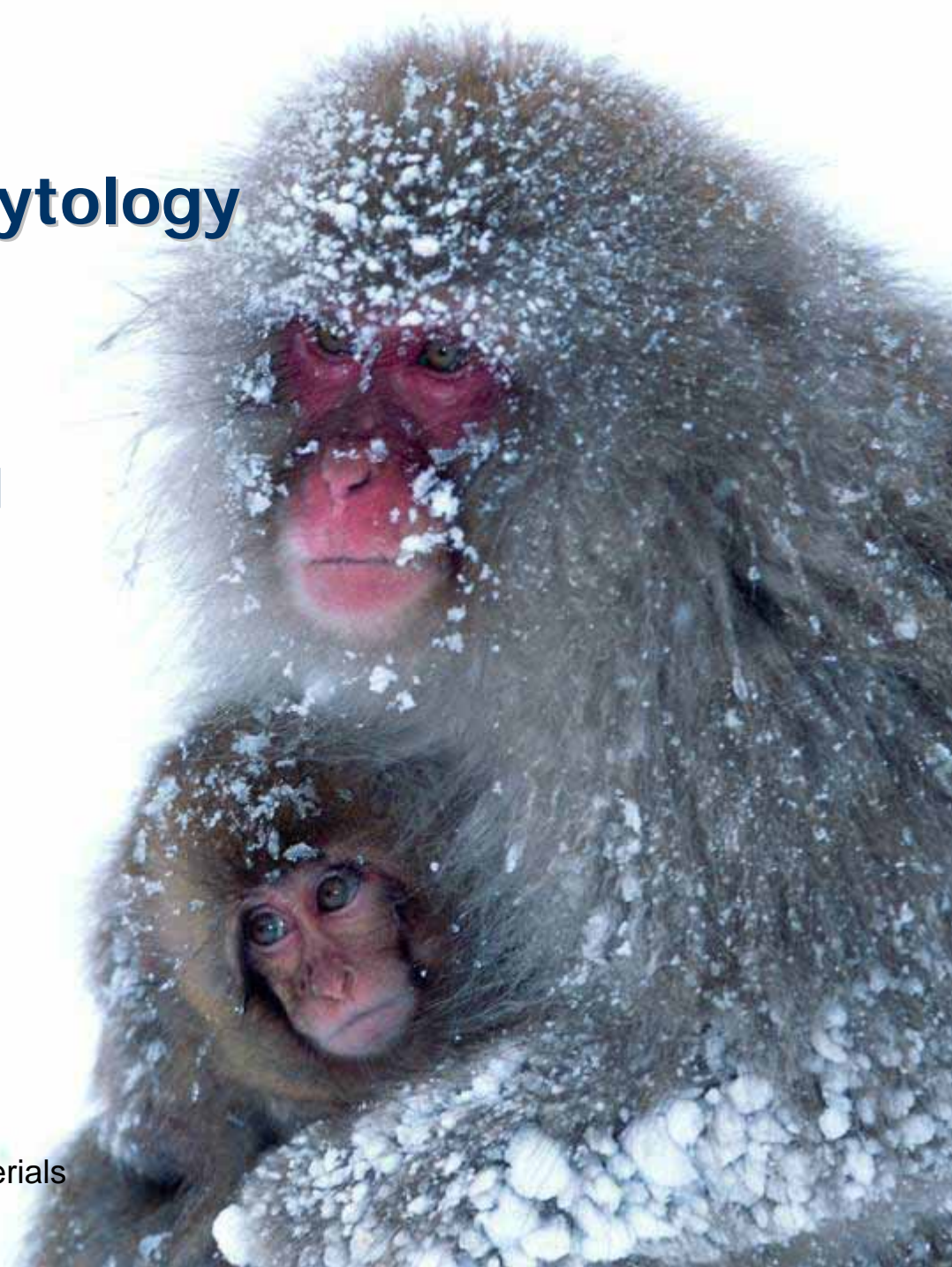


VM100 Aspiration Cytology of the Thyroid

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Slide evaluation

- History
 - Number and types of nodules, age, Rad
- Low Power
 - Cellularity: arrangement of cells, heterogeneity
 - Background: colloid, cystic change
- High Power
 - Types of cells: Follicular, PTC, other epithelial
 - Background cells: lymphs, PC, giant cells

Diagnostic Terminology

Mayo

- Non Diagnostic
 - Cyst/Acellular
- Negative
 - HASH, BTN
- Suspicious
 - FN/HN/PTC/Other
- Positive
 - PTC/Medullary/Anaplastic/Other

Pap Society

- Non Diagnostic
 - Cyst/Acellular
- Negative
 - HASH, BTN
- Indeterminate
 - Cellular Follicular Lesions
- Suspicious
 - FN/HN/PTC/Other
- Positive
 - PTC/Medullary/Anaplastic/Other

Diagnostic Categories

NON-DIAGNOSTIC

- Minimum of 6 fragments of well preserved epithelium on two slides
- Smears with fewer cells should be interpreted with extreme caution
- A descriptive diagnosis with comment on cellularity is indicated

Diagnostic Categories

NEGATIVE

- Thyroiditis
- Benign Thyroid Nodule
 - Benign Cysts
 - Colloid Nodule
 - Nodular Goiter

Diagnostic Categories

SUSPICIOUS

- Cellular follicular lesions
- Follicular neoplasia
- Hürthle cell lesions
- Preparations which are suggestive but not diagnostic for other malignancies

