

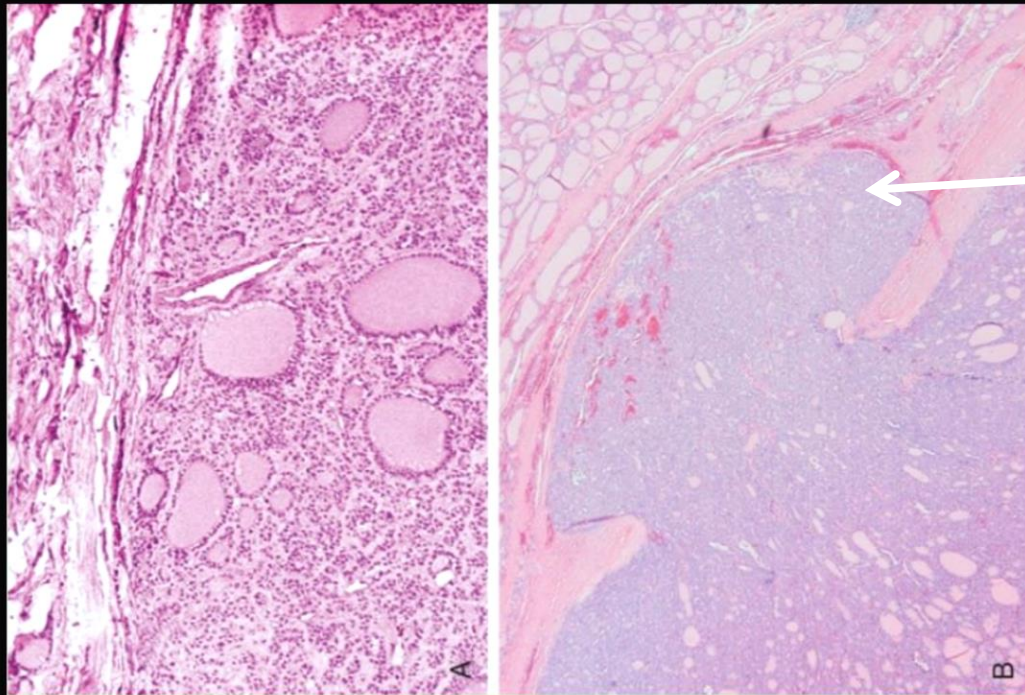
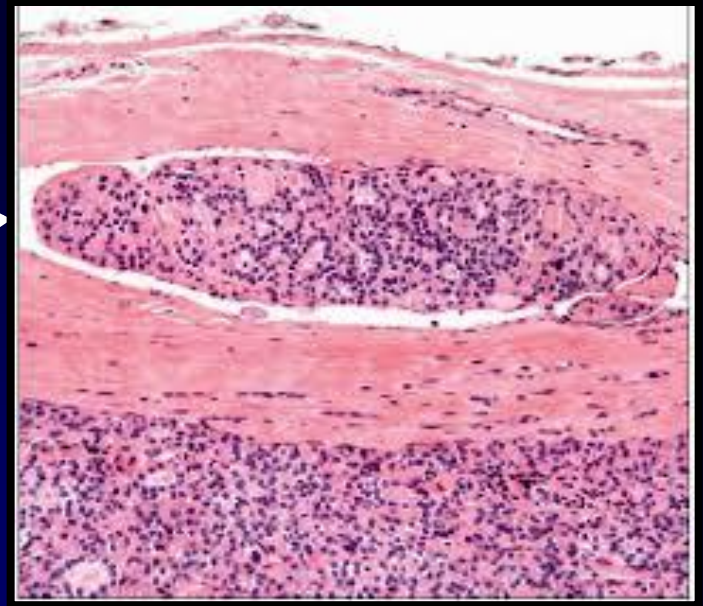
# Lecture

4

# FOLLICULAR CARCINOMA

- **Women, 40-60 years**
- **> common in iodine deficient regions**
- **Solitary cold nodule**
- **Hematogenous spread to bone, lung and liver**
- **50% die within 10 years**
- **Capsular and vascular invasion is the distinguishing feature from F. adenoma**

