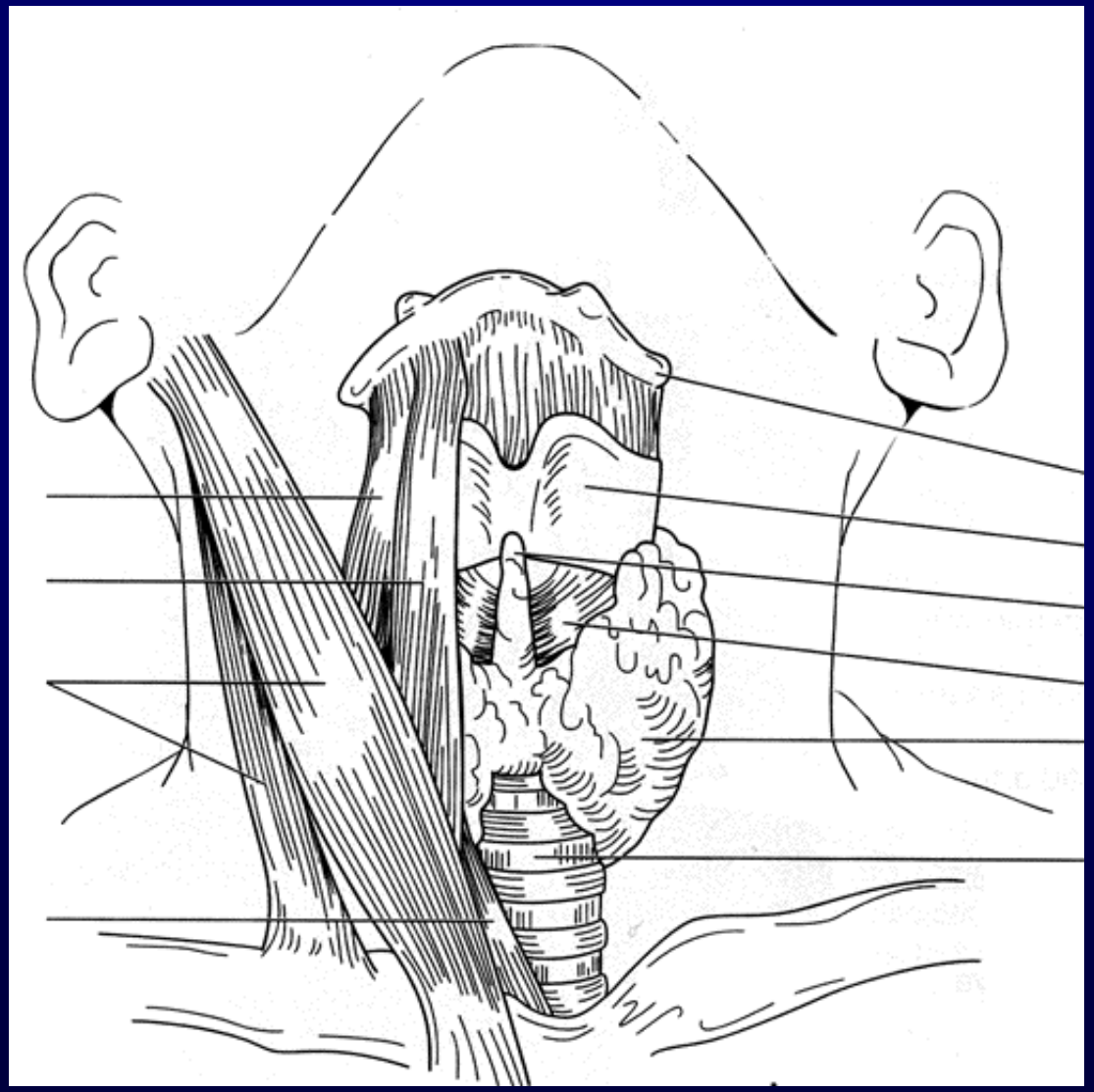
کلیات بیماریهای ندولر تیرویید

دکتر آذرهوش
دانشیار پاتولوژی دانشگاه علوم پزشکی گلستان

Location of Thyroid



Omohyoid Muscle
Sternohyoid Muscle

Sternocleidomastoid Muscle

Sternothyroid Muscle

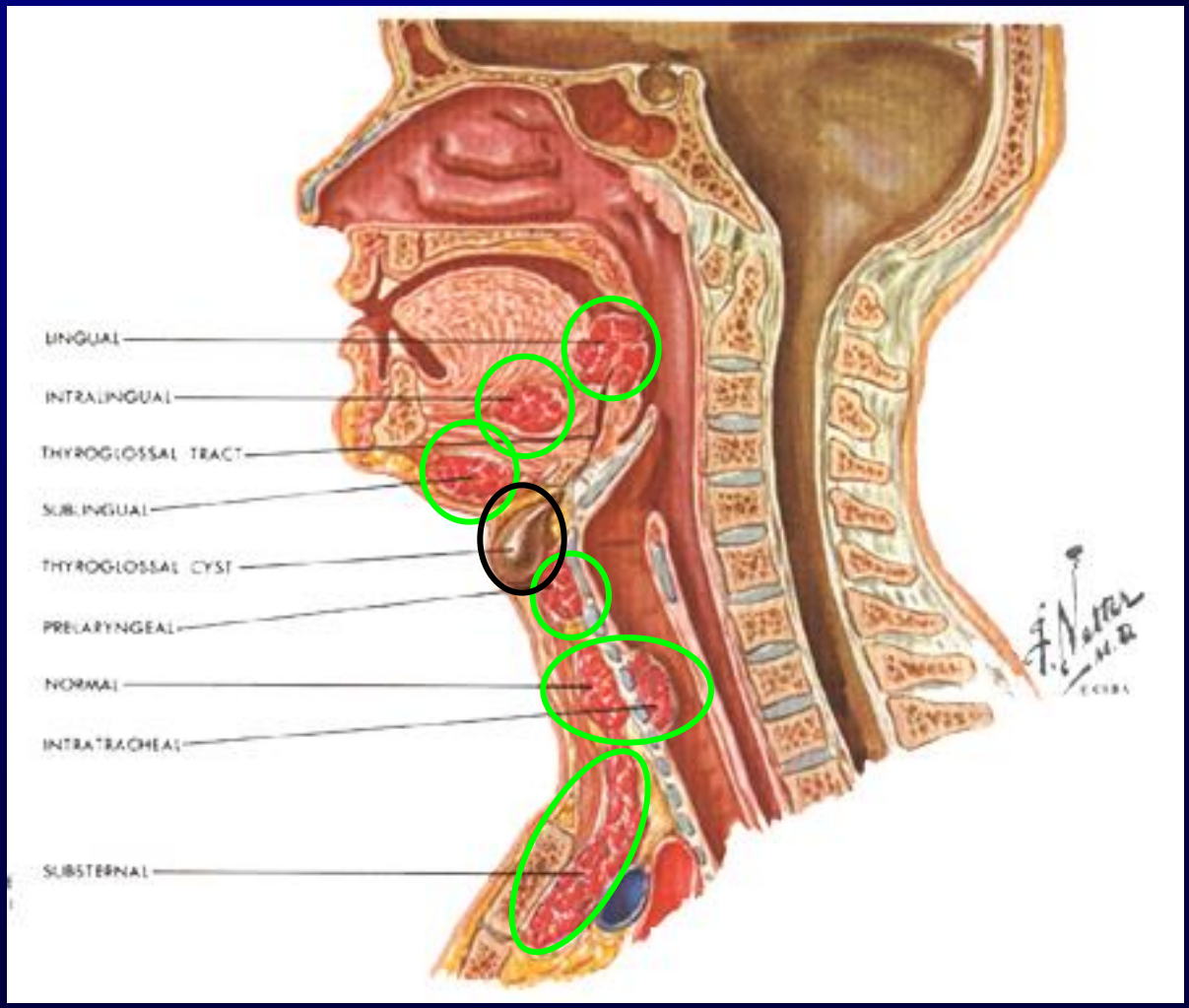
Hyoid Bone
Thyroid Cartilage
Pyramidal Lobe
Cricothyroid Muscle
Thyroid Gland

Trachea

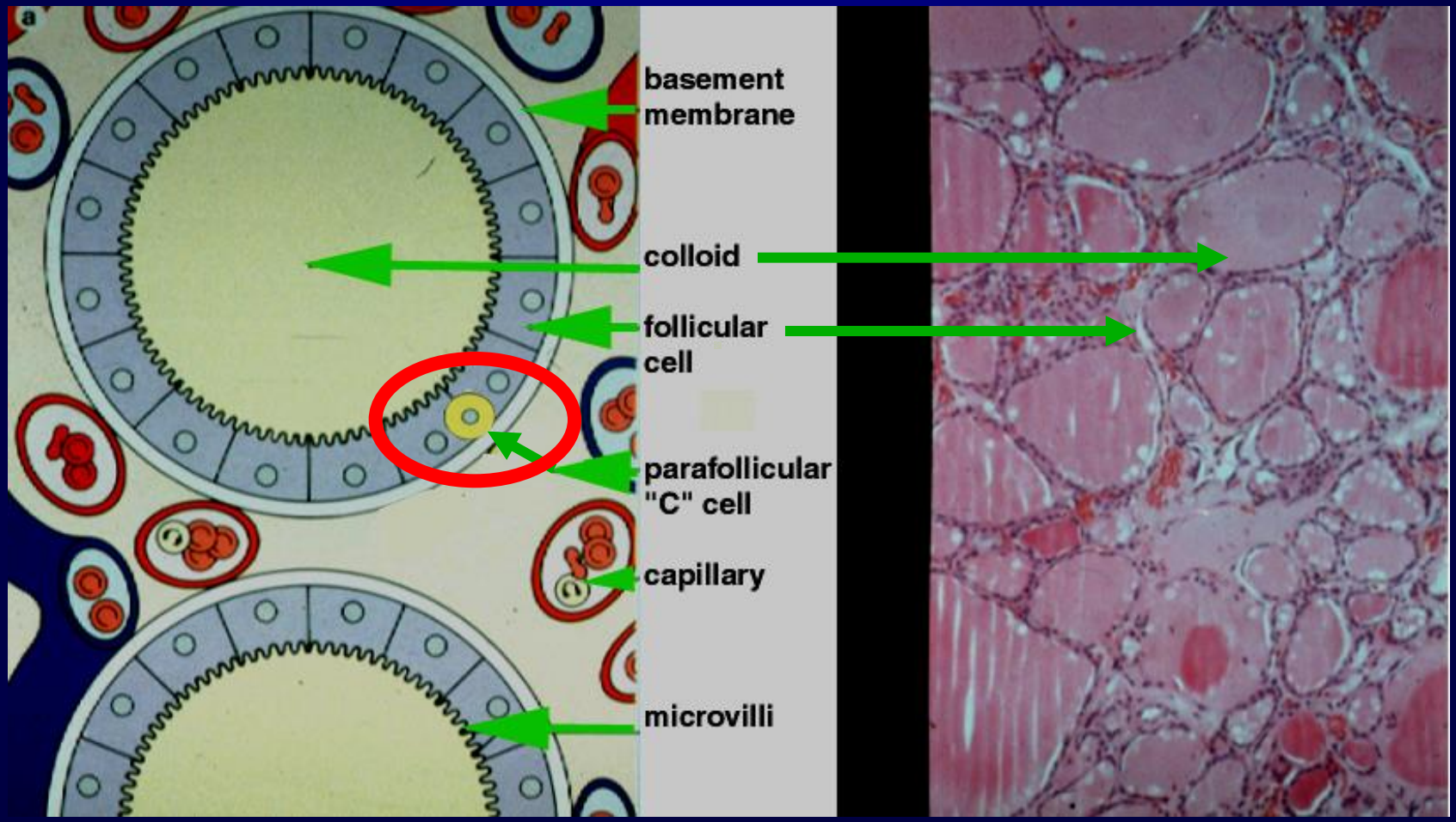
Normal and Ectopic Thyroid Locations

- Descends to cervical neck from back of tongue

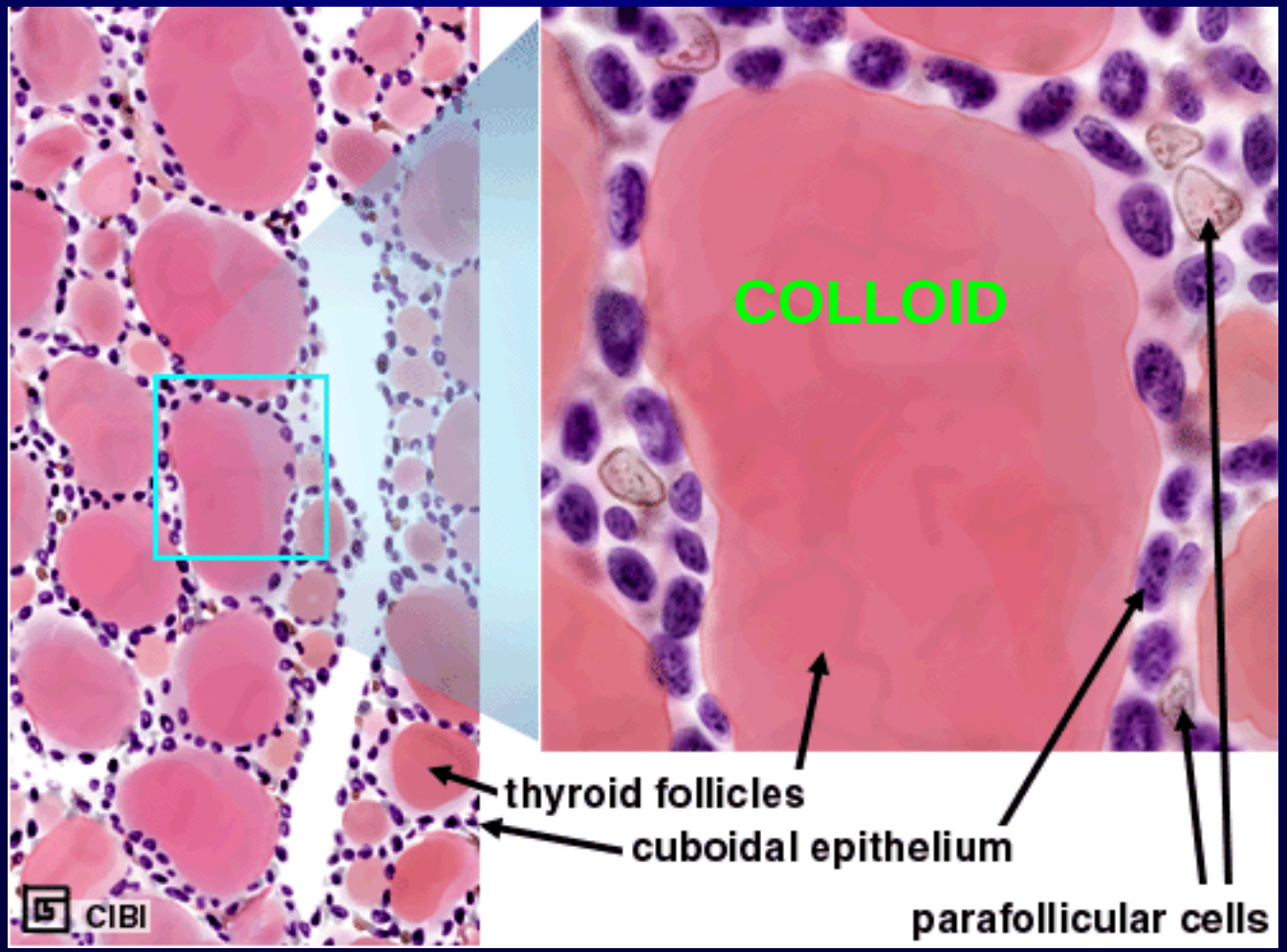
- Ectopic thyroid: Deposits thyroid tissue along track and beyond
  - Thyroglossal duct cysts/thyroid mass

