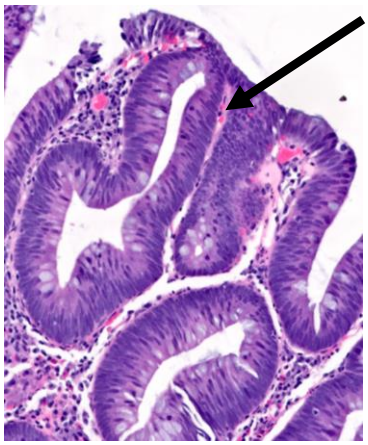
Last updated: 3/23/2023

Colon Polyps

Prepared by Kurt Schaberg

Adenoma

"Conventional colorectal adenoma" (as opposed to serrated)

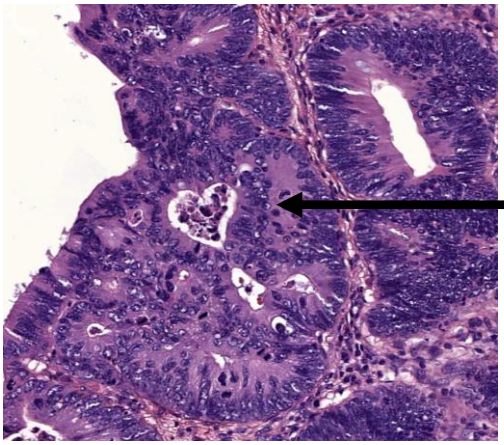


"Picket fence" nuclei: Elongated, **Pencillate**, Pseudostratified, **Hyperchromatic**
Generally, nuclei **retain basal orientation** (bottom 1/2 of cell)
Low grade dysplastic changes should involve at least the upper half of the crypts and the luminal surface

Rare morphologic findings, which are of no known significance, include: Paneth cell-rich, squamous morules, and clear cells.

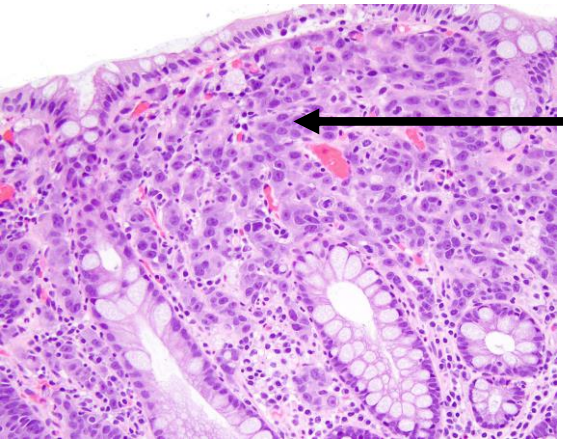
Generally, subtype based on architecture.
Tubular adenoma (TA): Most common, preserved crypt architecture
Villous adenoma (VA): Resembles villi or fronds. Often larger.
Tubulovillous adenoma (TVA): Both components present.

	Tubular	Tubulovillous	Villous
Tubules	>75%	25-75%	<25%
Villi	<25%	25-75%	>75%



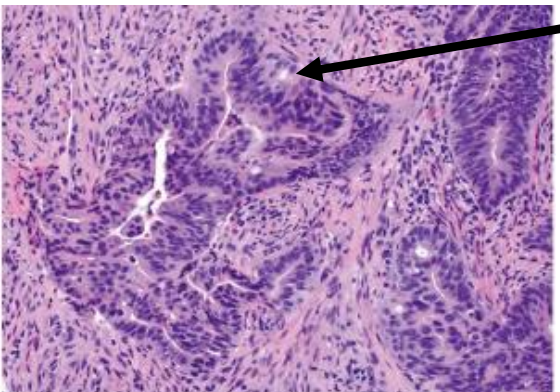
High-Grade Dysplasia ("Carcinoma in situ")
Significant cytologic **pleomorphism**
- Rounded, heaped-up cells, ↑ nuclear:cytoplasmic ratio
- "Open" vesicular chromatin, prominent nucleoli
- Lose basal orientation, extend to luminal half of cell

Architectural complexity
- Cribriforming, solid nests, intraluminal necrosis
- Absence of definite breach of basement membrane



Intramucosal Carcinoma
Neoplastic cells through basement membrane
Into lamina propria but not through muscularis mucosae
- Single cell infiltration, small and irregular/angulated tubules
  OR
- Marked expansion of back-to-back cribriform glands

