

Phyllodes tumor

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Breast fibroepithelial neoplasm | pathology lecture

Intralobular stromal origin • morphology • grading • clinical behavior

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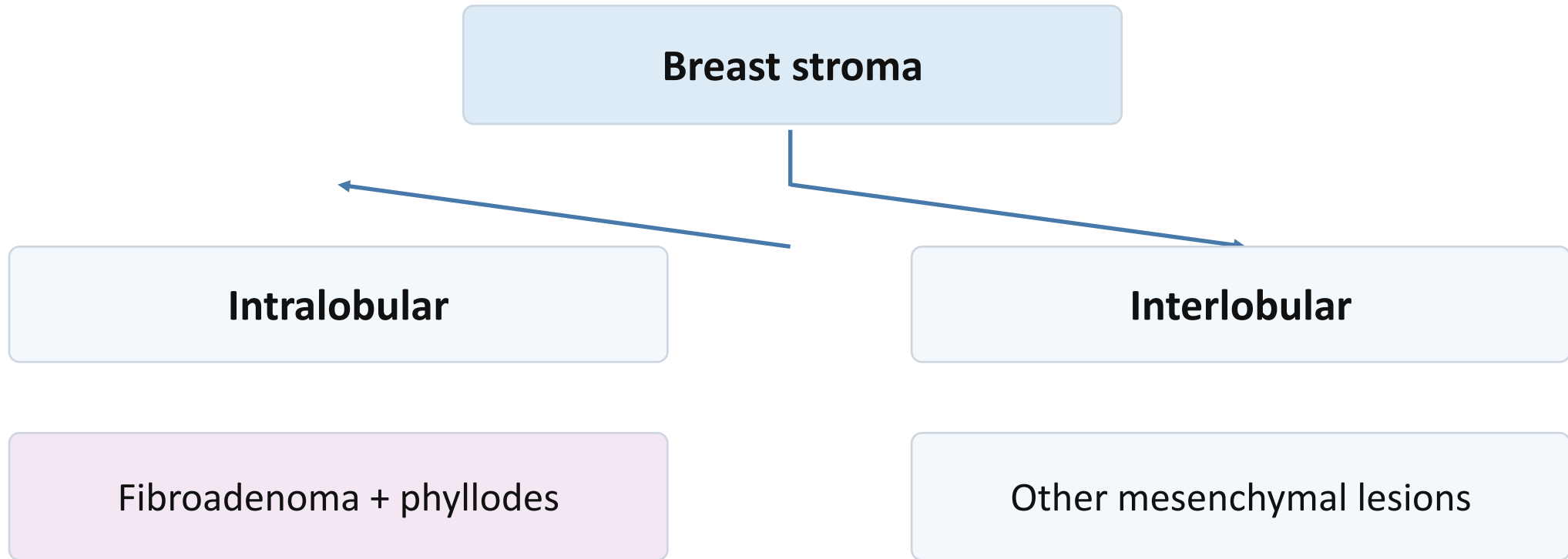
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What this lecture establishes

Four learning outcomes

- Recognize the intralobular stromal origin and biphasic structure.
- Explain leaf-like architecture and stromal histologic grading.
- Differentiate phyllodes tumor from fibroadenoma and related stromal lesions.
- Connect tumor grade, excision margins, and routes of spread to clinical behavior.

Breast stromal compartments



Distinct stromal origins → distinct tumor families

Intralobular stroma produces biphasic tumors

Neoplastic stromal core

+

Nonneoplastic epithelial lining

Biphasic primary tumor

Proliferative stroma is accompanied by a reactive/nonneoplastic epithelial component.

Interlobular stroma produces different tumors

Intralobular stroma	Interlobular stroma
Fibroadenoma	Lipoma
Phyllodes tumor	Myofibroblastoma
Biphasic: Stroma and epithelium	Stromal tumors without epithelial component

Phyllodes is a stromal neoplasm

Neoplastic component

- Intralobular stromal cells
- Drives tumor architecture and grade
- Forms proliferating stromal fronds

Associated component

- Nonneoplastic epithelium
- Covers stromal projections
- Does not constitute the metastatic tumor

Phyllodes is uncommon among fibroepithelial lesions

$\approx 2.5\%$

Of breast fibroepithelial lesions

- The relevant denominator is fibroepithelial lesions—not all breast neoplasms.
- Fibroadenoma is much more common.

