

2 Descriptive Terms in Anatomic Pathology

Central to effective learning in pathology is the ability to speak the language. This chapter covers the approach to defining and describing an unknown tumor or lesion and defines histologic terms commonly used in pathology.

Interface With the Surrounding Normal Tissue

Term and definition	Appearance	Example
Circumscribed: well delineated lesion	Well-defined border between normal tissue and the lesion	Fibroadenoma
Encapsulated: surrounded by a fibrous capsule	Thick pink border surrounding the lesion	Follicular adenoma, thyroid
Infiltrative: invading into and among the surrounding normal cells	Poorly defined border with normal tissue	Prostate carcinoma
Lobular: in architecture, refers to a generally circumscribed or anatomic distribution	Circumscribed, rounded nodules of cells; simulates a normal anatomic unit	Lobular capillary hemangioma
Pushing border: expanding into and compressing the surrounding tissue	Can create the appearance of a capsule	Medullary carcinoma, breast

Cellularity (Low to High) and Mitotic Rate

Note the cellularity (by *cellularity* we often mean how blue it is, or how densely packed the nuclei are). Cellularity may be described as *hypercellular* or just *cellular* or as *hypocellular/paucicellular*. Also look for mitoses on high power. High mitotic rate may be an indicator of malignancy. Atypical mitoses (tripolar) are convincing indicators of malignancy. Estimate how many mitoses are seen per high power field (40×).

Architectural Pattern

Term and definition	Appearance	Example
Alveolar: resembling alveoli or little cells, sacs, or nests	Nested—there is structure to the lesion but no glands or ducts	Paranglioma (Figure 2.1)
Basaloid: resembling basal cell carcinoma	A blue nested tumor (often poorly differentiated squamous) with tightly packed nuclei and palisading around the edge of the nest	Basal cell carcinoma (Figure 2.2)
Biphasic: having components of two cell lineages	Spindled cells with islands of epithelioid cells or glands	Synovial sarcoma
Cribriform: perforated, like a colander	Well-formed holes within a glandular lumen	Adenoid cystic carcinoma (Figure 2.3)
Discohesive: falling apart into single cells	No common borders among cells	Lobular carcinoma in situ
Epithelioid: composed of round to oval cells with abundant cytoplasm	Cells look plump, the opposite of sarcomatoid	Ductal carcinoma, breast (Figure 2.4)
Fascicular: composed of fascicles	Bundles of elongated, spindly cells streaming in parallel arrays	Leiomyoma (Figure 2.5)
Glandular: forming gland structures with lumens	True glands should have polarized cells radiating around a lumen	Adenocarcinoma
Glomeruloid: resembling the glomerulus	A coiled tangle of vessels, capillaries, or glands	Glioblastoma multiforme vascular proliferations
Herringbone: resembling a pattern of tweed fabric	A variant of fascicular that shows bundles alternating in a zigzag array	Fibrosarcoma (Figure 2.6)
Hobnailed: resembling a large-headed nail used in shoes	Epithelial or endothelial cells round up and protrude into the lumen as little humps	Angiosarcoma (Figure 2.7)
Indian file: cells infiltrating through the tissue in single-file lines	“Lines” may be only three to four cells long and run parallel to stromal planes	Lobular breast carcinoma
Microcystic: scattered small cystic spaces that are not ducts or tubules	Microcysts may look like glands but do not have polarized epithelial linings and are haphazard	Acinic cell carcinoma, microcystic pattern (Figure 2.8)
Micropapillary: papillary-shaped epithelial projections without true fibrovascular cores	Can have a medusa-head appearance (serous carcinoma) or lollipop projections in a duct (micropapillary ductal carcinoma in situ [DCIS])	Micropapillary serous carcinoma, ovary (Figure 2.9)
Nested: see <i>Alveolar</i>		
Pagetoid spread: single malignant cells scattered throughout a benign epidermis	Cells standing out at low power as not belonging in the epithelium	Paget’s disease
Palisading: resembling a fence made of sharp stakes	Parallel arrays of nuclei catching your eye at low power as a dark border	Basal cell carcinoma (see Figure 2.2)
Papillary: an exophytic growth pattern with fibrovascular cores supporting proliferative epithelium	Cauliflower- or coral-shaped structures with branching fibrovascular cores	Papillary carcinoma, breast (Figure 2.10)
Polarized: epithelial cells that have a uniform nuclear position, either apical (lumen side) or basal (basement membrane side)	Polarized cells surrounding a true lumen should show a distinct halo of cytoplasm surrounding the lumen, if the nuclei are basal	Cribriform DCIS
Pseudopapillary: a papillary pattern caused by cell die-off in between fibrovascular septa	In some areas, the tumor will look solid or nested, but the cells at the nest centers degenerate, creating an outline of the septa	Solid pseudopapillary neoplasm, pancreas
Reticular: resembling a network or net-like array	Microcystic or honeycomb appearance	Yolk sac tumor, testes (Figure 2.11)
Rosettes: a group of nonepithelial cells that are clustered and crowned around a common center	Pseudorosettes are rosettes around a vessel; true rosettes surround a lumen or a fibrillary core	Ependymoma (Figure 2.12) and other neuroglial and neuroendocrine lesions
Spindled: composed of elongated cells with fusiform nuclei	Sheets or fascicles of fusiform cells; suggests a lesion is either a soft tissue neoplasm or a sarcomatoid variant of something else	Leiomyoma