No/Low metastatic risk (few lymphatics in colonic mucosa)



Invasion into submucosa
→ implied by **Desmoplastic** response

Chromosomal Instability Pathway (most common):
APC → KRAS → p53 (also often β-Catenin and SMAD4)

Lynch Microsatellite Instability Pathway: *Germline MMR mutation → Loss of heterozygosity → Microsatellite instability*

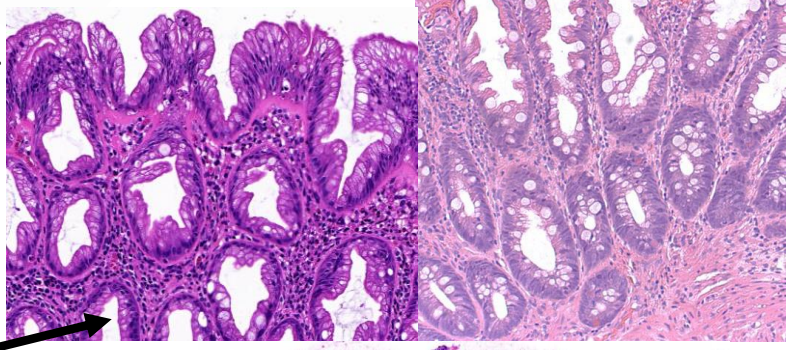
Serrated Polyps

Serrated, like a knife or saw!

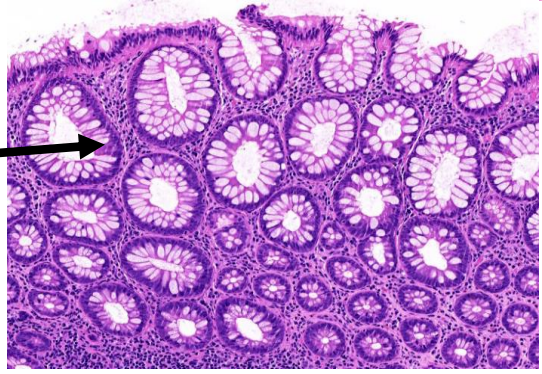
Hyperplastic Polyp (HP):

Superficial serrations (funnel-shaped).
Usually **Small**, **Left-sided**. Proliferation at bases.
Nondysplastic epithelium.
No significant malignant potential
→ don't impact follow-up

NOT necessary to subtype in reports clinically, but useful to be aware of the morphologic spectrum for diagnostic and molecular reasons



Microvesicular Hyperplasic Polyp (MVHP):
Fine apical vacuoles in epithelial cells at surface.
Stellate, frilly, lumina in cross section.

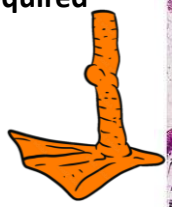


Goblet cell-rich Hyperplastic Polyp (GCHP):
Subtle! Taller and wider crypts (than normal), with slight surface serrations. Cross-sections round.

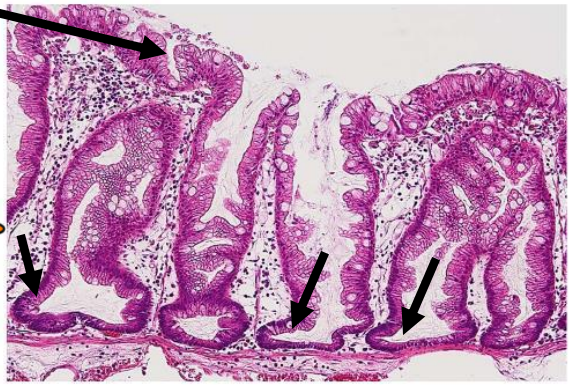
Sessile Serrated Lesion (SSL):

(formerly Sessile Serrated Polyp/Adenoma (SSP/A)

Usually large (≥1 cm) sessile, right-sided lesions
Architectural distortion at the bases of crypts is required
Serrations and Dilated extending to bases,
Often Asymmetric growth
→ Boot-shaped, "Duck foot"

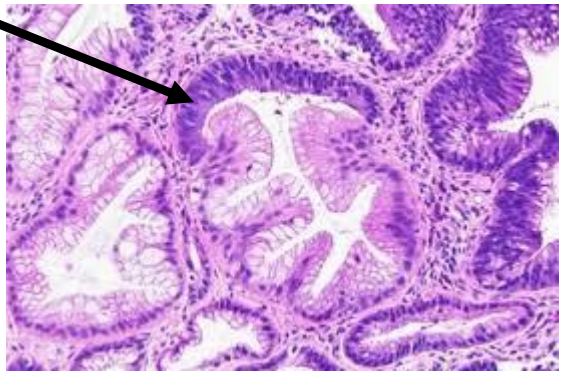


Only ≥1 unequivocal distorted crypt is required
Mixture of microvesicular mucin and goblet cells.