Typical presentation is later than fibroadenoma

Entity	Typical presentation
Fibroadenoma	Women in their 20s and 30s
Phyllodes tumor	Most present in the sixth decade
Age contrast	Phyllodes peak is approximately 10–20 years later

Clinical discovery: Palpable mass or imaging

Palpable presentation

- Most tumors are detected as a mass.
- A rapidly enlarging lesion warrants careful pathologic assessment.

Imaging detection

- Other lesions are detected at mammography.
- Clinical detection alone does not assign tumor grade.

Tumor size spans a broad spectrum

A few centimeters



**Massive lesion involving the
entire breast**

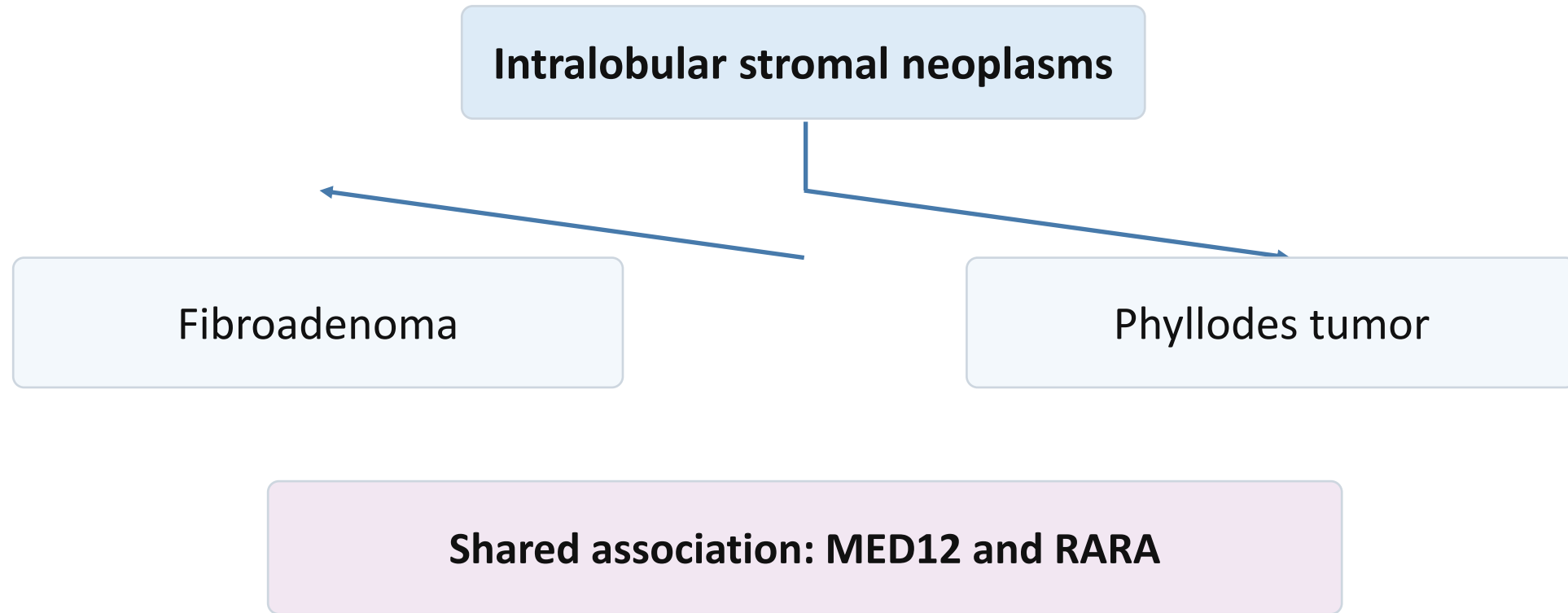
Size describes the macroscopic presentation; It is not synonymous with histologic grade.

