



La nueva clasificación anatomopatológica OMS 2022 en neoplasias tiroideas

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WHO Classification of Tumours series

5th Edition 4th Edition Cytopathology



Haematolymphoid Tumours (5th ed.)

| Beta V2



Head and Neck Tumours (5th ed.)

| Beta



Endocrine and Neuroendocrine Tumours (5th ed.)

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Urinary and Male Genital Tumours (5th ed.)

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Endocrine and Neuroendocrine Tumours (5th ed.)

1. Forewords and introductions

[WHO Classification of Tumours: Editorial Board](#)
[How to cite this volume](#)
[Foreword with changes from the book, including corrigenda](#)
[ICD-O coding of Endocrine and neuroendocrine tumours](#)
[Introduction to Endocrine and Neuroendocrine tumours](#)

2. Pituitary gland

3. Thyroid gland

4. Parathyroid glands

5. Adrenal gland

6. Tumours of the adrenal medulla and extra-adrenal paraganglia

7. Neuroendocrine pancreas

8. Neuroendocrine neoplasms, non-endocrine organs

9. Mesenchymal and stromal tumours

10. Haematolymphoid tumours

11. Germ cell tumours

12. Metastasis

13. Genetic tumour syndromes



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Overview of the 2022 WHO Classification of Thyroid Neoplasms

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Chan Kwon Jung⁷  · Virginia A. LiVolsi¹  · Mauro G. Papotti⁸  · Manuel Sobrinho-Simões⁹  ·
Giovanni Tallini^{10,11}  · Ozgur Mete¹² 

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¿CUÁLES SON LOS TITULARES...?

CAMBIOS CONCEPTUALES



CAMBIOS TERMINOLÓGICOS

CAMBIOS EN LOS CRITERIOS DIAGNÓSTICOS



CAMBIOS CONCEPTUALES

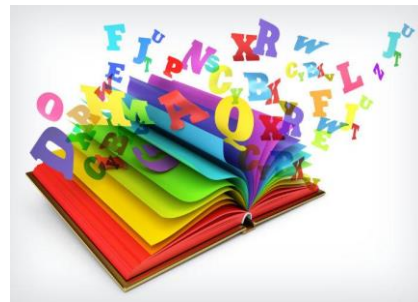


*La **estirpe celular**, **biología molecular**, características anatomopatológicas, y comportamiento biológico de los distintos tumores son los que guían su clasificación*

- Las neoplasias derivadas de la célula folicular se dividen en **benignas**, de **bajo riesgo** y **malignas**
- Las neoplasias malignas de célula folicular se estratifican según su perfil molecular (**BRAF like vs. RAS like**) y agresividad
- Se introduce el concepto “**alto grado**” (en carcinoma diferenciado de célula folicular y carcinoma medular)
- Los tumores en tiroides de **tipos celulares no específicamente tiroideos** (mesenquimales, hematolinfoides, germinales, metástasis...) constituyen capítulos independientes



CAMBIOS TERMINOLÓGICOS



- Se introduce el diagnóstico “**enfermedad folicular nodular benigna**” en el contexto clínico de bocio multinodular
- Se sustituye definitivamente el término célula de Hürthle por el de célula “**oncocítica**”
- Se sustituye el término “variante” por “**subtipo**” para los diferentes CPT
- El “**carcinoma cribiforme morular**” deja de ser un subtipo de CPT
- El “**microcarcinoma papilar**” deja de ser un subtipo de CPT
- El “**carcinoma escamoso**” primario tiroideo pasa a ser un carcinoma anaplásico



CAMBIOS EN LOS CRITERIOS DIAGNÓSTICOS



- Se *actualiza* el método de contaje del índice mitótico (**mitosis/mm²**), que cobra mayor importancia como criterio diagnóstico
- Se *revisan* los criterios diagnósticos del **NIFPT**
- Se *revisan* los criterios diagnósticos del subtipo “**células altas**” del CPT
- Se *define* con mayor precisión el criterio de “**neoplasia oncocítica**” (>75% del total)
- Se *incluye* el **adenoma folicular de arquitectura papilar** como una nueva entidad
- Se *incluye* el **tiroblastoma** como una nueva entidad