Sessile Serrated Lesion with dysplasia

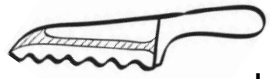
Several patterns, but all show nuclear atypia, hyperchromasia.
Often sharply demarcated.
Many cases show MLH1 loss by IHC, so if concerned consider staining.
Not recommended to stratify into high and low-grade as not reproducible due to heterogeneity.

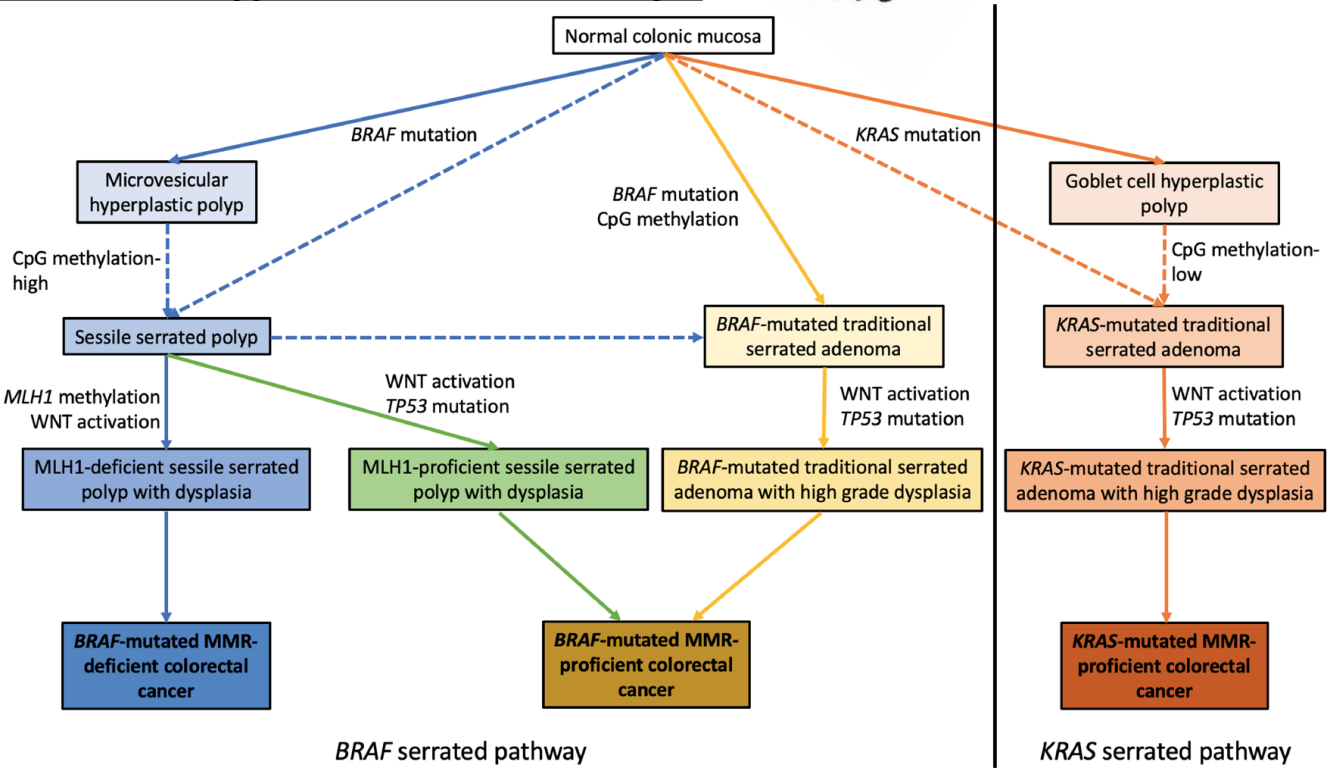


Size of polyp	Left Colon	Right Colon
1-5 mm	Vast majority HP	Mix of SSA and HP
6-9 mm	Mix of SSA and HP	Vast majority SSA
10+ mm	Vast majority SSA	Essentially all SSA