Fibroadenoma is the central comparator

Core observations

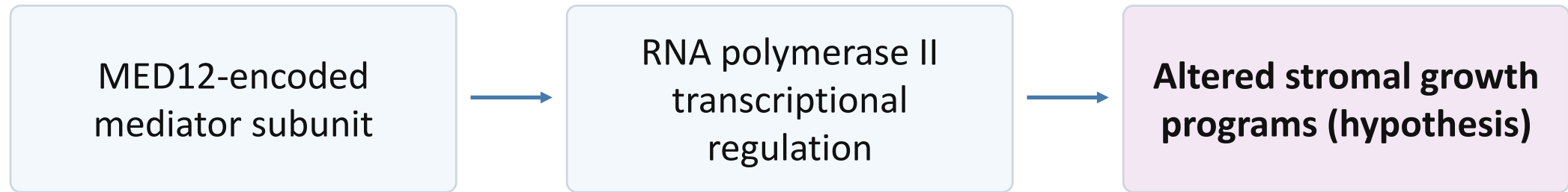
- Both lesions arise from intralobular stroma.
- Both contain nonneoplastic epithelium.
- Both can produce cleft-like spaces and an intracanalicular pattern.
- Discrimination depends especially on stromal histologic features.

MED12 links the two fibroepithelial tumors



Additional mutations are more often identified in phyllodes tumors: TERT, TP53, RB.

MED12 participates in transcriptional control



Altered hormone-regulated transcription as a possible mechanism, not a proven linear pathway.

RARA is another shared genetic association

Core observations

- RARA encodes retinoic acid receptor α .
- RARA mutations with both fibroadenoma and phyllodes tumor.
- RARA participates in transcriptional regulation.
- A shared finding supports biological relatedness, not identical clinical behavior.

Additional mutations are more common in phyllodes

Gene	Meaning stated by Robbins
TERT	Encodes telomerase
TP53	Listed among additional mutated genes
RB	Listed among additional mutated genes
Important boundary	Mutations alone do not provide a grading rule here

Shared genetics does not erase morphologic distinctions

Shared

- MED12 and RARA associations
- Stromal origin
- Biphasic epithelial–stromal composition

Distinctive for phyllodes

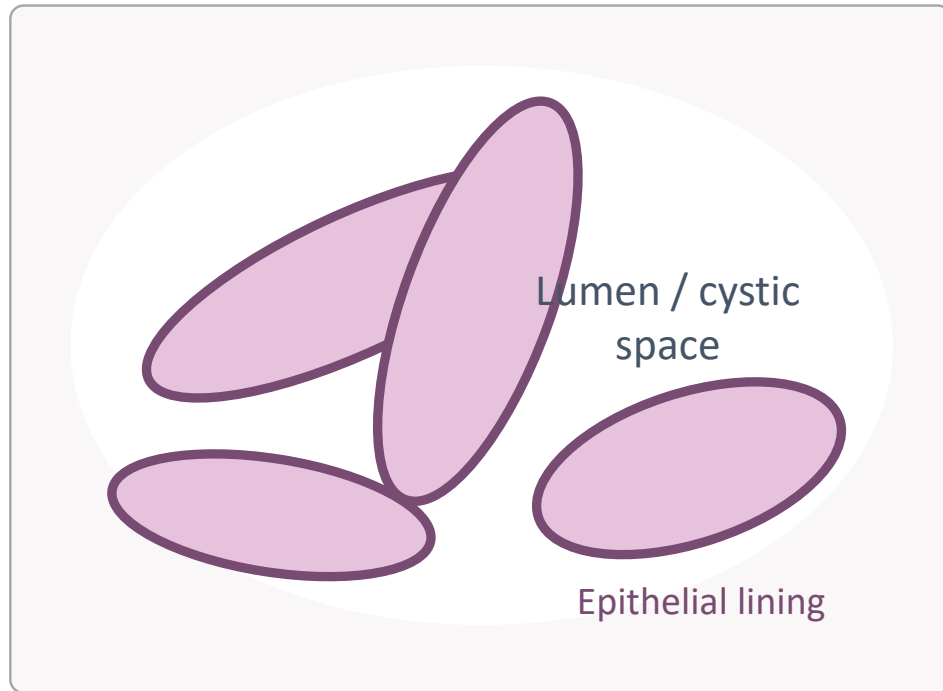
- Higher propensity for additional gene mutations
- Greater stromal cellularity and proliferation
- Potential for infiltrative and metastatic behavior

Gross lesions may contain bulbous protrusions

Core observations

- The protrusions reflect nodules of proliferating stroma.
- An epithelial covering remains over the stromal projections.
- Large lesions may have an exaggerated lobulated or clefted architecture.

