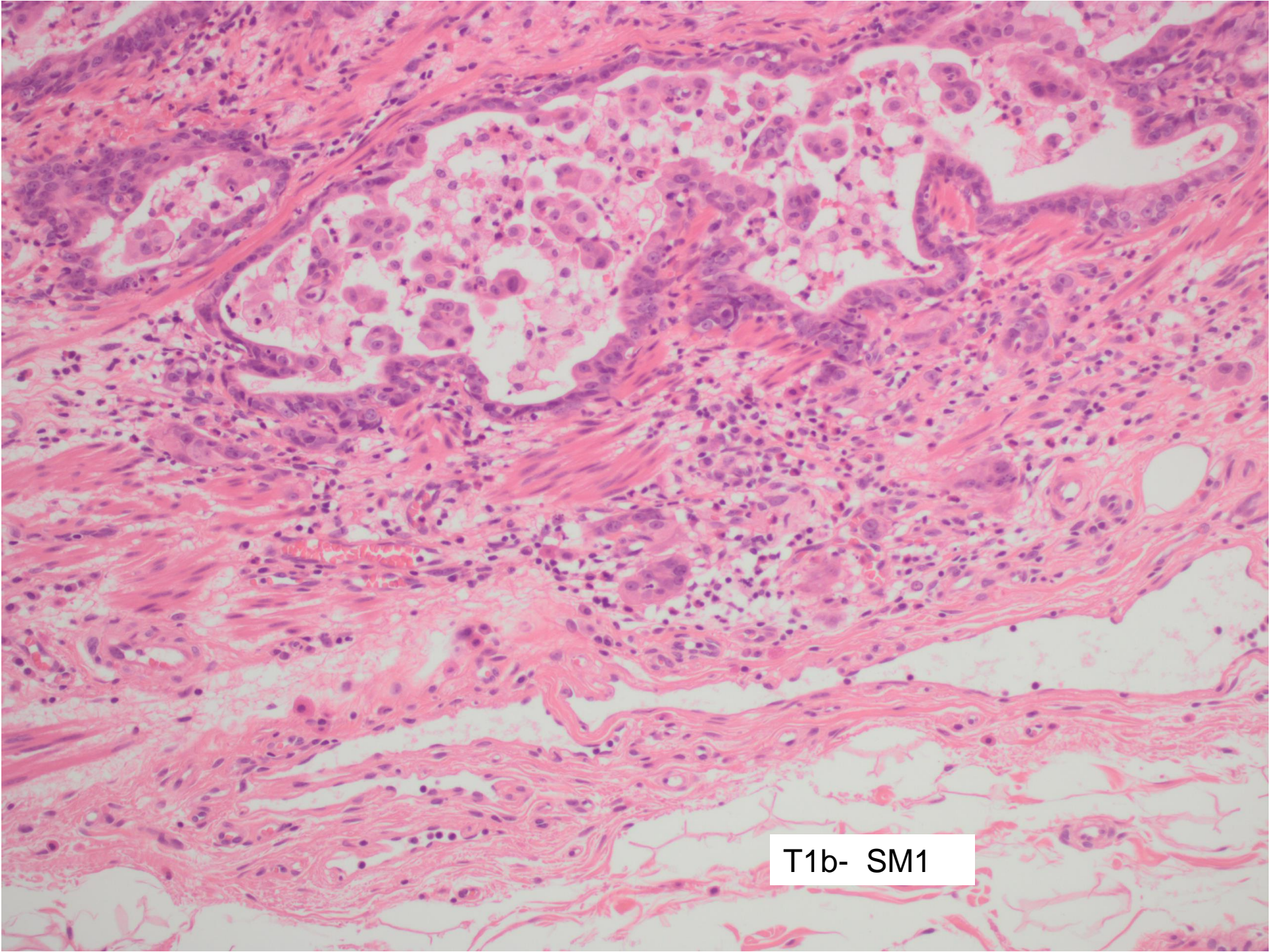
This histological image shows a cross-section of the gastrointestinal tract. The upper portion features glandular structures with a distinct, dark-stained epithelial lining. Below these glands is a thick, pink-stained layer of muscle, labeled 'mm' in the text. This layer is often misinterpreted as the muscularis propria, but it is actually the muscularis mucosae. The surrounding tissue consists of loose connective tissue and scattered inflammatory cells.





