



Germans Trias i Pujol  
Hospital

**UAB**

Universitat Autònoma  
de Barcelona

# Inmunohistoquímica en tumores de partes blandas superficiales: aspectos prácticos

MT Fernández-Figueras

# Cuatro tropiezos que me han enseñado





*"El que no sabe lo que busca no  
entiende lo que encuentra "*

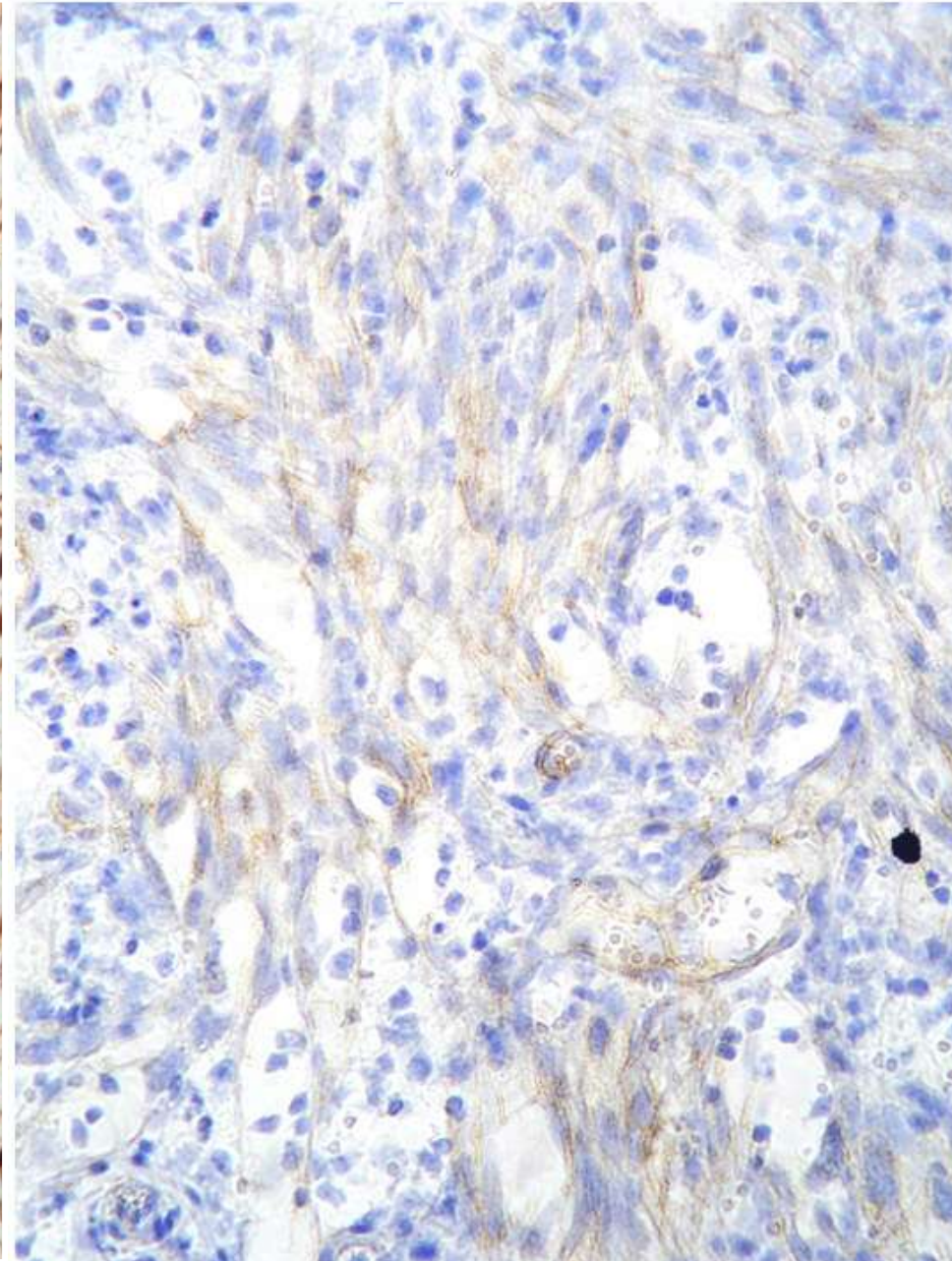
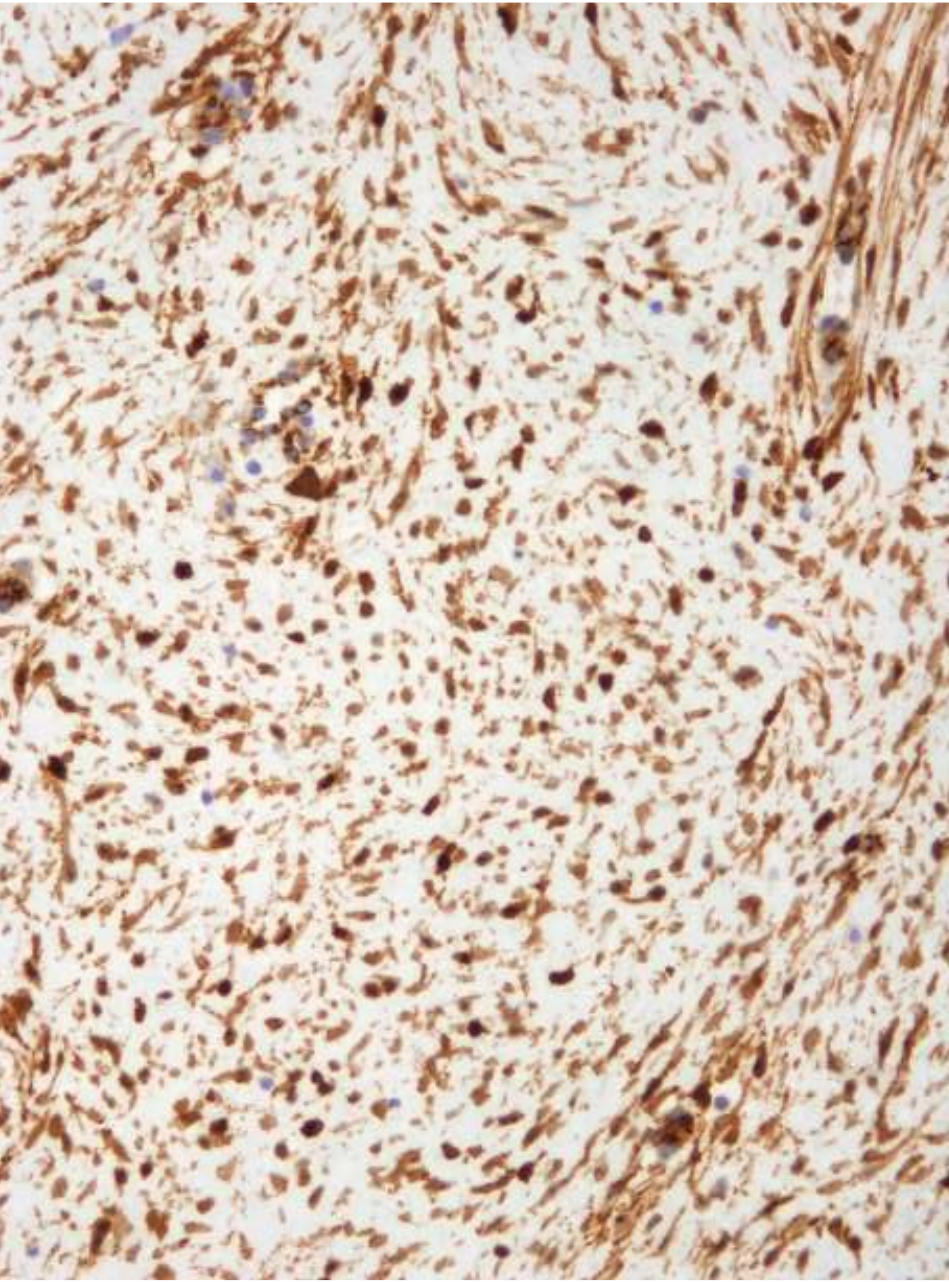
*Claude Bernard*

*"El que no sabe lo que busca no  
entiende lo que encuentra "*

*Claude Bernard*

**Diagnóstico diferencial en HE**

# $\beta$ -catenina



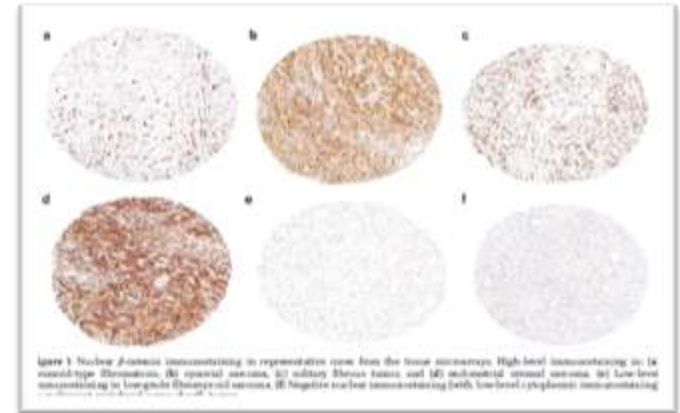
# Nuclear beta-catenin in mesenchymal tumors

Tony L Ng<sup>1</sup>, Allen M Gown<sup>2</sup>, Todd S Barry<sup>2</sup>, Maggie CU Cheang<sup>1</sup>, Andy KW Chan<sup>1</sup>, Dmitry A Turbin<sup>1</sup>, Forrest D Hsu<sup>1</sup>, Robert B West<sup>3</sup> and Torsten O Nielsen<sup>1</sup>

Modern Pathology (2005) 18, 68–74

nuclear expression of  $\beta$ -catenin is seen in a very restricted subset of mesenchymal tumors.