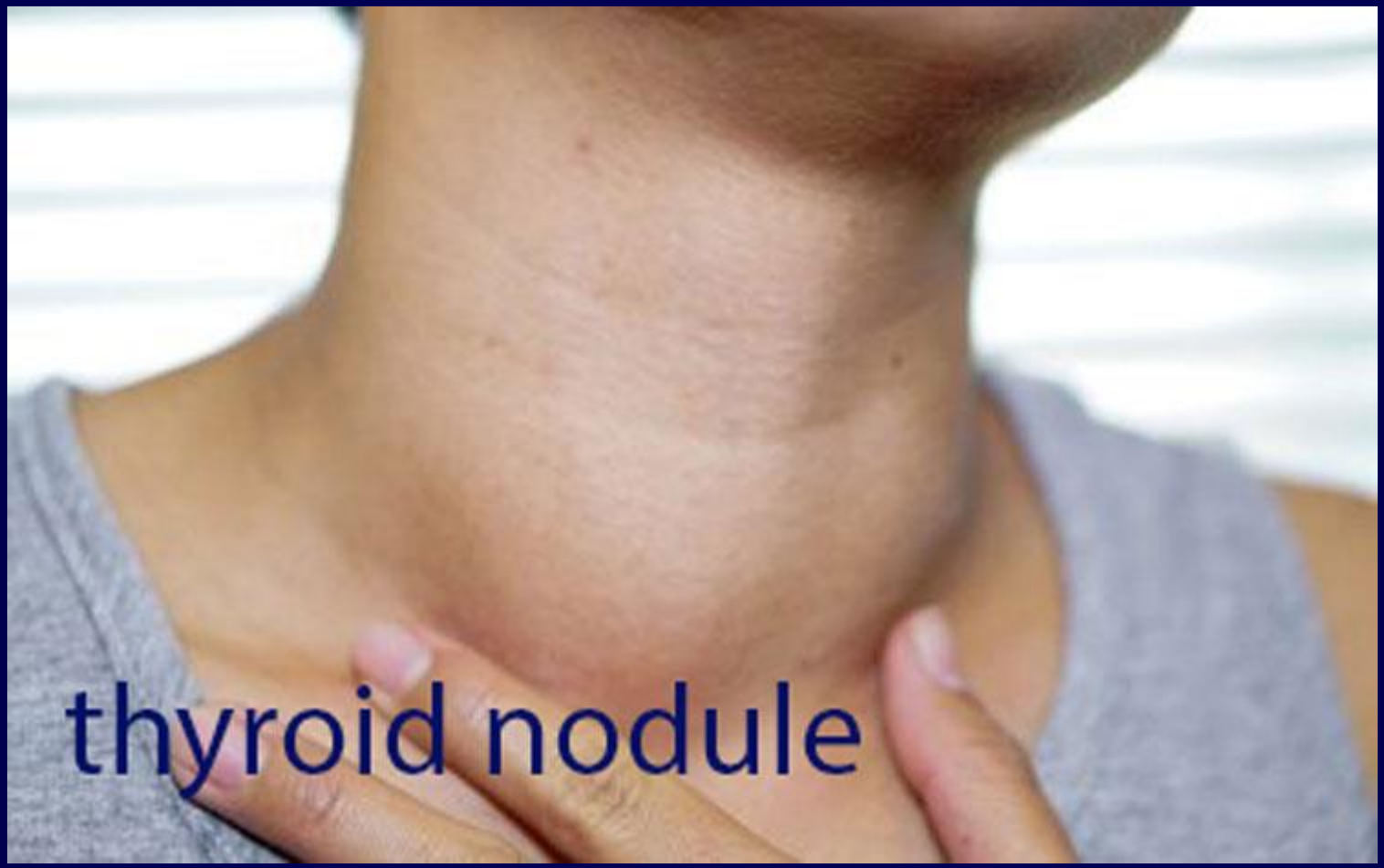


The Thyroid Follicle: The basic functional unit



Thyroid Follicular and Parafollicular Cells



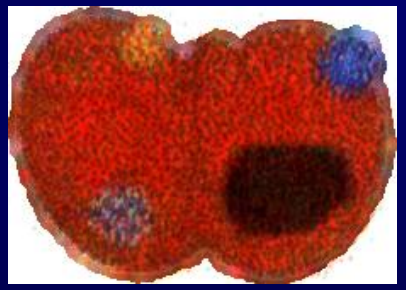

thyroid nodule

GENETIC BACKGROUND

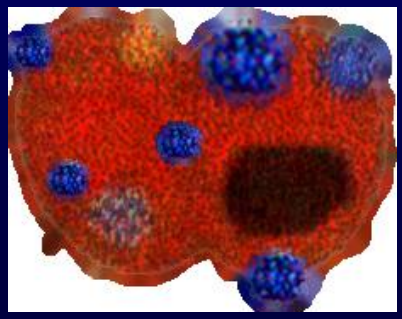
IODINE DEFICIENCY & ENVIRONMENTAL FACTORS

GOITROGENESIS

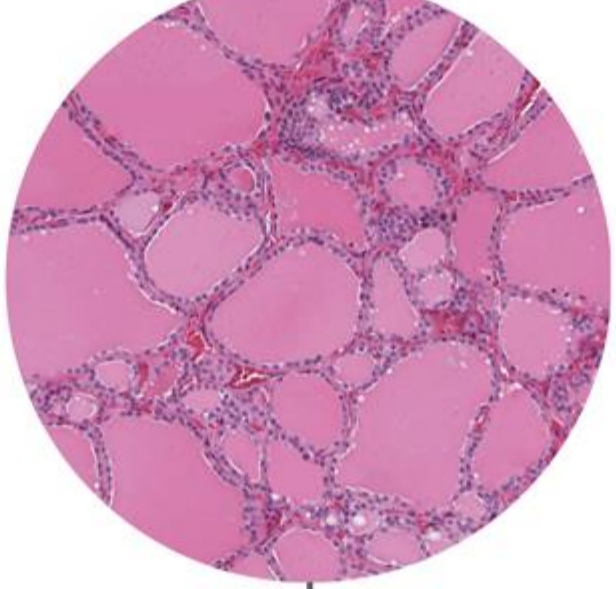
HYPERPLASIA



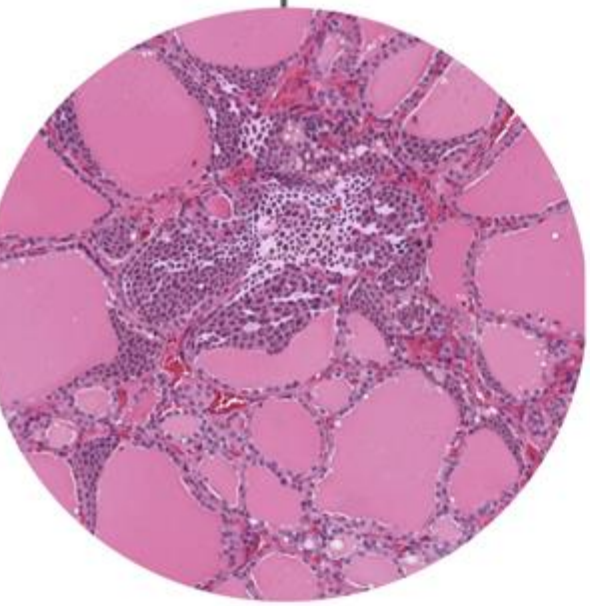
NON-TOXIC MNG



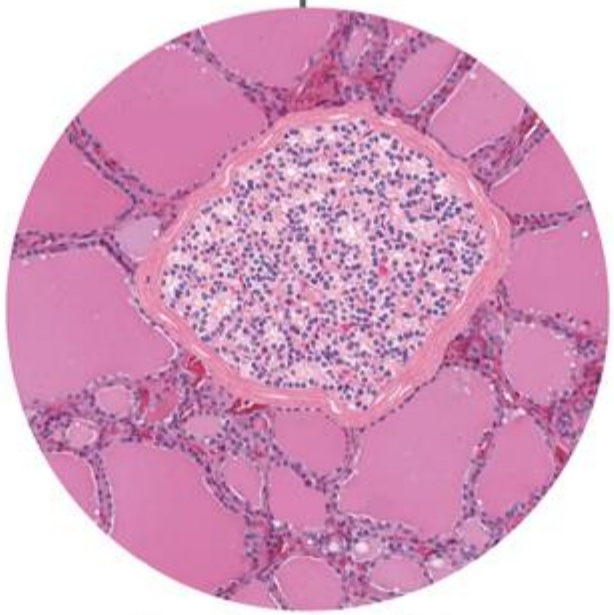
TOXIC MNG



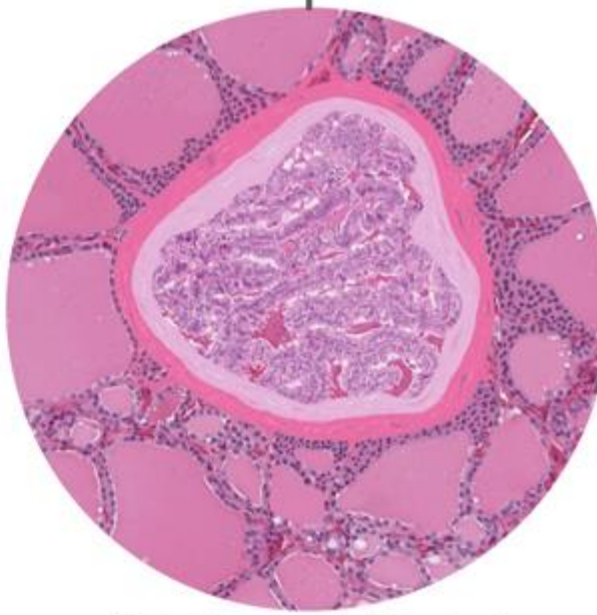
Normal
Thyroid



Hyperplastic



Benign Nodule
(Adenoma)



Malignant Nodule
(Papillary Cancer)

Goiter

- Any enlargement of the thyroid is a goiter
  - Diffuse, nodular, single nodule
  - Any etiology: thyroiditis, cancer, adenomatous goiter

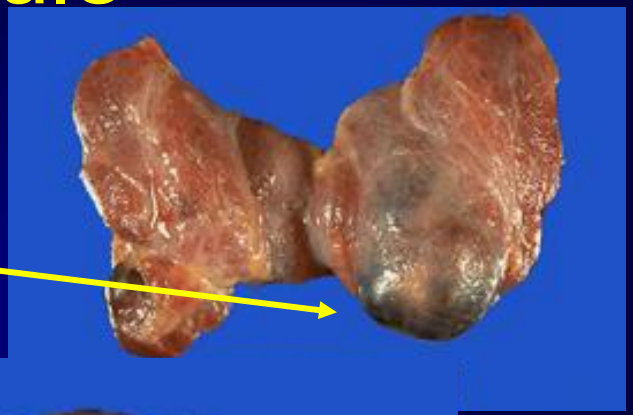
Thyroid nodule

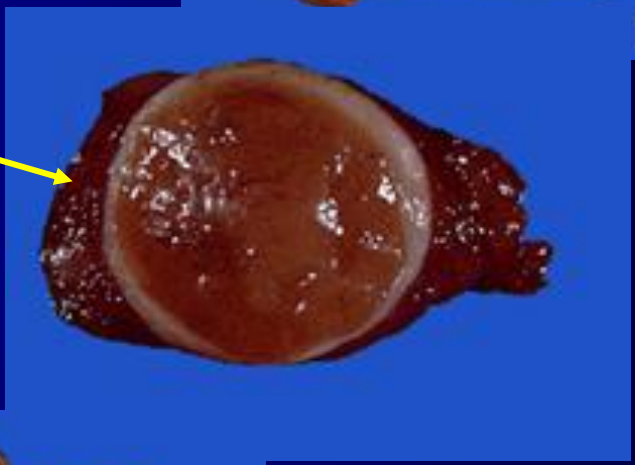
- Thyroid nodule may refer to:

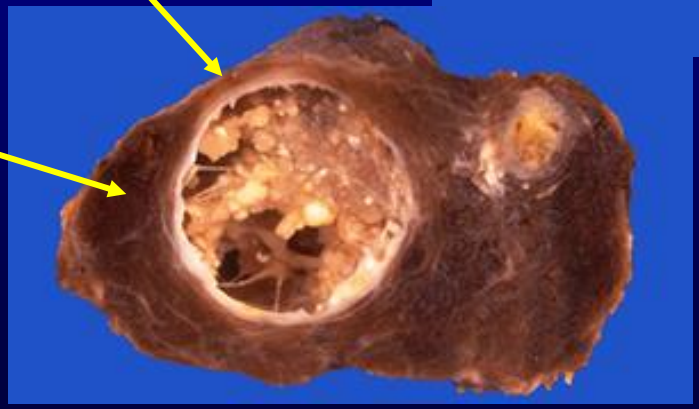
- Palpable mass (solitary nodule or dominant nodule of multinodular goiter)
- Nodule documented by imaging