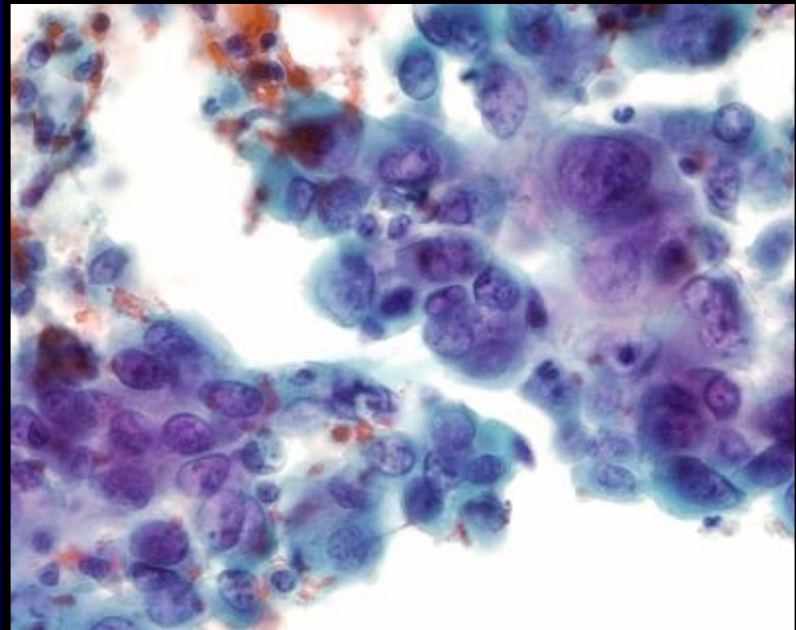
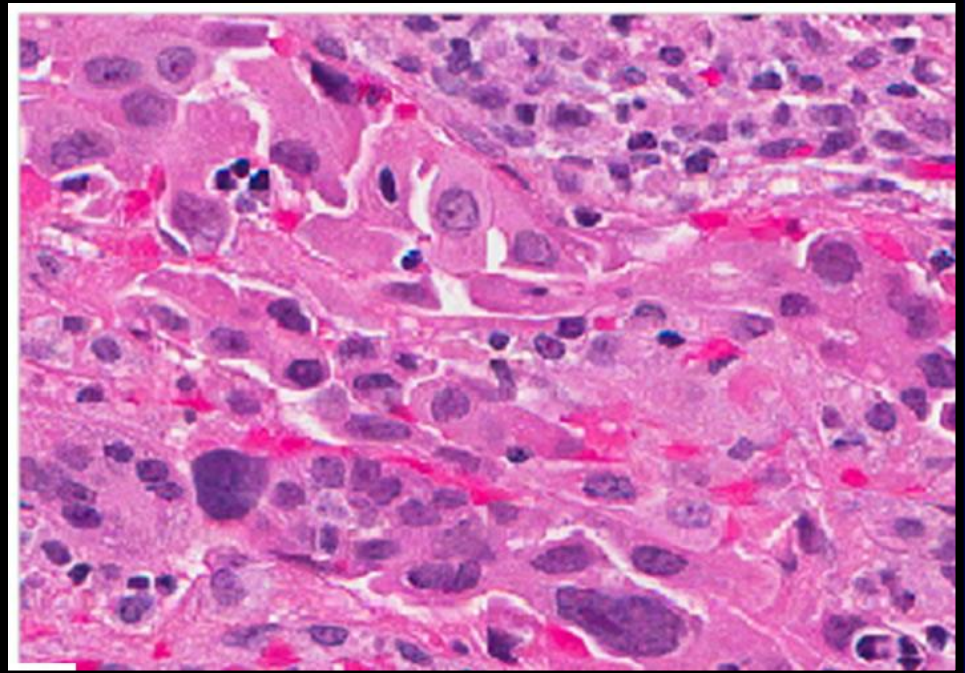
**Vascular  
invasion**