A large proportion of cases of desmoid-type fibromatosis do indeed show nuclear immunostaining



## Fibroblastic/myofibroblastic

Fasciitis (nodular, cranial, proliferative)	6	0 (0%)
Inflammatory myofibroblastic tumor	3	0 (0%)
Fibroma, benign	1	0 (0%)
Elastofibroma	1	0 (0%)
Fibroblastoma, desmoplastic	2	0 (0%)
Fibromatosis, desmoid-type	17	12 (71%)
Solitary fibrous tumor	15	6 (40%)
Hemangiopericytoma	5	0 (0%)
Dermatofibrosarcoma protuberans	9	0 (0%)
Low-grade fibromyxoid sarcoma	6	0 (0%)
Myxofibrosarcoma	2	0 (0%)
Fibrosarcoma	3	1 (33%)

# Mi panel básico de anticuerpos

## Multiusos

### T. blandos

- S100
- CD34
- SMA
- EMA
- CD10
- CD99
- CD117
- Bcl-2

### Epitelial y Epiteliode

- AE1/AE3
- CAM5.2
- CK7
- CK20

## Específicos

### Muscular

- Desmina
- Miogenina
- Caldesmon

### Neural

- Neurofilamentos
- GFAP
- PGP 9.5

### Vascular

- CD31
- D2-40
- VEGFR-3

### Adiposo

- MDM2

### Viral

- HHV8
- EBV

### Fibrohistiocitario

- Factor XIIIa
- CD68

## Para descartar otras posibilidades

- HMB45/Melan A
- CD56
- Sinaptofisina

### Linfocitario

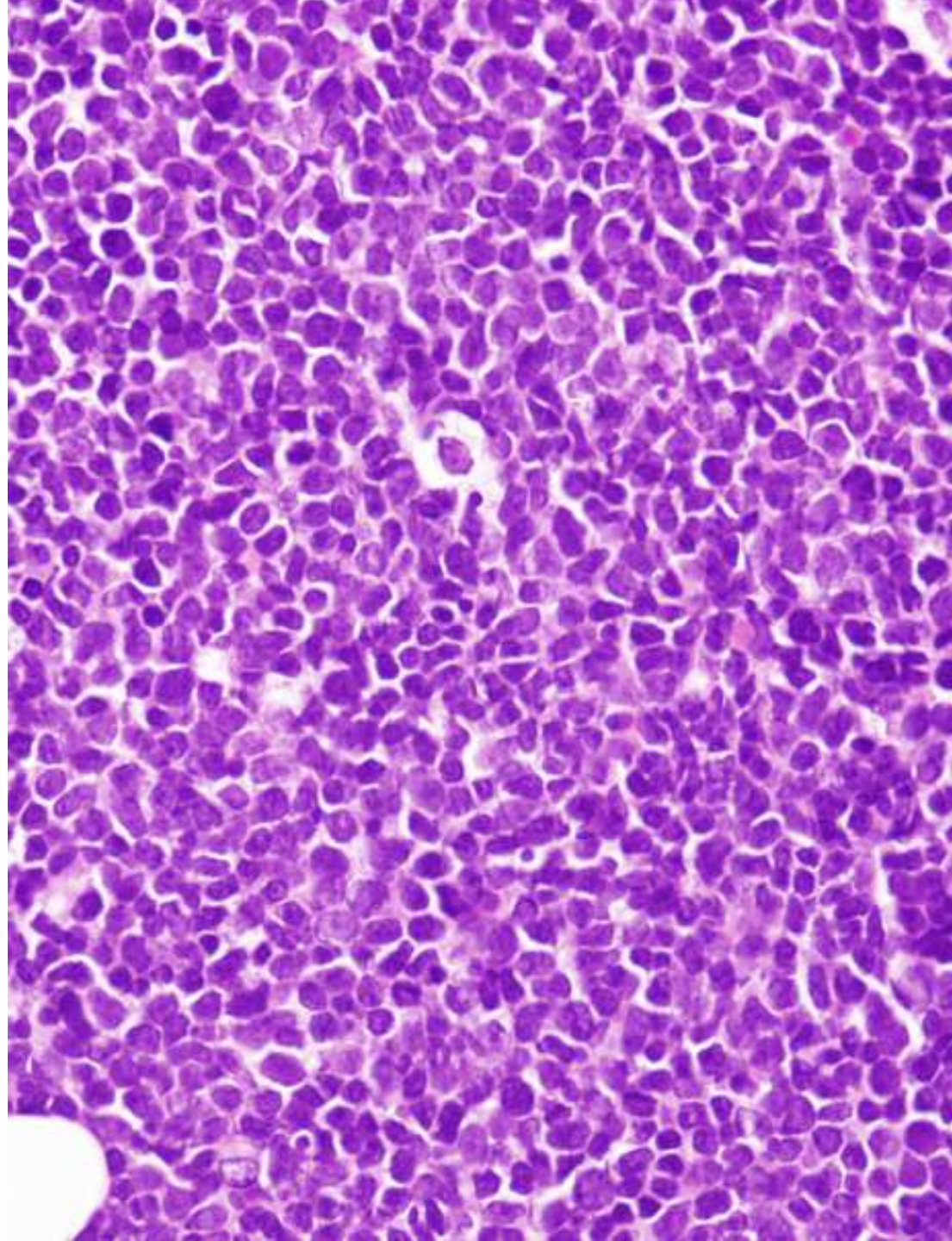
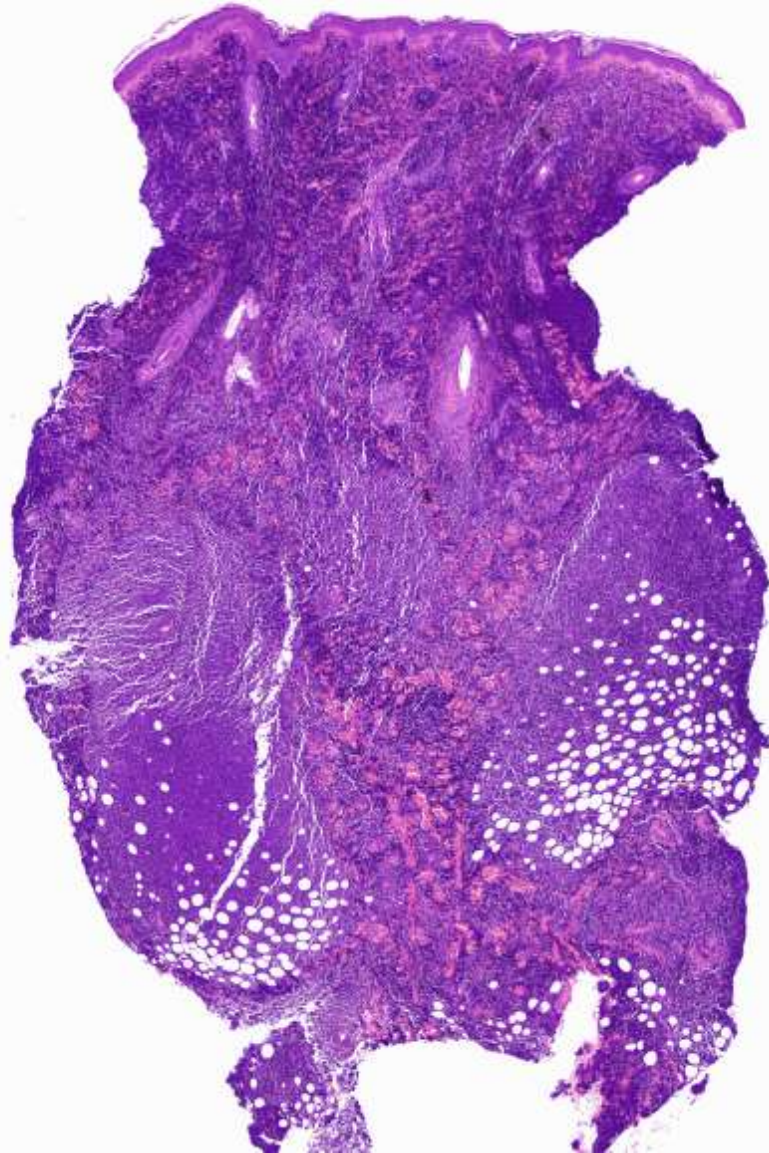
- CLA
- CD3
- CD20