Differential Diagnosis of a Palpable Thyroid Nodule

- Dominant or first nodule of a multinodular goiter
- Benign adenomas
- Thyroid cysts
  - Degeneration of benign nodules and thyroid CA
- Focal thyroiditis
- Carcinoma 5-10%







Multinodular or Adenomatous Goiter

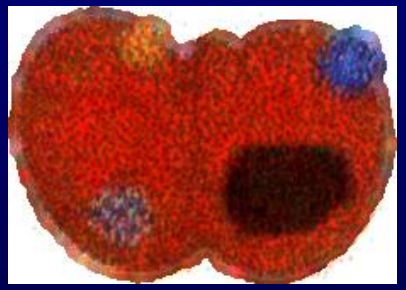
- Nontoxic goiter
  - Any enlargement of the thyroid
    - Not a result of inflammation or a neoplastic process
    - Not associated with hypothyroidism or hyperthyroidism
    - Also called: goiter, simple multinodular goiter
  - Endemic goiter
    - Nontoxic goiter in >10% of the population
  - Sporadic goiter
    - Due to hereditary and environmental factors in a single individual rather than a population

Pathology of GOITROGENESIS

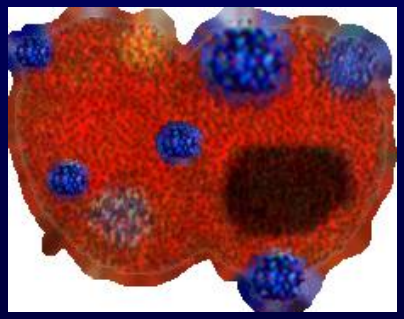
GENETIC BACKGROUND

IODINE DEFICIENCY & ENVIRONMENTAL FACTORS

HYPERPLASIA



NON-TOXIC MNG

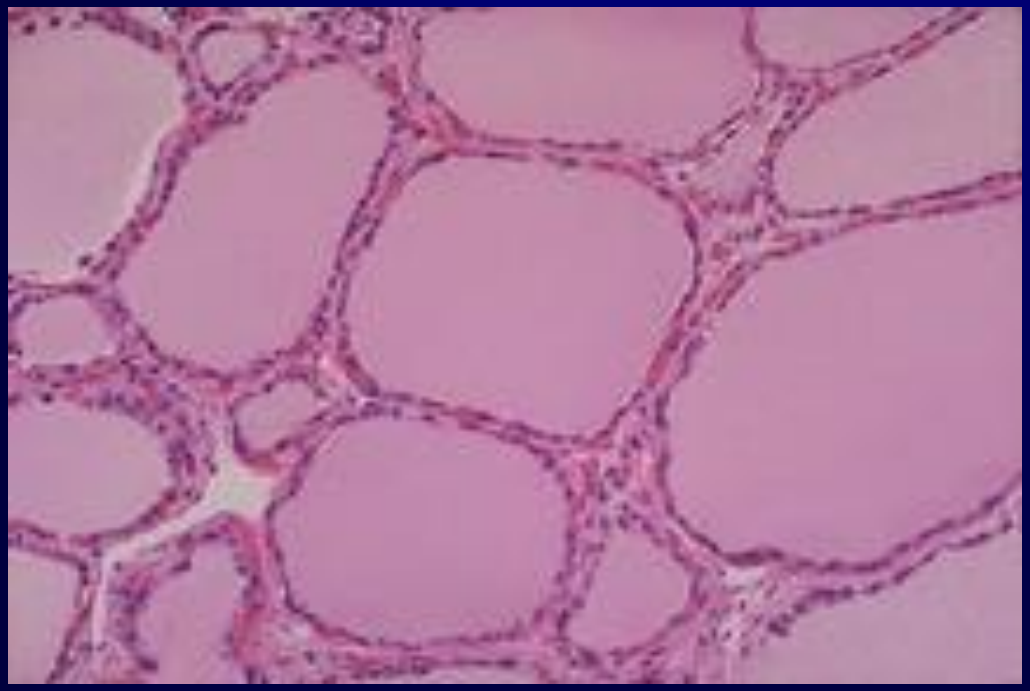


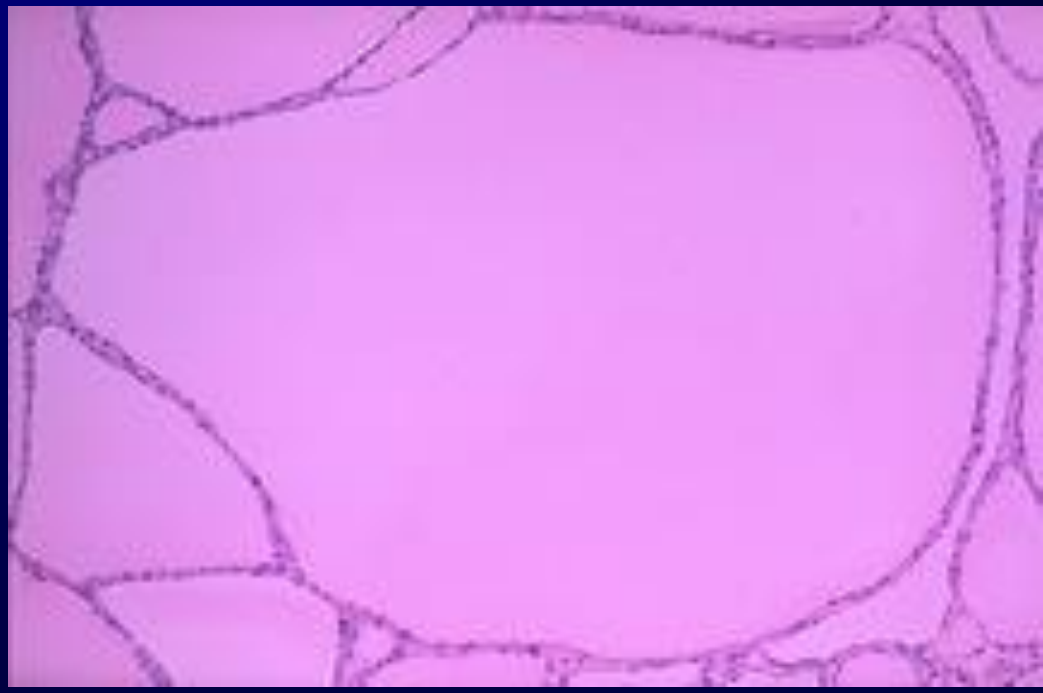
TOXIC MNG

Alternating cycles of hyperplasia and involution

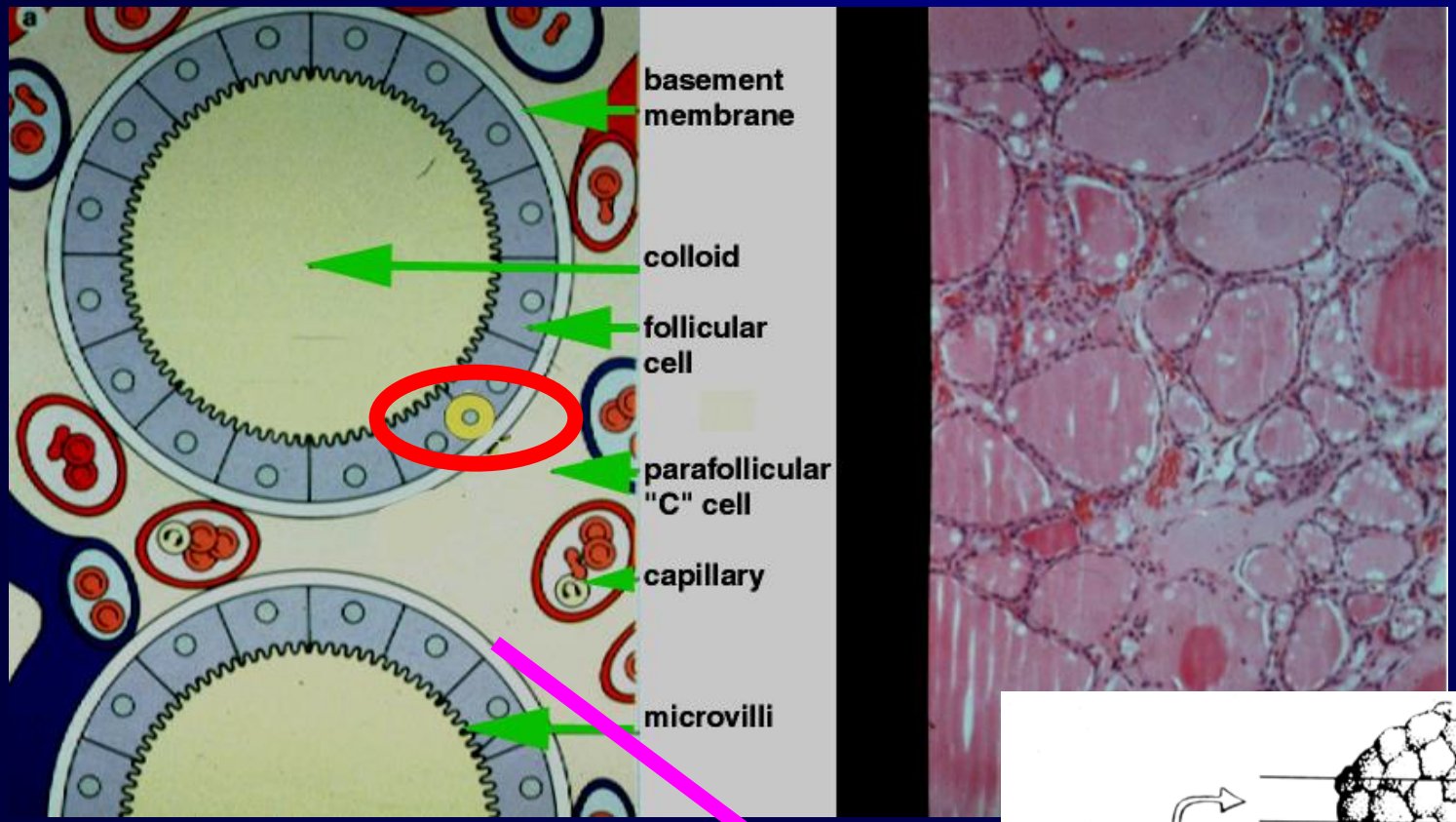
Early Adenomatous Goiter

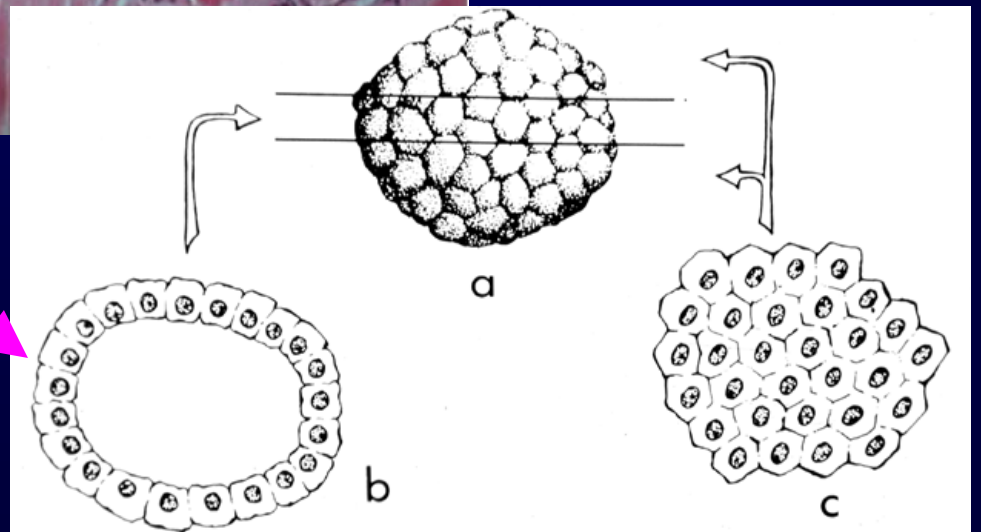
- Initially uniform hypertrophy and hyperplasia
- Focal areas of colloid accumulation