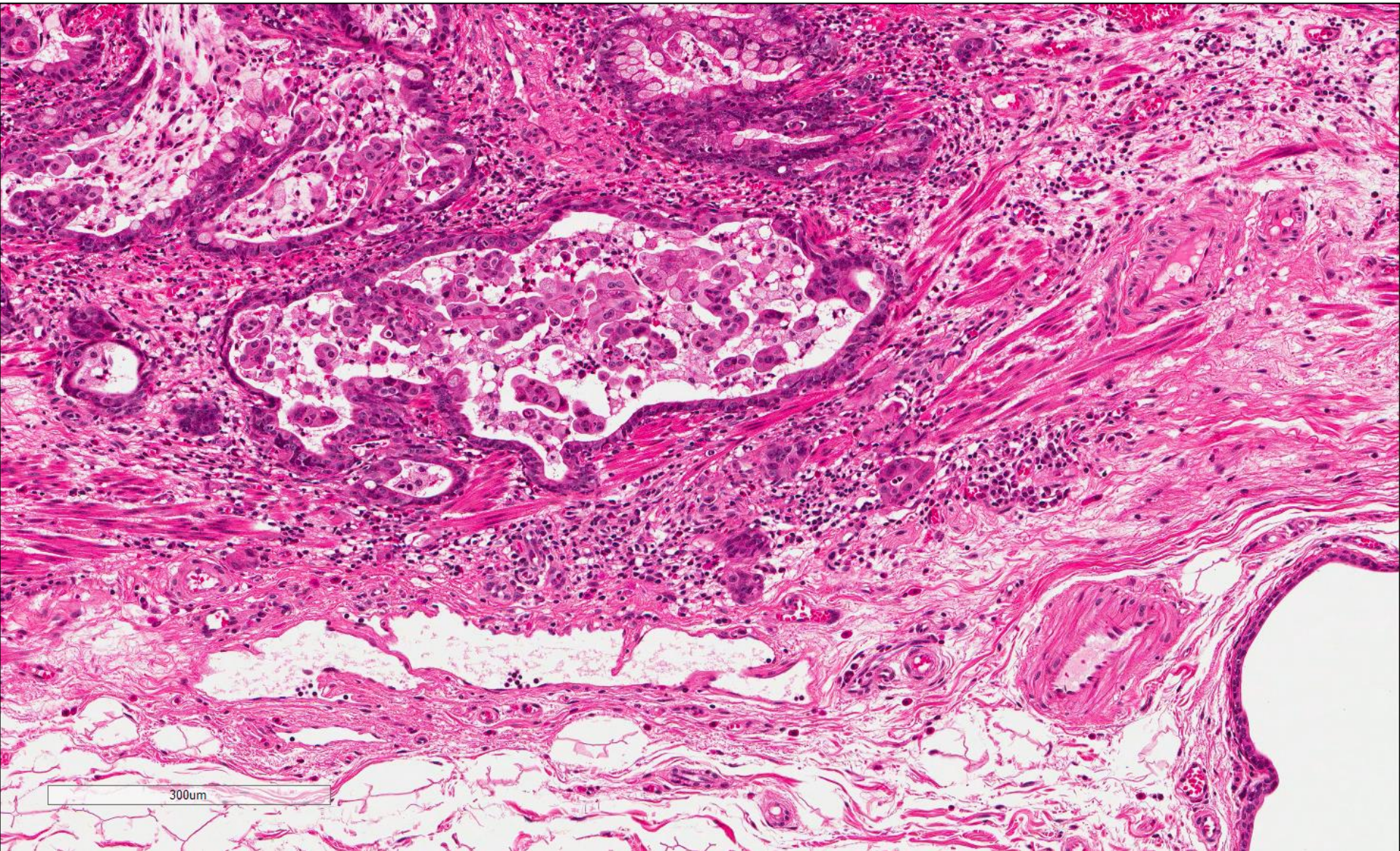
2mm





T1b- SM1





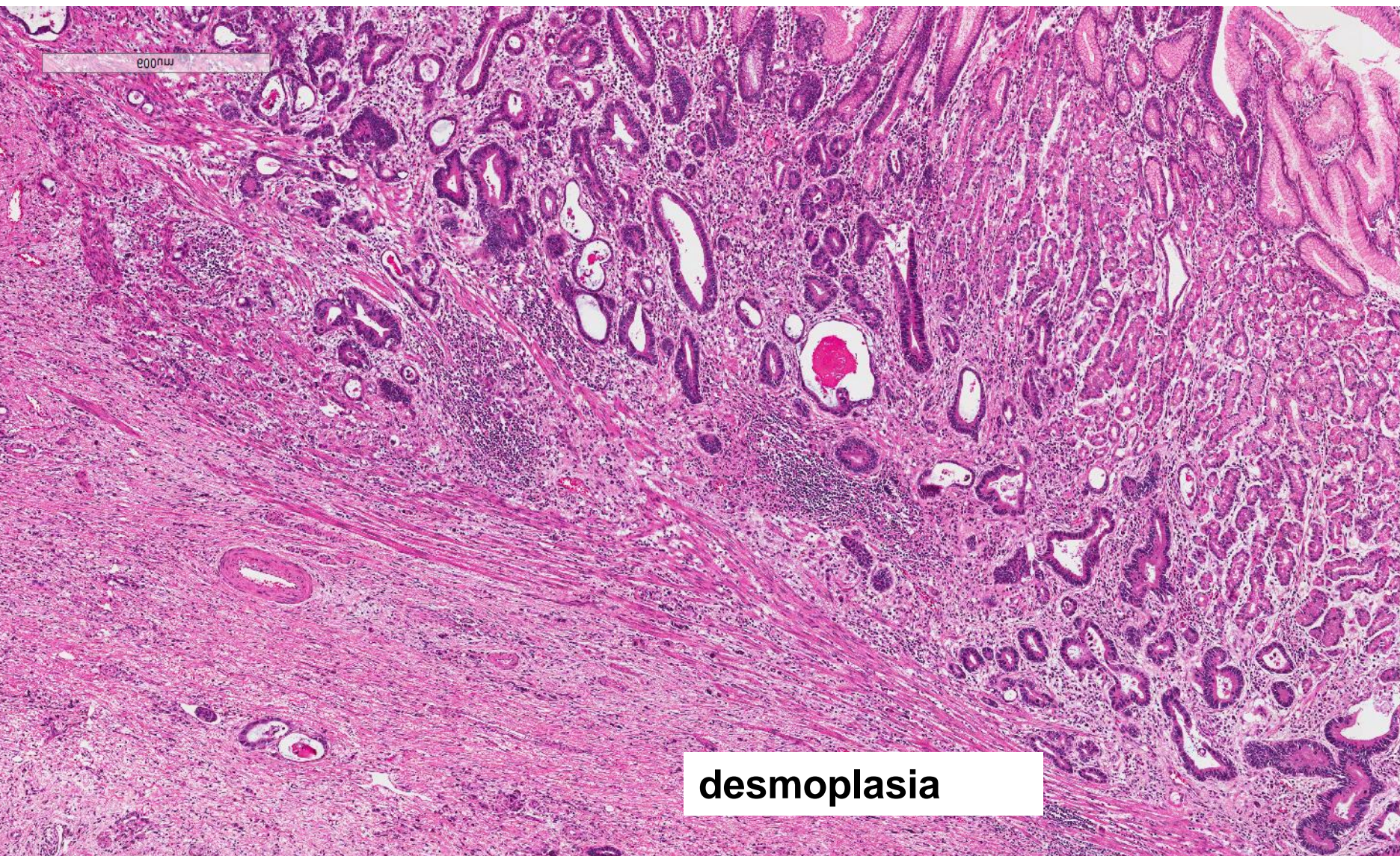
T1a M4/ T1b - SM1





T1a- Stolte M3,  
AJCC M3





**desmoplasia**

T1b SM 2-3



# Implications of duplication of mm

## 1. Misinterpretation of invasion of MM as MP

### T1 vs. T2

## 2. Invasion into various levels within the duplicated mm

- Difficulties in differentiating T1a from T1b (SM)
- ? *Difference in the behaviour of T1a carcinomas*

•Lewis JT, Wang KK and Abraham SC (2008). Muscularis mucosae duplication and the musculo-fibrous anomaly in endoscopic mucosal resections for Barrett esophagus: implications for staging of adenocarcinoma. *Am J Surg Pathol* 32:566-571.