Diagnostic Categories

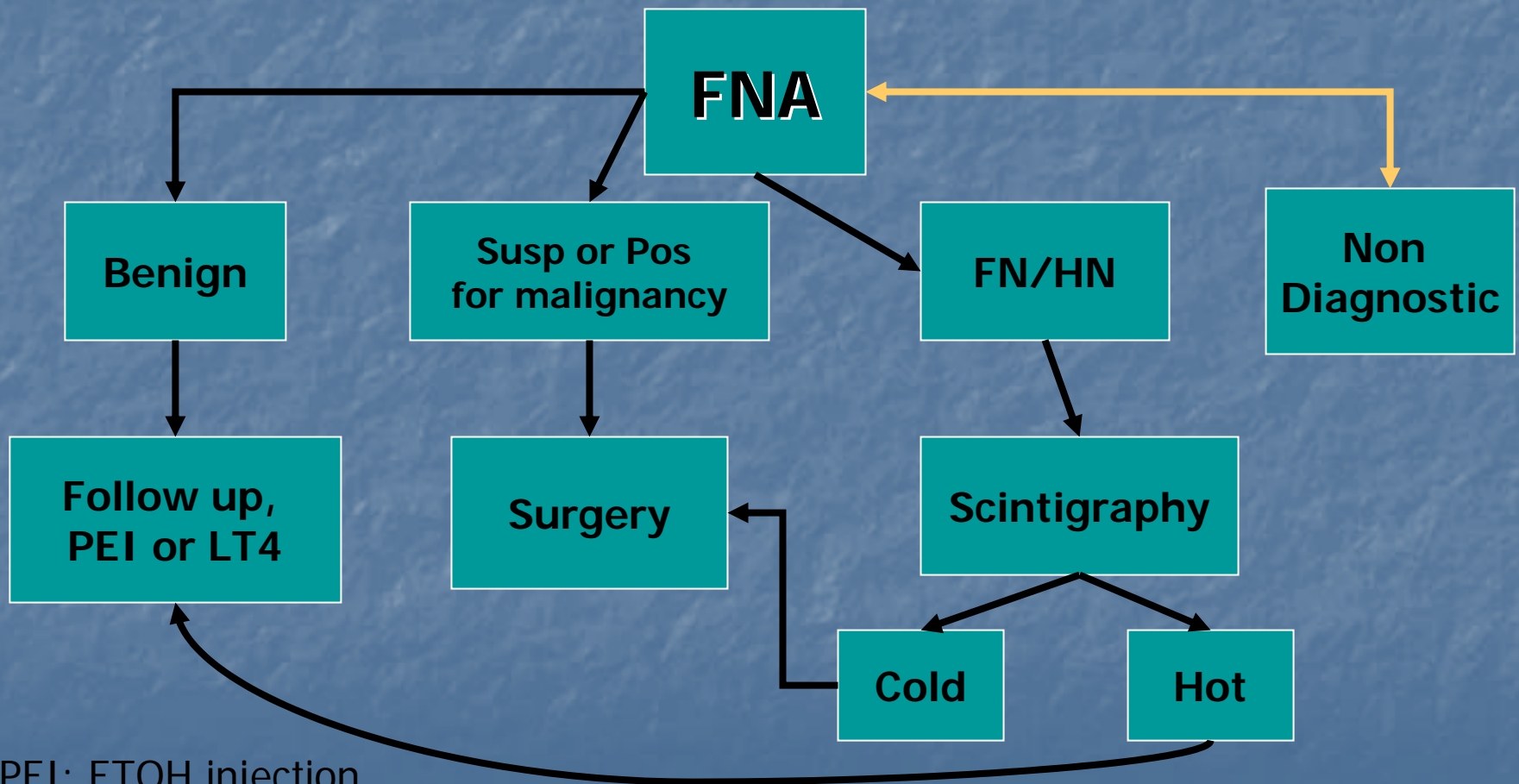
POSITIVE FOR MALIGNANCY

- Includes any preparation where an unequivocal diagnosis of malignancy can be made
- Should be as specific as possible

NIH Thyroid Consensus Conference

- Oct 22-23: Bethesda MD
- Similar to TBS conference with web based comment periods
- <http://thyroidfna.cancer.gov/forums/default.aspx>

American Association of Clinical Endocrinologists: Medical Guidelines for Diagnosis and Management of Thyroid Nodules: Endocr Pract. 2006;12(1) 63-102