(continued)

(Continued)

Term and definition	Appearance	Example
Staghorn vessels: gaping, branching vessels with thin walls, scattered throughout a lesion	Vessels should strike you as prominent at low power; the shape is unusual and the walls are disproportionately thin for the caliber	Hemangiopericytoma (Figure 2.13)
Storiform: having a cartwheel pattern—spindle cells with elongated nuclei radiating from a center point	A cellular spindled lesion with whorls of cells as opposed to parallel fascicles or right-angle bundles	Dermatofibrosarcoma protuberans (Figure 2.14)
Syncytial: having cytoplasmic continuity between the constituent cells	Looks like a collection of nuclei without recognizable cell borders	Meningioma
Tissue culture pattern: a loose aggregate of stellate (star-shaped) cells	Cells have delicate tentacles of cytoplasm	Nodular fasciitis (Figure 2.15)
Trabecular: in cord-like arrays separated by fibrous septa	Long nests and cords of cell groups	Oncocytoma (Figure 2.16)

Presence or Absence of Necrosis

Coagulative necrosis	Cells appear mummified; architecture is preserved, but there is no basophilia or cell detail	Ischemia (Figure 2.17)
Caseating necrosis	Total loss of cellular structure and architecture; basically degenerates into pink soup	Tuberculosis (Figure 2.18)
Fibrinoid necrosis	Vessels with replacement of wall by pink amorphous material	Vascular necrosis (Figure 2.19)
Fat necrosis	Grossly hard and chalky white; microscopically the fat cells are disrupted and collapsed, with foamy macrophages and giant cells	Biopsy site changes in breast (Figure 2.20)
Geographic necrosis	Describes large confluent “continent-shaped” patches of necrosis	Kikuchi's disease
Necrobiosis or gangrenous necrosis	Has a somewhat granular and blue look, with lots of fibrin deposition; loss of cellular and architectural detail	Gangrene (Figure 2.21)

Cell Shape and Size, Cytoplasm

Amphophilic: having an affinity for both acid and basic dyes	Has a unique color character, almost an iridescent purple	Pheochromocytoma (Figure 2.22)
Foamy macrophages: macrophages (histiocytes) stuffed with lipid	Macrophages have a small dark eccentric nucleus; the lipid vacuoles give a glittery granular appearance	Papillary renal cell carcinoma (Figure 2.23)
Granular: containing granules or tiny vacuoles	Color may vary, but granular texture is visible especially with lowered condenser	Granular cell tumor
Hof: a perinuclear clear zone corresponding to the Golgi apparatus	Looks like a pale spot hugging the nucleus	Plasma cells
Keratinized: keratin-producing	Keratin has a very pink and dense appearance on hematoxylin and eosin (H&E) stain	Squamous cell carcinoma (Figure 2.24)
Mucous (adj.): mucinous or producing mucin; also called <i>colloid</i>	Mucin appears clear after processing but can be stained with mucicarmine or periodic acid-Schiff–alcian blue (PAS-AB)	Adenocarcinoma
Oncocytic: large cells with cytoplasm that is granular and eosinophilic due to the presence of abundant mitochondria	Oncocytes are usually cytologically bland (uniform small dense nuclei) and look pink on H&E, mahogany on gross examination	Oncocytoma (see Figure 2.16)
Plasmacytoid: like plasma cells	Round cells with abundant cytoplasm and an eccentric round nucleus	Plasmacytoma (Figure 2.25)
Signet ring: having the shape of a ring, with a flattened nucleus compressed by a cytoplasm stuffed with mucin	Can be very hard to see but should appear on low power as a nonspecific pink “stuff” in the lamina propria	Signet-ring cell carcinoma (Figure 2.26)