•Estrella JS, Hofstetter WL, Correa AM, Swisher SG, Ajani JA, Lee JH, Bhutani MS, Abraham SC, Rashid A and Maru DM (2011). Duplicated muscularis mucosae invasion has similar risk of lymph node metastasis and recurrence-free survival as intramucosal esophageal adenocarcinoma. *The American Journal of Surgical Pathology* 35(7):1045-1053.

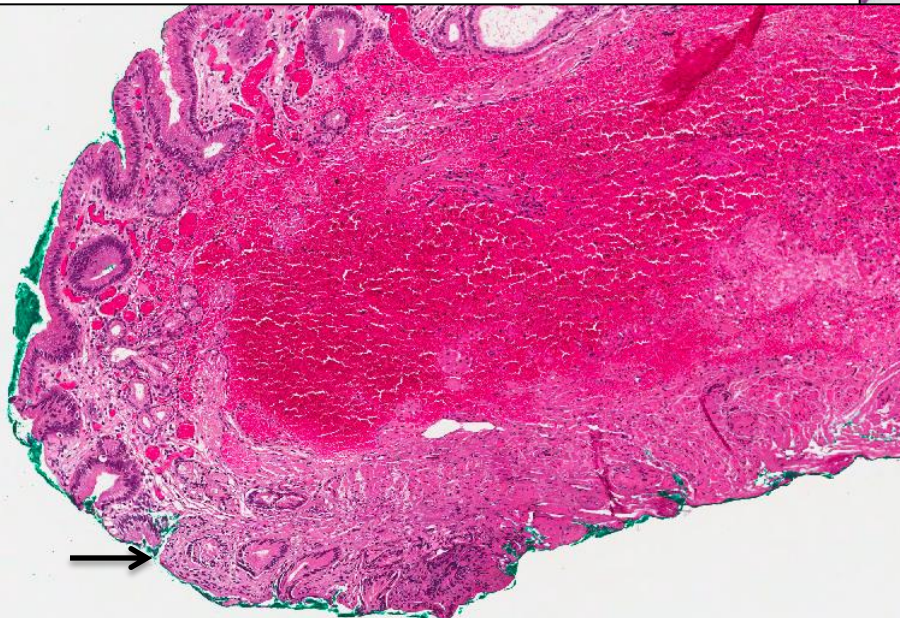
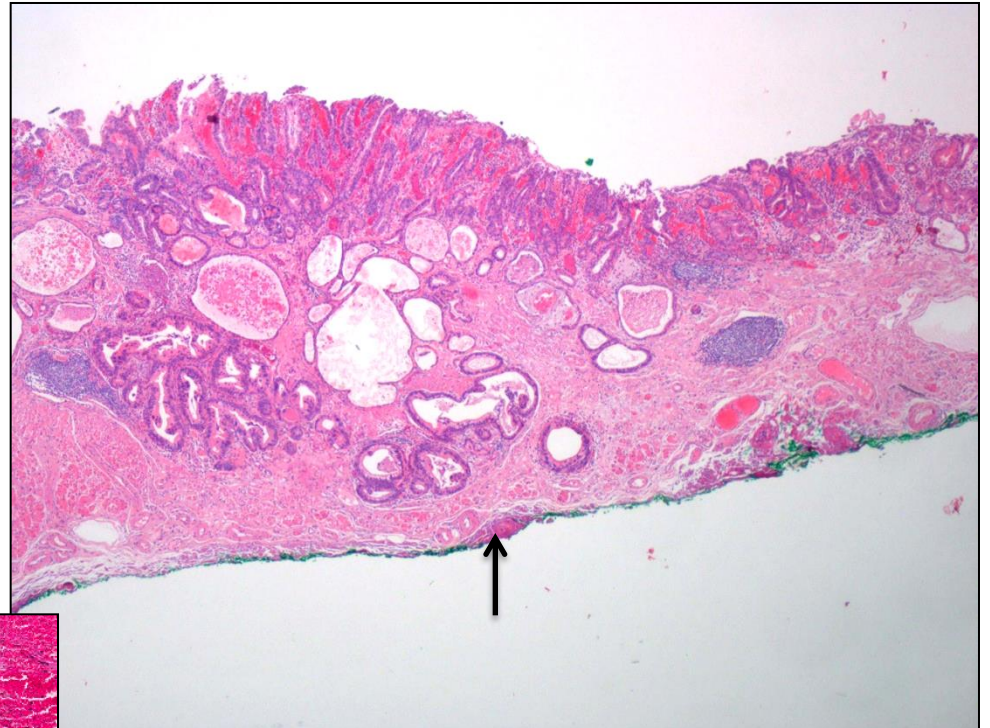
•Mandal RV, Forcione DG, WR B, Nishiokai NS, Mino-Kenudson M and Lauwers GY (2009). Effect of Tumor Characteristics and Duplication of the Muscularis Mucosae on the Endoscopic Staging of Superficial Barrett Esophagus-related Neoplasia. *Am J Surg Pathol* 33:620-625.