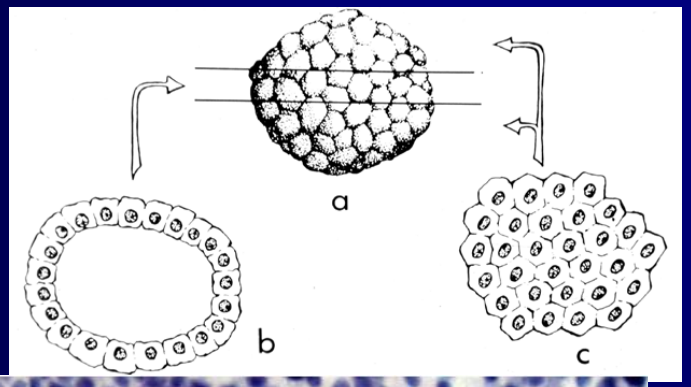


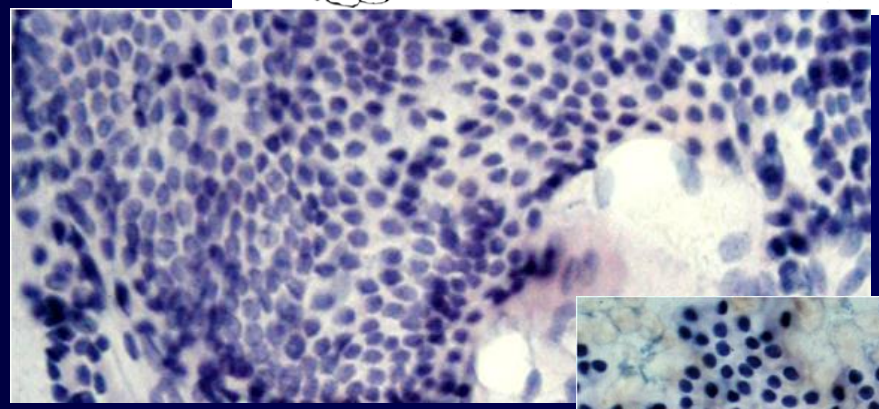
FNA Histology of Thyroid Disease

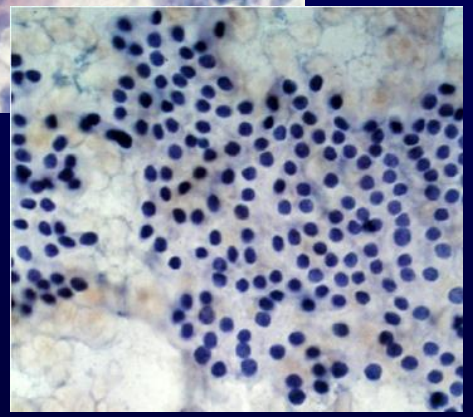




BENIGN:MNG=Adenomatous goiter = Colloid nodule = Macrofollicular adenoma





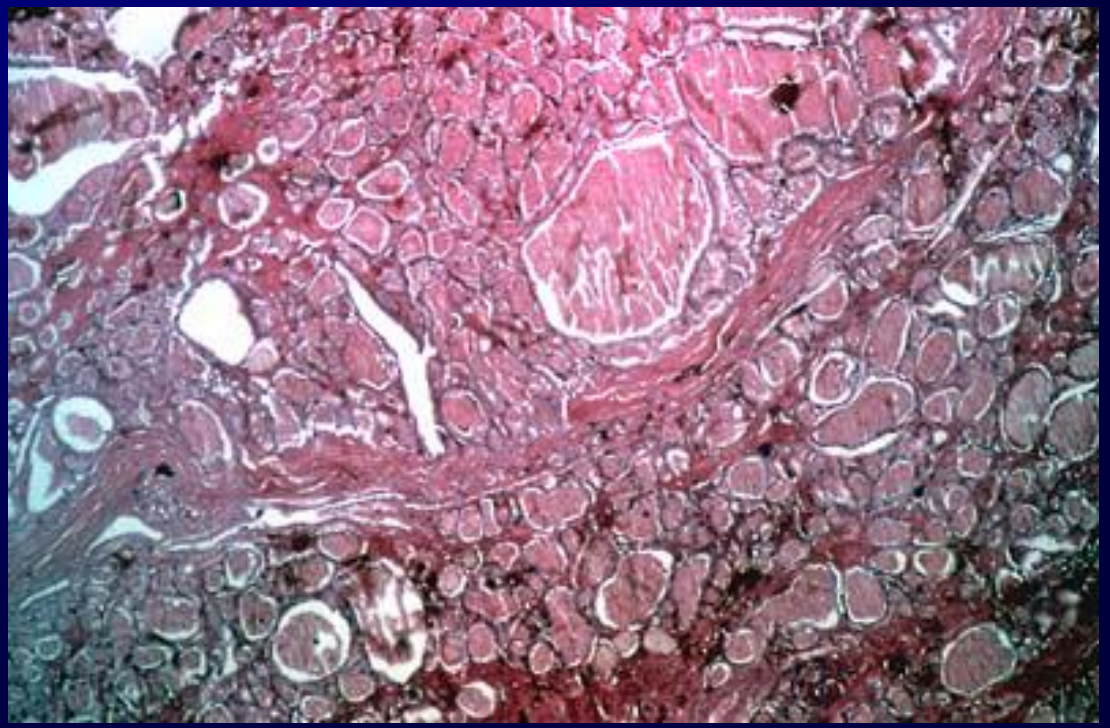


"flat sheets", macrofollicles,
large colloid,
colloid "lakes",
regular, small nuclei

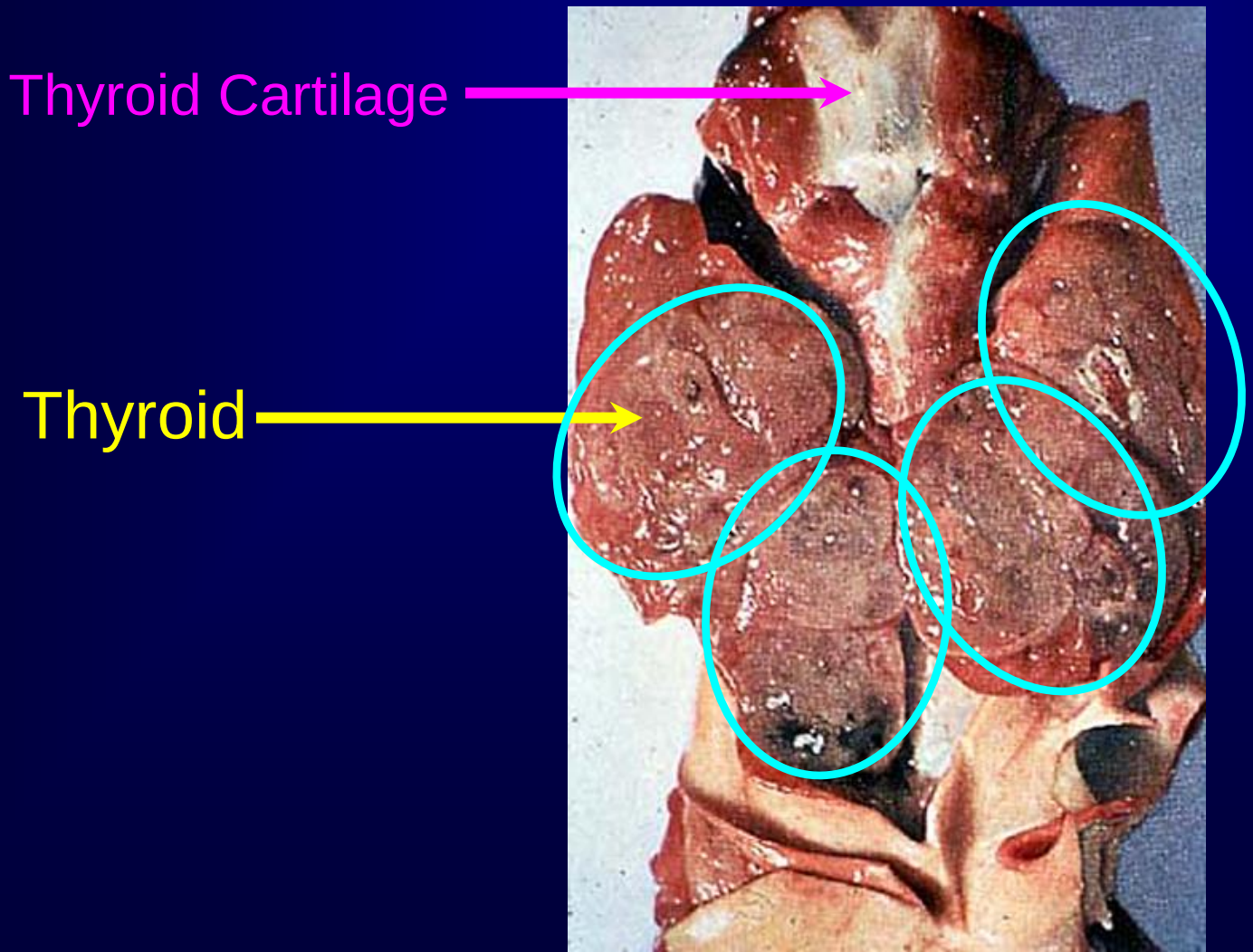
Adenomatous goiter:
solid, cystic, and hemorrhagic nodules (gross)

Later Stages of Adenomatous Goiter

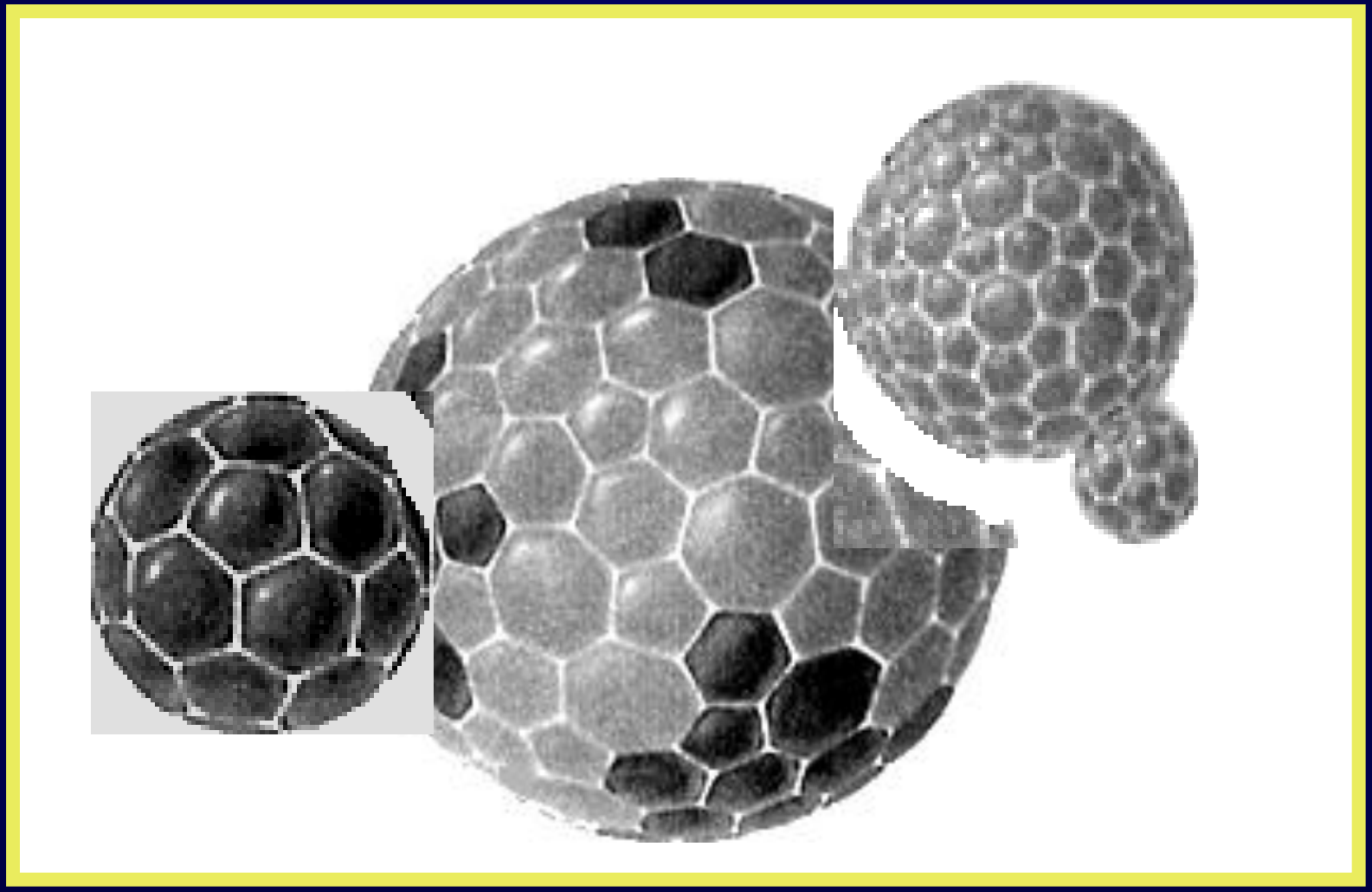
- **Later the architecture changes with the development of many soft nodules**
- **Areas of involution or fibrosis**
- **Areas of focal hyperplasia or colloid**
- **Hemorrhage or cystic degeneration of hyperplastic nodules**
- **Irregular calcifications**



Later Stage Adenomatous Goiter
Multiple Soft Large Nodules



Nontoxic MNG: Functional and Morphologic Hetereogeneity



Peter, Gerber, Studer et al., J Clin Invest 76(1985)1992

Adenomatous Nodule Vs. Adenoma

Gross & Histological Characteristics	Adenomatous Nodule	Adenoma
Nodules	Frequently many	Solitary
Encapsulation	Irregular and incomplete	Complete
Follicular structure	Variable	Uniform
Growth in adjacent thyroid	Comparable to nodule	Different
Compression of adjacent thyroid	Absent	Present