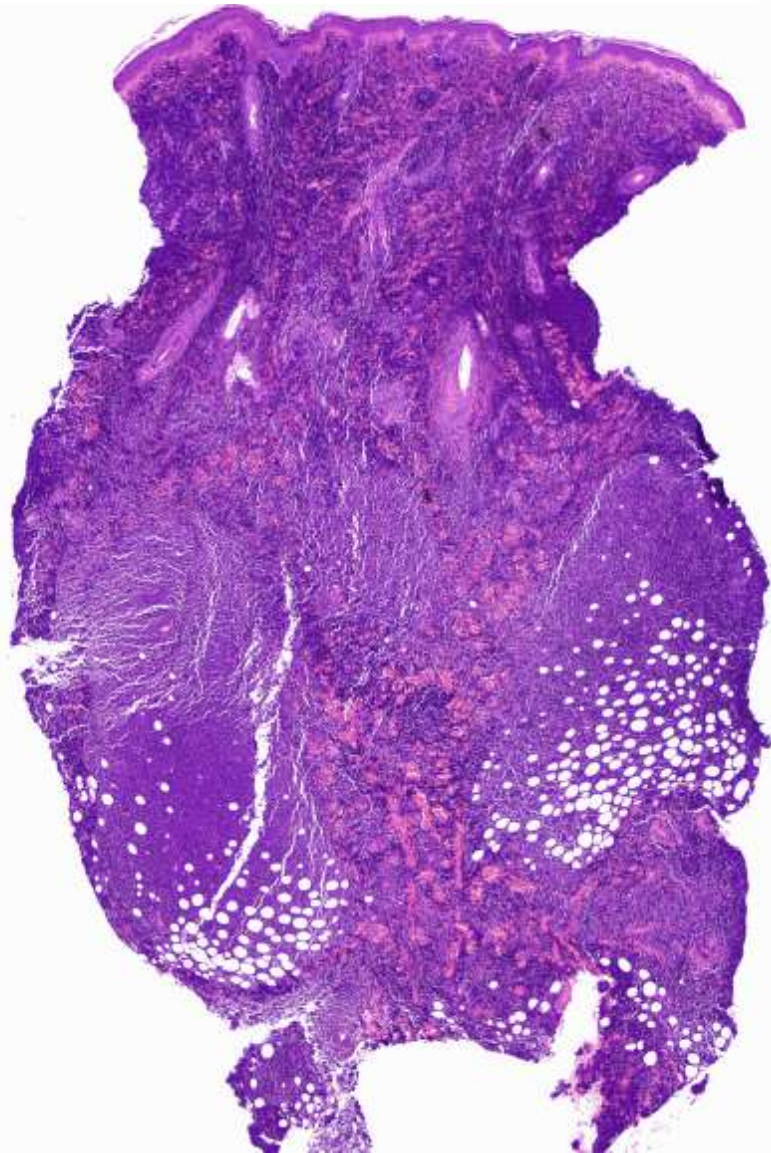
**Olvida la vimentina !**



- Lesión nasal en un niño de 2 años

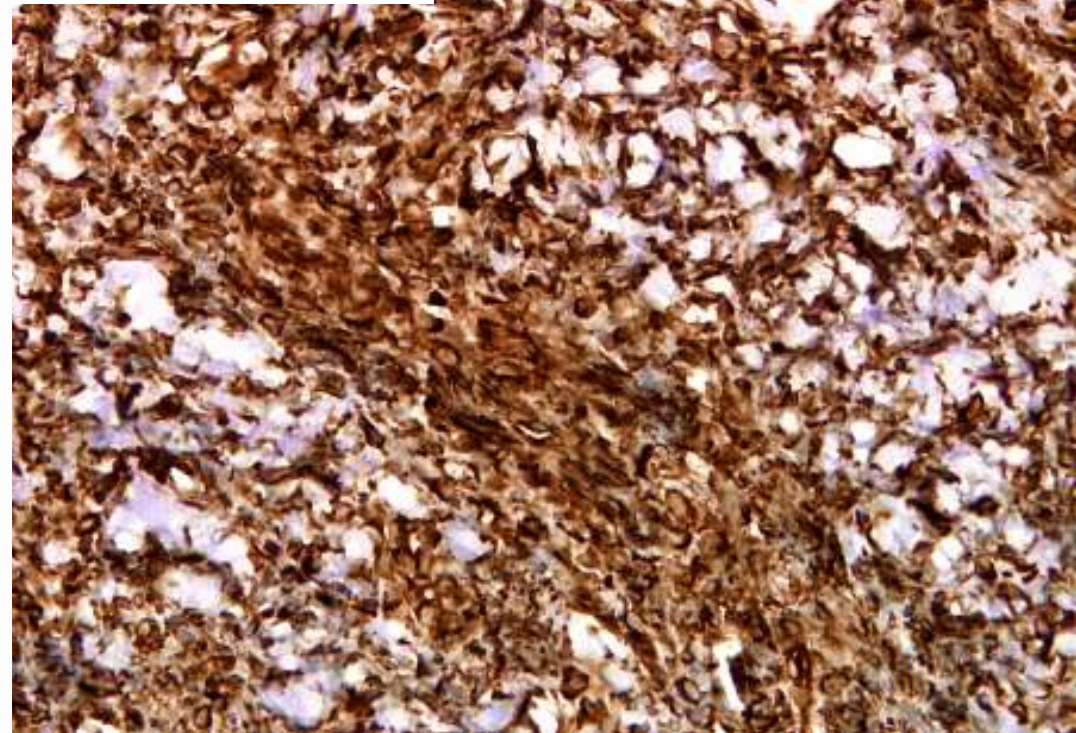


# Leucemia linfoblástica aguda pre-B



## ■ Vimentina

- CD20 -
- CD3 -
- LCA +
- CD10 +
- CD79a +



**¿Y los anticuerpos  
"de moda"?**

*“Moda es...  