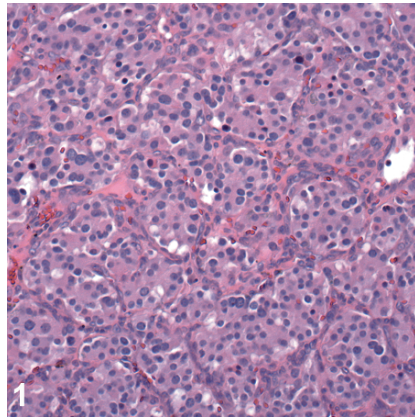


FIGURE 2.1. Alveolar pattern, paraganglioma.

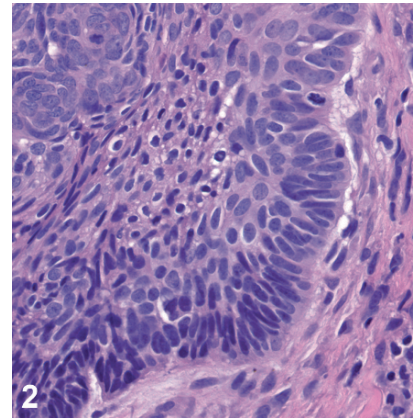


FIGURE 2.2. Basaloid pattern and palisading, basal cell carcinoma.

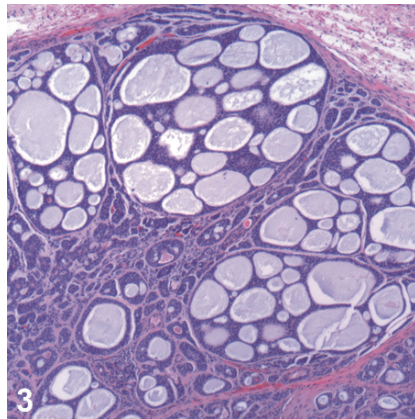


FIGURE 2.3. Cribriform pattern, adenoid cystic carcinoma.

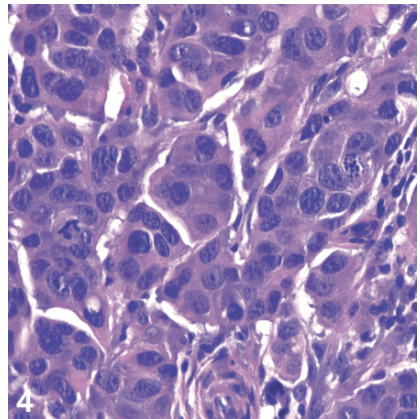


FIGURE 2.4. Epithelioid cells, breast carcinoma.

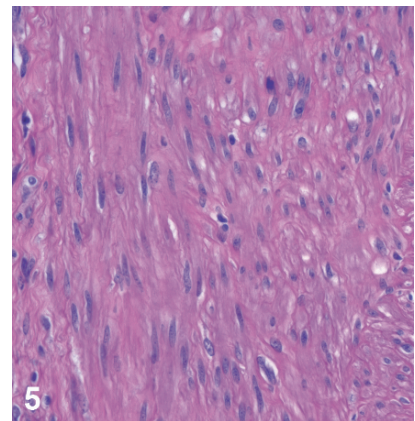


FIGURE 2.5. Fascicular pattern, leiomyoma.

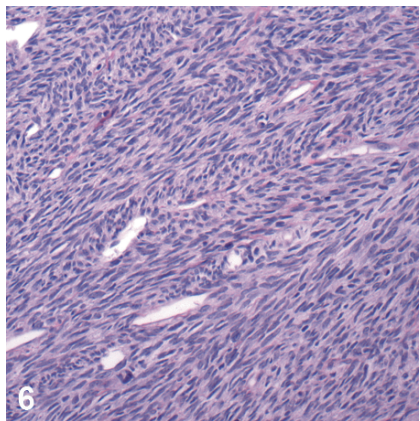


FIGURE 2.6. Herringbone pattern, fibrosarcoma.