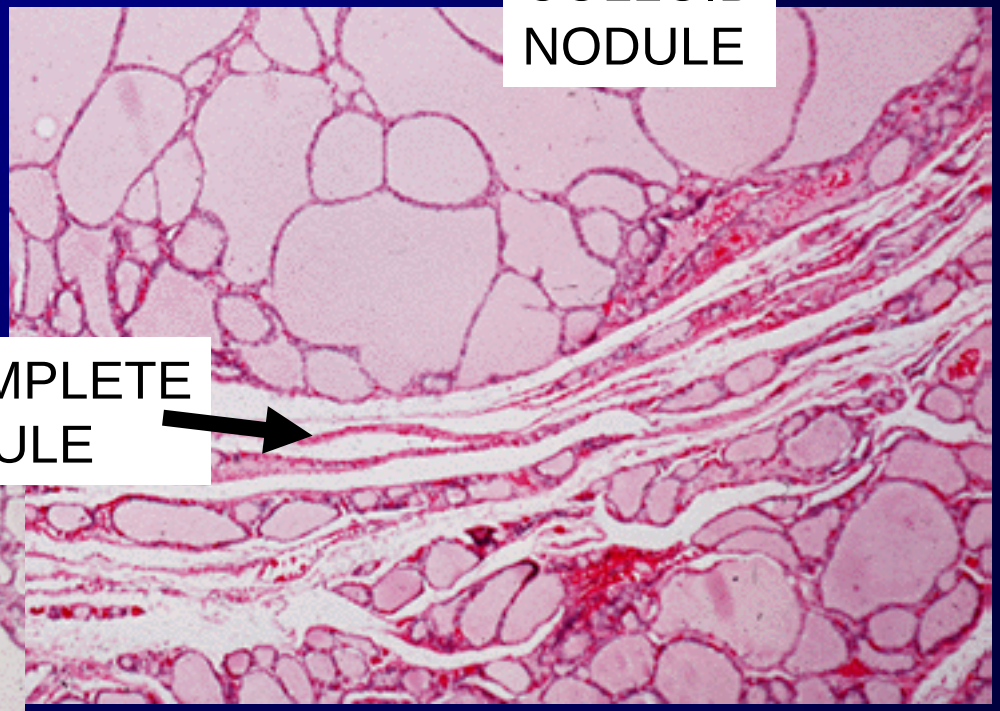
Classification of Thyroid Adenomas*

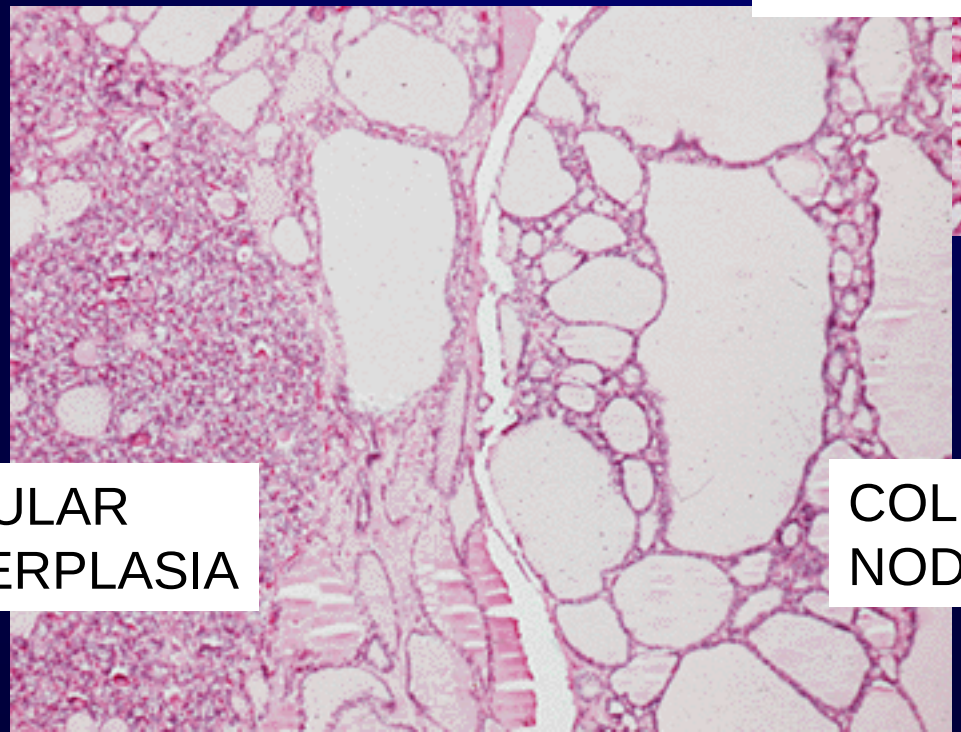
TYPE	STRUCTURE	FOLLICLES
FOLLICULAR		
Embryonal	**Trabecular**	**Poorly formed**
Fetal	**Microfollicles**	**Scant colloid**
Simple	**Normal follicles**	**Normal colloid**
Colloid	**Macrofollicles**	**Excess colloid**
Hurthle	**Acidophilic,solid pattern**	**Uncommon**
ATYPICAL	**Solid growth, spindle cells**	**None**

* Most pathologist feel that thyroid neoplasms with papillary pattern are carcinomas

Adenomatous Goiter

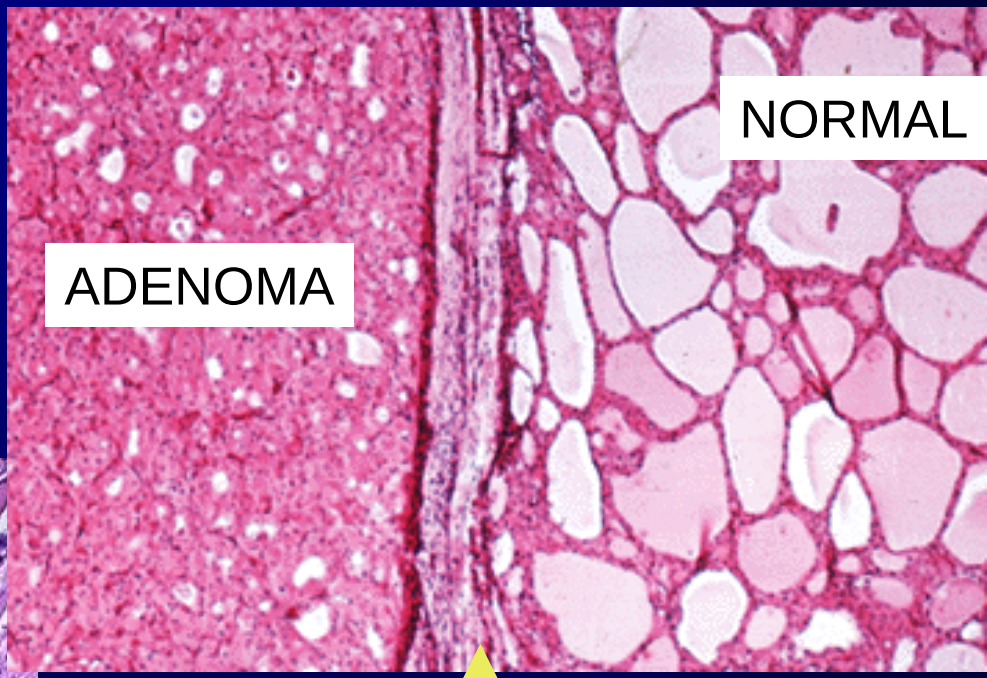
Many nodules
Capsule incomplete, irregular
Follicles variable
No compression of surrounding follicles

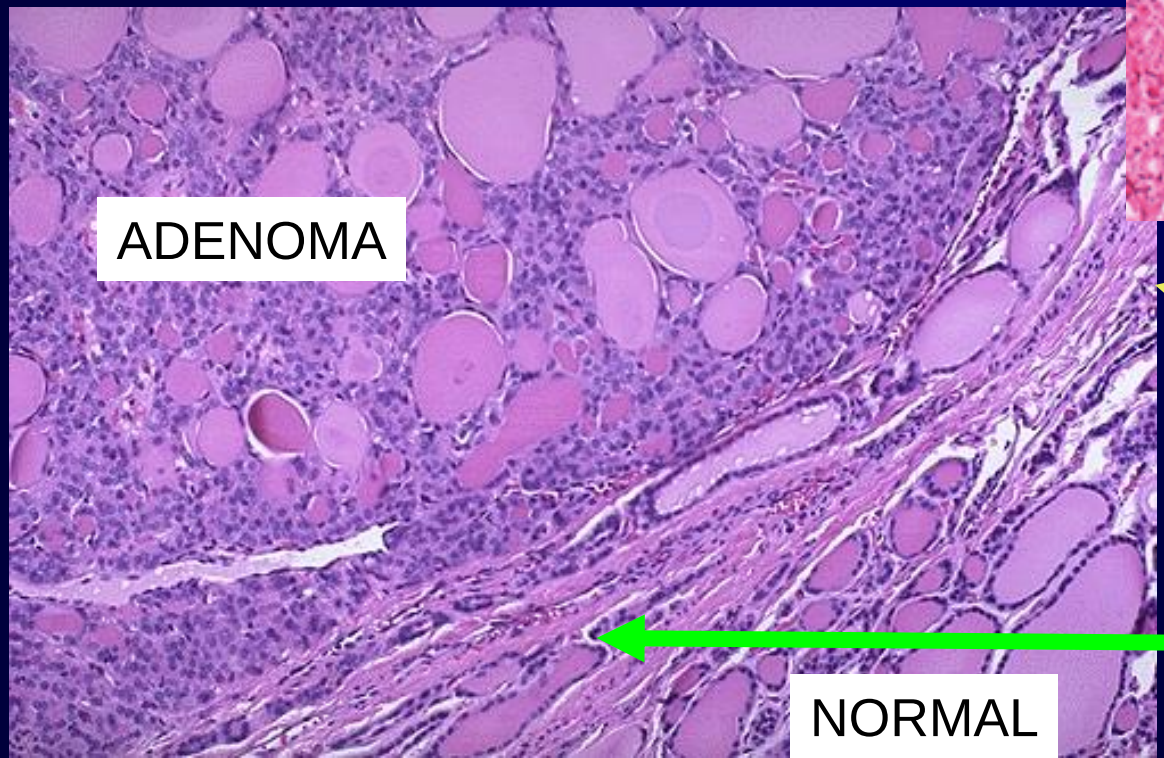




Benign Adenoma

-Solitary
-Monoclonal
-Follicles uniform
-Complete capsule
-No invasion through capsule
-Different morphology
-Compression of surrounding

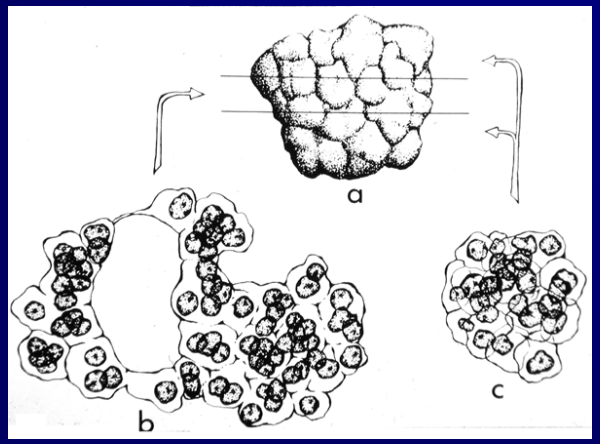


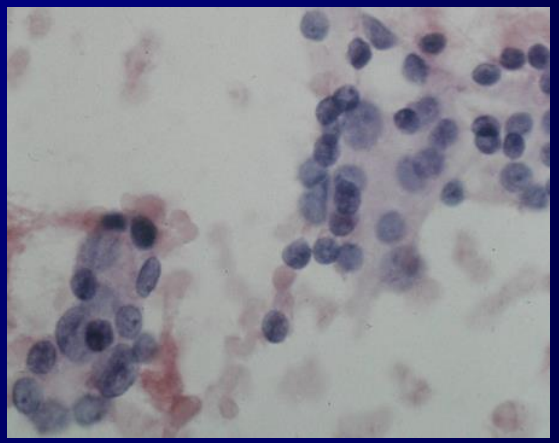


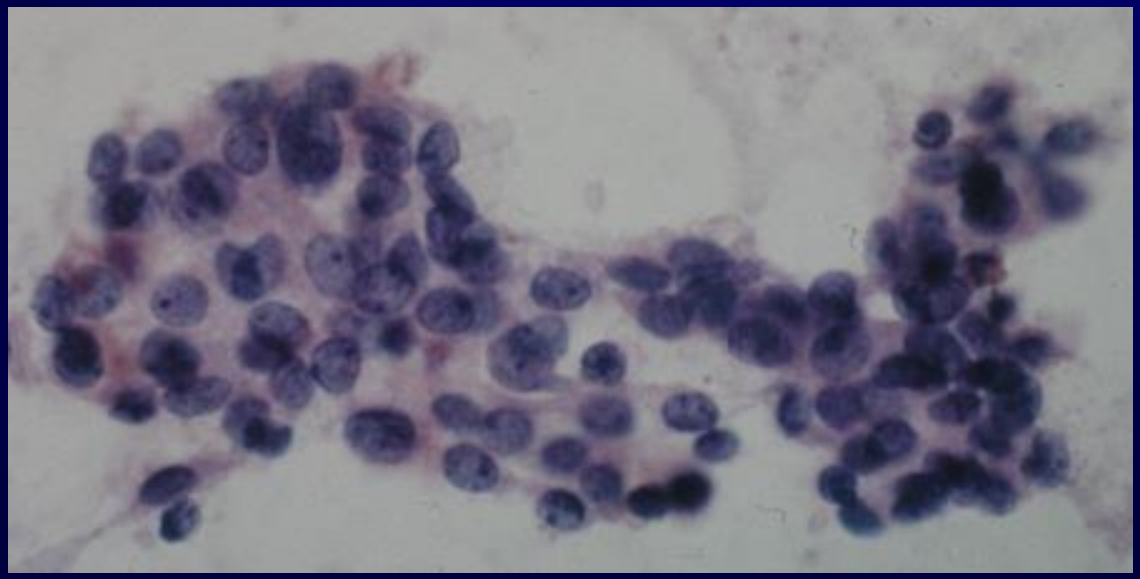
COMPLETE CAPSULE

Compression normal follicles

Follicular Neoplasia/Lesion:
Adenoma= Follicular Thyroid CA = Growth Phase Adenomatous Goiter