todo lo que puede  
pasar de moda”*

*Gabrielle Coco Chanel*



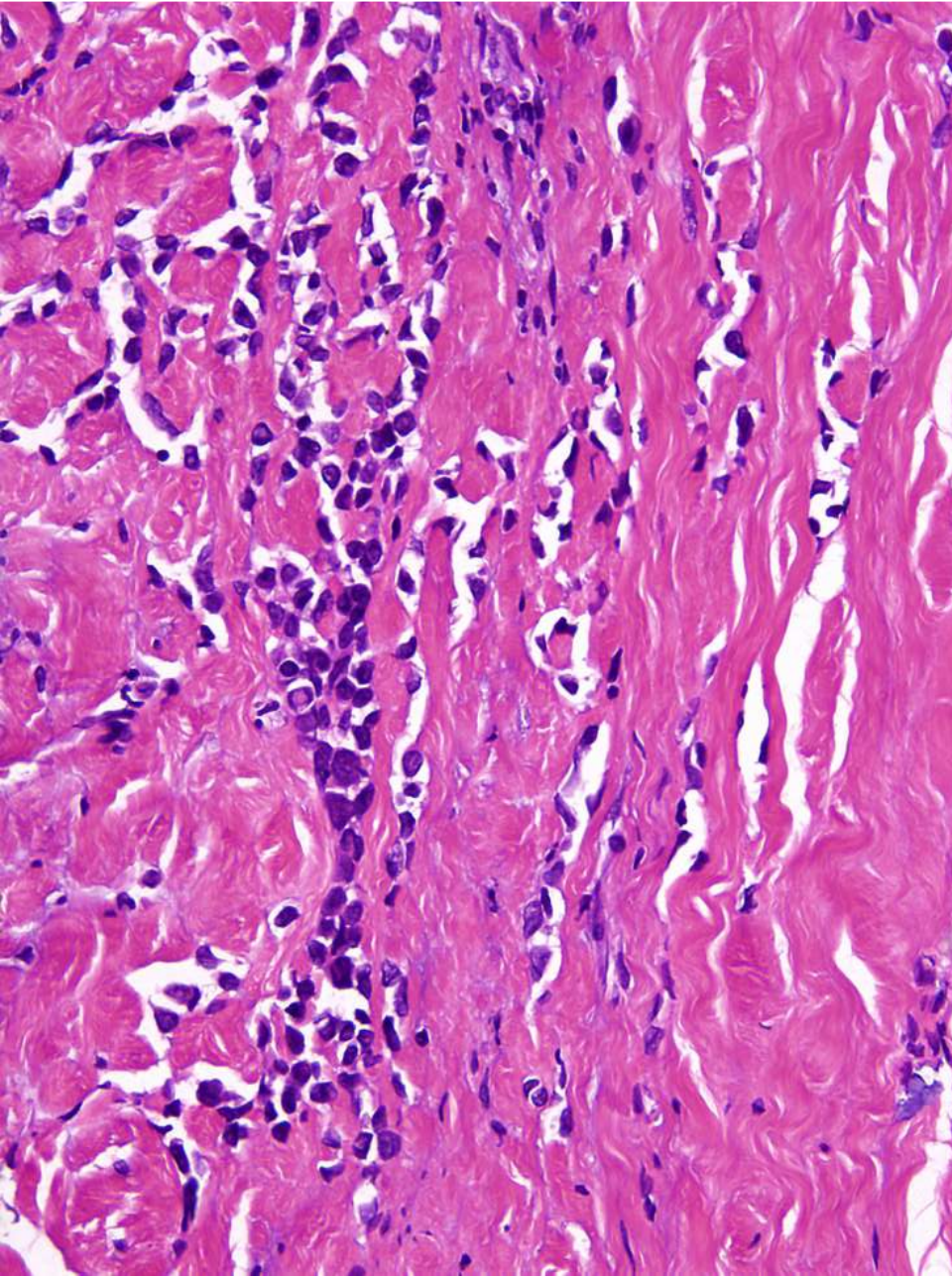


# Considerar todas las posibilidades



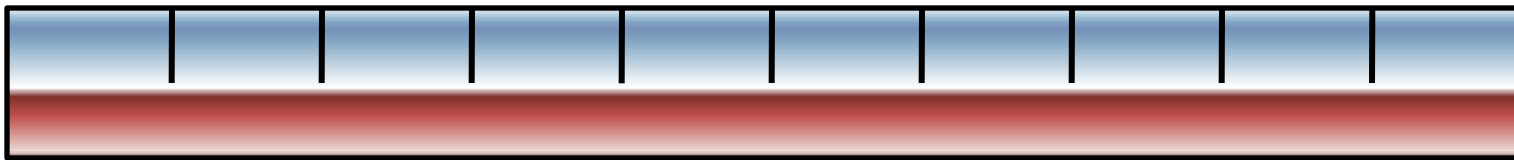
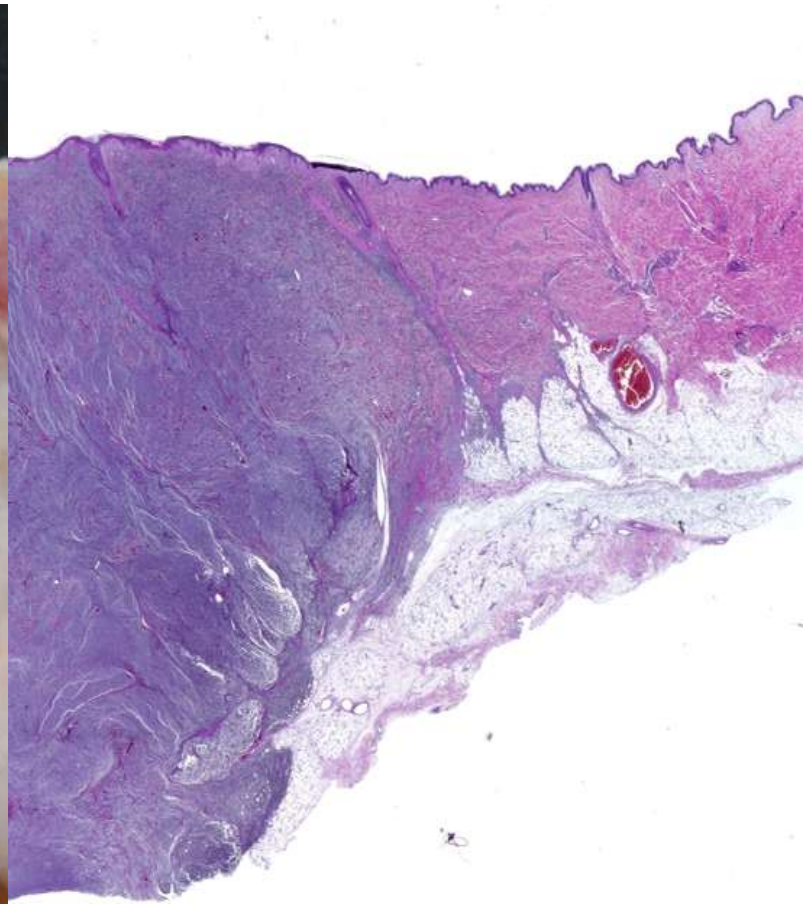
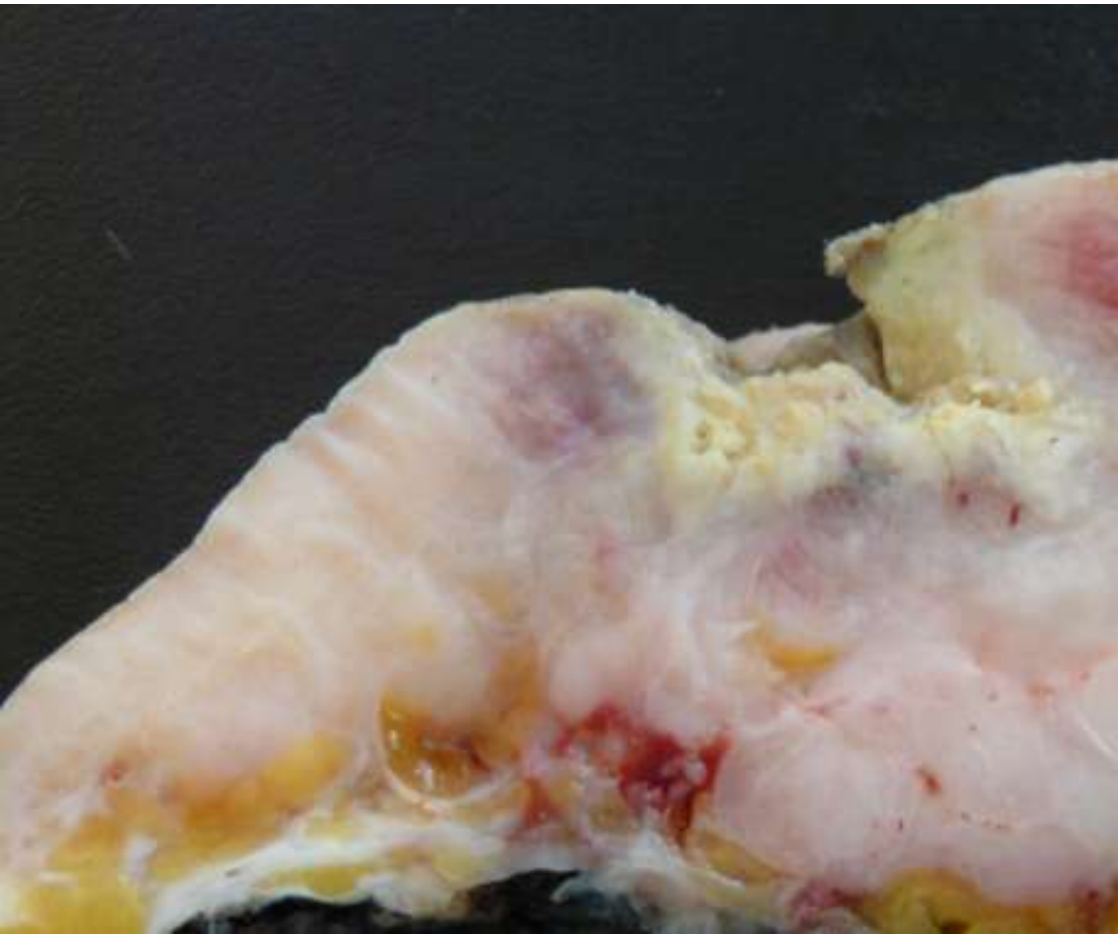
**Tumores de células  
redondas azules**