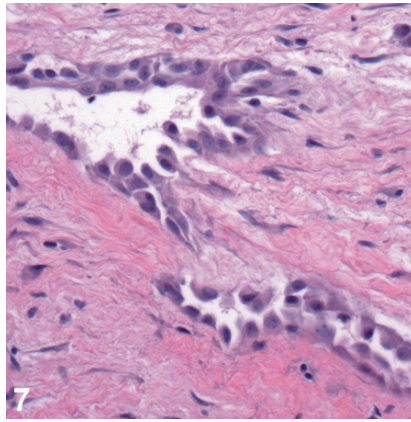


FIGURE 2.7. Hobnailed cells, angiosarcoma.

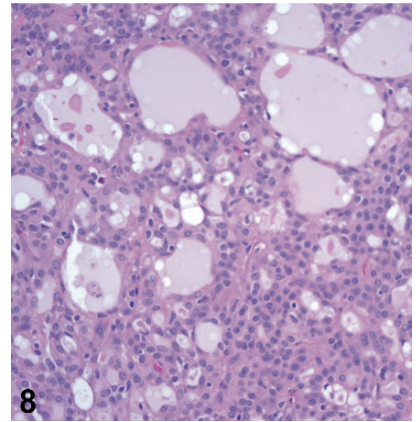


FIGURE 2.8. Microcystic pattern, acinic cell carcinoma.

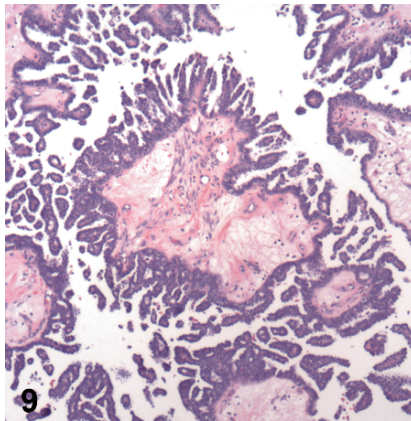


FIGURE 2.9. Micropapillary architecture, micropapillary serous carcinoma of the ovary.

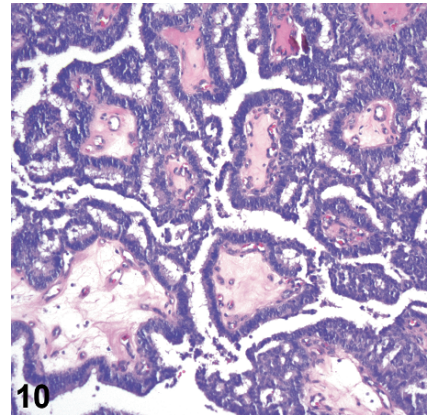


FIGURE 2.10. Papillary architecture, papillary carcinoma of breast.

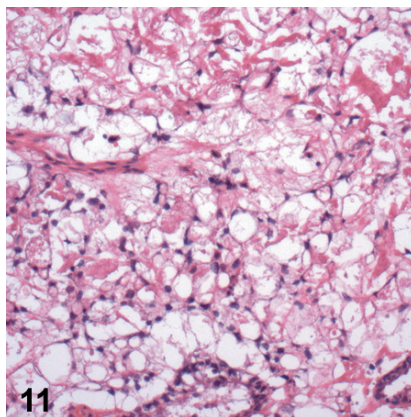


FIGURE 2.11. Reticular pattern, yolk sac tumor of testis.

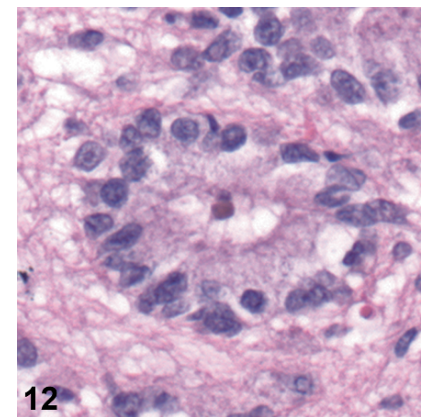


FIGURE 2.12. Rosette, ependymoma.