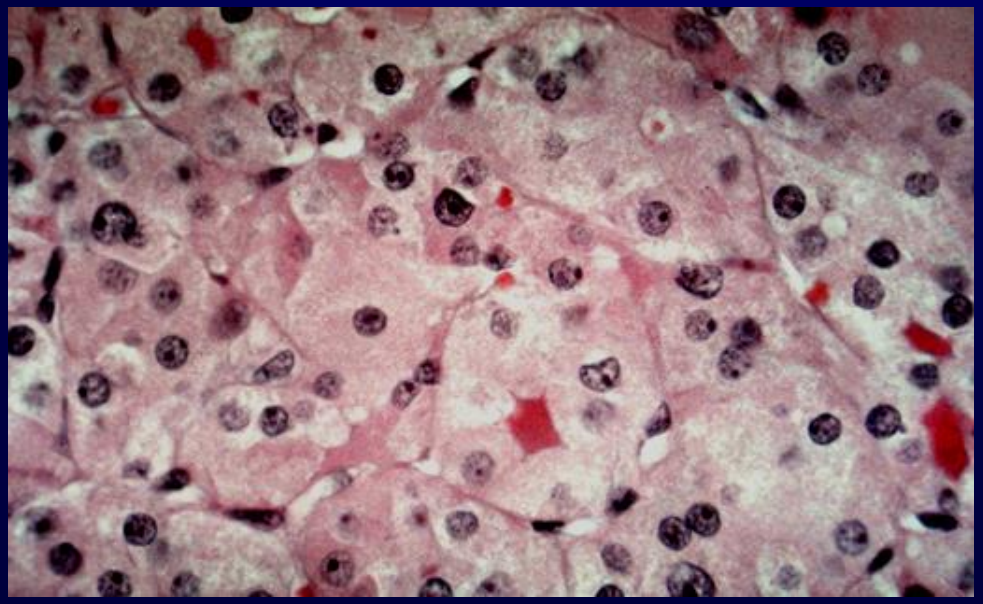




Microfollicles, syncytia, nuclear atypia, little or no colloid

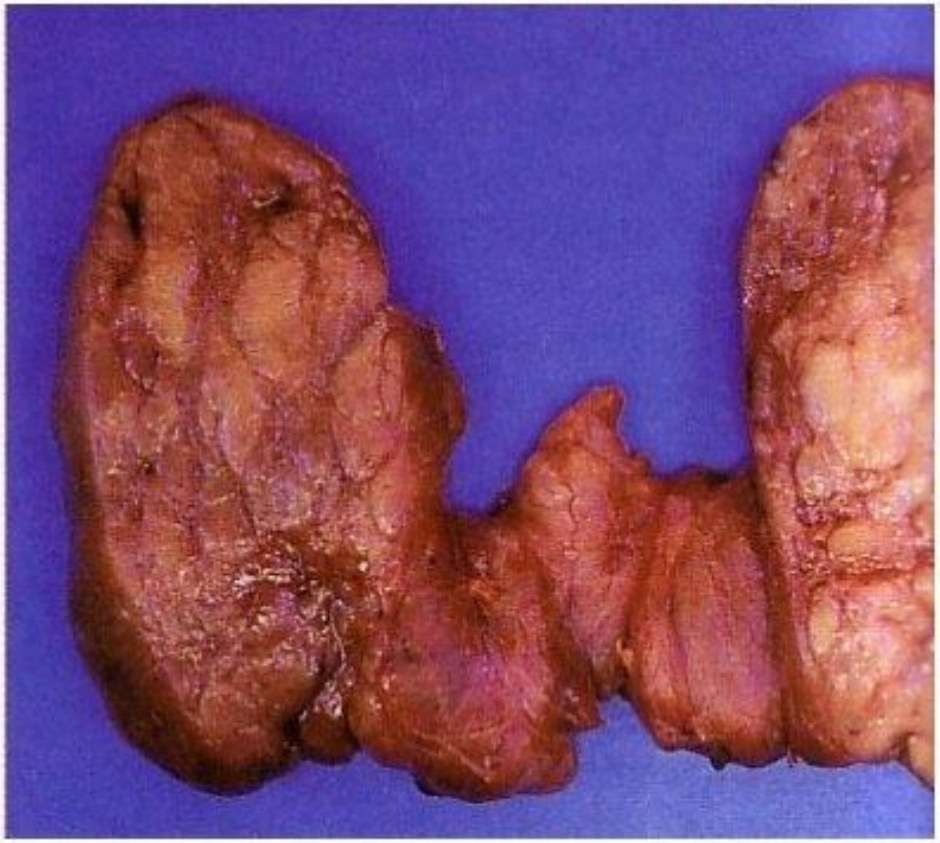
Hurthle Cells

- Histological characteristics
  - Voluminous, pink, granular cytoplasm (mitochondria)
  - Striking Nuclear Atypia
    - **Not an indication of malignancy**
  - Prominent nucleoli



- May occur in many types of thyroid pathology
  - Hurthle Adenoma
  - Hurthle Carcinoma
  - Hashimoto's thyroiditis
  - Nodular goiter
    - **Focal**

Hashimoto's Thyroiditis - Gross

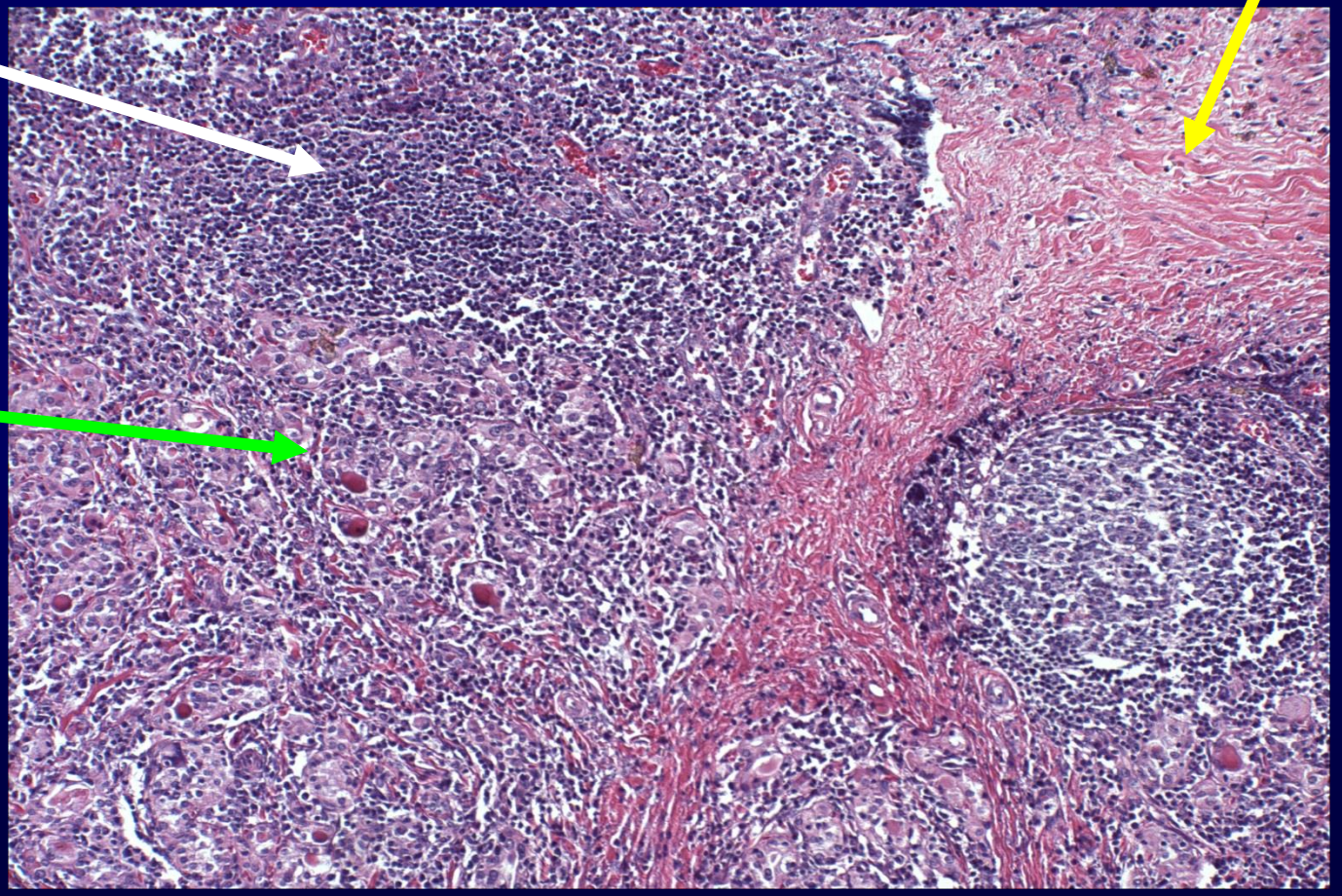


Complications

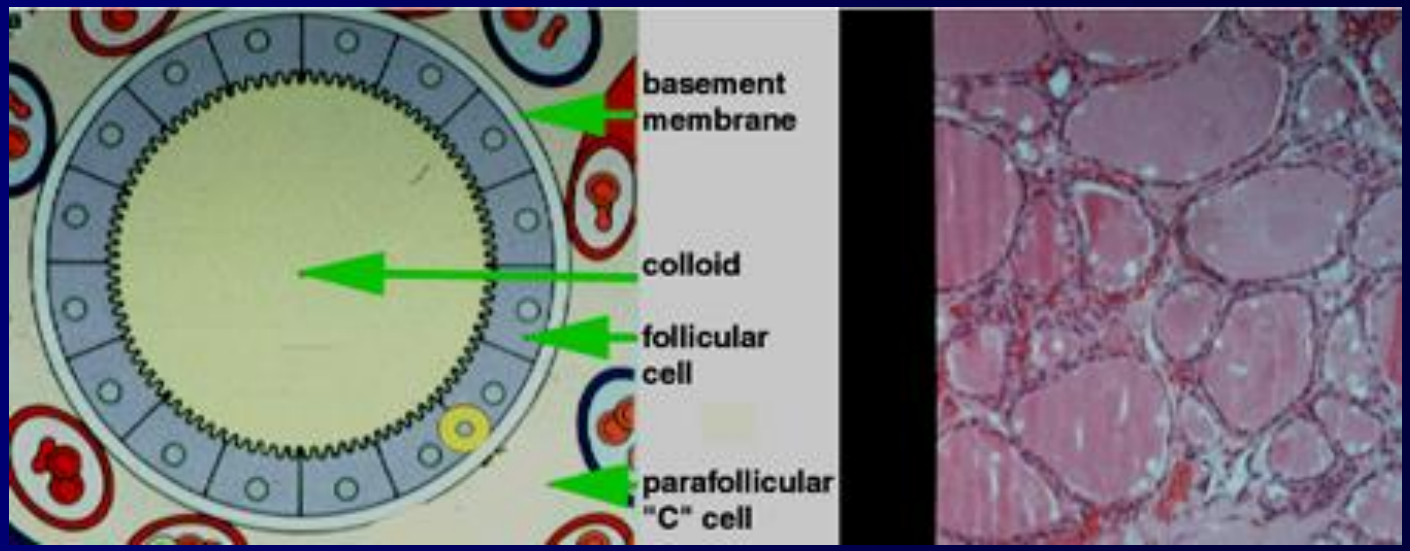
a. *B cell lymphoma*
b. *Papillary carcinoma*

- *Diffuse enlargement.*
- *Firm or rubbery.*
- *Pale, yellow-tan, firm & somewhat nodular cut surface*

Hashimoto Thyroiditis



CELLULAR ORIGIN OF THYROID MALIGNANCY



FOLLICULAR CELLS

- **Differentiated**
  - **80%** **Papillary**
  - **15%** **Follicular**
- **Undifferentiated**
  - **<5%** **Anaplastic**

PARAFOLLICULAR CELLS

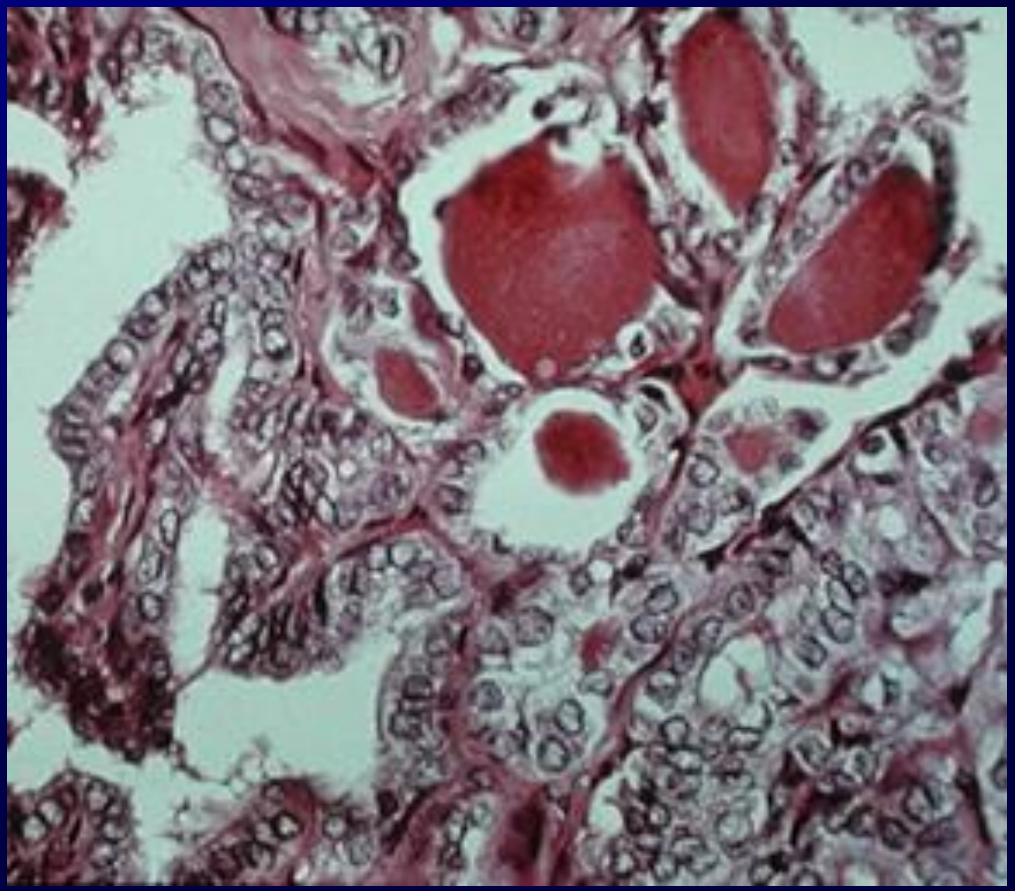
- **“C” cell hyperplasia**
- **<5%** **Medullary thyroid CA**

OTHER CELLS

- **<5%**
- **Lymphoma**
- **Sarcoma**
- **Metastases**

Papillary Thyroid Carcinoma

- Most common thyroid cancer
- Variable size - average 2 cm
- 25-30 % micrometastases in contralateral lobe
- Often undergoes cystic degeneration
- Frequently has local lymph node metastases
- Less commonly has local and distant invasion (important for prognosis)