WHO 2017



TUMORES EN TIROIDES

ANARQUÍA EN LA CLASIFICACIÓN

Follicular adenoma	8330/0	Ectopic thymoma	8580/3
Hyalinizing trabecular tumour	8336/1*	Spindle epithelial tumour with thymus-like differentiation	8588/3
Other encapsulated follicular-patterned thyroid tumours		Intrathyroid thymic carcinoma	8589/3
Follicular tumour of uncertain malignant potential	8335/1*		
Well-differentiated tumour of uncertain malignant potential	8348/1*	Paraganglioma and mesenchymal/stromal tumours	
Non-invasive follicular thyroid neoplasm with papillary-like nuclear features	8349/1*	Paraganglioma	8693/3
		Peripheral nerve sheath tumours (PNSTs)	
		Schwannoma	9560/0
Papillary thyroid carcinoma (PTC)		Malignant PNST	9540/3
Papillary carcinoma	8260/3	Benign vascular tumours	
Follicular variant of PTC	8340/3	Haemangioma	9120/0
Encapsulated variant of PTC	8343/3	Cavernous haemangioma	9121/0
Papillary microcarcinoma	8341/3	Lymphangioma	9170/0
Columnar cell variant of PTC	8344/3	Angiosarcoma	9120/3
Oncocytic variant of PTC	8342/3	Smooth muscle tumours	
		Leiomyoma	8890/0
Follicular thyroid carcinoma (FTC), NOS	8330/3	Leiomyosarcoma	8890/3
FTC, minimally invasive	8335/3	Solitary fibrous tumour	8815/1
FTC, encapsulated angioinvasive	8339/3*		
FTC, widely invasive	8330/3	Haematolymphoid tumours	
		Langerhans cell histiocytosis	9751/3
Hürthle (oncocytic) cell tumours		Rosai-Dorfman disease	
Hürthle cell adenoma	8290/0	Follicular dendritic cell sarcoma	9758/3
Hürthle cell carcinoma	8290/3	Primary thyroid lymphoma	
Poorly differentiated thyroid carcinoma	8337/3	Germ cell tumours	
		Benign teratoma (grade 0 or 1)	9080/0
Anaplastic thyroid carcinoma	8020/3	Immature teratoma (grade 2)	9080/1
		Malignant teratoma (grade 3)	9080/3
Squamous cell carcinoma	8070/3		
		Secondary tumours	
Medullary thyroid carcinoma	8345/3		
Mixed medullary and follicular thyroid carcinoma	8346/3		
Mucoepidermoid carcinoma	8430/3		
Sclerosing mucoepidermoid carcinoma with eosinophilia	8430/3		
Mucinous carcinoma	8480/3		

The morphology codes are from the International Classification of Diseases for Oncology (ICD-O) [898A]. Behaviour is coded /0 for benign tumours; /1 for unspecified, borderline, or uncertain behaviour; /2 for carcinoma in situ and grade III intraepithelial neoplasia; and /3 for malignant tumours. The classification is modified from the previous WHO classification, taking into account changes in our understanding of these lesions.

*These new codes were approved by the IARC/WHO Committee for ICD-O.



WHO 2022



TUMORES DE TIROIDES

TAXONOMÍA EN LA CLASIFICACIÓN

- Developmental abnormalities
 - Thyroglossal duct cyst
 - Other congenital thyroid abnormalities
- Follicular cell-derived neoplasms
 - Benign tumours
 - Thyroid follicular nodular disease
 - Follicular thyroid adenoma
 - Follicular thyroid adenoma with papillary architecture
 - Oncocytic adenoma of the thyroid
 - Low risk neoplasms
 - Non-invasive follicular thyroid neoplasm with papillary-like nuclear features
 - Thyroid tumours of uncertain malignant potential
 - Hyalinizing trabecular tumour of thyroid
 - Malignant neoplasms
 - Follicular thyroid carcinoma
 - Invasive encapsulated follicular variant papillary carcinoma
 - Papillary thyroid carcinoma
 - Oncocytic carcinoma of the thyroid
 - Follicular-derived carcinomas, high-grade
 - Anaplastic follicular cell derived thyroid carcinoma
- Thyroid C-cell derived carcinoma
 - Medullary thyroid carcinoma
- Mixed medullary and follicular-cell derived carcinomas
 - Mixed medullary and follicular cell-derived thyroid carcinoma
- Salivary gland-type carcinomas of the thyroid
 - Mucoepidermoid carcinoma of the thyroid
 - Secretory carcinoma of salivary gland type
- Thyroid tumours of uncertain histogenesis
 - Sclerosing mucoepidermoid carcinoma with eosinophilia
 - Cribiform morular thyroid carcinoma
- Thymic tumours within the thyroid
 - Thymoma family
 - Spindle epithelial tumour with thymus-like elements
 - Thymic carcinoma family
- Embryonal thyroid neoplasms
 - Thyroblastoma



Developmental abnormalities

1. Thyroglossal duct cyst
2. Other congenital thyroid abnormalities

Follicular cell-derived neoplasms

1. Benign tumors
 - a. Thyroid follicular nodular disease
 - b. Follicular adenoma
 - c. Follicular adenoma with papillary architecture
 - d. Oncocytic adenoma of the thyroid
2. Low-risk neoplasms
 - a. Non-invasive follicular thyroid neoplasm with papillary-like nuclear features
 - b. Thyroid tumors of uncertain malignant potential
 - c. Hyalinizing trabecular tumor
3. Malignant neoplasms
 - a. Follicular thyroid carcinoma
 - b. Invasive encapsulated follicular variant papillary carcinoma
 - c. Papillary thyroid carcinoma
 - d. Oncocytic carcinoma of the thyroid
 - e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
 - f. Anaplastic follicular cell-derived thyroid carcinoma