# Angiosarcoma de células pequeñas



**Diagnóstico  
diferencial  
amplio**

- Mujer de 60 años, tumor de más de 10 cm en muslo

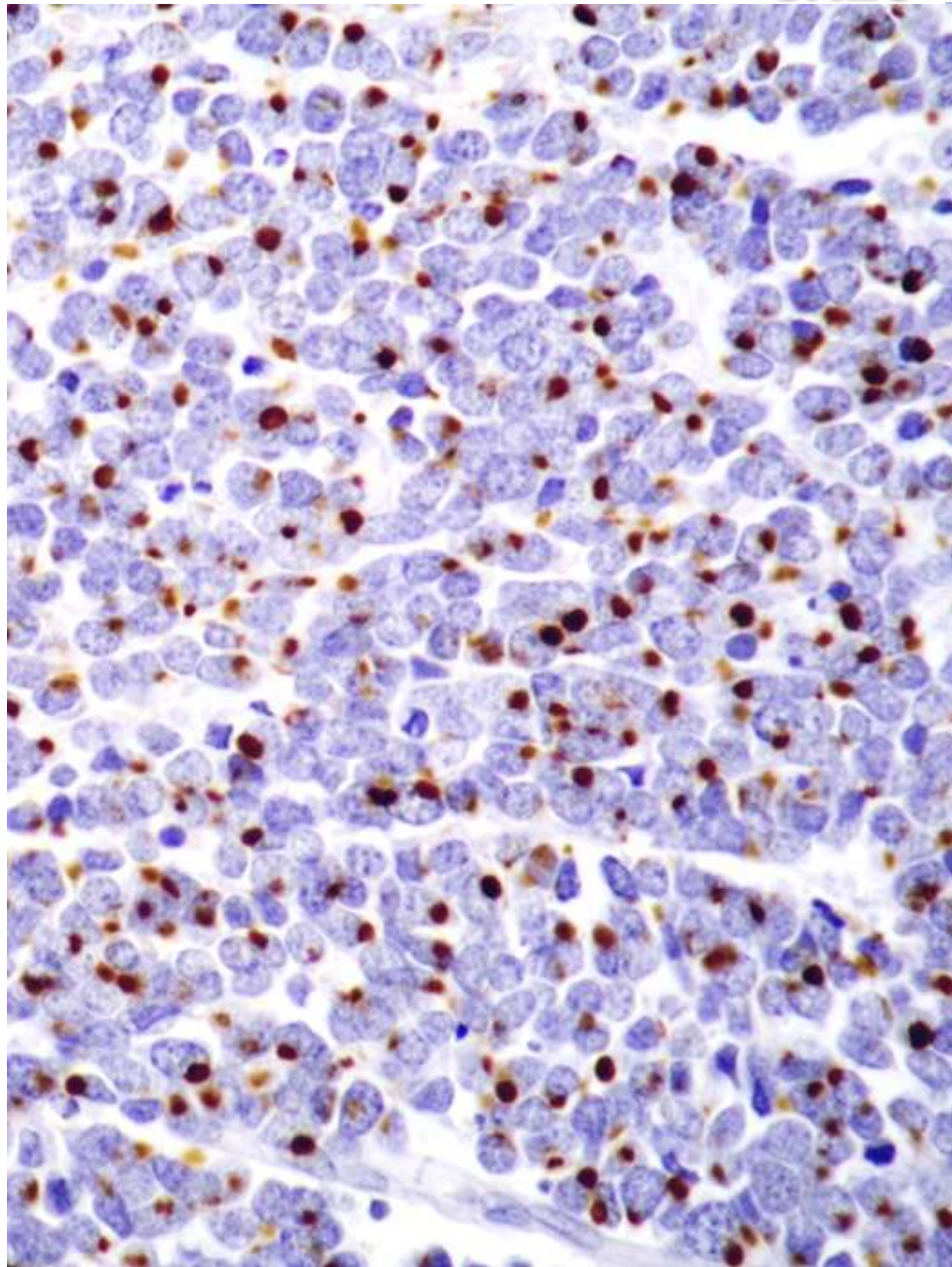
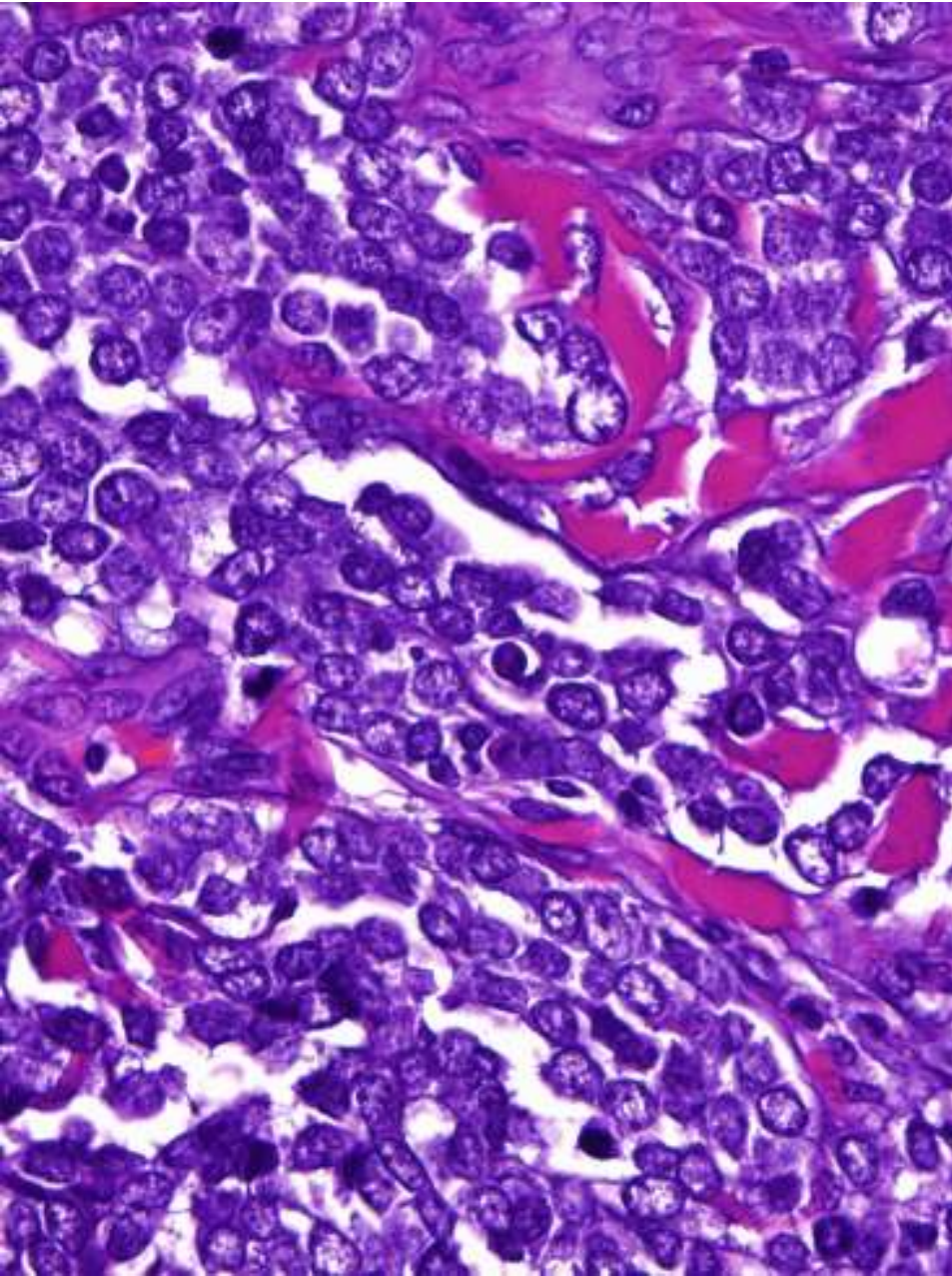