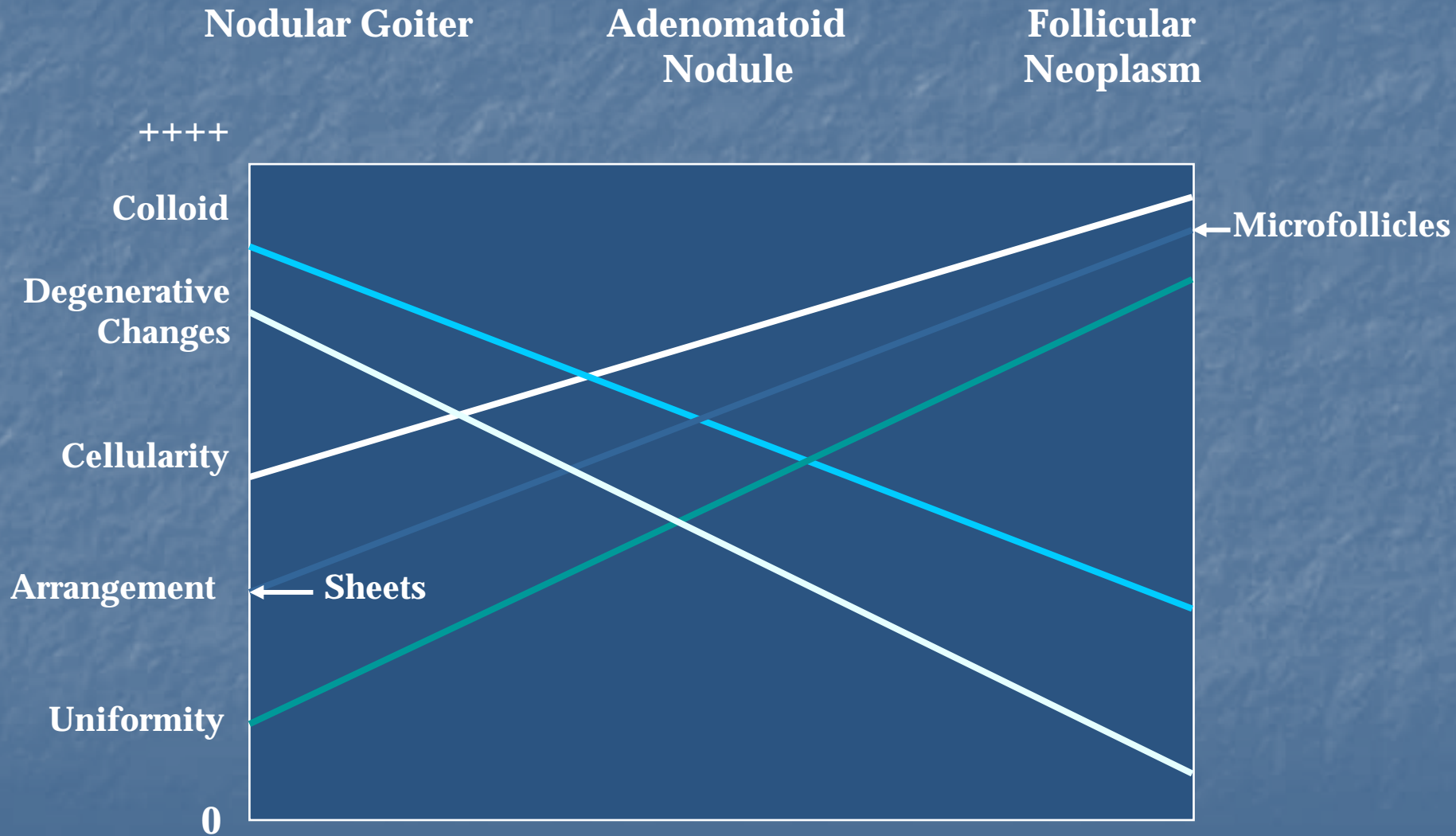
PEI: ETOH injection
LT4: Levothyroxine

Mayo Surgical Follow-up Experience

(5,722 FNAs with 1,219 surgical follow up from 2001-2005)

Cytology Diagnosis	Histology Diagnosis N(%)					
	Benign	Follicular/ Hurthle Cell Adenoma	Foll/ Hurth Ca	PTC	Other Thyroid Cancer	Non- Thyroid Cancer
Nondiagnostic	68 (55)	41 (33)	3 (2)	9 (7)	0 (0)	2 (1)
Negative	215 (70)	66 (21)	5 (2)	16 (5)	1 (0)	5 (2)
Suspicious for Follicular/Hurthle Neoplasm	55 (16)	242 (72)	18 (5)	22 (7)	0 (0)	1 (0)
Suspicious for Papillary Cancer	16 (15)	16 (14)	2 (2)	75 (68)	2 (2)	0 (0)
Suspicious for Malignancy, NOS	8 (27)	5 (17)	1 (3)	0 (0)	6 (20)	10 (33)
Positive	3 (1)	4 (1)	3 (1)	262 (85)	15 (5)	22 (8)

Differential Diagnosis in Cases with Follicular Cells



Case 1

- 45 YO male with multinodular thyroid gland
- Cystic on US

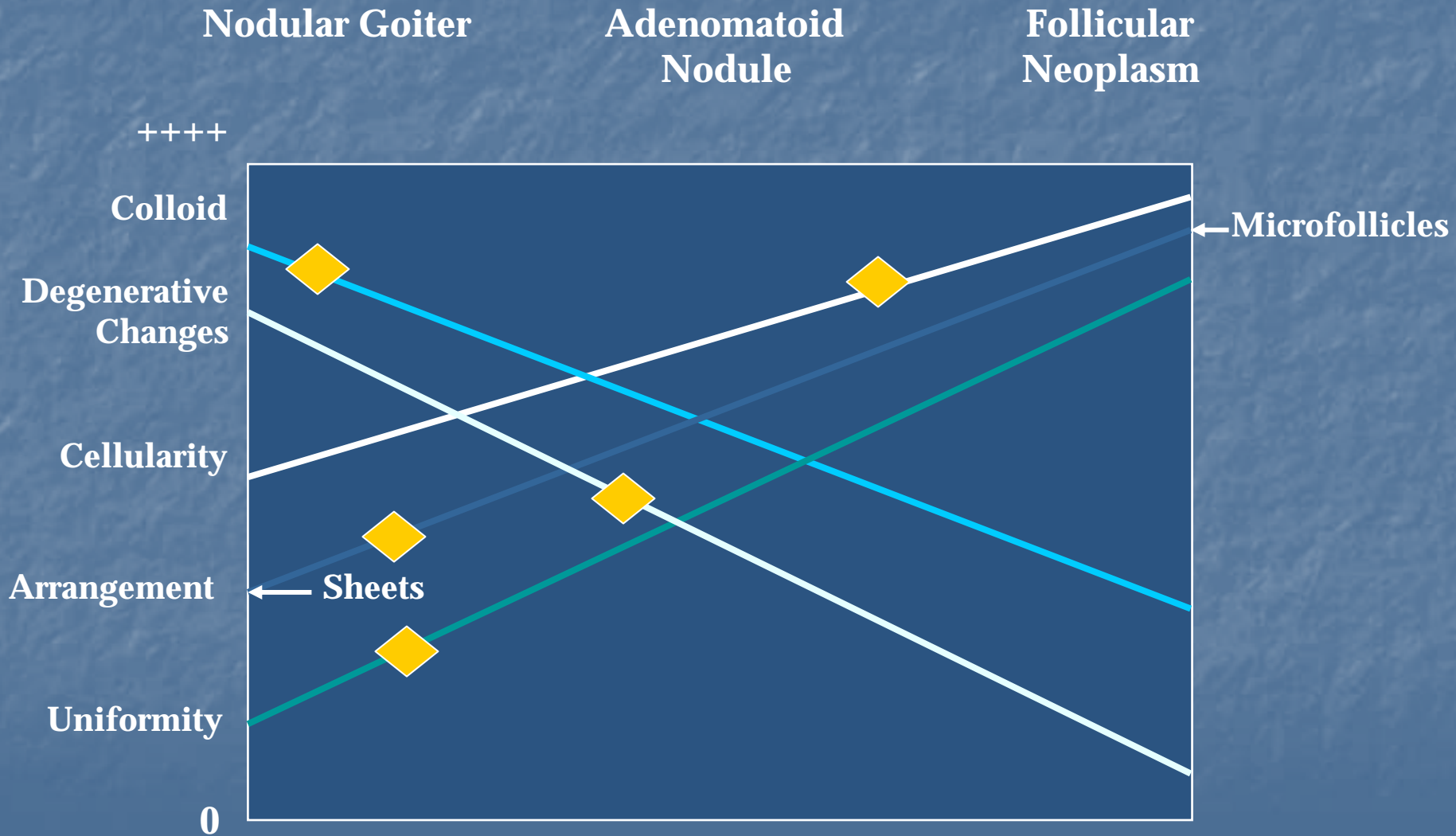
Non Diagnostic

Cyst contents with inadequate numbers of thyroid epithelial cells for evaluation

Case 2

- 55 YO female with multinodular thyroid gland
- Partially cystic on US, aspirate of cellular areas