NEOPLASIAS DERIVADAS DE LA CÉLULA FOLICULAR

Thyroid C-cell-derived carcinoma

1. Medullary thyroid carcinoma

NEOPLASIAS DERIVADAS DE LA CÉLULA PARAFOLICULAR

Mixed medullary and follicular cell-derived carcinomas

Salivary gland-type carcinomas of the thyroid

1. Mucoepidermoid carcinoma of the thyroid
2. Secretory carcinoma of salivary gland type

Thyroid tumors of uncertain histogenesis

1. Sclerosing mucoepidermoid carcinoma with eosinophilia
2. Cribriform morular thyroid carcinoma

OTRAS

Thymic tumors within the thyroid

1. Thymoma family
2. Spindle epithelial tumor with thymus-like elements
3. Thymic carcinoma family

Embryonal thyroid neoplasms

1. Thyroblastoma



Follicular cell-derived neoplasms

1. Benign tumors
 - a. Thyroid follicular nodular disease
 - b. Follicular adenoma
 - c. Follicular adenoma with papillary architecture
 - d. Oncocytic adenoma of the thyroid
2. Low-risk neoplasms
 - a. Non-invasive follicular thyroid neoplasm with papillary-like nuclear features
 - b. Thyroid tumors of uncertain malignant potential
 - c. Hyalinizing trabecular tumor
3. Malignant neoplasms
 - a. Follicular thyroid carcinoma
 - b. Invasive encapsulated follicular variant papillary carcinoma
 - c. Papillary thyroid carcinoma
 - d. Oncocytic carcinoma of the thyroid
 - e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
 - f. Anaplastic follicular cell-derived thyroid carcinoma

Thyroid C-cell-derived carcinoma

1. Medullary thyroid carcinoma

Mixed medullary and follicular cell-derived carcinomas

Salivary gland-type carcinomas of the thyroid

1. Mucoepidermoid carcinoma of the thyroid
2. Secretory carcinoma of salivary gland type

Thyroid tumors of uncertain histogenesis

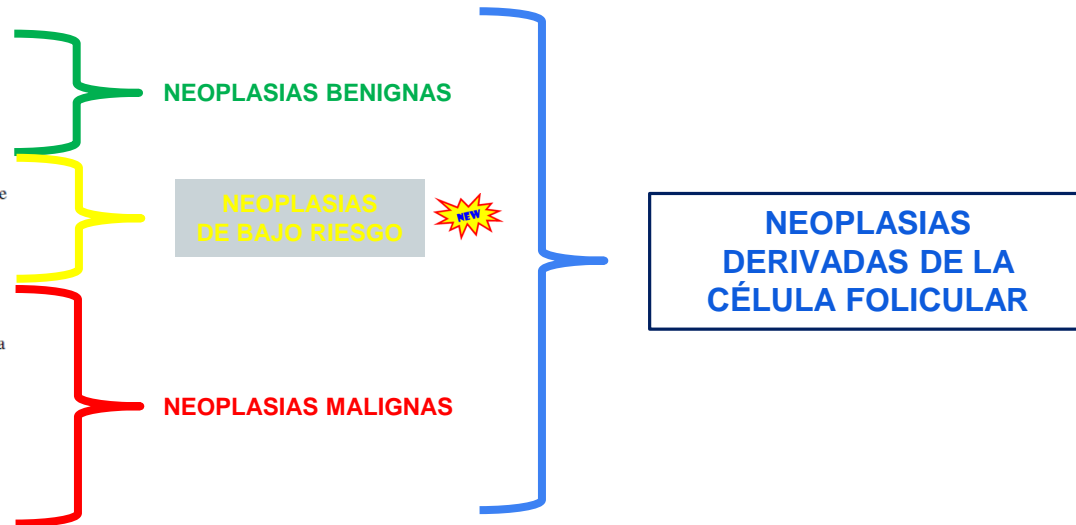
1. Sclerosing mucoepidermoid carcinoma with eosinophilia
2. Cribriform morular thyroid carcinoma

Thymic tumors within the thyroid

1. Thymoma family
2. Spindle epithelial tumor with thymus-like elements
3. Thymic carcinoma family

Embryonal thyroid neoplasms

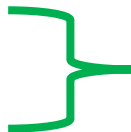
1. Thyroblastoma





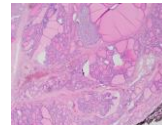
Follicular cell-derived neoplasms

- I. Benign tumors
 - a. Thyroid follicular nodular disease
 - b. Follicular adenoma
 - c. Follicular adenoma with papillary architecture
 - d. Oncocytic adenoma of the thyroid



NEOPLASIAS BENIGNAS
Fenotipo *RAS like*

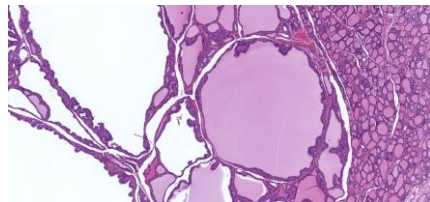
Desparecen los términos bocio multinodular, hiperplasia nodular, nódulo coloide, nódulo hiperplásico, nódulo adenomatoso, hiperplasia adenomatosa...