**Capsular  
invasion**

# ANAPLASTIC CARCINOMA

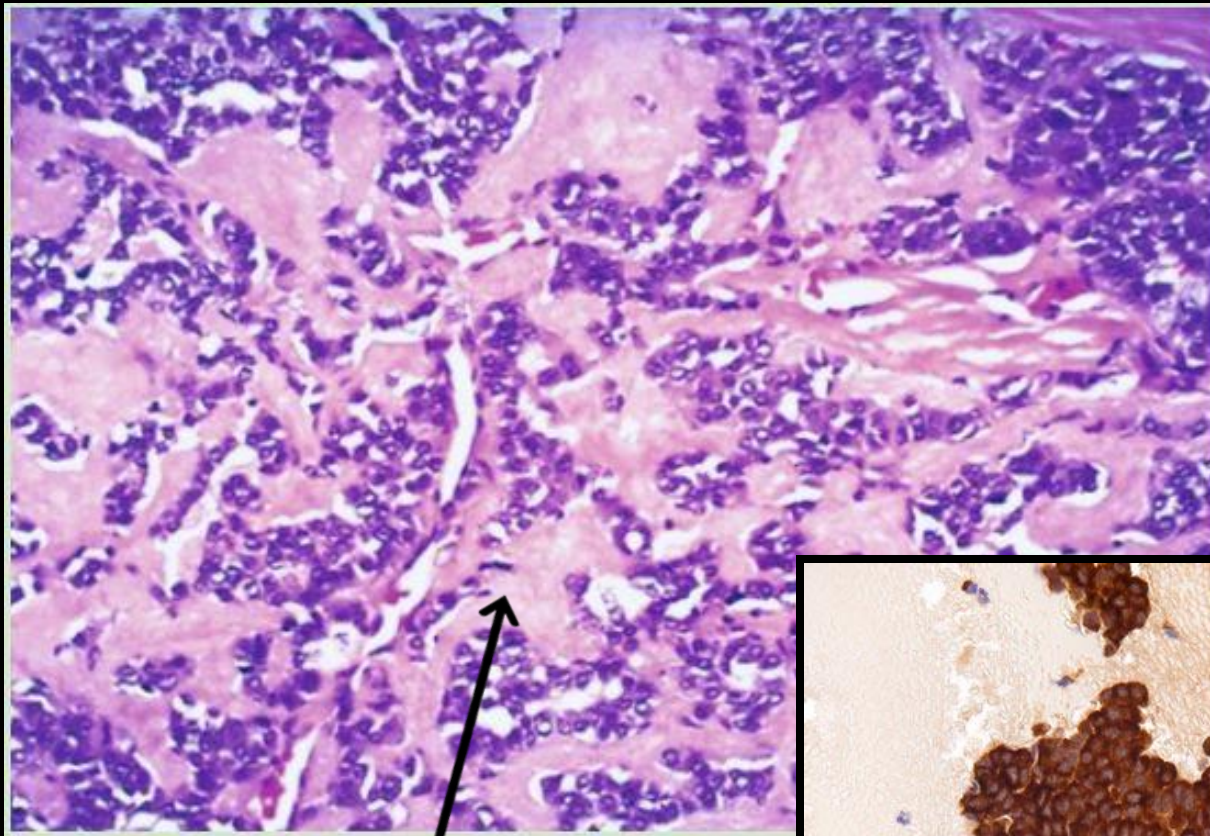
- < than 5%
- Undifferentiated carcinoma
- Very aggressive, 100% mortality
- > than 65 years
- 25% have hx of previous well-differentiated thyroid carcinoma