10 cm



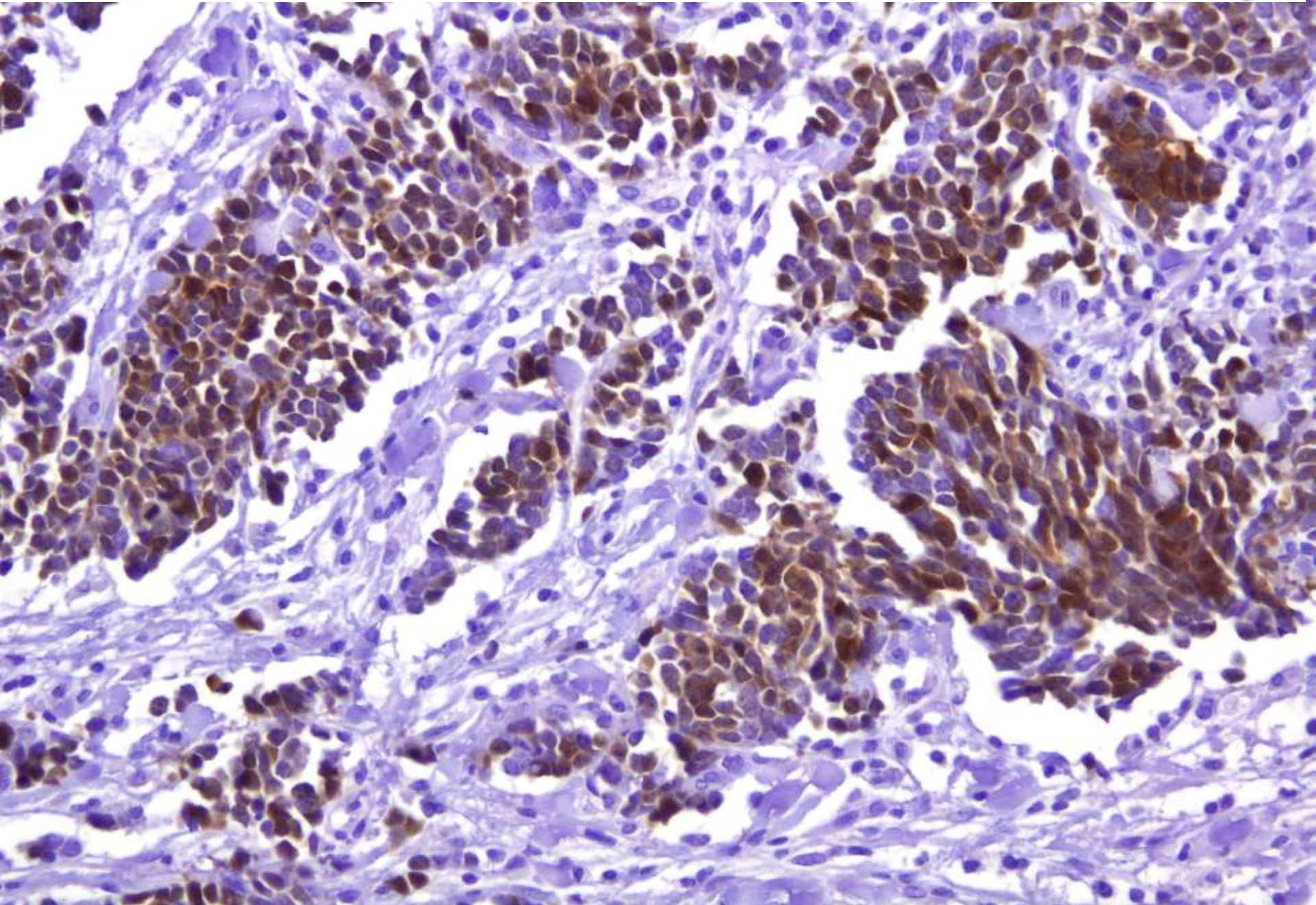
# Carcinoma de células de Merkel

CK20+

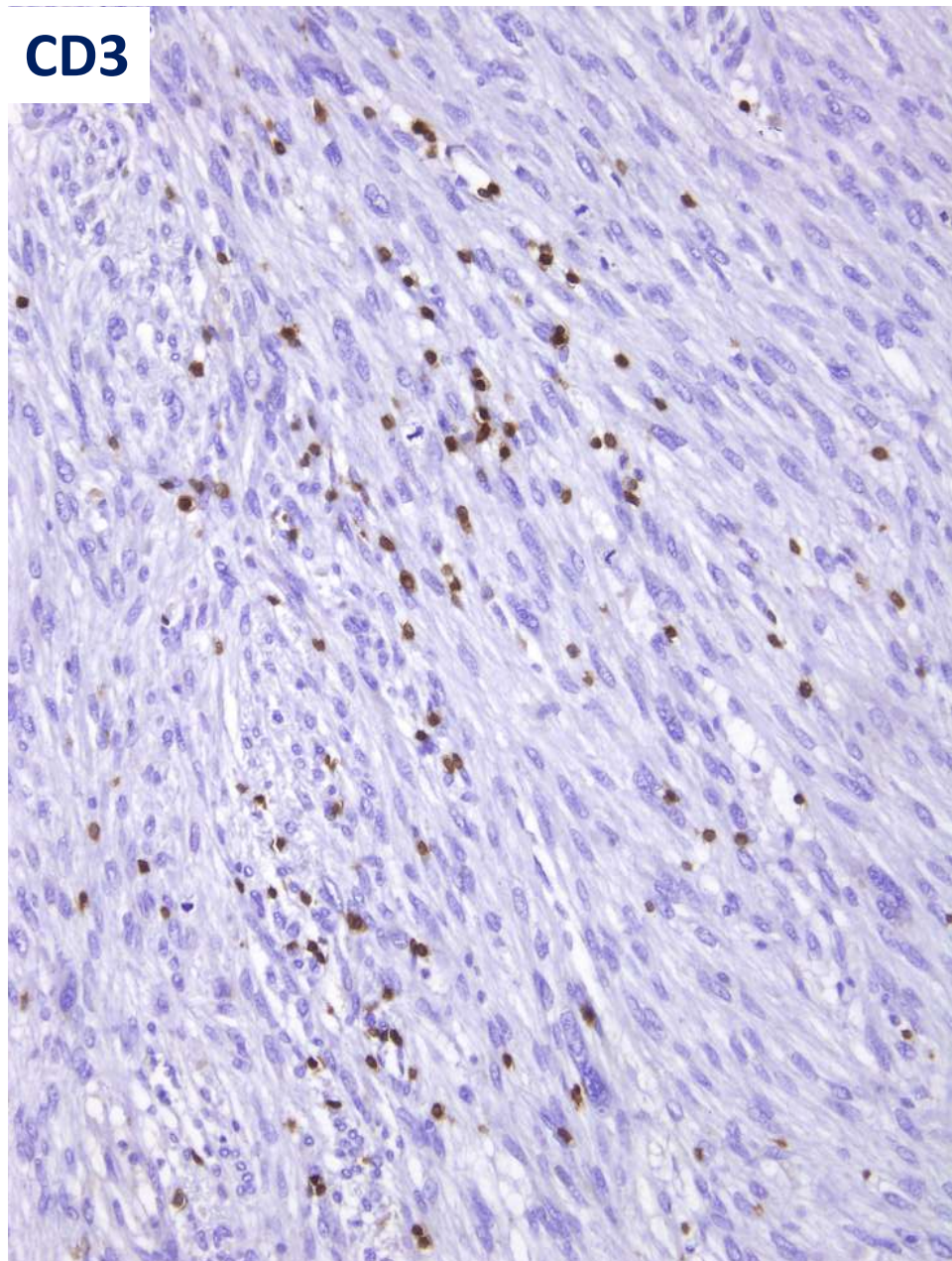
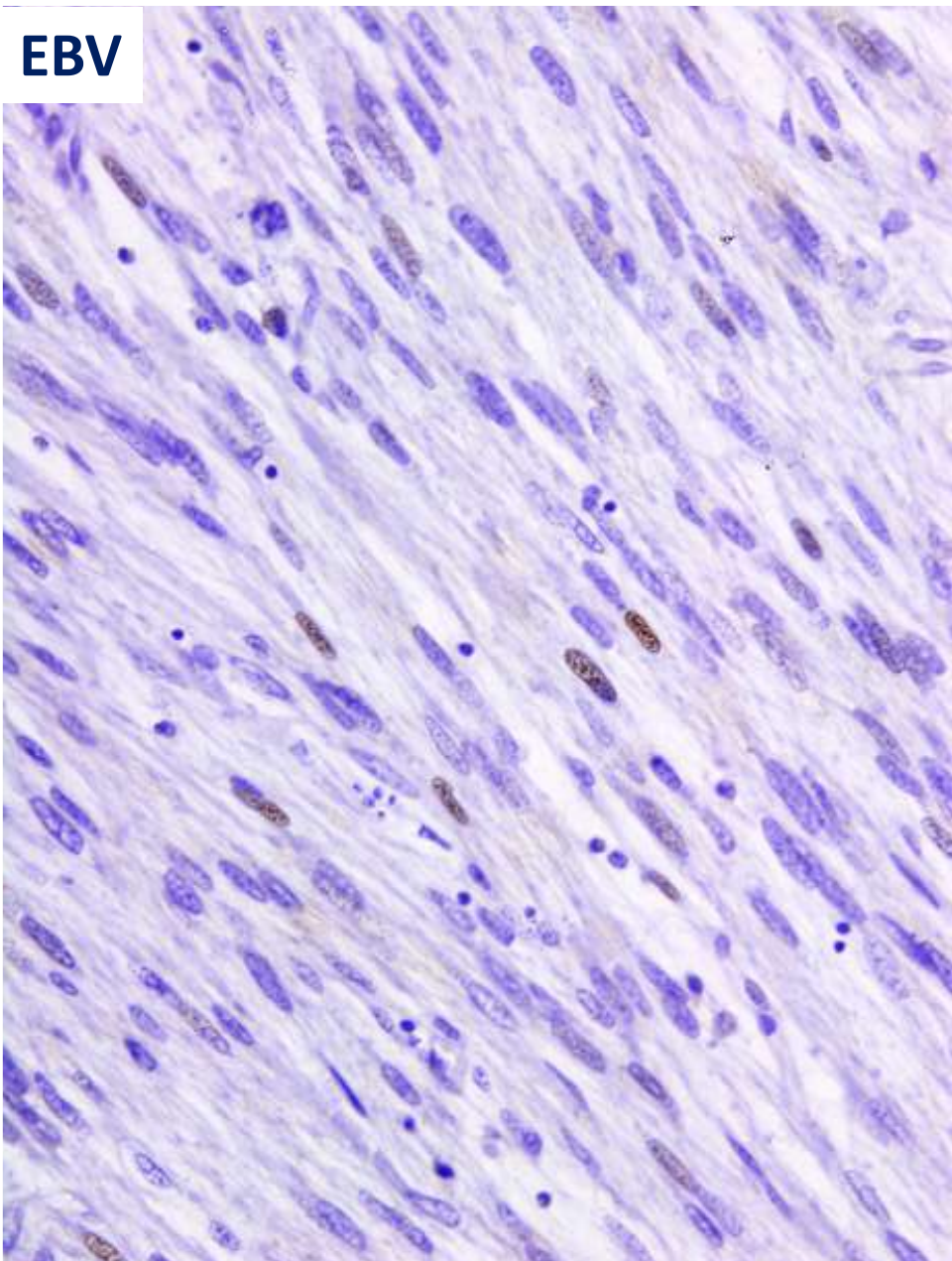