Mezcla de proliferaciones hiperplásicas y neoplásicas que se engloban en el término **“enfermedad nodular folicular”**

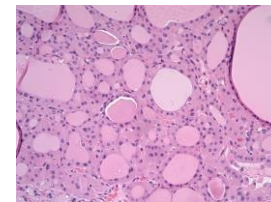


“Adenoma folicular de arquitectura papilar”



Arquitectura centrípetra característica, hipertiroidismo

“Adenoma oncocítico”



>75% componente oncocítico



2. Low-risk neoplasms

- a. Non-invasive follicular thyroid neoplasm with papillary-like nuclear features
- b. Thyroid tumors of uncertain malignant potential
- c. Hyalinizing trabecular tumor

NEOPLASIAS DE BAJO RIESGO
RAS LIKE (excepto TTH)



Tumores de estirpe folicular con clínica y morfología **intermedia** entre los benignos y los malignos

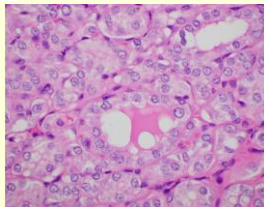
Extremadamente baja capacidad de metástasis

Agrupados en una única categoría

NIFTP

Neoplasia folicular no invasiva con núcleos de tipo papilar

- < 1 % de papilas en ausencia de mutación BRAF V600E
- Incluye lesiones > 2 mm
- Incluye lesiones oncocíticas

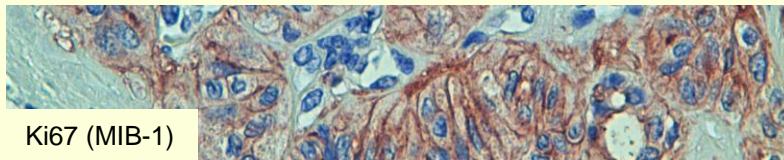


TUMORES DE POTENCIAL INCIERTO (FT-UMP y WDT-UMP)

- Invasión vascular y/o capsular cuestionable

TUMOR TRABECULAR HIALINIZANTE

- Se incorpora a la categoría de tumores inciertos
- Reordenamiento de GLIS (específico)



Ki67 (MIB-1)

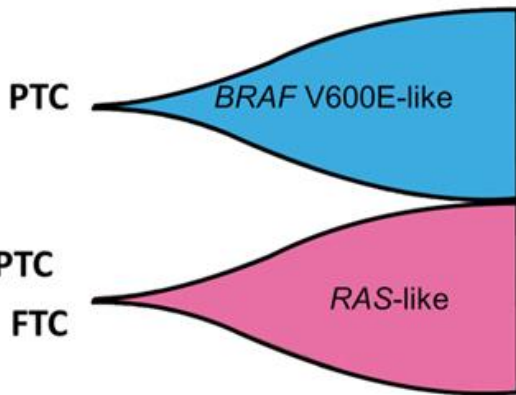


3. Malignant neoplasms

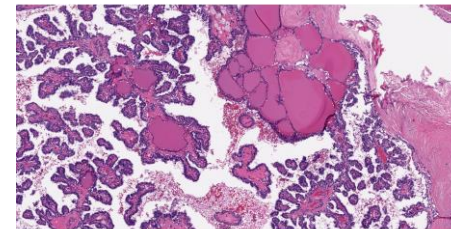
- a. Follicular thyroid carcinoma
- b. Invasive encapsulated follicular variant papillary carcinoma
- c. Papillary thyroid carcinoma
- d. Oncocytic carcinoma of the thyroid
- e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
- f. Anaplastic follicular cell-derived thyroid carcinoma

NEOPLASIAS MALIGNAS

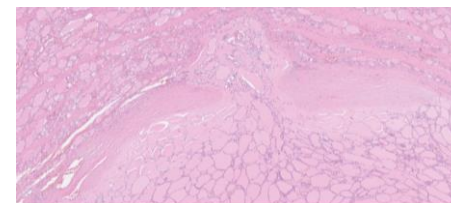
El **fenotipo molecular** rige la clasificación de los tumores y correlaciona con la morfología
El **IEVFPTC** deja de ser un subtipo de CPT



Atipia nuclear florida
Arquitectura no folicular
Patrón infiltrativo
Cápsula infrecuente



Escasa atipia nuclear
Arquitectura folicular
Patrón expansivo/invasivo
Cápsula frecuente