Case 2



Negative

Benign Thyroid Nodule

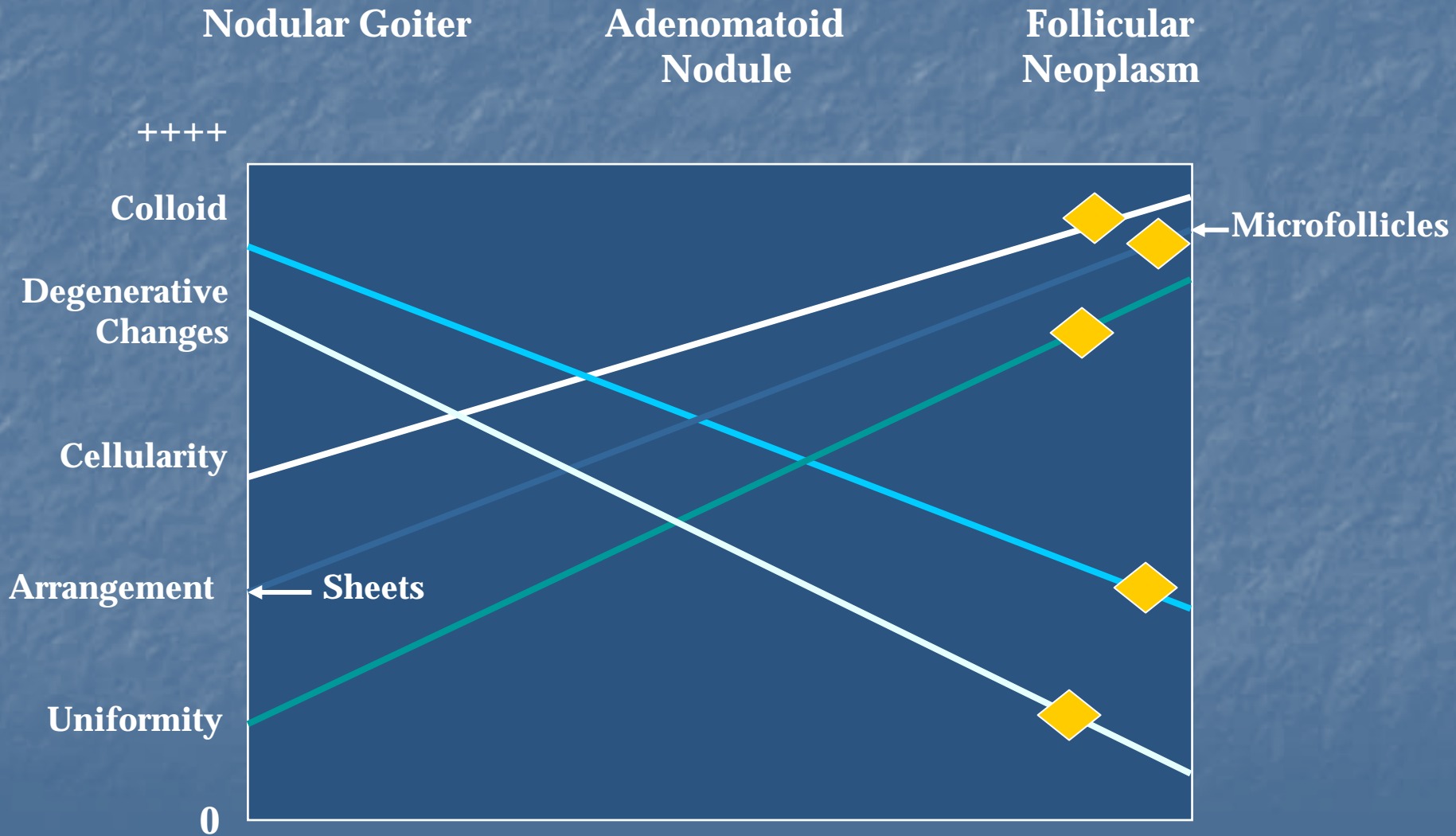
BTN

- Colloid
- Benign follicular cells in sheets, follicles and single cells
- May see Hürthle cell metaplasia
- Degenerative changes are common with histiocytes, stromal fragments, giant cells and cholesterol crystals