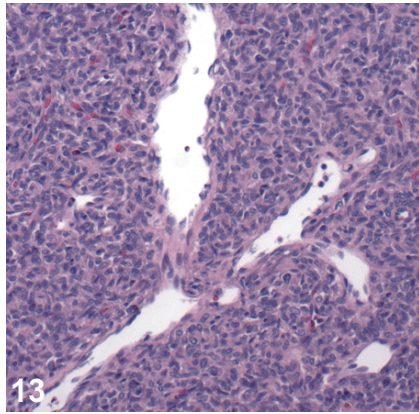


FIGURE 2.13. Staghorn vessels, hemangiopericytoma.

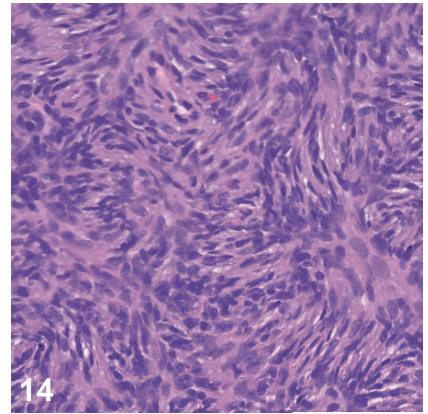


FIGURE 2.14. Storiform pattern, dermatofibrosarcoma protuberans.

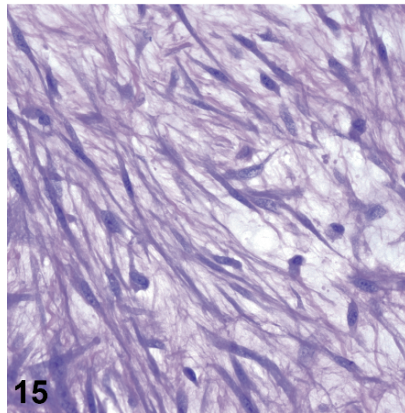


FIGURE 2.15. Tissue culture cells, nodular fasciitis.

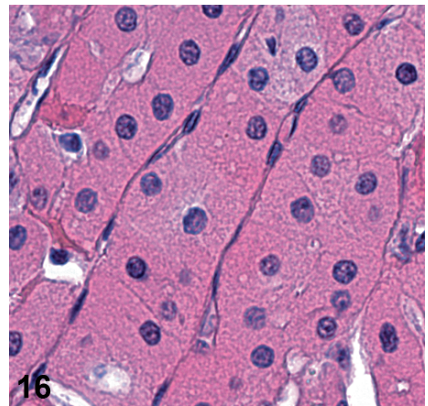


FIGURE 2.16. Trabecular pattern and oncocytes, oncocytoma.

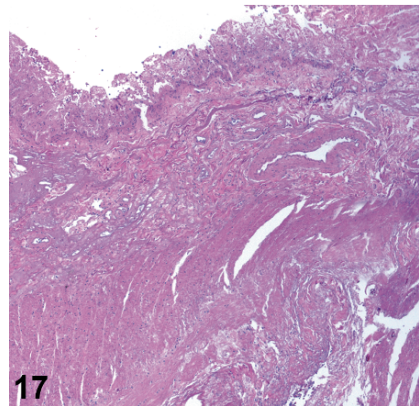


FIGURE 2.17. Coagulative necrosis, ischemic bowel.

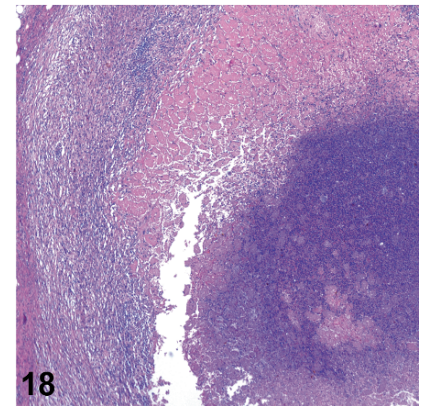


FIGURE 2.18. Caseating necrosis in a granuloma, tuberculosis.

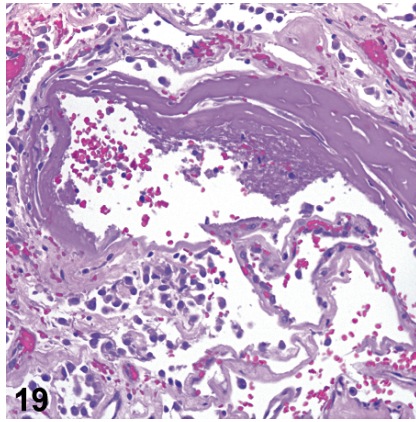


FIGURE 2.19. Fibrinoid necrosis, pulmonary vessel.