•Susan C. Abraham SC, Krasinskas AM, Correa AM, Hofstetter WL, Ajani JA, Swisher SG and Wu T-T (2007). Duplication of the Muscularis Mucosae in Barrett Esophagus: An Underrecognized Feature and Its Implication for Staging of Adenocarcinoma. *Am J Surg Pathol* 31:1719-1725.

***further subdivision of mm invasion is appropriate...***

# Margins

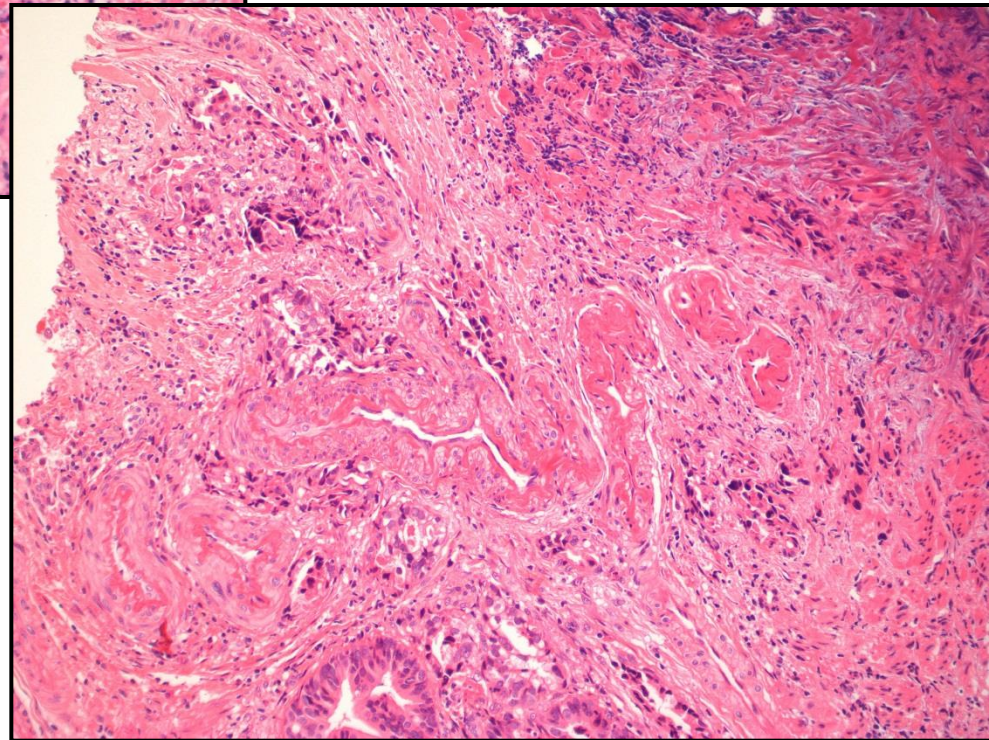
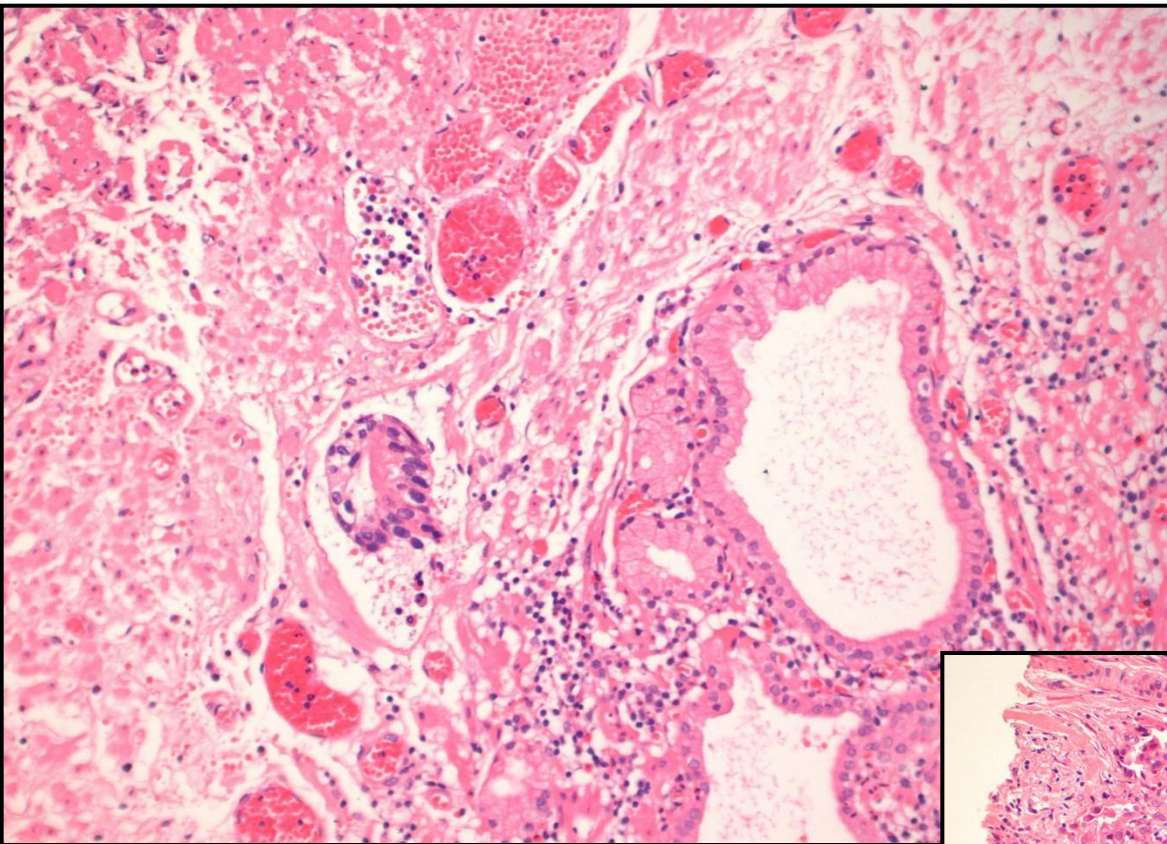
Deep margins (levels if required)