# **MEDULLARY CARCINOMA:**

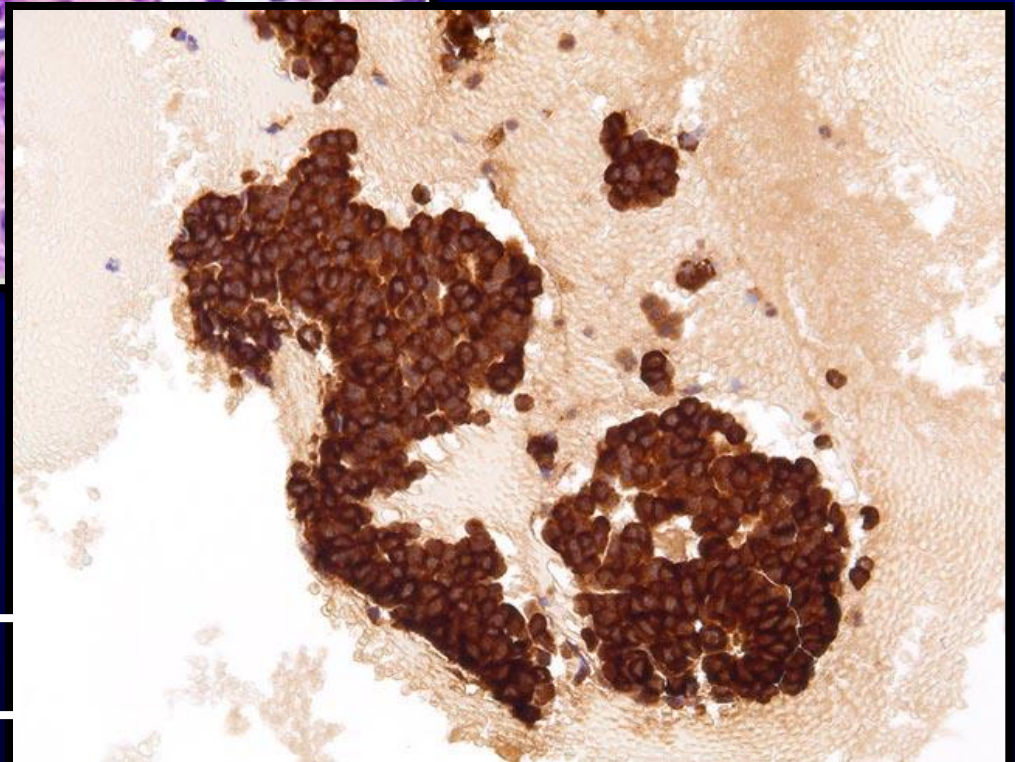
- **Arise from C cells (parafollicular cells) that secretes Calcitonin (increase level and hypocalcemia)**
- **70% sporadic, 30% familial (MEN 2A&B)**
- **RET receptor tyrosine kinase mutations**
- **Sporadic 50-60 years; familial younger**
- **Multicentric, contain amyloid**
- **RET +ve family members require prophylactic thyroidectomy**