Multifocal Papillary Thyroid Carcinoma– Gross cut section

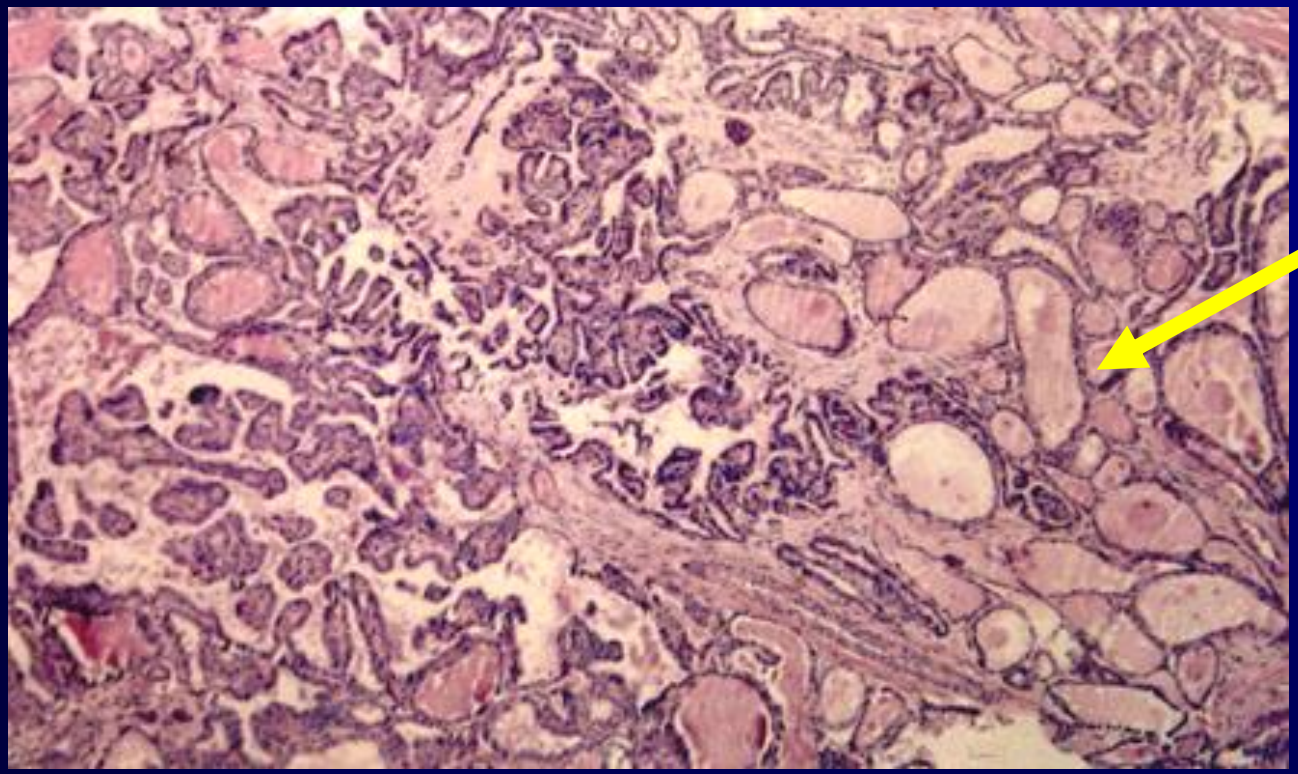
Sectioning through a lobe of excised thyroid gland reveals a papillary carcinoma. This neoplasm can be multifocal, as seen here, because of the propensity of this neoplasm to invade lymphatics within thyroid, and lymph node metastases are also common. The larger mass shown here is cystic and contains papillary excresences

Papillary Thyroid Carcinoma

- Complex branching structures
- Monolayer sheets of crowded, overlapping, vesicular nuclei
- Fibrovascular core
- Calcificatons with concentric lamination: psammoma bodies
- Little colloid

Psammoma bodies

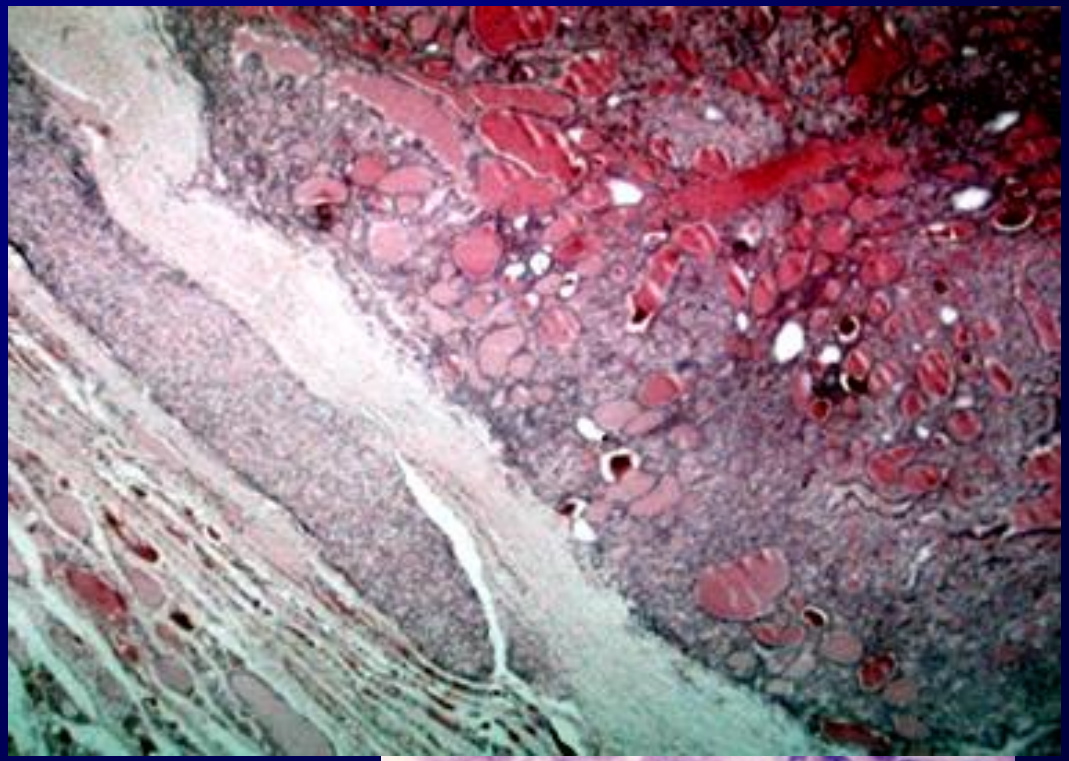
Papillary Thyroid CA



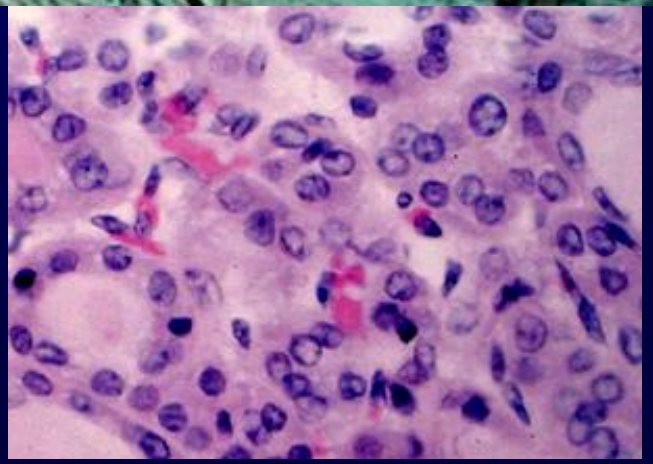
Follicular variant of PTC:
Nuclear characteristics of PTC but in solid micro-follicular pattern

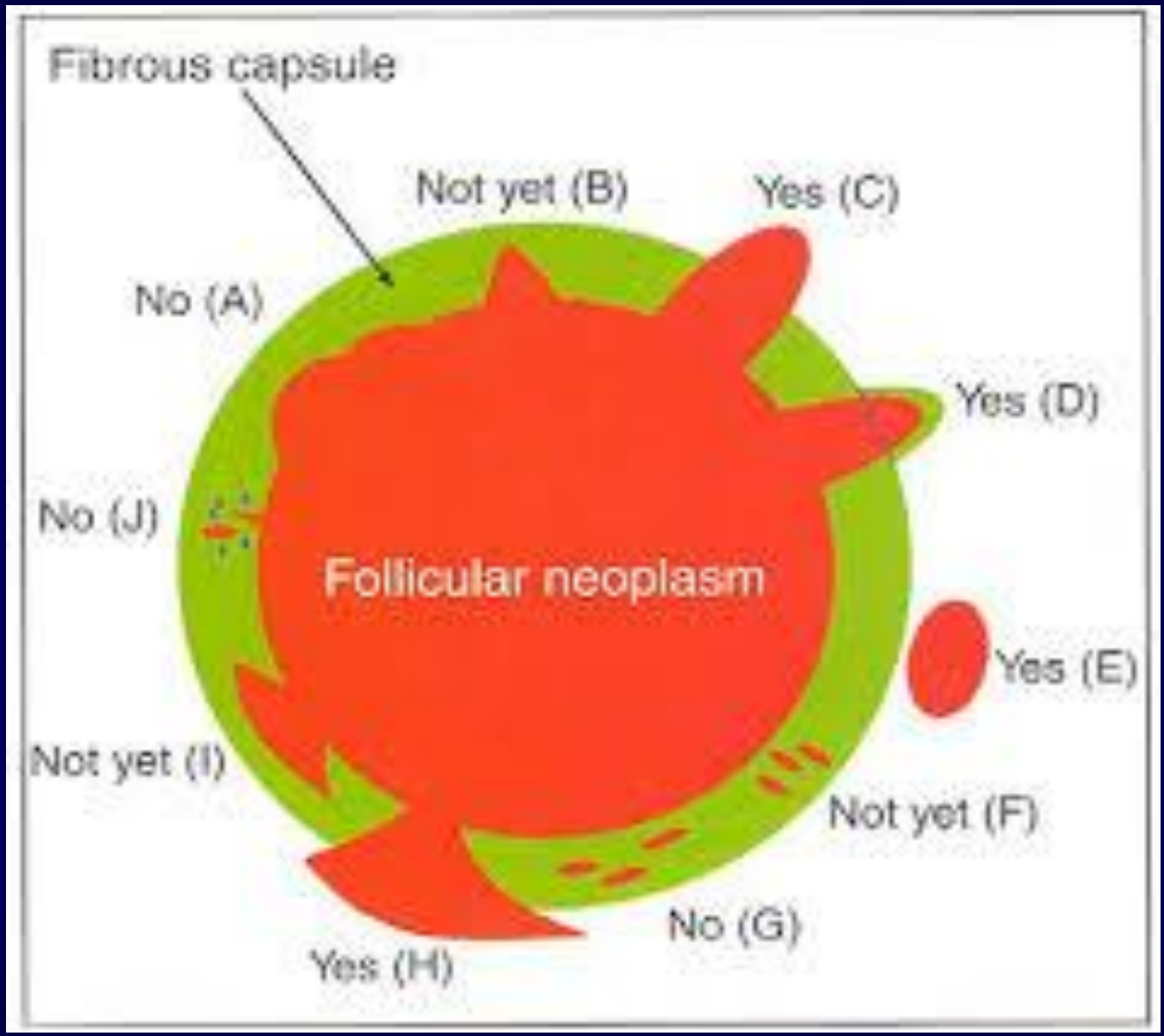
Follicular variant of PTC acts biologically like classic PTC and NOT follicular thyroid CA

Follicular Carcinoma



Require capsular and vascular invasion otherwise looks like adenoma




Fibrous capsule
Not yet (B)
Yes (C)
No (A)
Yes (D)
No (J)
Follicular neoplasm
Yes (E)
Not yet (I)
Not yet (F)
No (G)
Yes (H)

Laboratory Studies

- Determine thyroid function
  - TSH level
- Determine if thyroiditis is the cause of nodularity
  - Thyroid autoantibodies (anti-TPO antibodies)
- Urinary Iodine for special conditions:
  - Recent radiology studies using iodinated contrast dye
  - Medication history of iodine containing medications
    - Amiodarone, some expectorants, seaweed tablets
  - Family history and history of recent immigration from regions of the world with iodine deficiency

Carcinoma Risk in Nodular Thyroid Disease

- Palpable nodule 5-10%
- Cystic nodule 6-8%
- Multinodular goiter 5%
  - Dominant nodule in MNG treated like solitary
- Autonomous nodule <1% (not zero)
- Somewhere in goiter with head & neck radiation 30-40%
- Child with thyroid nodule 20-30%
  - Prevalence of nodules 0.2 - 1.5%
  - Occult thyroid CA in normal thyroids at autopsy 6-13%