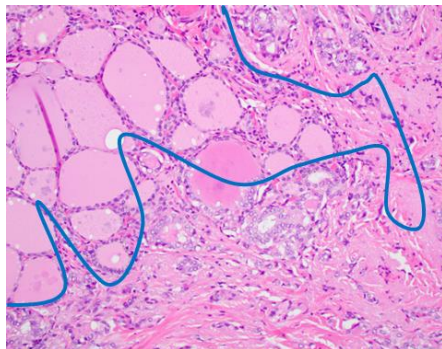
3. Malignant neoplasms

- a. Follicular thyroid carcinoma
- b. Invasive encapsulated follicular variant papillary carcinoma
- c. Papillary thyroid carcinoma (VF)
- d. Oncocytic carcinoma of the thyroid
- e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
- f. Anaplastic follicular cell-derived thyroid carcinoma

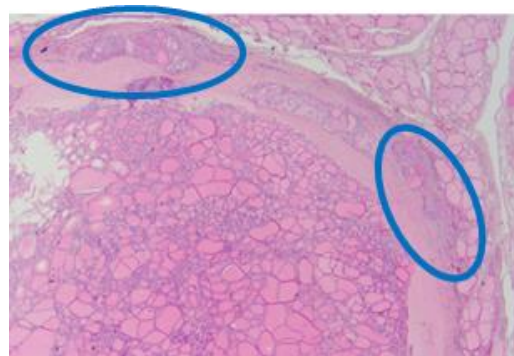
NEOPLASIAS MALIGNAS

CARCINOMA PAPILAR DE VARIANTE FOLICULAR (CPVF)

CPVF INFILTRATIVO → BRAF LIKE



CPVF ENCAPSULADO INVASIVO → RAS LIKE





3. Malignant neoplasms

- a. Follicular thyroid carcinoma
- b. Invasive encapsulated follicular variant papillary carcinoma
- c. Papillary thyroid carcinoma (VF)
- d. Oncocytic carcinoma of the thyroid
- e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
- f. Anaplastic follicular cell-derived thyroid carcinoma

NEOPLASIAS MALIGNAS

CARCINOMAS DIFERENCIADOS DE PATRÓN FOLICULAR

CARCINOMA FOLICULAR

CPVF

CARCINOMA ONCOCÍTICO

REPERCUSIÓN CLÍNICA

MÍNIMAMENTE INVASIVO



BAJO RIESGO

ANGIOINVASIVO

AMPLIAMENTE INVASIVO



ALTO RIESGO



- 3. Malignant neoplasms
 - a. Follicular thyroid carcinoma
 - b. Invasive encapsulated follicular variant papillary carcinoma
 - c. Papillary thyroid carcinoma
 - d. Oncocytic carcinoma of the thyroid
 - e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
 - f. Anaplastic follicular cell-derived thyroid carcinoma

NEOPLASIAS MALIGNAS

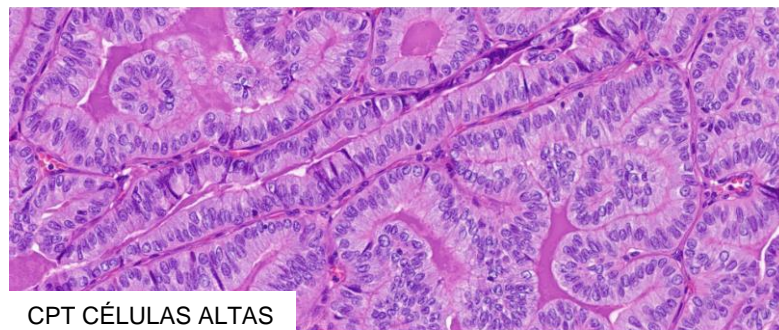
Subtype(s)

- Classic PTC
- Encapsulated classic PTC
- Infiltrative follicular PTC
- Diffuse sclerosing PTC
- Solid/trabecular PTC
- Warthin-like PTC
- Oncocytic PTC
- Clear cell PTC
- Spindle cell PTC
- PTC with fibromatosis/fasciitis-like/desmoid-type stroma
- Tall cell PTC
- Hobnail PTC
- Columnar cell PTC

RIESGO INTERMEDIO
DE RECURRENCIA (ATA)

El **microcarcinoma papilar** deja de ser un subtipo de CPT

Criterios más estrictos para el **CPT de células altas**
(células 3 veces más altas que anchas)