Leaf-like architecture has a structural explanation



Proliferating stromal core

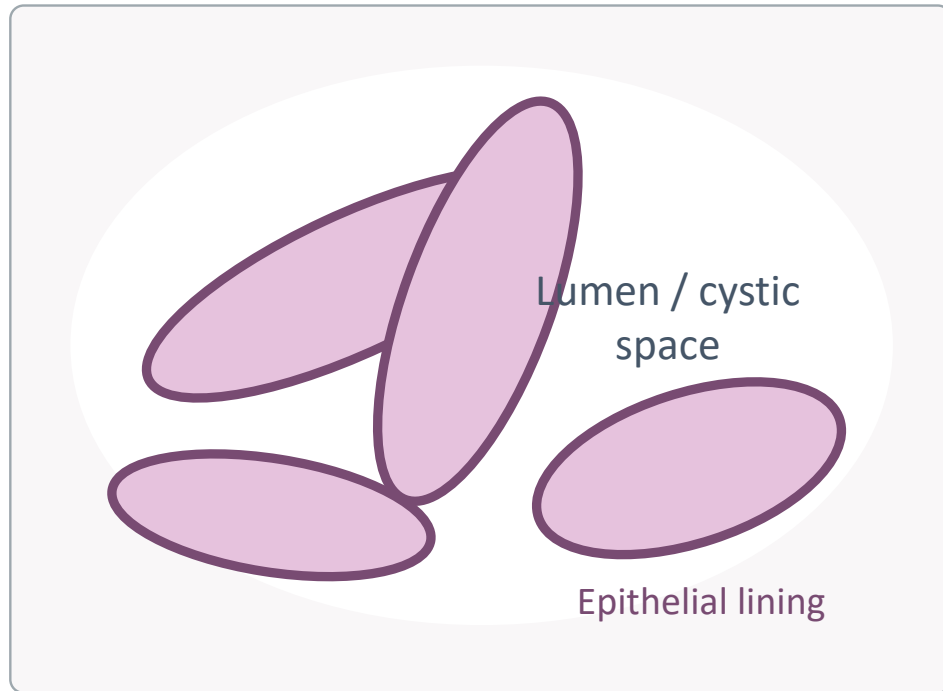
Stromal frond

Epithelial covering

Cleft / luminal space

Original schematic — not a histologic specimen

Epithelial-lined clefts create the leaf-like pattern



Proliferating stromal core

Stroma pushes toward an open space

A thin epithelial lining remains

Repeated projections generate “leaf-like”
contour

Fronds may extend into cystic spaces

Architecture

- Bulbous stromal nodules
- Epithelium covers projecting fronds
- Projections may enter a cystic lumen

Interpretation

- Describes spatial growth pattern
- Does not by itself determine whether a tumor is malignant

Leaf-like growth is not equivalent to malignancy

Finding: Leaf-like projections



Conclusion: Grade must be assessed separately

Comparable protrusions may occasionally occur in large fibroadenomas.

The epithelium is not the neoplastic driver

Neoplastic stromal core

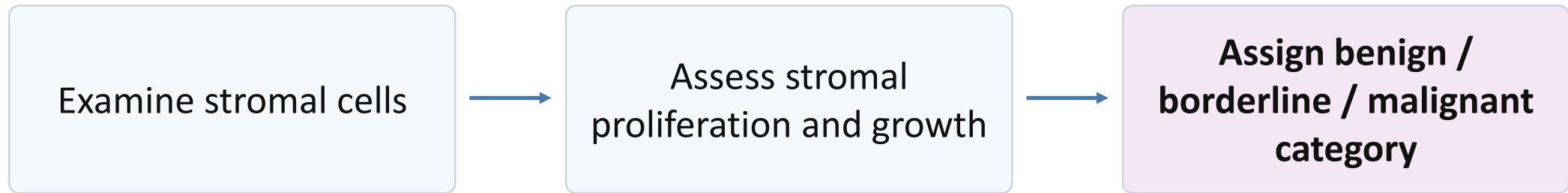
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Nonneoplastic epithelial lining

Biphasic primary tumor

Only the stromal component is neoplastic and forms metastases.