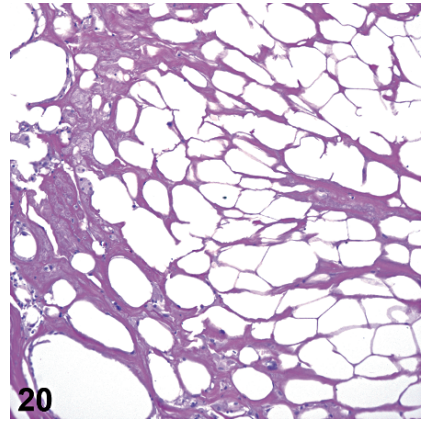


FIGURE 2.20. Fat necrosis, breast.

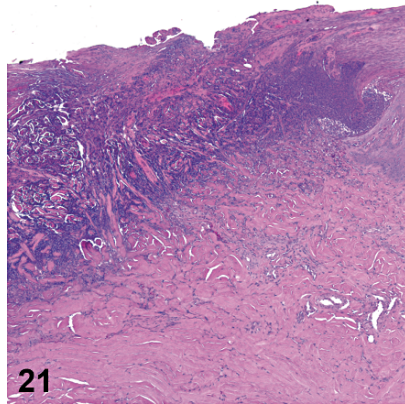


FIGURE 2.21. Gangrenous necrosis, toe wound.

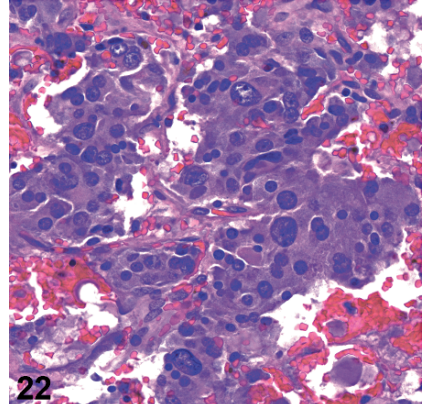


FIGURE 2.22. Amphiphilic cytoplasm, pheochromocytoma.

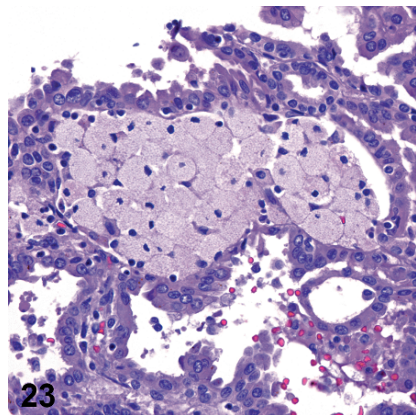


FIGURE 2.23. Foamy macrophages, papillary renal cell carcinoma.

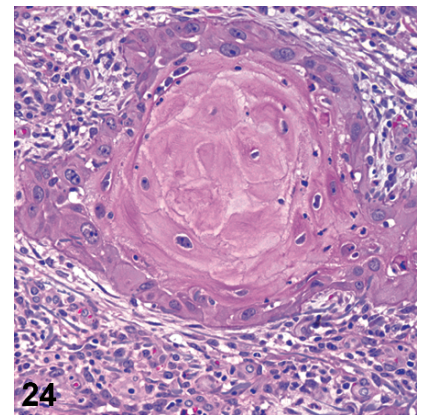


FIGURE 2.24. Keratin, squamous cell carcinoma.

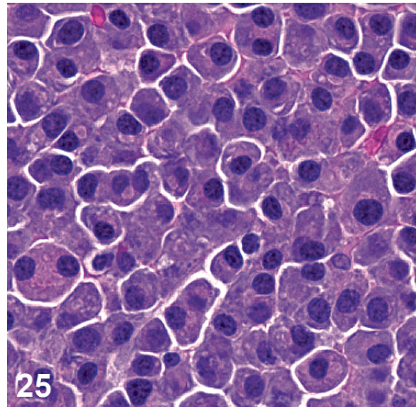


FIGURE 2.25. Plasmacytoid, plasmacytoma.