Lateral margins



# Lympho-vascular invasion

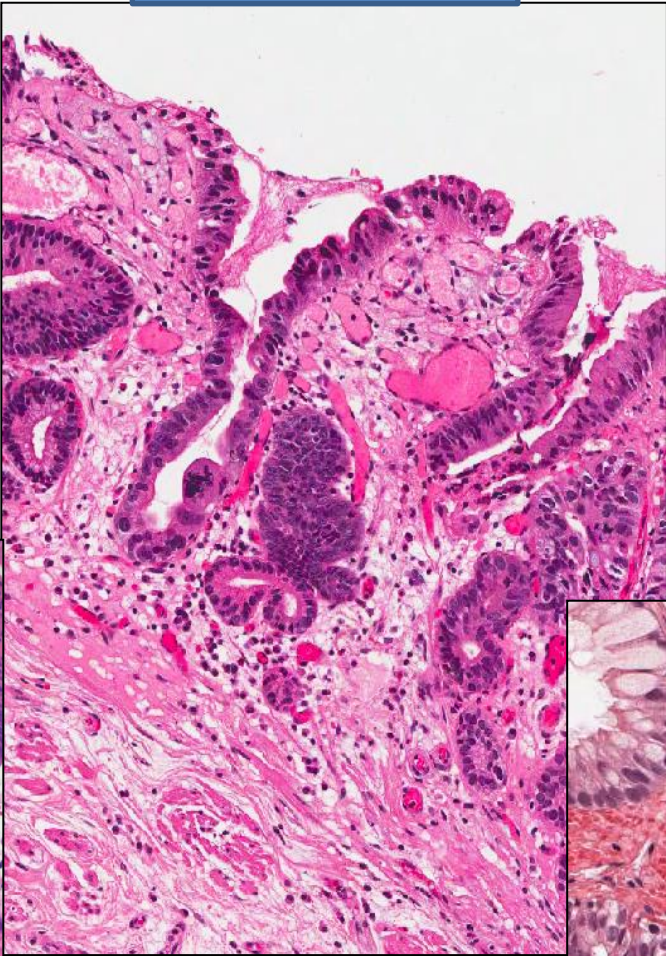
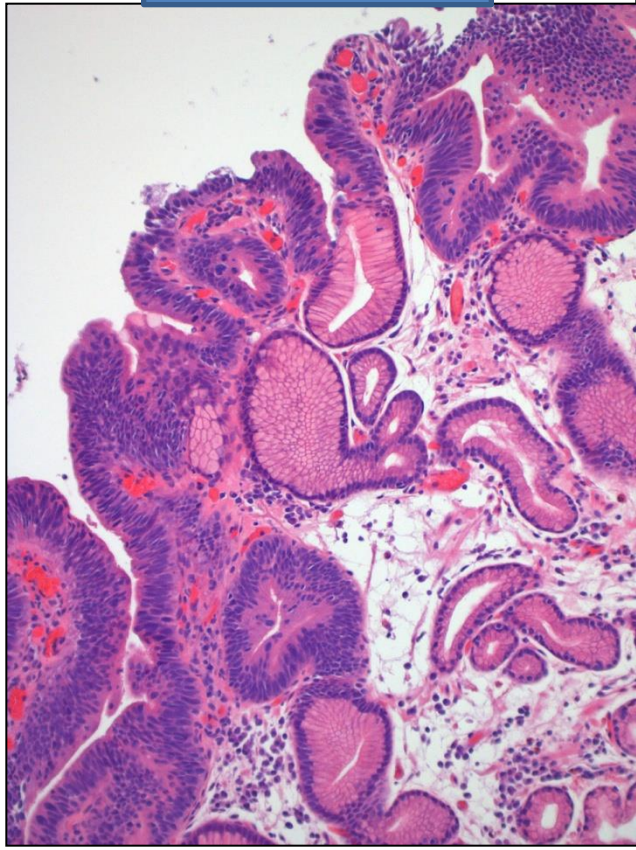