# Carcinoma de células de Merkel

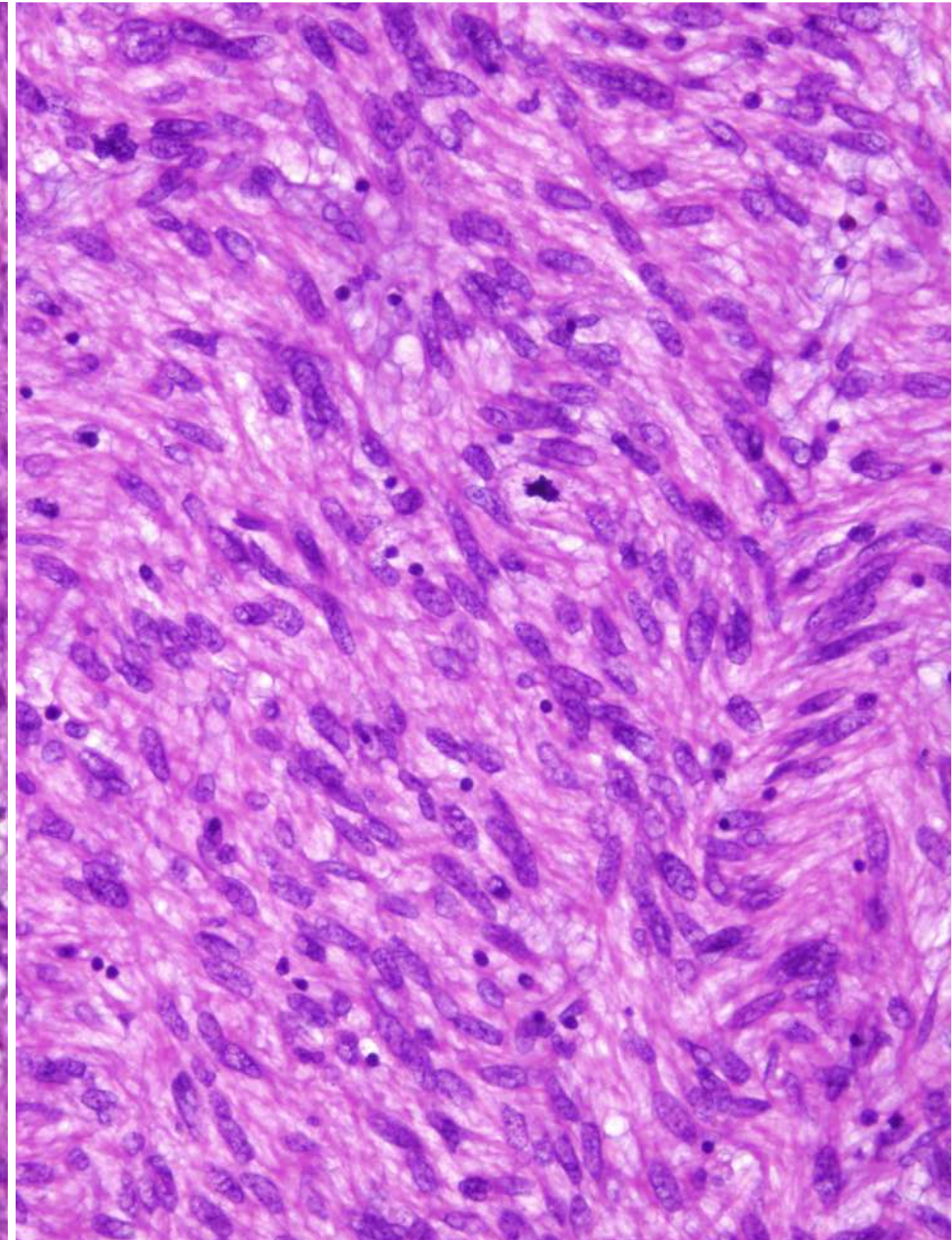
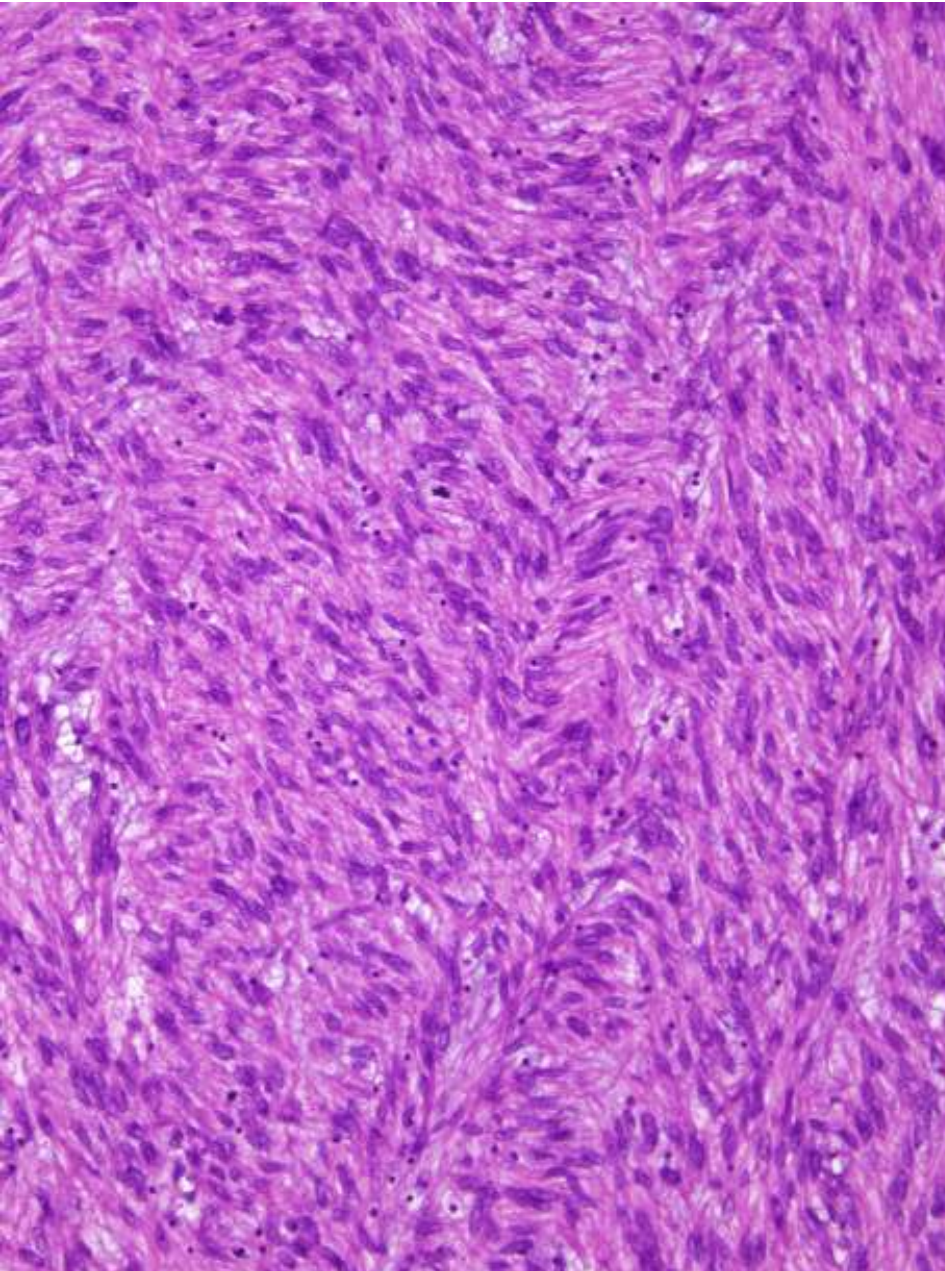
MCPyV