CPT CÉLULAS ALTAS



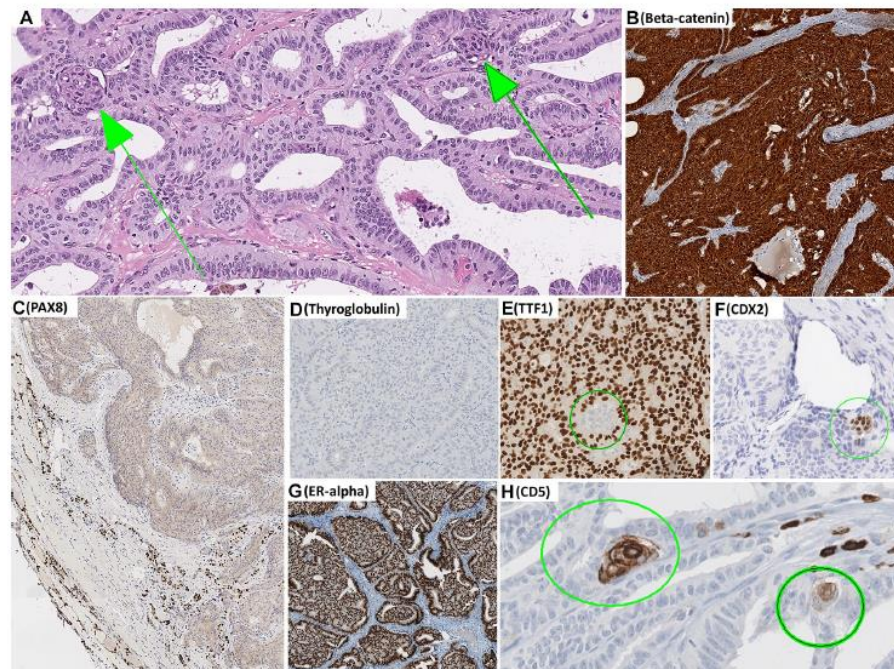
Thyroid tumors of uncertain histogenesis

1. Sclerosing mucoepidermoid carcinoma with eosinophilia
2. Cribriform morular thyroid carcinoma

El **CARCINOMA CRIBIFORME MORULAR** DEJA DE SER UN CPT Y PARA PASAR A SER UN CARCINOMA DE HISTOGÉNESIS INCIERTA



Alteración de la vía Wnt/beta-catenina
Perfil IHQ híbrido





- 3. Malignant neoplasms
 - a. Follicular thyroid carcinoma
 - b. Invasive encapsulated follicular variant papillary carcinoma
 - c. Papillary thyroid carcinoma
 - d. Oncocytic carcinoma of the thyroid
 - e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
 - f. Anaplastic follicular cell-derived thyroid carcinoma



NEOPLASIAS MALIGNAS

**CARCINOMA DIFERENCIADO DE ALTO GRADO
BRAF like (la mayoría)**



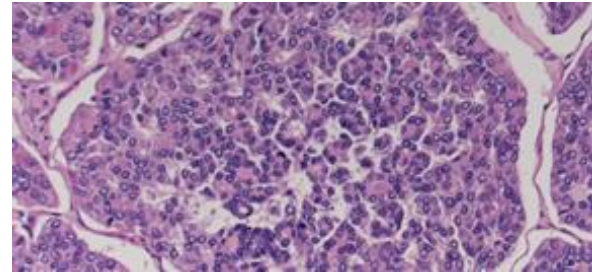
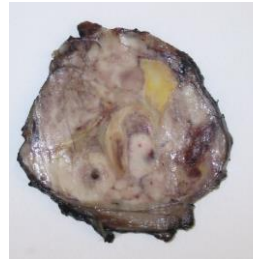
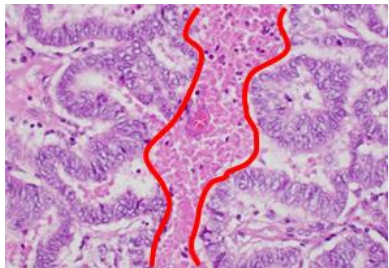
**CARCINOMA POCO DIFERENCIADO
RAS like**

CUALQUIER CARCINOMA DIFERENCIADO
(CPT >%) INVASIVO CON:

- NECROSIS y/o
- ≥ 5 MITOSIS / 2 mm^2 (10 campos de gran aumento)

CRITERIOS DE TORINO CLÁSICOS

- TUMOR INVASIVO DE PATRÓN SÓLIDO/INSULAR/TRABECULAR
- NO NÚCLEOS DE CPT
- NÚCLEOS CONVOLUTOS Y/O ≥ 3 MITOSIS / 2 mm^2 Y/O NECROSIS





- 3. Malignant neoplasms
 - a. Follicular thyroid carcinoma
 - b. Invasive encapsulated follicular variant papillary carcinoma
 - c. Papillary thyroid carcinoma
 - d. Oncocytic carcinoma of the thyroid
 - e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
 - f. Anaplastic follicular cell-derived thyroid carcinoma