The stromal component determines grading



Biphasic architecture identifies the lesion; Stromal histology determines its class.

Three histologic classes define the spectrum

Benign

Relatively lower stromal cellularity, atypia, and mitotic activity.

Borderline

Greater stromal atypia, cellularity, and mitotic activity than benign tumors.

Malignant

Infiltrative growth; Marked stromal overgrowth can obscure the epithelium.

Classification is based on stromal histology—not the leaf-like name alone.

Benign phyllodes: Relatively modest atypia

Core observations

- May closely resemble fibroadenoma.
- Stroma is more cellular and mitotically active than typical fibroadenoma.
- Benign cytologic features do not prevent occasional local recurrence.

Borderline phyllodes: Intermediate stromal changes

Core observations

- More conspicuous stromal atypia than in benign phyllodes tumors.
- Greater stromal cellularity and mitotic activity.
- Higher risk of local recurrence than the benign category.

Malignant phyllodes: Infiltrative stromal tumor

Core observations

- A widely infiltrative growth pattern may be present.
- Marked stromal overgrowth can leave few residual epithelial structures.
- Under these conditions, distinction from sarcoma is challenging.

Stromal cellularity is a discriminating feature

Pattern	Relative stromal cellularity
Fibroadenoma	Delicate stroma in common patterns
Benign phyllodes	More cellular than fibroadenoma
Borderline phyllodes	More prominent than benign phyllodes
Malignant phyllodes	Assess alongside infiltration and overgrowth

Stromal atypia informs the grading continuum

Benign profile: Less prominent atypia



Borderline: More conspicuous atypia

Atypia must be integrated with other stromal features; Robbins does not give numerical nuclear-atypia cutoffs in this section.