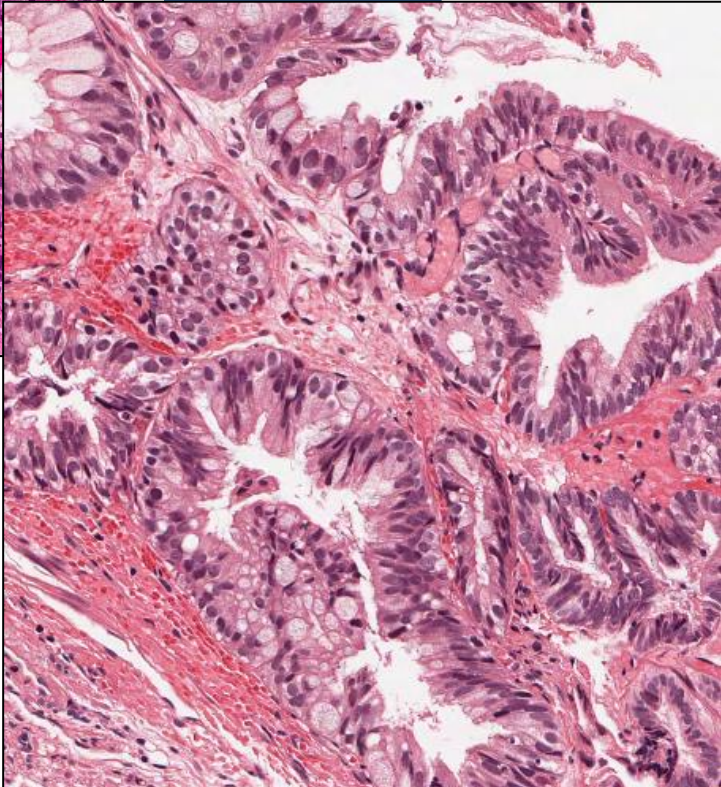
HYBRID/MIXED

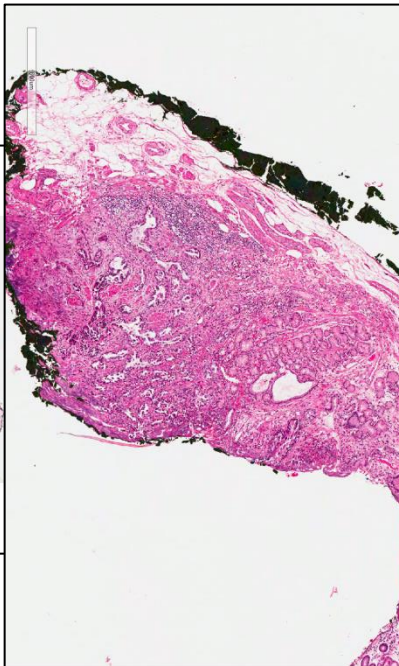
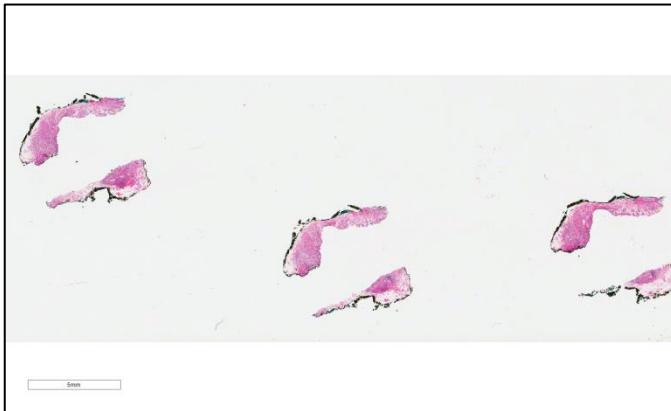
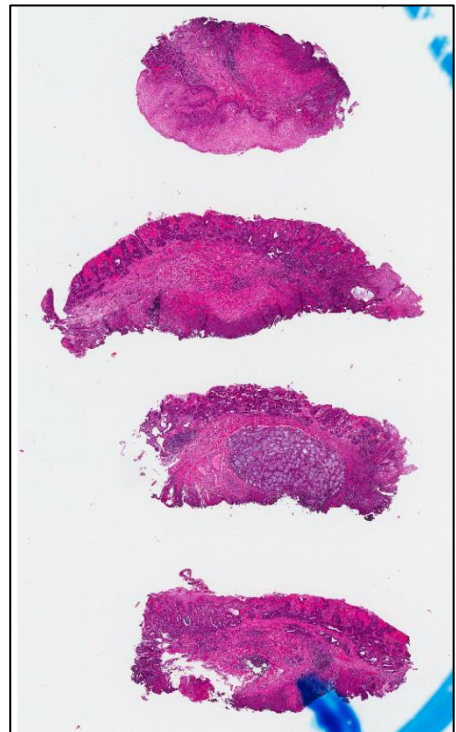
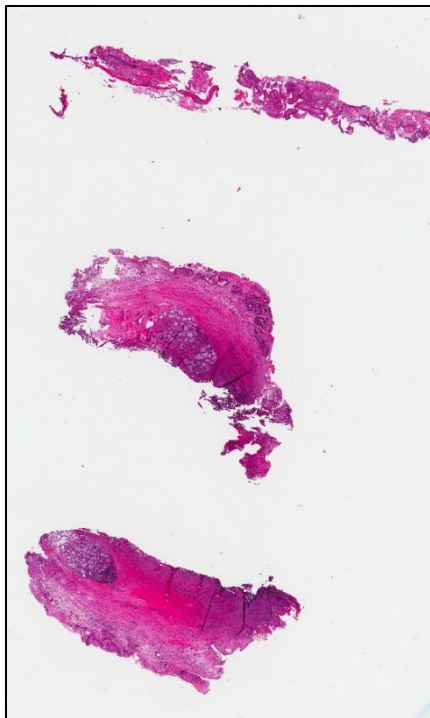
Phenotypes