**Amyloid**

**Calcitonin +ve by IHC**



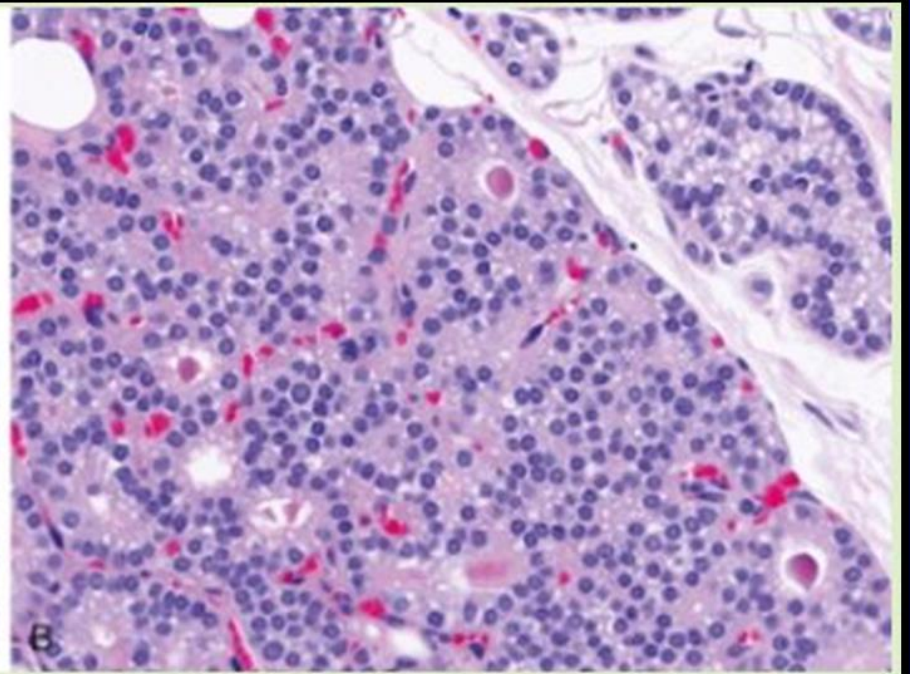
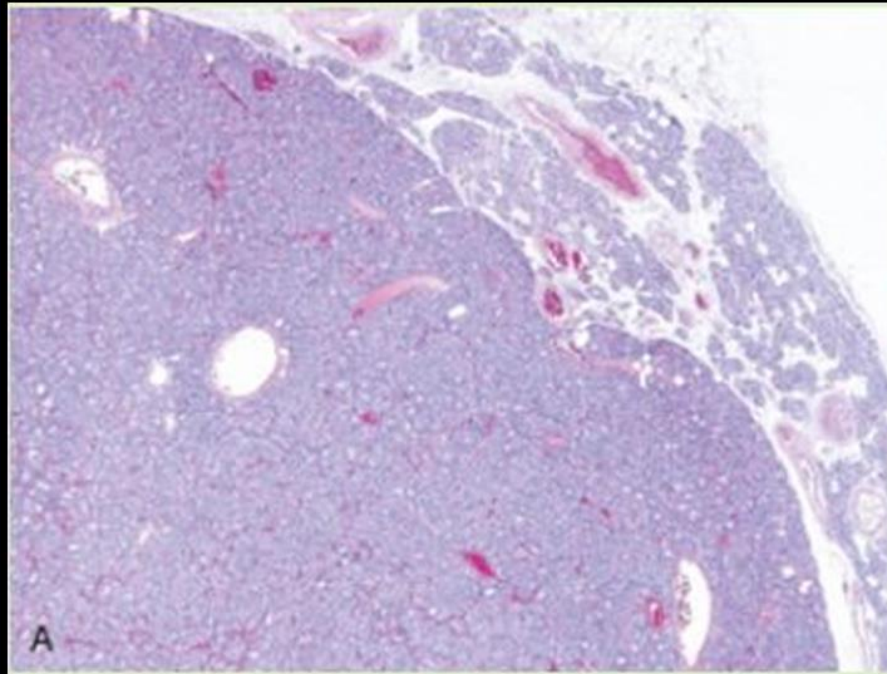
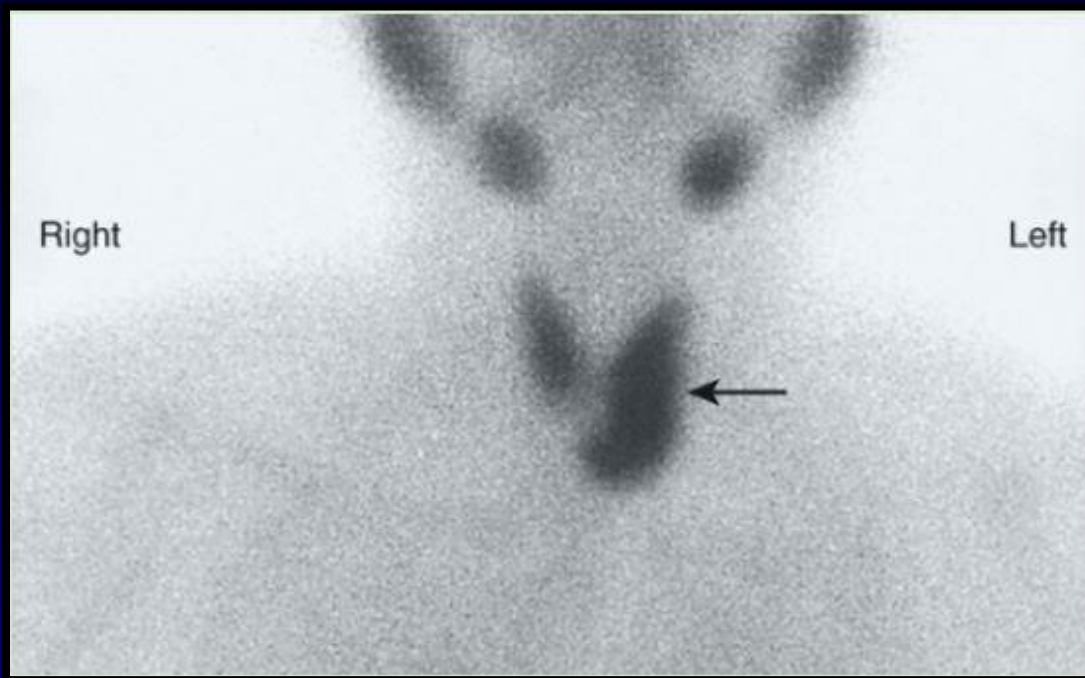
# PARATHYROID GLAND:

- PTH secreted by Chief cells.
- Controlled mainly by free  $\text{Ca}^{+2}$  level in serum less than trophic hormones
- Hyper, Hypo and tumors (rare mass effects)
- Functions of PTH:
  - Reabsorption of Ca from renal tubules
  - Excretion of  $\text{PO}_4$  into urine
  - Vit D conversion to active form
  - Stimulates osteoclast activity on bone resorption