Case 3

- 65 YO female with single 3cm solid nodule

Case 3



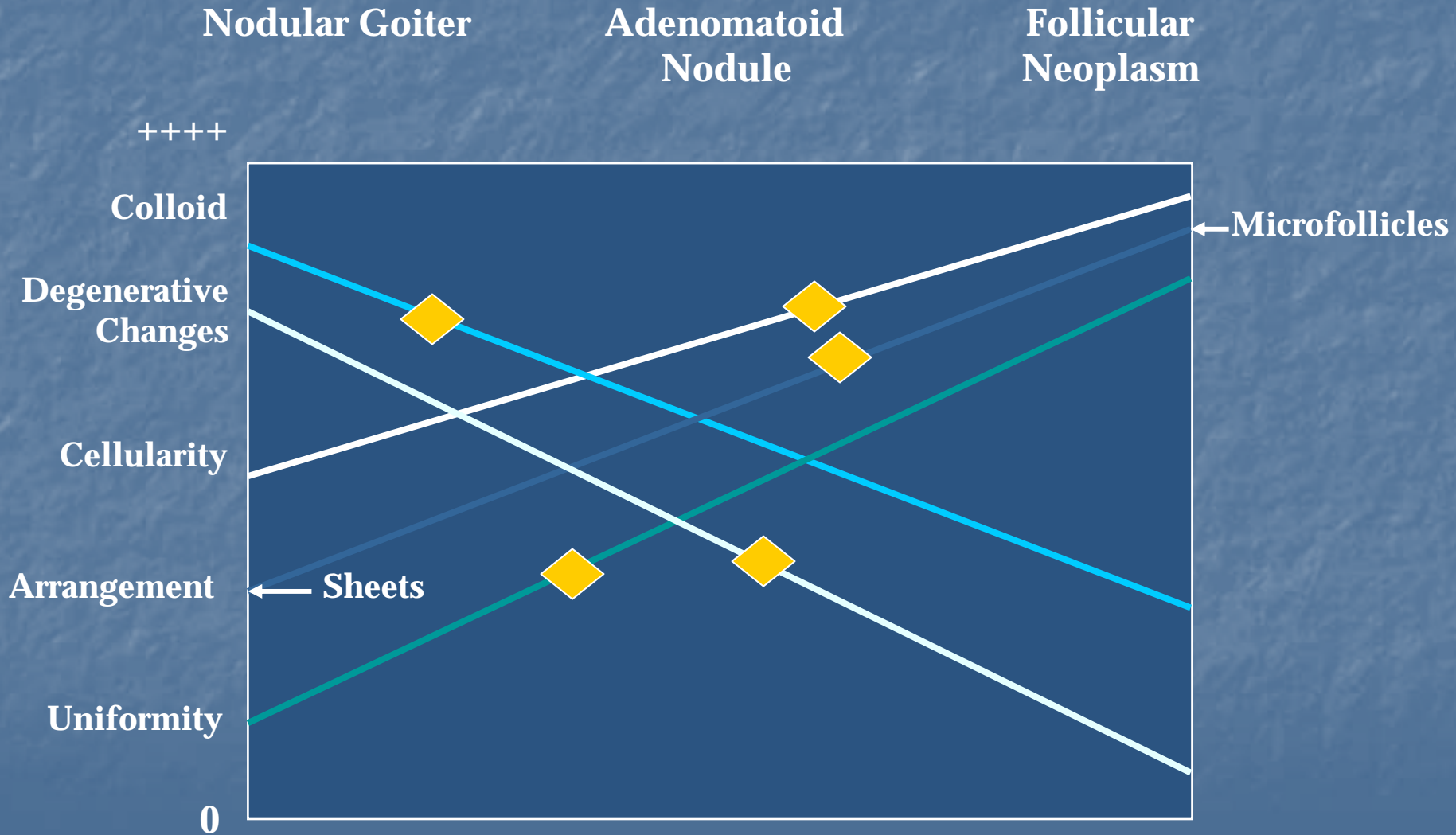
Suspicious

Suspicious for Follicular
Neoplasm

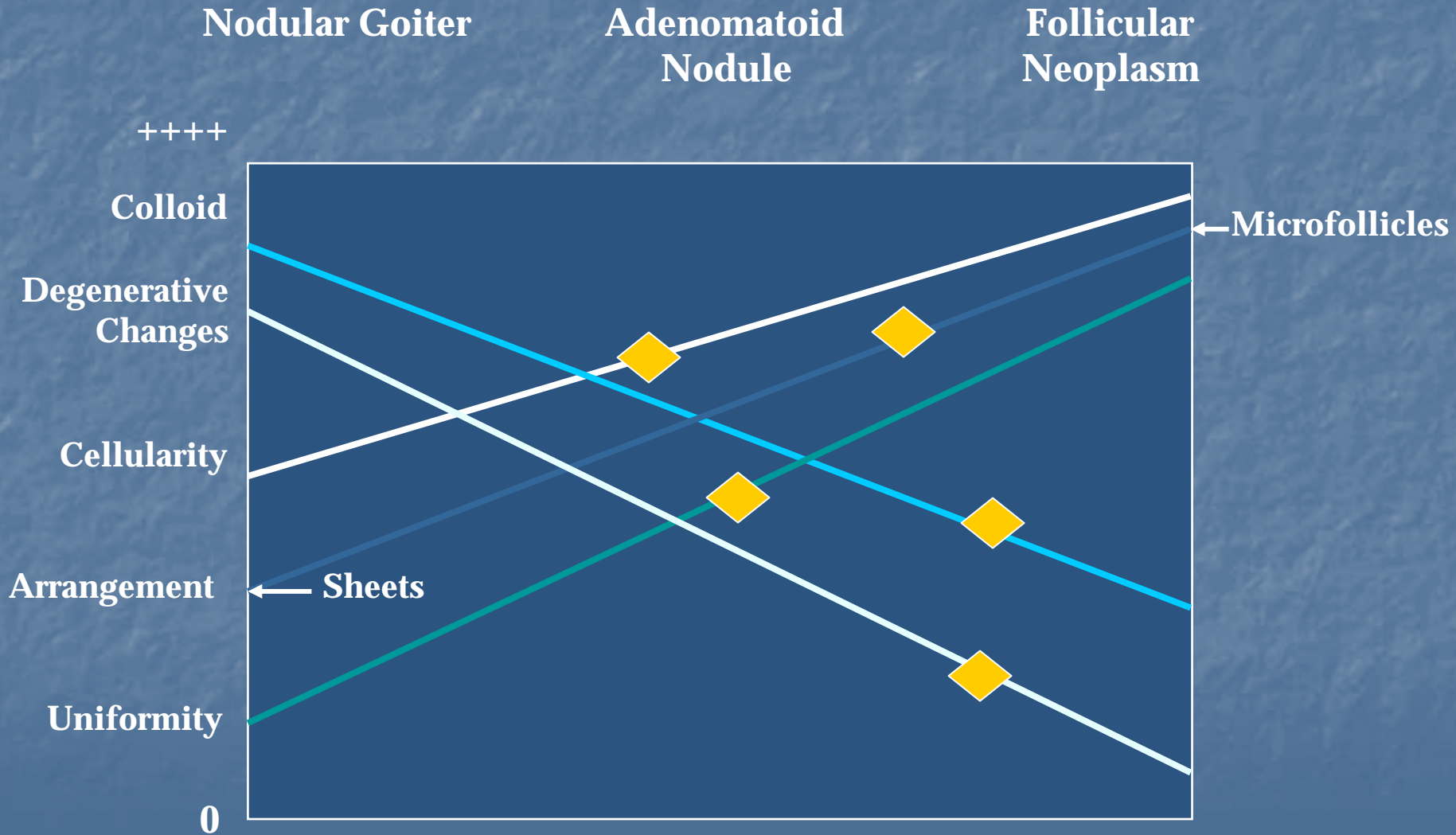
Follicular Neoplasia

- Cytologically cannot distinguish between follicular adenoma and follicular carcinoma
- The term Follicular Neoplasm encompasses both adenoma and carcinoma