Mitotic activity is evaluated in the stroma

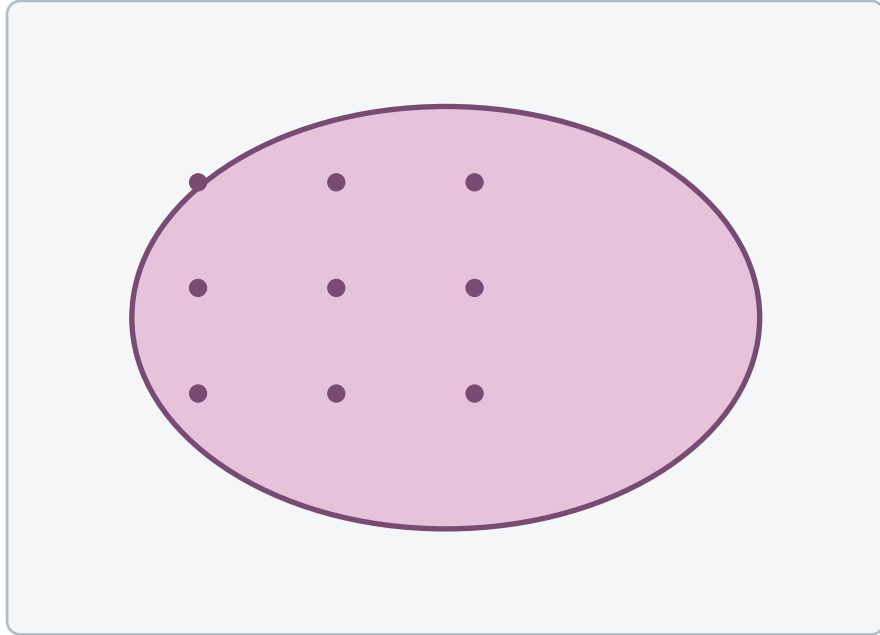
Benign: Increased over fibroadenoma



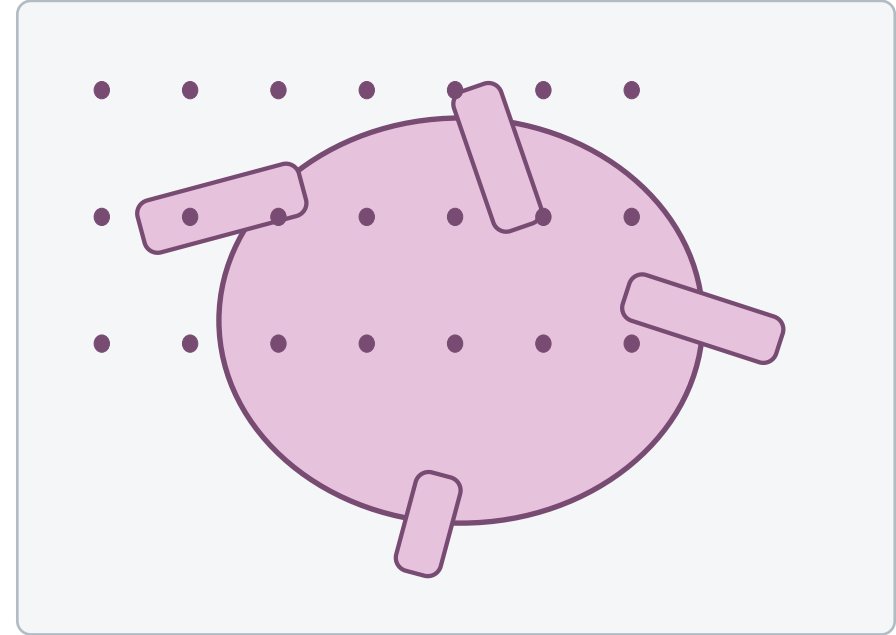
**Borderline: More mitotic activity
than benign**

This passage describes relative activity; It does not specify exact mitoses-per-area grading thresholds.

Border infiltration is a malignant feature



Circumscribed example



Infiltrative interface: Schematic

Stromal overgrowth can obscure biphasic structure

Preserved biphasic pattern

- Numerous epithelial-lined clefts
- Stromal component remains recognizable

Marked stromal overgrowth

- Few remaining epithelial profiles
- Resembles a spindle-cell sarcoma

Grade is a synthesis of multiple features

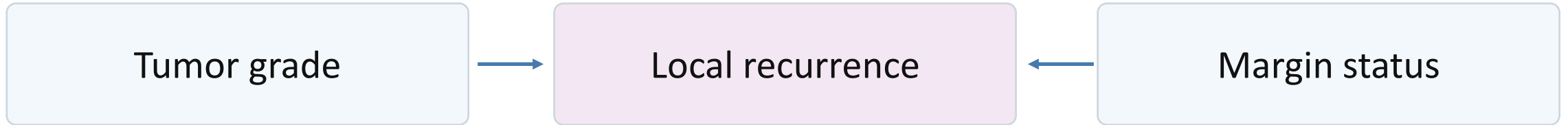
Feature	Benign	Borderline	Malignant
Cellularity	Mild relative increase	More conspicuous	Evaluate with full pattern
Atypia	Less prominent	More prominent	May be marked
Mitotic activity	Exceeds typical FA	Increased	May be conspicuous

A characteristic shape cannot replace grading

Core observations

- Architectural recognition identifies a phyllodes-like fibroepithelial tumor.
- Cellular atypia, stromal cellularity, mitoses, and tumor border complete the assessment.
- A large or leaf-like tumor need not be malignant.

Surgical margin status has prognostic relevance



Margin status as the most important predictor of local recurrence after excision.

Fibroadenoma: A useful benign baseline

Growth and border

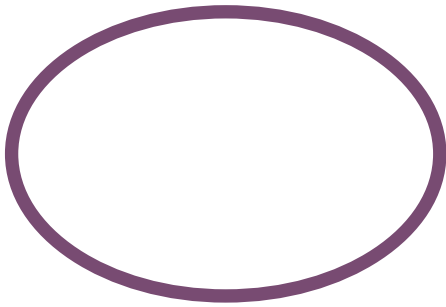
- Usually well-circumscribed gray-white nodule
- Delicate, sometimes myxoid stroma
- Patent ducts or compressed clefts

Clinical pattern

- Peak presentation in 20s–30s
- Often multiple or bilateral
- Hormonal responsiveness

Pericanalicular and intracanalicular patterns

Pericanalicular



Stroma around patent ducts

Intracanalicular



Stroma compresses ducts into clefts

Phyllodes versus fibroadenoma

Dimension	Fibroadenoma	Phyllodes tumor
Stroma of origin	Intralobular	Intralobular
Epithelial component	Nonneoplastic	Nonneoplastic
Stromal cellularity	Usually delicate	Often more cellular
Mitotic activity	Generally less prominent	Greater in benign PT than FA
Typical age	20s–30s	Sixth decade
Behavior	Benign	Benign to malignant spectrum

Why an intracanalicular pattern can mislead

Core observations

- Fibroadenoma can compress ducts into cleft-like spaces.
- Phyllodes tumors can display pronounced epithelial-lined leaf-like clefts.
- An isolated cleft is insufficient: Examine the associated stromal features.