# **HYPERPARATHYROIDISM:**

- **Primary, secondary and tertiary**
- **Osteitis fibrosa cystica, Brown tumor of bone, nephrolithiasis, nephrocalcinosis and metastatic calcifications**
- **Primary HPT:**
  - **Adenomas (85-95%, Hyperplasia (5-10%), carcinoma (1%)**
  - **Mutations: *Cyclin D1* gene on chromosome 12 or *MEN1* mutations**





# CAUSES OF HYPERCALCEMIA:

## Increased PTH

Hyperparathyroidism  
Primary (adenoma > hyperplasia)\*  
Secondary<sup>†</sup>  
Tertiary<sup>†</sup>  
Familial hypocalciuric hypercalcemia

## Decreased PTH

Hypercalcemia of malignancy  
Osteolytic metastases  
PTH-rP-mediated  
Vitamin D toxicity  
Immobilization  
Drugs (thiazide diuretics)  
Granulomatous diseases (sarcoidosis)

# Hyperparathyroidism classification

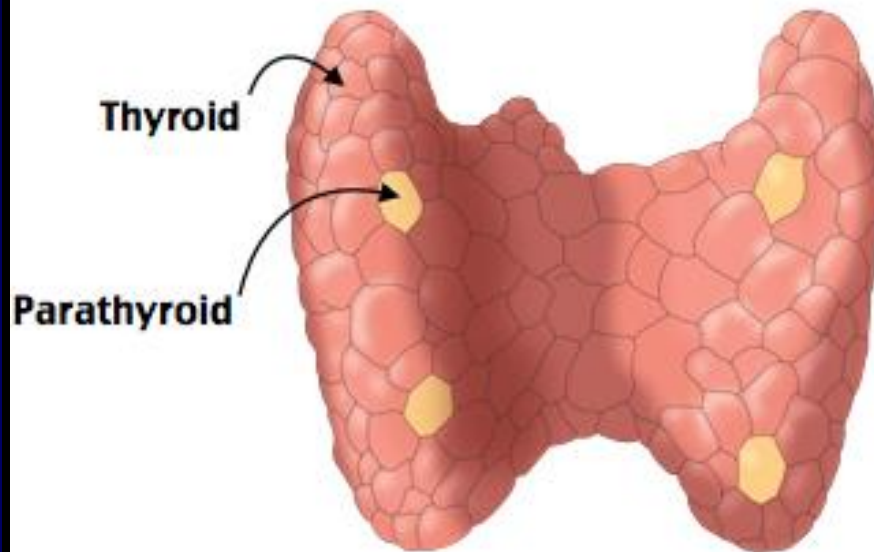
*Different causes and features of hyperparathyroidism - raised parathormone (PTH).*

	primary	secondary	tertiary
pathology	Hyperfunction of parathyroid cells due to hyperplasia, adenoma or carcinoma.	Physiological stimulation of parathyroid in response to hypocalcaemia.	Following long term physiological stimulation leading to hyperplasia.
associations	May be associated with multiple endocrine neoplasia.	Usually due to chronic renal failure or other causes of Vitamin D deficiency.	Seen in chronic renal failure.
serum calcium	high	low / normal	high
serum phosphate	low / normal	high	high
management	Usually surgery if symptomatic. Cinacalcet can be considered in those not fit for surgery.	Treatment of underlying cause.	Usually cinacalcet or surgery in those that don't respond.

NICE have issued guidance for the use of cinacalcet in what they call refractory secondary hyperparathyroidism which is classified as tertiary hyperparathyroidism in this table. <http://www.nice.org.uk/TA117>

# Hypoparathyroidism

↓PTH = ↓Calcium



## Causes

- Thyroid surgery
- Parathyroid surgery
- Autoimmune
- Infiltrative
- Familial
- Idiopathic

## Hypocalcemia

- Tetany
- Chvostek sign (Contraction of facial muscles after tapping facial nerve)
- Trousseau sign (Induction of carpal pedal spasm)
- Paresthesias (Fingertips/perioral)
- Prolonged QT interval