INTESTINAL



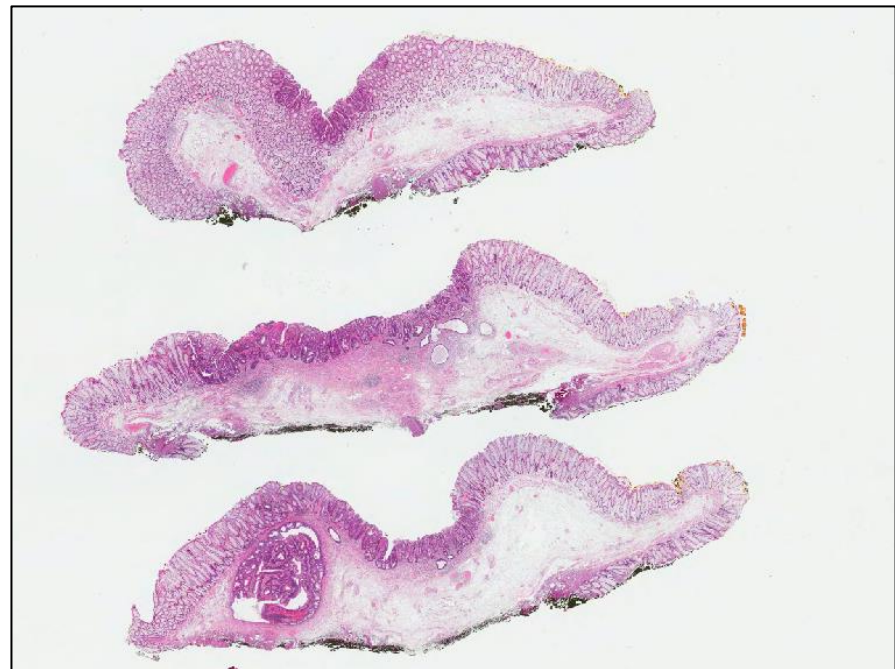
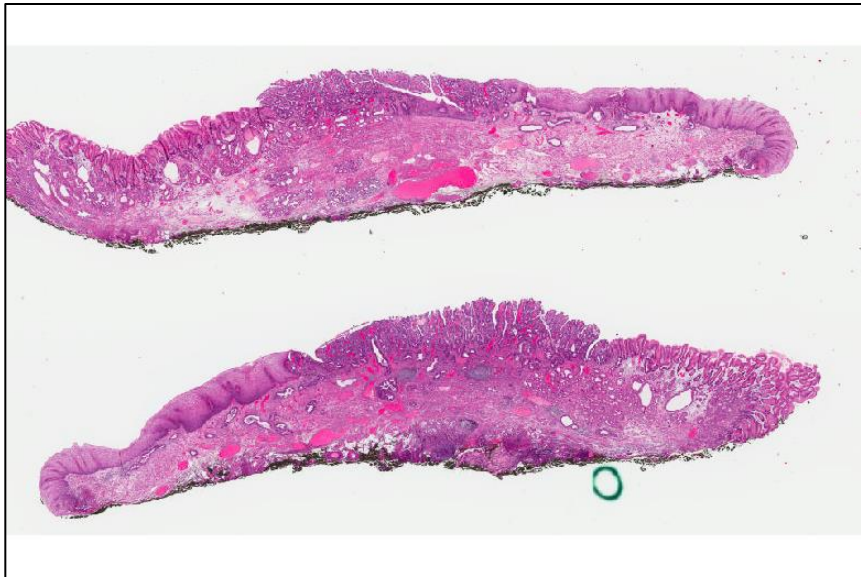
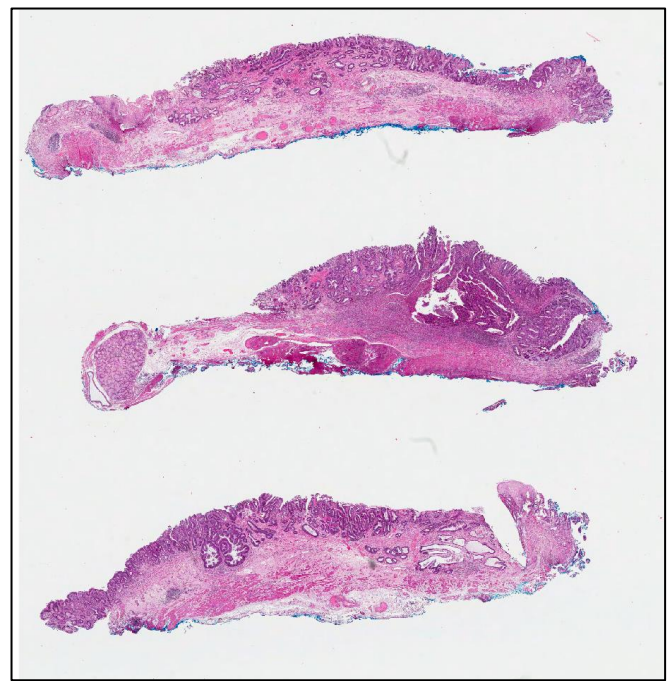
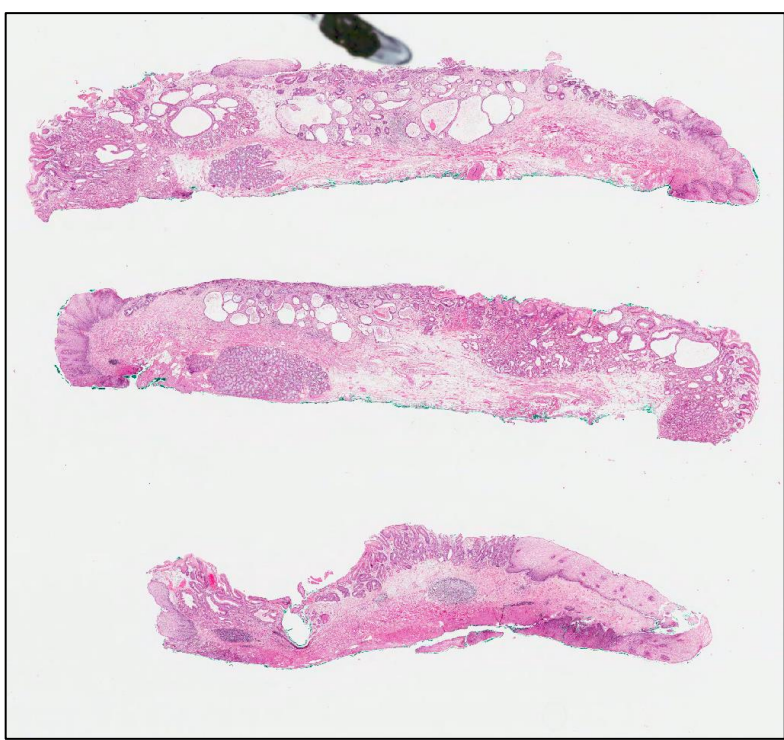
GASTRIC