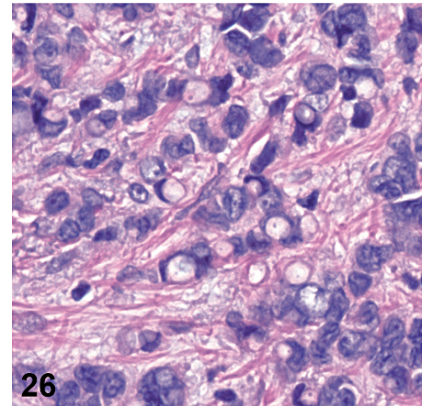


FIGURE 2.26. Signet-ring cells, breast carcinoma.

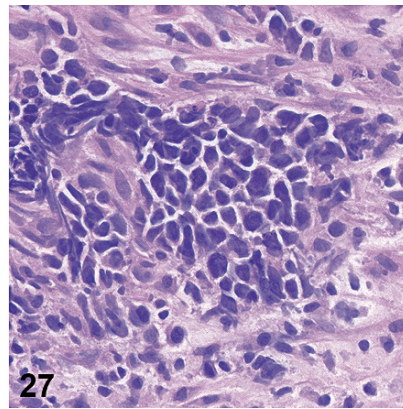


FIGURE 2.27. Nuclear molding, small cell carcinoma.

Nucleus

Clock face: evenly distributed clumped chromatin	Looks like a soccer ball	Plasma cells
Molding: nuclei that press together and indent each other due to the near absence of cytoplasm	Has a mosaic appearance and usually seen in conjunction with small dense blue nuclei	Small cell carcinoma (Figure 2.27)
Neuroendocrine: having finely speckled or salt and pepper chromatin	Nuclei should be round and bland, without nucleoli, but with occasional chromatin “chunks” or speckles	Carcinoid (Figure 2.28)
Pleomorphic: multiple sizes and shapes	Usually refers to nuclei and implies a very irregular mix of sizes and shapes	Embryonal carcinoma, testis
Vesicular: full of vesicles (bubbles)	A nucleus that is swollen and distorted by apparent bubbles in the chromatin	Various malignant neoplasms

Nucleolus

Cherry red: implies a malignant-looking nucleolus	An enlarged, solid nucleolus with a refractile reddish tinge	Prostate cancer Melanoma (Figure 2.29)
---	--	---

Cell Membrane

Ciliated: having cilia	If the cilia are not visible, sometimes the terminal bar is enough	Respiratory mucosa
Intercellular bridges: desmosomes	The prickles or spines between squamous cells	Normal skin

Stroma of Lesion, If Present

Myxoid: resembling mucus, but usually associated with a soft tissue lesion and hyaluronic acid	Appears as a faint pink to bluish-grey background, with a stringy mucous look, very paucicellular.	Myxoid myxofibrosarcoma (Figure 2.30)
Desmoplastic: causing edema and fibrosis in the stroma next to a neoplasm.	Appears as a pale halo around an infiltrating gland on low power; on high power fibrosis is visible	Adenocarcinoma, pancreas or colon (Figure 2.31)
Ectatic: dilated (as in a duct)	Often the duct is also filled with macrophages and debris	
Edematous: waterlogged	Water is clear on H&E so appears as lots of cleared-out space	
Fibrotic/sclerotic: replaced by collagen (fibrosis)	Collagen is pink and opaque on H&E and usually streams in parallel fibers	Sclerosed intraductal papilloma
Hyaline: clear, transparent, homogeneous	Glassy pink appearance	Amyloid, collagen, many others (Figure 2.32)

Other Noncellular Entities

Amyloid: protein deposited in a β -pleated sheet molecular structure	Appears glassy pink, stains salmon-pink with Congo red and fluoresces apple green	Medullary carcinoma, thyroid
Anthracotic pigment	Very black, very dense fine granules	Pulmonary lymph nodes
Calcium and psammoma bodies	Purple and granular, with hard edges; psammoma bodies are concentrically laminated	Papillary thyroid carcinoma
Colloid: refers to a mucin-producing neoplasm <i>or</i> the pink substance in thyroid follicles	Thyroidal colloid is a thin homogeneous pink.	
Hemosiderin	Has a glittery golden-brown refractile appearance with the poor-man's polarizer (which is waving your finger above the light source)	Old blood in any lesion (Figure 2.33)
Lipofuscin	Appears yellowish brown and globular	Seminal vesicle
Melanin	Is <i>not</i> refractile; may be brown to grey	Melanoma
Tattoo pigment	Similar to anthracotic pigment, may be multicolored	Skin with tattoos