NEOPLASIAS MALIGNAS

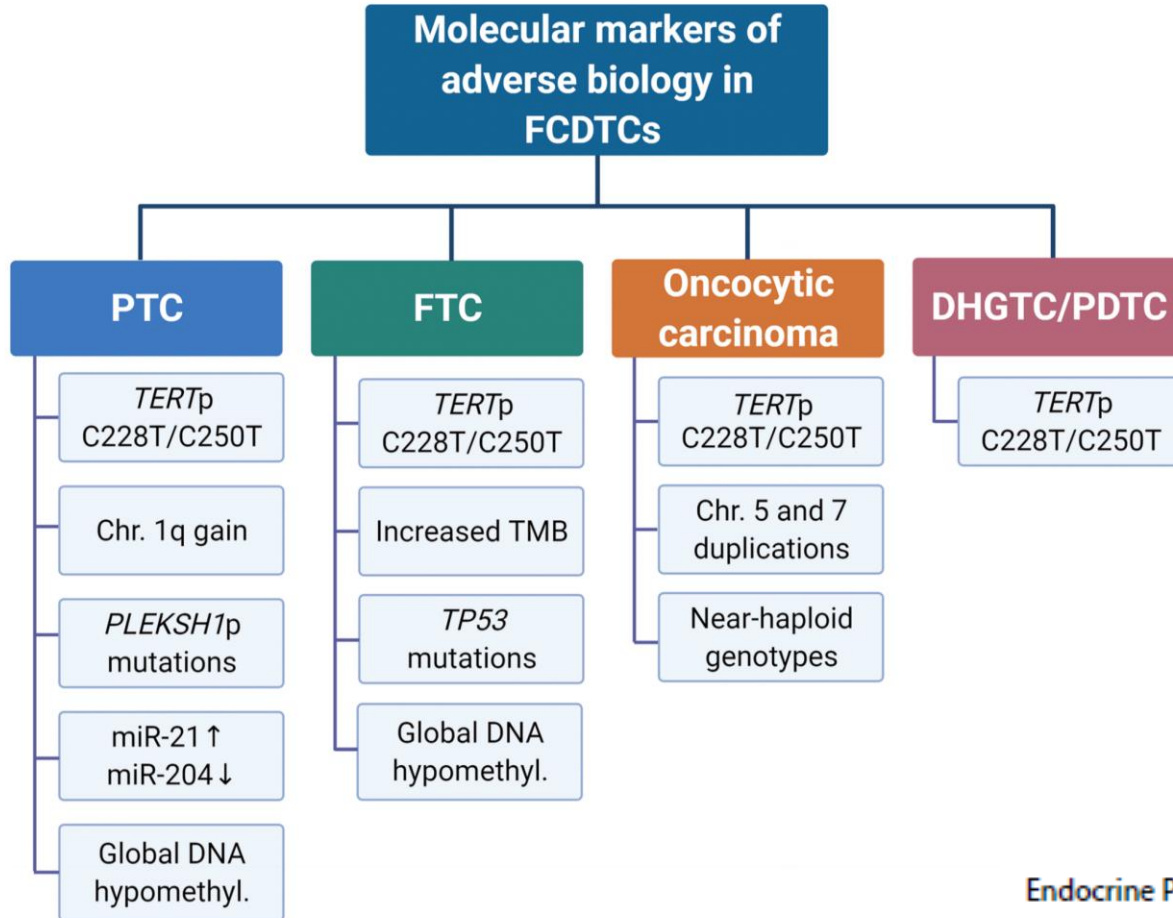
Histotype	Differentiation (growth pattern)	Grade (mitotic activity, tumor necrosis)	Prognosis
PTC	Good (papillae, follicles)	Low	Excellent
FTC			
OCA			
DHGTC (papillary, follicular, oncocytic)	Poor (solid/trabecular/insular growth)	High	Intermediate
PDTC			
ACA	Absent (undifferentiated growth)		Dismal



AMBOS ALTO RIESGO, SIN DIFERENCIAS

SUPERVIVENCIA 50% A LOS 10 AÑOS

50% SON RESISTENTES A TERAPIA CON YODO (CANDIDATOS A TERAPIA SISTÉMICA SEGÚN FIRMA MOLECULAR)





- 3. Malignant neoplasms
 - a. Follicular thyroid carcinoma
 - b. Invasive encapsulated follicular variant papillary carcinoma
 - c. Papillary thyroid carcinoma
 - d. Oncocytic carcinoma of the thyroid
 - e. Follicular-derived carcinomas, high-grade
 - i. Differentiated high-grade thyroid carcinoma
 - ii. Poorly differentiated thyroid carcinoma
 - f. Anaplastic follicular cell-derived thyroid carcinoma

NEOPLASIAS MALIGNAS

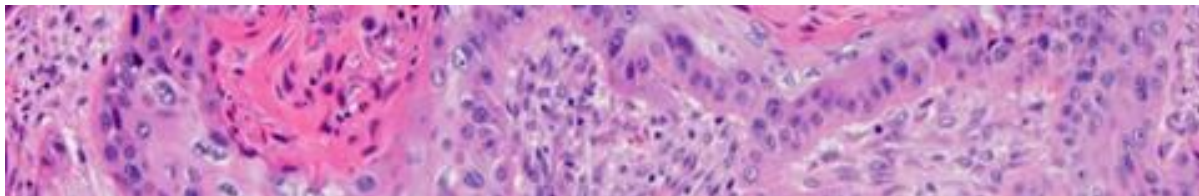
EL CARCINOMA ESCAMOSO PRIMARIO DE TIROIDES SE CONSIDERA UN CARCINOMA ANAPLÁSICO:



MUTACIÓN *BRAF* V600E O EXPRESIÓN DE PAX8/TTF1 QUE CONFIRMAN ESTIRPE FOLICULAR
COMPORTAMIENTO CLÍNICO SIMILAR



TESTAR LA MUTACIÓ *BRAF* V600E DE ENTRADA → TERAPIA DIRIGIDA (BRAF/MEK)





Thyroid C-cell-derived carcinoma

1. Medullary thyroid carcinoma

SE INTRODUCE LA **GRADACIÓN** DE LOS TUMORES

ALTO GRADO



NECROSIS

Y/O

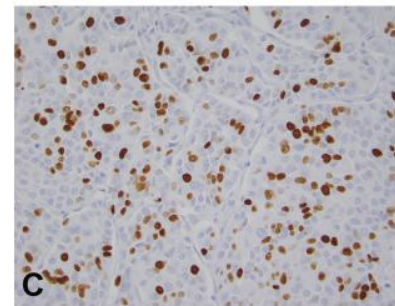
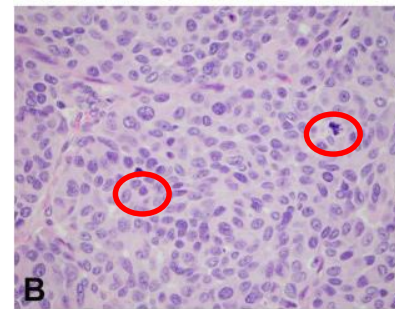
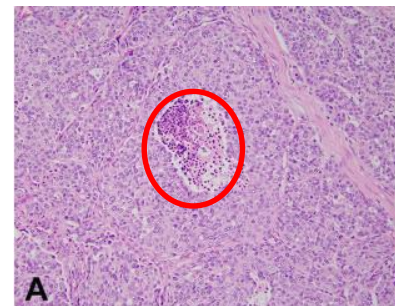
≥ 5 MITOSIS / 2 mm^2

Y/O

Ki67 $\geq 5\%$

INCLUIR ESTOS CRITERIOS EN EL INFORME AP,
SEA O NO UN CMT DE ALTO GRADO

ALTO GRADO SUPONEN EL 25% APROX., INDEPENDIENTE DE MUTACIÓN *RET* O *RAS*
BUEN PREDICTOR DE EVOLUCIÓN ADVERSA





Mixed medullary and follicular cell-derived carcinomas

Salivary gland-type carcinomas of the thyroid

1. Mucoepidermoid carcinoma of the thyroid
2. Secretory carcinoma of salivary gland type


Thyroid tumors of uncertain histogenesis

1. Sclerosing mucoepidermoid carcinoma with eosinophilia
2. Cribriform morular thyroid carcinoma

Thymic tumors within the thyroid

1. Thymoma family
2. Spindle epithelial tumor with thymus-like elements
3. Thymic carcinoma family

Embryonal thyroid neoplasms

1. Thyroblastoma 

NEOPLASIAS RARAS

La **histogénesis** también rige la clasificación de los tumores infrecuentes

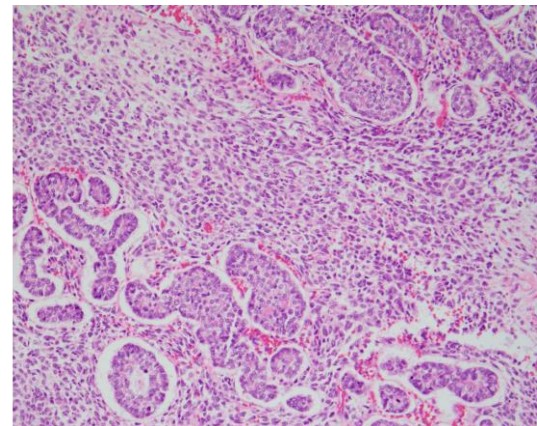


Aparece el **tiroblastoma** como una nueva entidad



Tumor embionario de alto grado
Mutaciones en *DICER1*

Células foliculares primitivas + células pequeñas
+ estroma mesenquimal



¿EN QUÉ PUNTO ESTAMOS...?

ESPERANDO LA **IMPRESIÓN** DEFINITIVA DE LA CLASIFICACIÓN WHO 22



ESPERANDO LA NUEVA ACTUALIZACIÓN DE LA GUÍA **ATA** (2023?)



ESPERANDO LA NUEVA ACTUALIZACIÓN DE **BETHESDA** 2023