**XXX**







# Report format



*TISSUE LAYERS PRESENT:* Mucosa/ Muscularis mucosa/ submucosa.

**TYPE OF LESION:** (e.g. Adenocarcinoma, High Grade dysplasia/Intraepithelial neoplasia)

*HISTOLOGICAL TYPE:* (e.g. signet ring cell, mucinous, adenocarcinoma NOS)

**HISTOLOGICAL GRADE:**

PHENOTYPE:

TUMOUR SIZE:

**DEPTH OF INVASION:** (e.g. T1a - tumour invades lamina propria)

3-tiered (AJCC): (e.g. M2)

4-tiered (Stolte): (e.g. M1)

**LYMPHATIC AND CAPILLARY SPACE INVASION:** Absent/Present

PERINEURAL INVASION: Absent/Present

**SURGICAL MARGIN STATUS**

**Deep margin:** Not involved/Involved

**Distance to deep margin (if applicable)**

**Lateral margin (if applicable):** Not involved/Involved

**Distance to lateral margin (if applicable)**

**OTHER PATHOLOGIES:** (Barrett disease/ scar formation/ ulceration/other)



# **ENDOSCOPIC RESECTION (ER) OF THE OESOPHAGUS AND GASTRO- OESOPHAGEAL JUNCTION STRUCTURED REPORTING PROTOCOL. 1st Edition 2013. © RCPA**

Pathology (October 2014) 46(6), pp. 473–480

## **REVIEW**

### **Standardised reporting protocol for endoscopic resection for Barrett oesophagus associated neoplasia: expert consensus recommendations**

M. P. KUMARASINGHE<sup>1</sup>, I. BROWN<sup>2</sup>, S. RAFTOPOULOS<sup>3</sup>, M. J. BOURKE<sup>4</sup>, A. CHARLTON<sup>5</sup>,  
W. B. DE BOER<sup>1</sup>, R. ECKSTEIN<sup>6</sup>, K. EPARI<sup>7</sup>, A. J. GILL<sup>6,8</sup>, A. K. LAM<sup>9</sup>, T. PRICE<sup>10</sup>,  
C. STREUTKER<sup>11</sup> AND G. Y. LAUWERS<sup>12</sup>

<sup>1</sup>PathWest, Queen Elizabeth II Medical Centre, Nedlands, and University of Western Australia, WA, <sup>2</sup>Envoi Pathology, Herston, Qld, <sup>3</sup>Sir Charles Gairdner Hospital, Nedlands, WA, <sup>4</sup>Department of Gastroenterology and Hepatology, Westmead Hospital, Sydney, and Westmead Clinical School, University of Sydney, Sydney, NSW, <sup>5</sup>Department of Histopathology, The Children's Hospital at Westmead, Sydney, NSW, <sup>6</sup>Department of Anatomical Pathology, Royal North Shore Hospital, Sydney, NSW, <sup>7</sup>St John of God Hospital Murdoch, Murdoch, and Department of Surgery, Fremantle Hospital, Fremantle, WA, <sup>8</sup>Cancer Diagnosis and Pathology Group, University of Sydney, NSW, <sup>9</sup>Griffith Medical School and Griffith Health Institute, Griffith University, Qld, <sup>10</sup>Department of Medical Oncology, The Queen Elizabeth Hospital and University of Adelaide, Adelaide, SA, Australia, <sup>11</sup>St. Michael's Hospital, Toronto, Canada, and <sup>12</sup>Massachusetts General Hospital and Harvard Medical School, Boston, MA, United States



END