Sarcoma enters the differential in high-grade lesions

Typical phyllodes

- Biphasic epithelial–stromal tissue
- May preserve epithelial-lined clefts
- Stromal component drives biologic behavior

Sarcoma-like phyllodes

- Marked stromal overgrowth
- Few residual epithelial elements
- A difficult differential with sarcoma

Interlobular stromal tumors form a separate group

Core observations

- Interlobular tumors lack the accompanying epithelial component.
- They include benign mesenchymal lesions and uncommon malignant tumors.
- The origin and composition differ from biphasic phyllodes tumor.

Fibromatosis differs in composition and behavior

Feature	Phyllodes tumor	Breast fibromatosis
Origin	Intralobular stroma	Interlobular stromal lesion
Epithelial component	Present in primary lesion	Absent in tumor
Growth	Variable, may infiltrate	Irregular, infiltrating
Metastasis	Possible in malignant PT	Does not metastasize

Angiosarcoma is not malignant phyllodes

Phyllodes tumor

- Intralobular stromal origin
- Biphasic primary tumor
- Malignant variant spreads hematogenously

Angiosarcoma

- An interlobular stromal malignancy
- Vascular malignant neoplasm
- May be sporadic or therapy-associated

The benign category predominates

Up to 75%

Have benign cytologic features (Robbins wording)

- These lesions may recur locally.
- Benign phyllodes tumors do not metastasize in the source description.

Benign tumors can still recur locally

Benign histologic features



Possible local recurrence

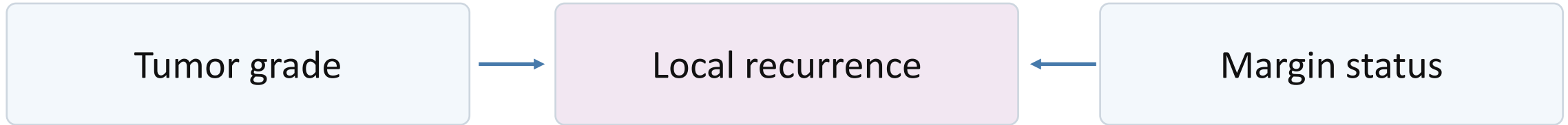
“Benign” here does not mean that complete local excision is clinically irrelevant.

Borderline and malignant tumors recur more often

Core observations

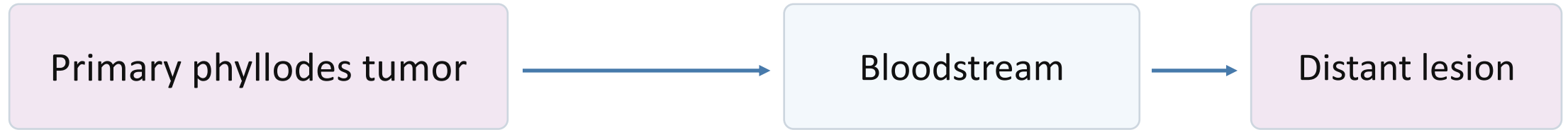
- Local recurrence increases relative to benign phyllodes tumor.
- Tumor grade is relevant, but margin status is the strongest predictor specified.
- Avoid conflating local recurrence with distant metastasis.

Margin status predicts recurrence after excision



Margin status as the most important predictor of local recurrence after excision.

Distant spread is hematogenous



Metastases contain the neoplastic stroma—not the nonneoplastic breast epithelium.

Malignant phyllodes can metastasize

$\approx 1/3$

Of uncommon malignant lesions develop distant hematogenous metastases

- This statement refers to malignant phyllodes tumors—not all phyllodes tumors.
- Robbins does not specify a time horizon in the supplied passage.