Case 3A



Case 3B



Case 4

- 57 YO male with single 4 cm nodule

Suspicious

Suspicious for Hurthle Cell
Neoplasm

Hürthle Cell Neoplasm

- Monomorphic cell population with isolated cells or loosely cohesive sheets or follicles
- Abundant, granular cytoplasm
- Prominent nucleoli
- Scant to absent colloid

Case 5

- 37 YO male with 2 nodules on the right and left.
- US shows small calcifications

Positive for malignancy

Papillary Carcinoma

Papillary Carcinoma

- Cellular smears with papillary fragments and monolayered sheets
- Cells are variable in shape
- Nuclei are large with finely granular chromatin
- Nuclear membranes are wrinkled with linear grooves or multilobation (popcorn)
- Intranuclear cytoplasmic inclusions may be seen

Papillary Carcinoma

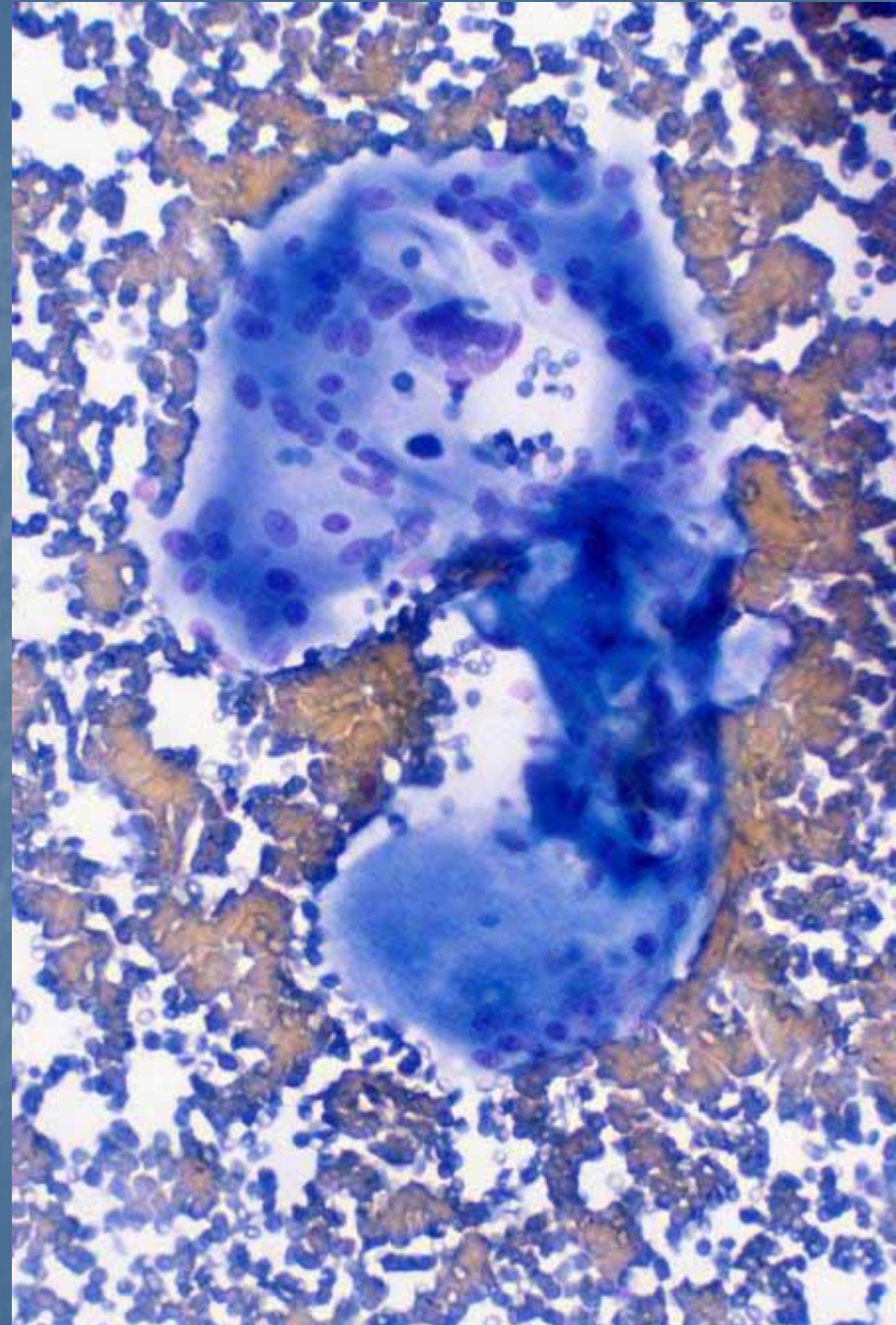
Adjunct features include:

- Psammoma bodies
- Multinucleated giant cells
- Degenerative cystic changes

Psammoma Body



Giant Cell



Case 6

- 27 YO female with single solid nodule

Positive for malignancy

Medullary Carcinoma

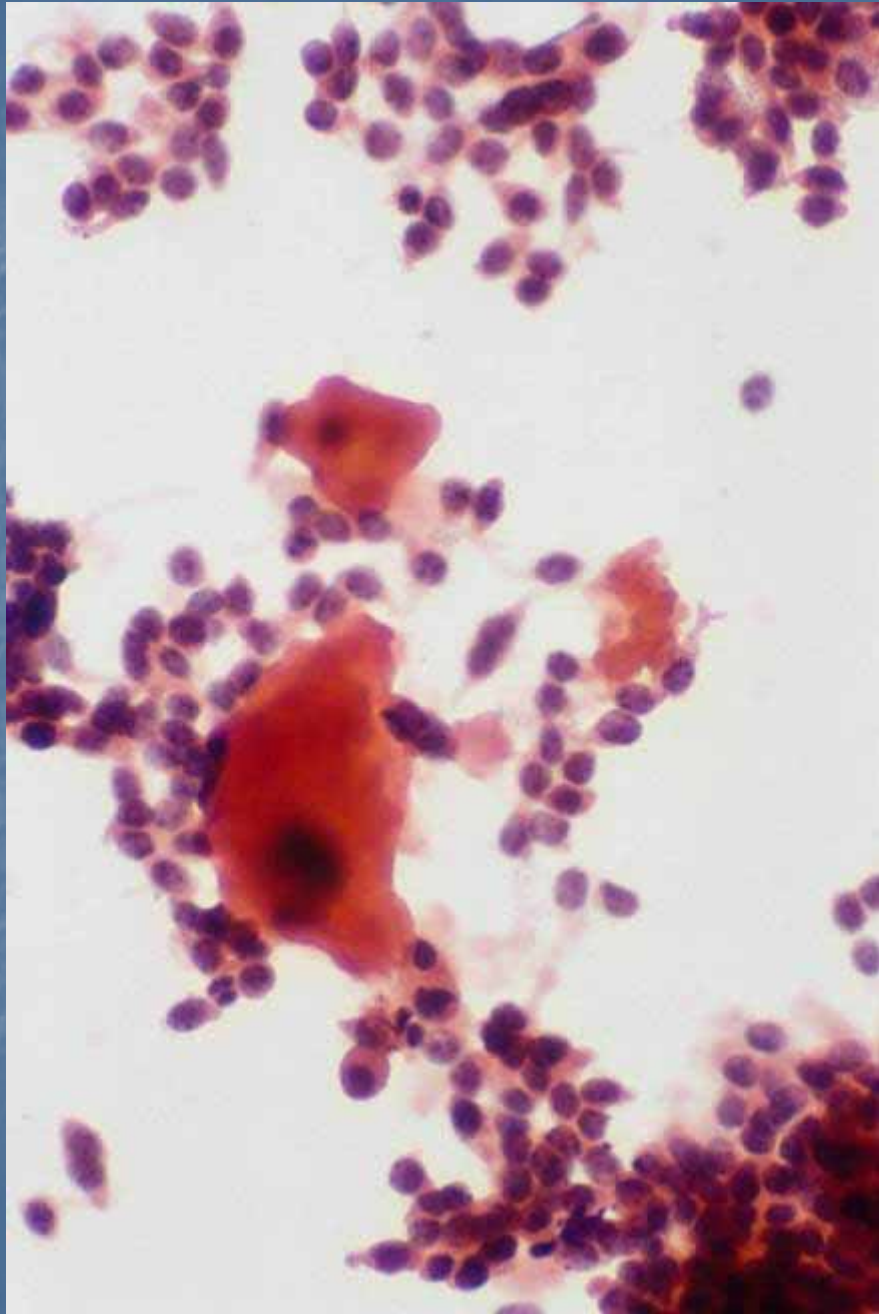
Medullary Carcinoma

- Cellular smears with numerous isolated cells and small syncytial groups
- Cells are round to spindled with eccentric nuclei
- Nuclei are variable in shape and multinucleation is common
- May have intranuclear inclusions