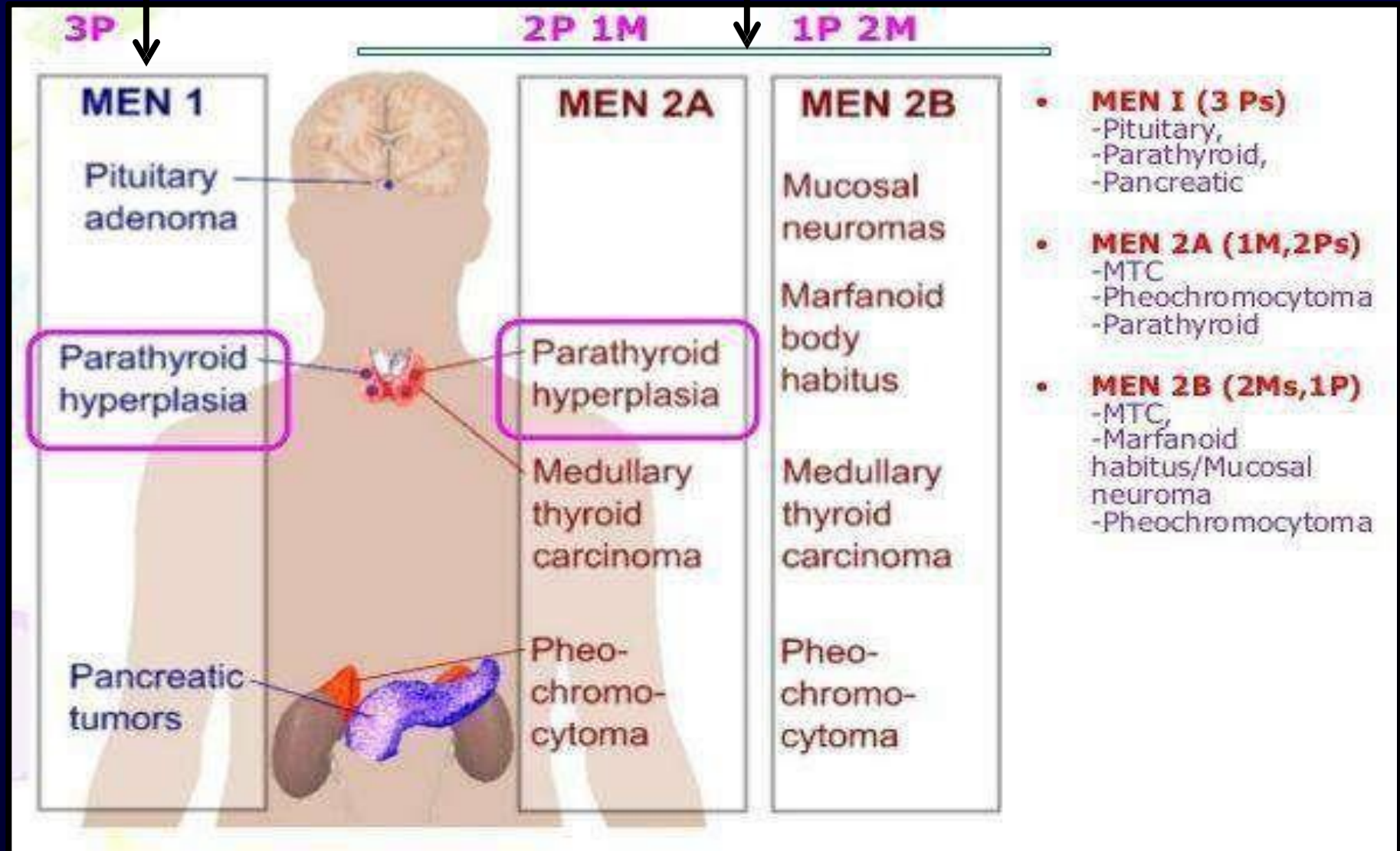


# **MULTIPLE ENDOCRINE NEOPLASIA SYNDROMES (MEN):**

- **Inherited disorders, proliferative of multiple endocrine organs**
- **Younger age groups**
- **Synchronous or meta-chronous in multiple organs**
- **Often multi-focal in the same organ**
- **Often preceded by asymptomatic hyperplasia**
- **More aggressive than their sporadic counterparts**

Chromosome 11: *MEN1*  
tumor suppressor gene  
encodes protein Menin

Chromosome 10: *RET* proto-  
oncogene, +ve test, prophylactic  
thyroidectomy



Good

Luck