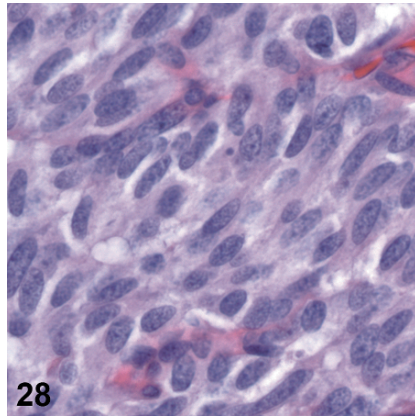


FIGURE 2.28. Neuroendocrine nuclei, carcinoid tumor.

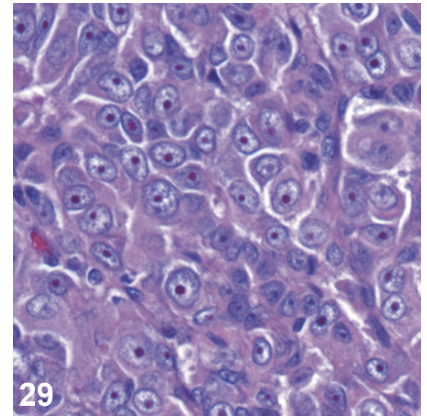


FIGURE 2.29. Cherry-red nucleolus, melanoma.

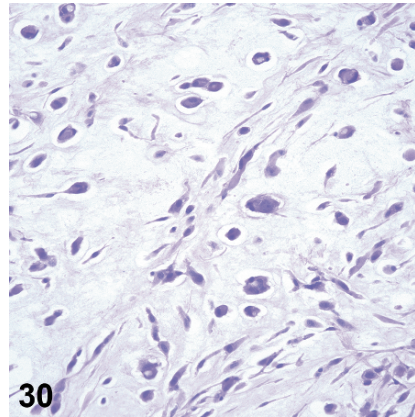


FIGURE 2.30. Myxoid stroma, myxoid myxofibrosarcoma.

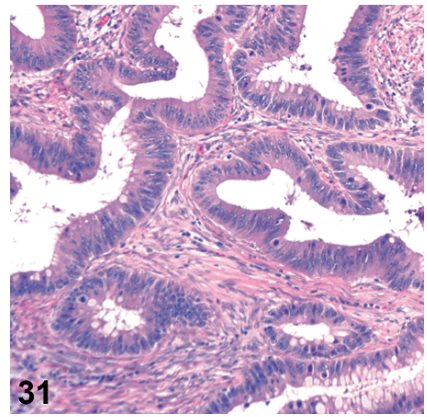


FIGURE 2.31. Desmoplastic stroma, colon cancer.

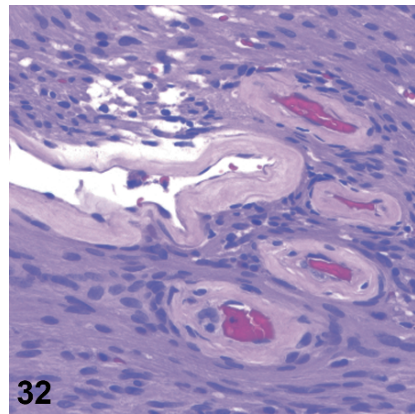


FIGURE 2.32. Hyaline deposits, vessels in schwannoma.

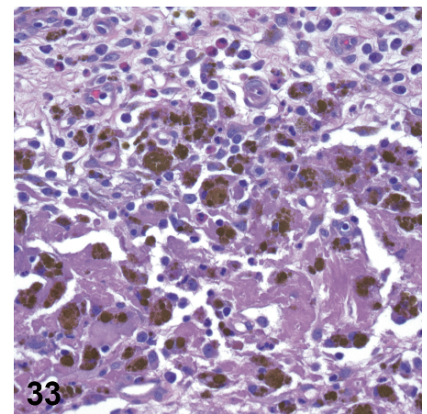


FIGURE 2.33. Hemosiderin, nasal polyp.