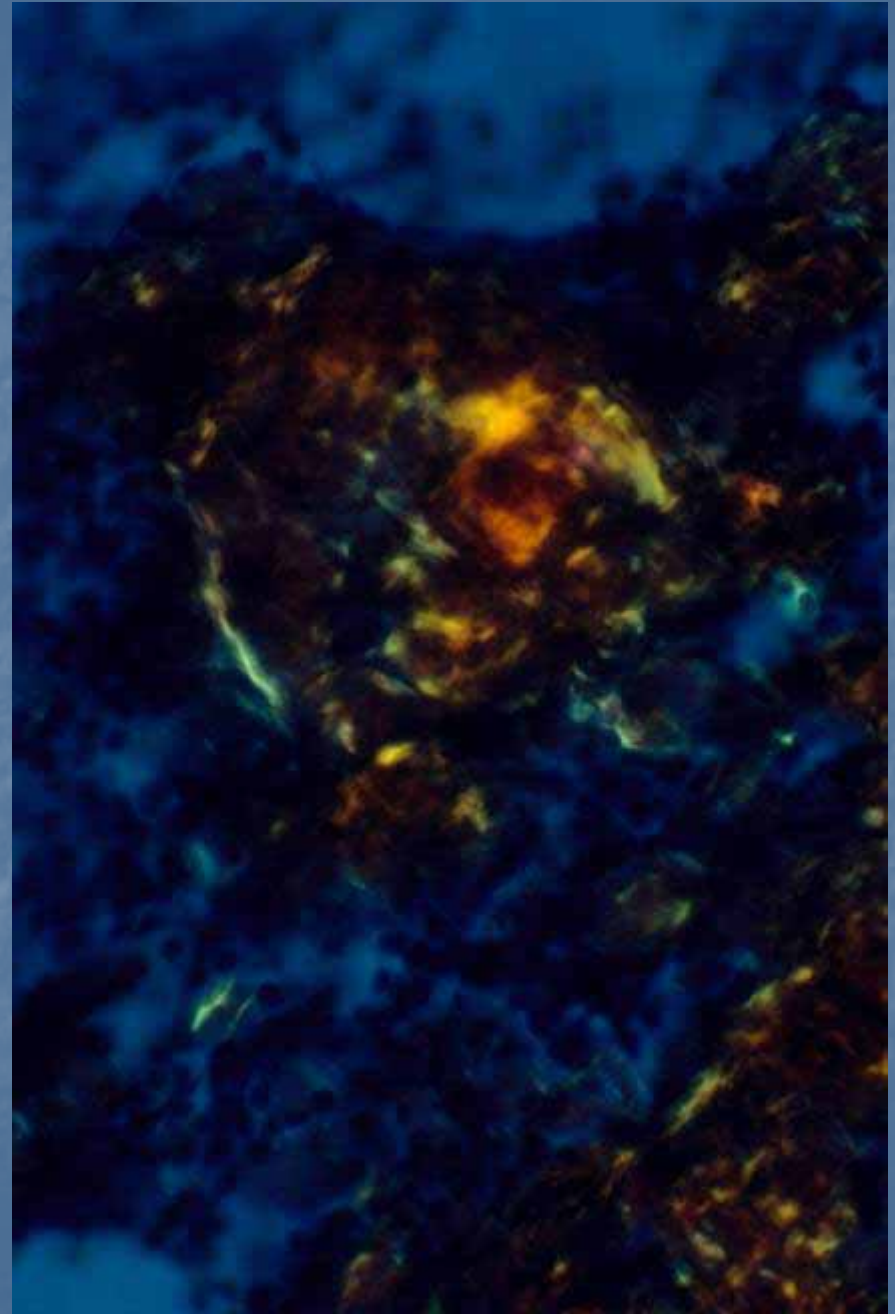
Medullary Carcinoma

- The cytoplasm is pale and variable in amount
- Cytoplasm may contain red granules in Romanowsky stained preparations
- Extracellular amyloid may be stained with Congo Red or Thioflavin T stains
- Immunocytochemical stains for calcitonin are very helpful

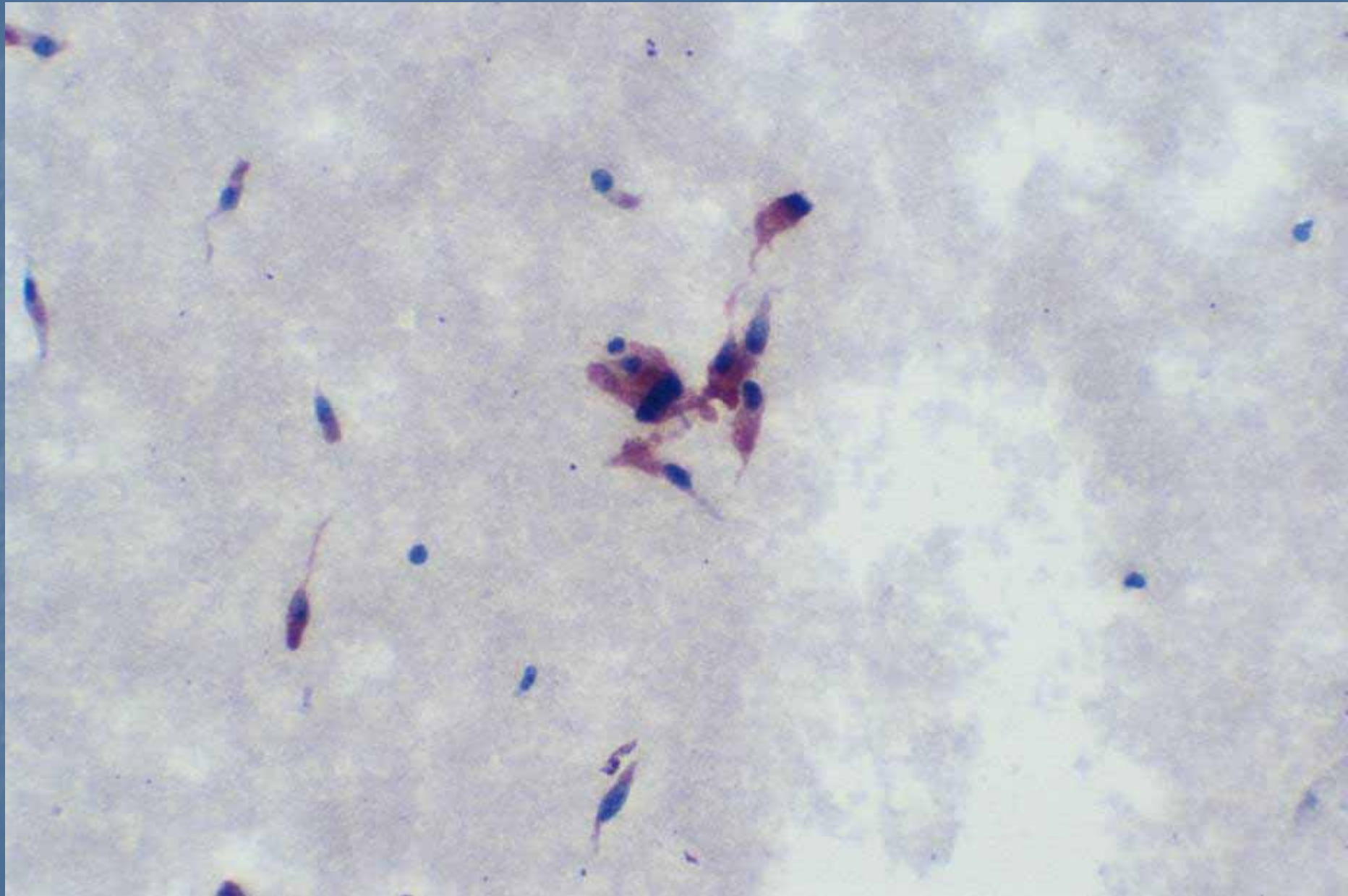
Congo Red



Apple Green Birefringence



Medullary Carcinoma: Calcitonin



Case 7

- 80 YO male with large fast growing thyroid mass

Positive for malignancy

Anaplastic Carcinoma

Anaplastic Carcinoma

- Cellularity is inversely proportional to stromal fibrosis
- Isolated cells with obviously malignant features
- May have a giant cell or spindle cell pattern
- Prominent tumor diathesis

Case 8

- 65 YO male with 2 nodules on the right and left.
- History of renal cell carcinoma

Positive for malignancy

Metastatic Renal Cell Carcinoma

Metastatic Neoplasms

- Unusual but may be the first presentation with an unknown primary
- Common sites; Kidney, Breast, Lung
- Renal cell resembles Hurthle cell changes
- Ductal carcinoma may resemble medullary or follicular neoplasms



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