Metastatic lesions contain only tumor stroma

Primary lesion

- Neoplastic stroma
- Nonneoplastic epithelial covering
- Classically biphasic

Metastatic deposit

- Neoplastic stromal component only
- Epithelial component is absent in metastases

Lymphatic dissemination is rare at every grade

Core observations

- Lymphatic spread as rare regardless of grade.
- This is mechanistically distinct from hematogenous dissemination.
- Do not assume the axillary nodal pathway of ordinary breast carcinoma.

Routine axillary dissection is contraindicated

Rare lymphatic spread



**Do not perform routine axillary
lymph node dissection**

This point is explicitly stated for phyllodes tumors regardless of grade.

Clinicopathologic behavior by class

Class	Local recurrence	Distant metastasis
Benign	Occasional	Not described
Borderline	Higher than benign	Not quantified in this passage
Malignant	Higher than benign	Hematogenous; Approximately one-third

Case: A new mass in later adulthood

Teaching vignette (illustrative, not a real patient)

A woman in her sixth decade presents with a palpable breast mass. Why should phyllodes tumor be included among fibroepithelial possibilities?

Reasoning focus

- Age modifies the differential.
- The palpable finding alone cannot establish histologic grade.

Case: Leaf-like fronds with bland stroma

Teaching vignette (illustrative, not a real patient)

**An excision shows epithelial-lined leaf-like projections and relatively bland stroma.
Does the architecture prove malignancy?**

Reasoning focus

- Identify the biphasic architecture.
- Grade depends on stromal characteristics.

Case: Increasing stromal atypia and mitoses

Teaching vignette (illustrative, not a real patient)

A fibroepithelial tumor has greater stromal cellularity, atypia and mitotic activity than a benign phyllodes tumor. Which category is suggested?

Reasoning focus

- Relative stromal findings point toward borderline disease.
- A single feature is not a complete grading algorithm.

Case: Infiltrative spindle-cell overgrowth

Teaching vignette (illustrative, not a real patient)

A breast mass shows widely infiltrative stromal growth and very few epithelial elements. What diagnostic pitfall emerges?

Reasoning focus

- Search for remaining epithelial structures.
- Use the full morphologic and clinical context.

Case: Local recurrence after excision

Teaching vignette (illustrative, not a real patient)

A borderline phyllodes tumor recurs at the excision site. Which reported pathologic factor most strongly predicts this event?

Reasoning focus

- Local recurrence and distant spread are separate endpoints.
- Record margin status accurately.

Case: Stromal metastasis without epithelium

Teaching vignette (illustrative, not a real patient)

A distant lesion from a malignant phyllodes tumor contains only spindle-cell stroma. Is absence of epithelium unexpected?

Reasoning focus

- Primary tumor is biphasic.
- Metastatic component is stromal only.

Case: Considering an axillary dissection

Teaching vignette (illustrative, not a real patient)

A phyllodes tumor is classified as malignant. Does the grade alone justify routine axillary node dissection?

Reasoning focus

- Hematogenous spread is the clinically relevant distant route.
- Do not use carcinoma-style nodal assumptions.

Integrated diagnostic reasoning

Fibroepithelial breast lesion



Identify stromal + epithelial components



Evaluate stromal atypia, cellularity, mitoses, border, overgrowth



Grade → local recurrence / metastatic risk / clinical decisions

Essential morphologic discriminators

Morphologic criteria, interpreted together

- Biphasic lesion with neoplastic stromal component.
- Leaf-like stromal fronds covered by nonneoplastic epithelium.
- Increasing stromal cellularity, atypia and mitoses refine grade.
- Infiltrative borders and stromal overgrowth favor malignancy.

Essential clinical discriminators

Behavior follows the stromal tumor grade

- Typical presentation in the sixth decade.
- Benign lesions may recur but do not metastasize' account.
- Margin status strongly predicts local recurrence after excision.
- Lymphatic spread is rare; Malignant distant spread is hematogenous.

References and source boundaries

Primary text

- Robbins, Cotran & Kumar. Pathologic Basis of Disease. 11th edition, 2026.
- Section: Stromal Tumors — Phyllodes Tumor.
- Phyllodes Tumor; Morphology; Clinical Features; Fig. 23.25 caption.

This lecture uses source-based relative grading descriptions; numerical WHO cutoffs were not introduced.