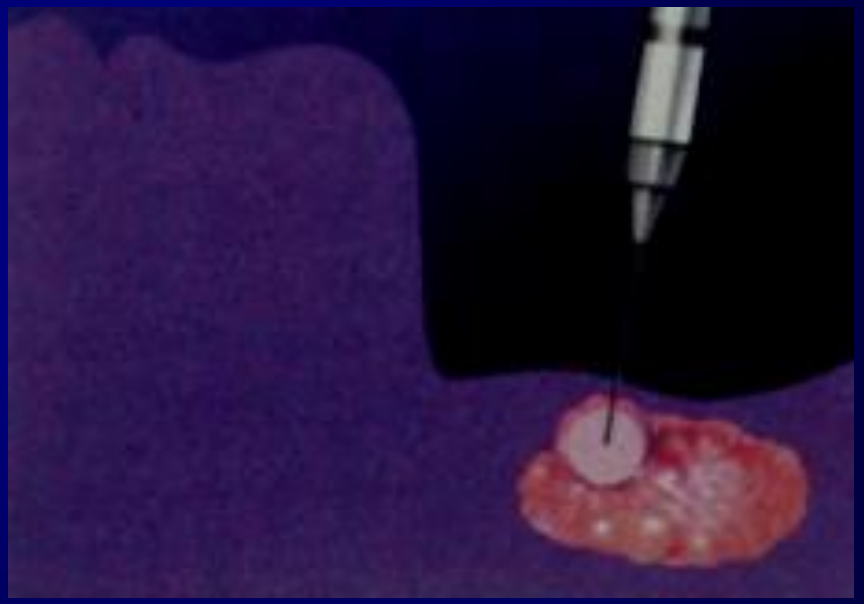
Mortenson Surg Forum 5(1954)659

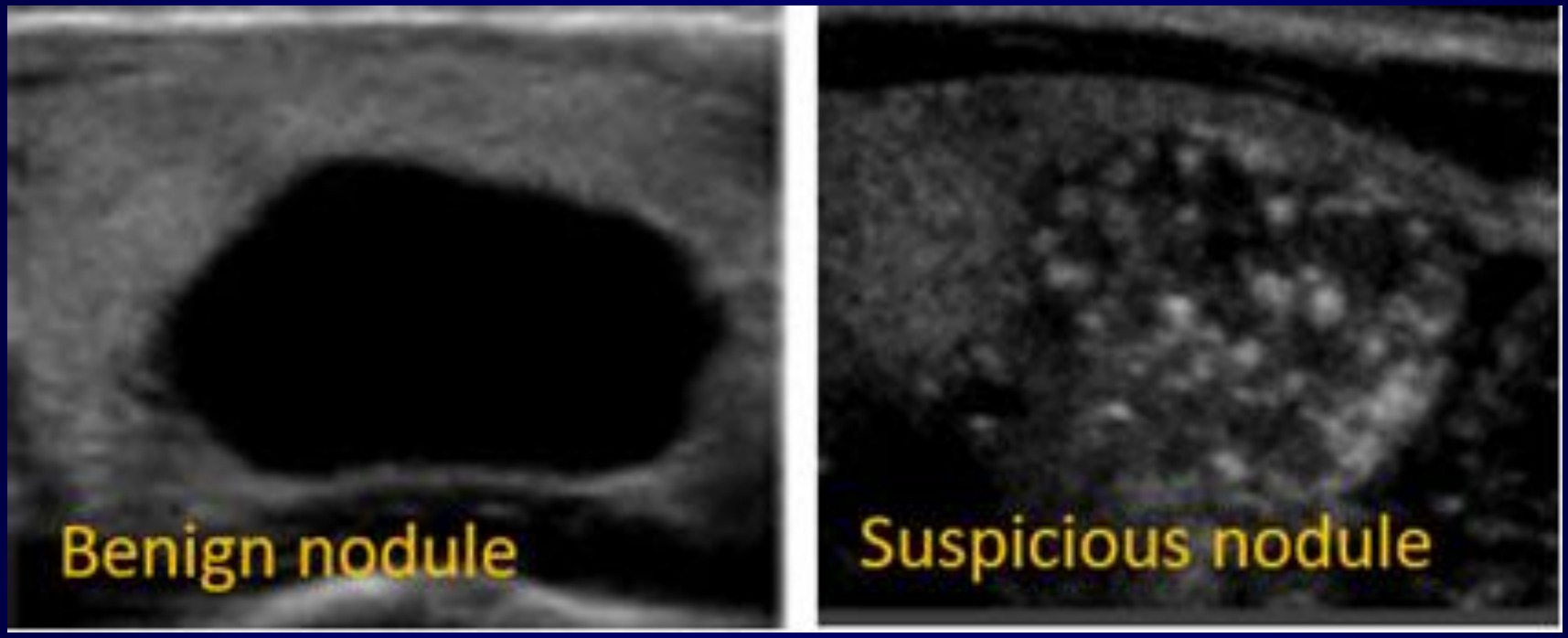
Diagnosis of Thyroid CA

- The most cost effective evaluation to diagnose thyroid carcinomas is controversial.
- Clinically important thyroid CA is rare but small thyroid CA are common (8 - 15%)
- Papillary thyroid carcinoma <1 to 1.5 cm is “microcarcinoma ” has no mortality and a low morbidity
  - Evaluation for carcinoma limited to thyroid nodules > 1 cm in diameter or with recent growth

Fine Needle Aspiration Biopsy

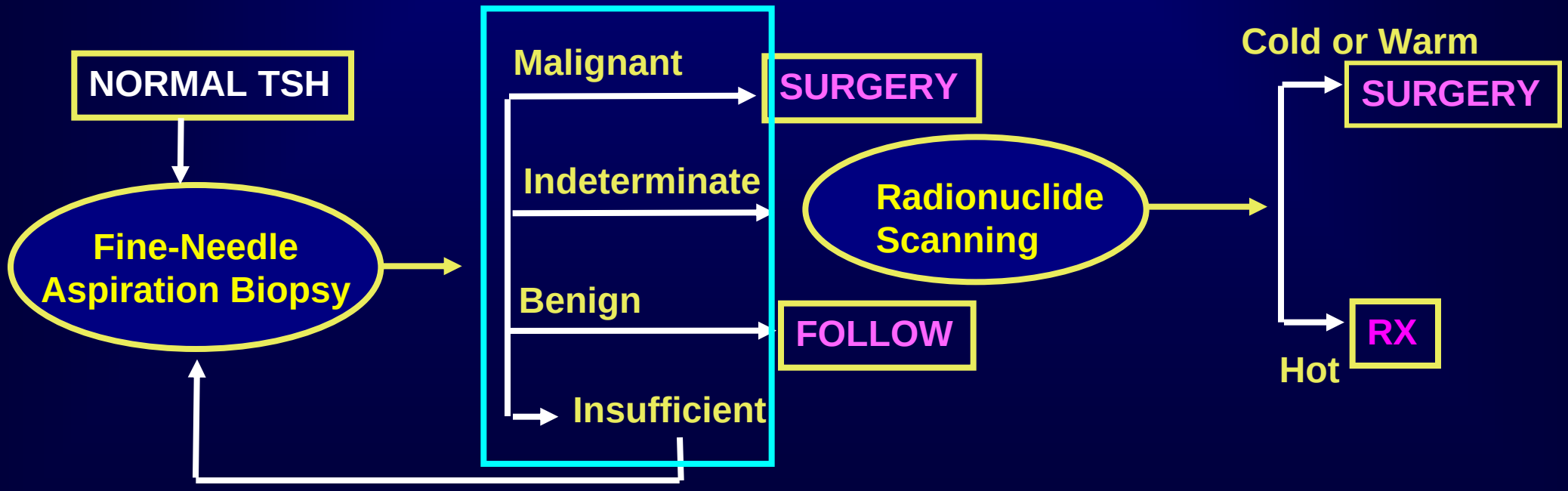
- The diagnostic procedure of choice for a solitary thyroid nodule or a dominant nodule in a nodular gland is FINE NEEDLE ASPIRATION BIOPSY




Benign nodule
Suspicious nodule

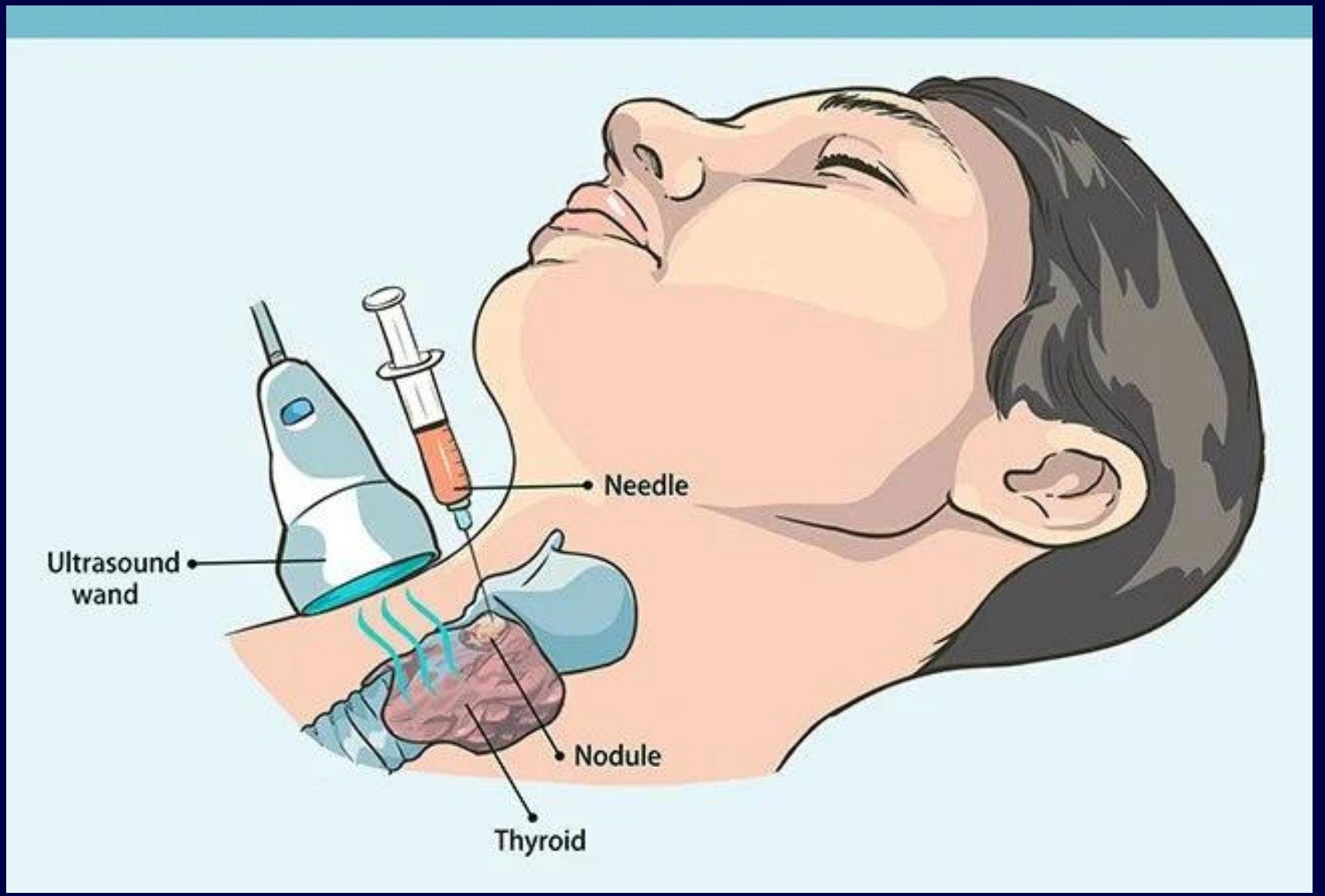
Laboratory Evaluation(FNA) of Thyroid CA

- No significant morbidity or risk of a thyroid thin needle aspiration biopsy
- Outpatient procedure requiring no special preparation
- Requires a skillful and experienced pathologist to read the biopsy

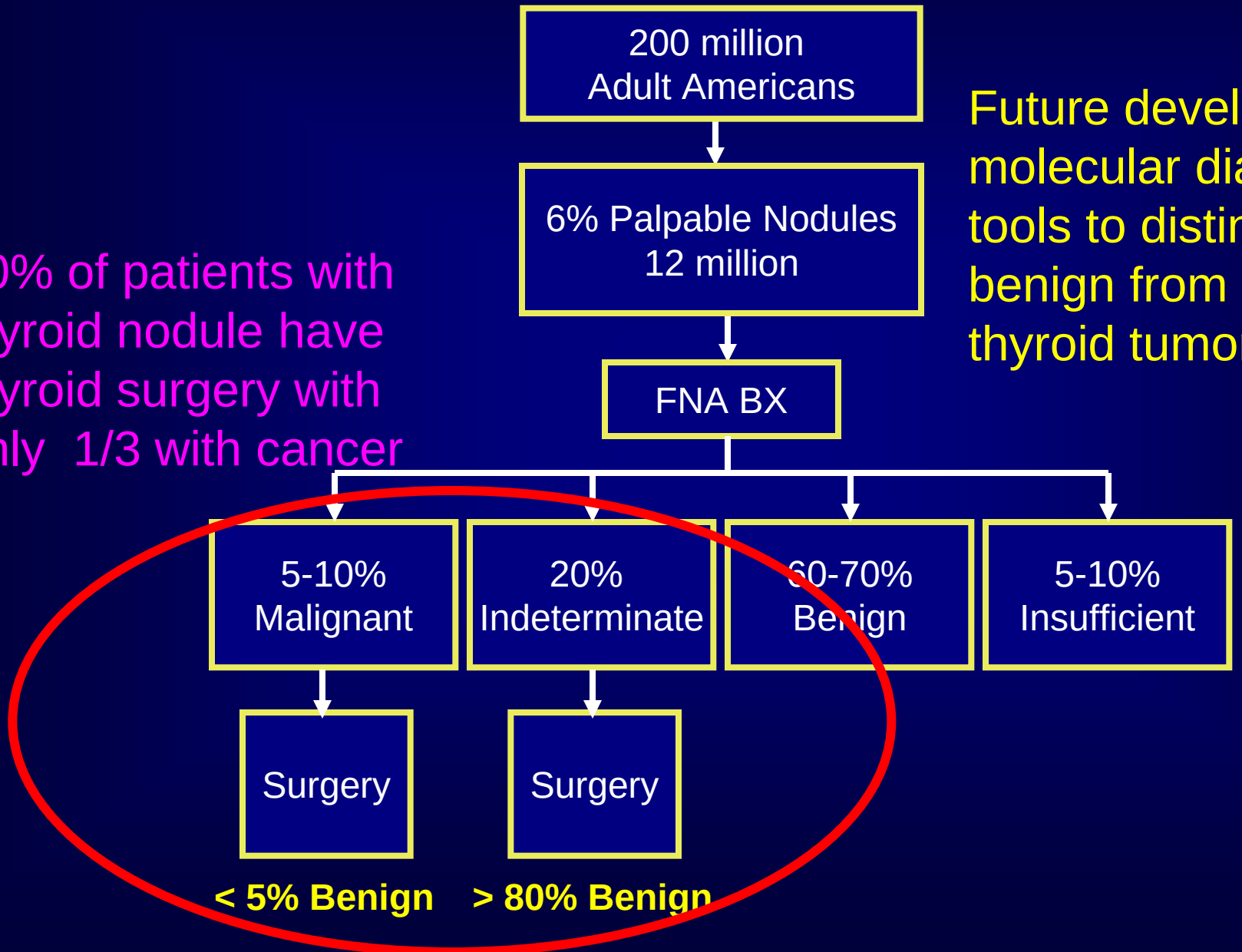


FNA BX for Thyroid CA

- 60-70% are **benign**
  - **Goiter (macrofollicular and colloid), thyroiditis, subacute thyroiditis, hemorrhage**
- 15-20% are considered **indeterminate** (hypercellular in a microfollicular pattern, no colloid and nuclear atypia)
  - **Follicular adenoma (70-75% of indeterminate)**
  - **Follicular carcinoma (25-30% of indeterminate)**
- 10% are **insufficient** number of cells for diagnosis
  - **Repeat until diagnostic or surgically remove**
- 5-10% of biopsies contain **cancer**
  - **Papillary, anaplastic, MTC, lymphoma, etc.**


Needle
Ultrasound wand
Nodule
Thyroid

Evaluation of Thyroid Nodules



30% of patients with thyroid nodule have thyroid surgery with only 1/3 with cancer

Future development of molecular diagnostic tools to distinguish benign from malignant thyroid tumors

Prognosis: Cancer Death

- Risk factors
  - Age at diagnosis
  - Tumor stage
  - Male gender
  - Delay in therapy
  - Surgical and medical management
  - NOT LOCAL ADENOPATHY

Mazzaferri. *Am J Med.* 1994;97:418–428.

با تشکر و تقدیم احترام