Sporadic Microsatellite Instability Pathway: *Normal colon → BRAF V600E → MVHP → DNA methylation → SSL → MLH1 promoter methylation/deficiency → Microsatellite instability → Dysplasia → Carcinoma*

Serrated Polyp Molecular Pathways:





*From: Pai, R.K., et al. Mod Pathol **32**, 1390–1415 (2019). PMID: 31028362*

Polyp Type	Histologic findings				Molecular findings		
	Crypts	Proliferation Zone	Cytology	Mucin type	BRAF	KRAS	CpG-island methylation
MVHP	Top serrations only	Base	No dysplasia	Microvesicular and goblet cells	70-80%	0%	+
GCHP	Elongated crypts. No Serrations	Base	No dysplasia	Goblet cell predominant	0%	50%	-
SSL	Dilated crypts, with lateral growth and/or serrations at bottom	Variable, often part way up	No dysplasia	Microvesicular and goblet cells	>90%	0%	++
SSLD	Complex architecture	Variable, often part way up	Dysplasia (variable LGD or HGD)	Varied	>90%	0%	+++
TSA	Slit-like serrations, Ectopic crypt foci	Bases and Ectopic crypt foci	Dysplasia. Penicillate nuclei.	Scattered goblet cells	50-70%	20-40%	+

Adapted from the WHO blue book, Digestive System, 5th edition

Serrated Polyposis Syndrome:

Criteria 1: At least 5 serrated polyps proximal to the rectum, all ≥5mm, with at least two ≥10mm

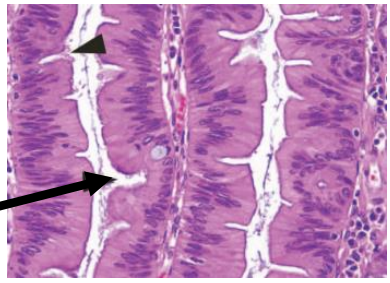
Criteria 2: More than 20 serrated polyps of any size in the large bowel, with at least 5 proximal to the rectum.

Polyp count is cumulative over multiple colonoscopies. Any type of serrated polyp can count in final tally.

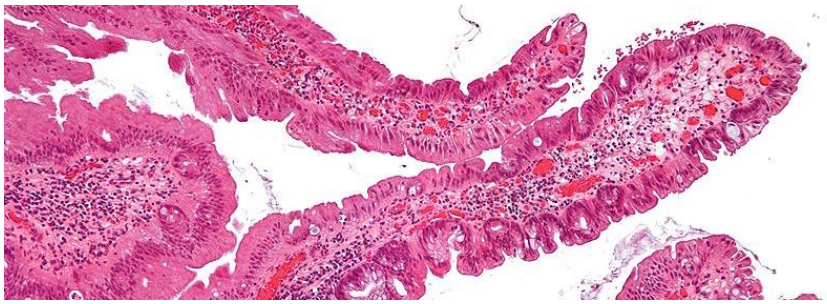
~25% risk of colorectal cancer. Often distal. No known etiology. Increased screening (every 1-2 years)

Traditional Serrated Adenoma

aka TSA

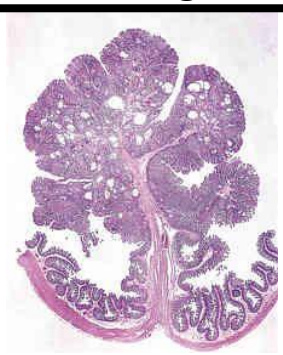


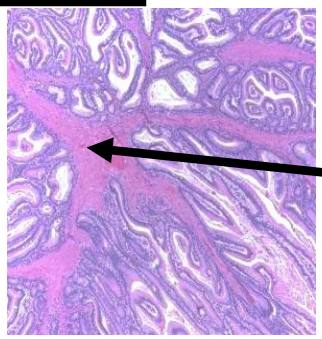
Serrated Adenomatous Polyps. Uncommon.
Prominent frilly **serrations** of glands
Columnar cells with mucin-depleted, **eosinophilic cytoplasm**
Central pencillate nuclei. Minimal atypia
Complex architecture with **ectopic crypt foci (slit-like serrations)**
Often increased intraepithelial lymphocytes
Often pedunculated, villous, and left sided



Can contain either KRAS mutations (derived from goblet-cell rich HPs) or BRAF mutations (derived from microvesicular HPs/SSL)
→ Microsatellite *stable* adenocarcinoma

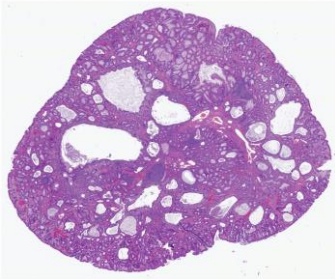
Peutz-Jeghers Polyp

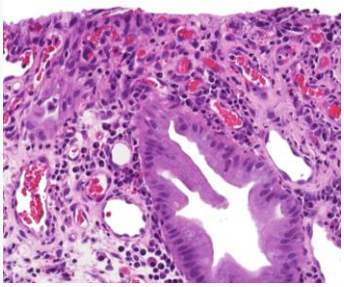




Hamartomas (non-neoplastic).
Usually syndromic→ Peutz-Jeghers syndrome
Germline mutation in the STK11/LKB1 gene.
Most frequent in small intestine
Multilobated, may have papillary or frond-like surface
Arborizing smooth muscle
Generally cytologically bland epithelium
Mucocutaneous melanotic macules (lips and oral mucosa)
Increased **risk of many cancers**
(e.g., Stomach, Colon, Pancreas, Breast, etc…)

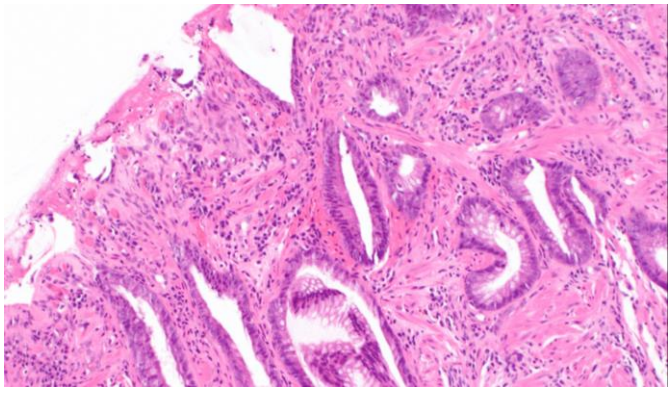
Juvenile/Inflammatory Polyp





Common in **children**, but may occur at any age
Usually **smoothly spherical** pedunculated polyp
Prominent **cystically dilated glands**
Abundant **inflamed stroma**
Surface may be eroded
Dysplasia and carcinoma are very rare in sporadic polyps
≥5 polyps or extra-colorectal location may indicate Juvenile Polyposis syndrome

Inflammatory Cloacogenic Polyp



Secondary to rectal mucosal **prolapse**
Often anterior rectal wall within 12 cm of anal verge
Superficial ulceration or **erosion** of mucosa
Thickened, disorganized muscularis mucosae with extension into lamina propria→ **Smooth muscle surrounds individual crypts**
Regenerating mucosal epithelium (may *appear* adenomatous)
Distorted crypts, sometimes diamond-shaped

Clinical Follow-up Guidelines

From: Gupta et al. Gastroenterology 2020 Mar;91(3):463-485

Colonoscopy starting at age 50.

Next follow-up in:

No polyps/Normal → 10 yrs

Adenomas:

- 1-2 TAs (<1cm) → 7-10 yrs
- 3-4 TAs (<1cm) → 3-5 yrs
- 5-10 TAs (<1cm) → 3 yrs
- >10 TAs → 1 yr
- ≥1 TA >1 cm → 3 yrs
- ≥1 Villous Adenoma/TVA → 3 yrs
- Adenoma with High-grade dysplasia → 3 yrs
- Piecemeal resection of adenoma ≥ 2 cm → 6 mo

Serrated Polyps:

- ≤ 20 HPs (<1cm) → 10 yrs
- 1-2 SSP, < 1 cm → 5-10 yrs
- 3-4 SSP, < 1 cm → 3-5 yrs
- 5-10 SSP, < 1 cm → 3 yrs
- SSP, > 1cm → 3 yrs
- SSP with dysplasia → 3 yrs
- HP ≥ 1cm → 3-5 yrs
- TSA → 3 yrs
- Piecemeal resection of SSP ≥2 cm → 6 mo