# Tumor de músculo liso EBV-positivo



# Tumor de músculo liso EBV-positivo



# Expression of EBV Latent Antigens, Mammalian Target of Rapamycin, and Tumor Suppression Genes in EBV-Positive Smooth Muscle Tumors: Clinical and Therapeutic Implications

Kong Wee Ong,<sup>1</sup> Marissa Teo,<sup>3</sup> Victor Lee,<sup>4</sup> Danny Ong,<sup>3</sup> Ann Lee,<sup>3</sup> Chieh Suai Tan,<sup>6</sup>  
A. Vathsala,<sup>5</sup> and Han Chong Toh<sup>2</sup>

*Clin Cancer Res* 2009;15:5350-5358

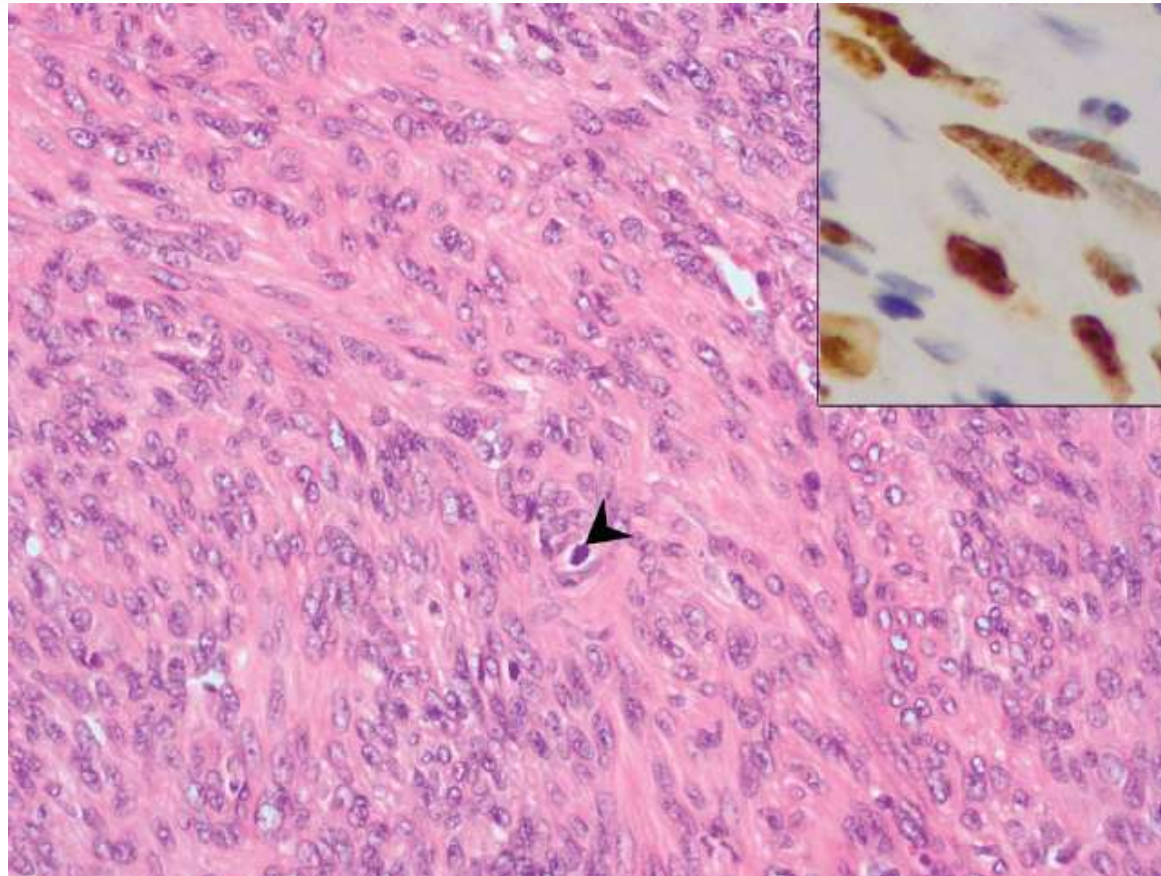
- Posttransplante
  - Inmunosupresión
  - Infección por HIV
  - Esporádico
- EBV (patrón tipo III de latencia)
  - Opciones terapéuticas:
    - Inhibidores de mTOR
    - Agentes demetilantes

# Dermal Epstein Barr Virus–Associated Leiomyosarcoma: Tocsin of Acquired Immunodeficiency Syndrome in Two Children

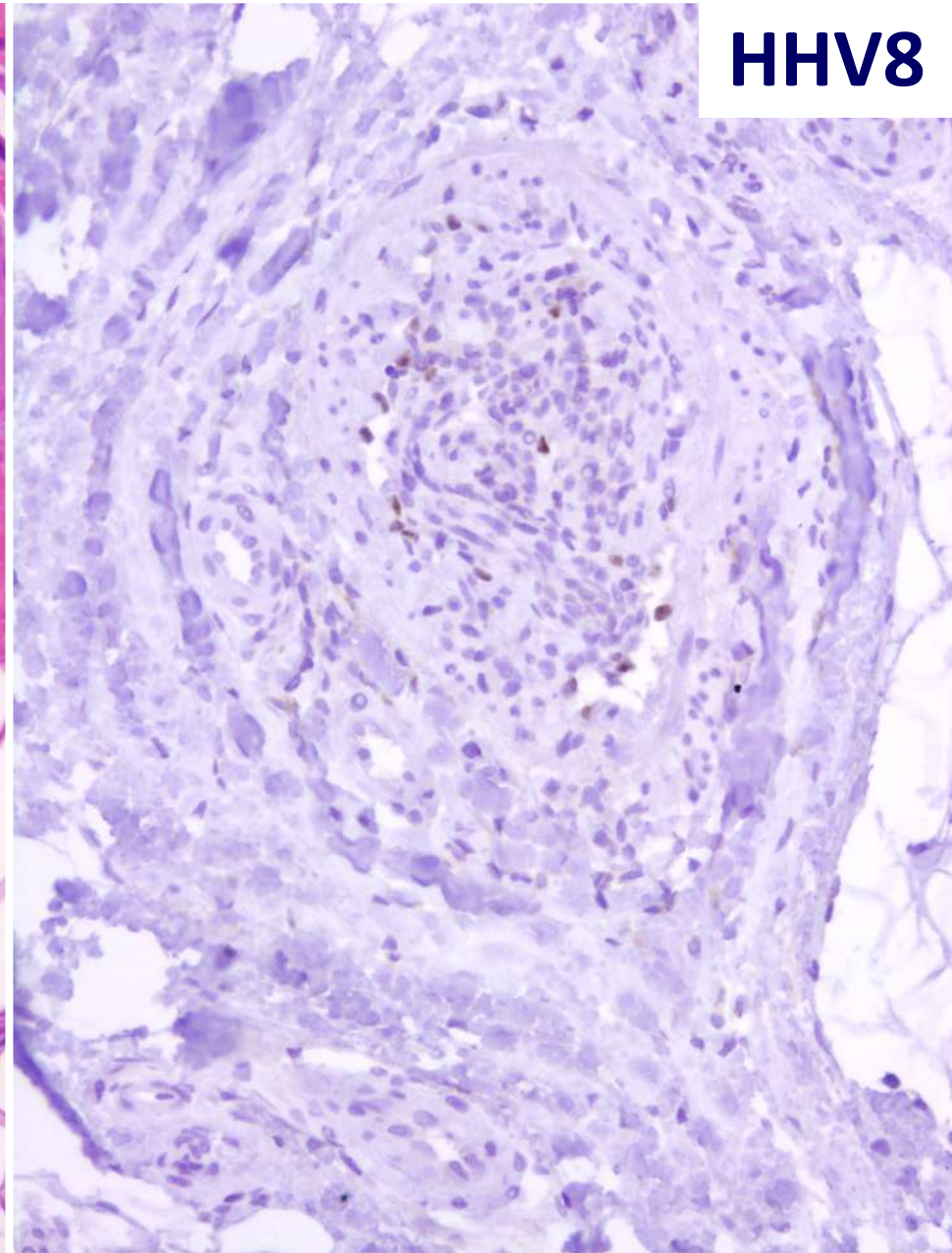
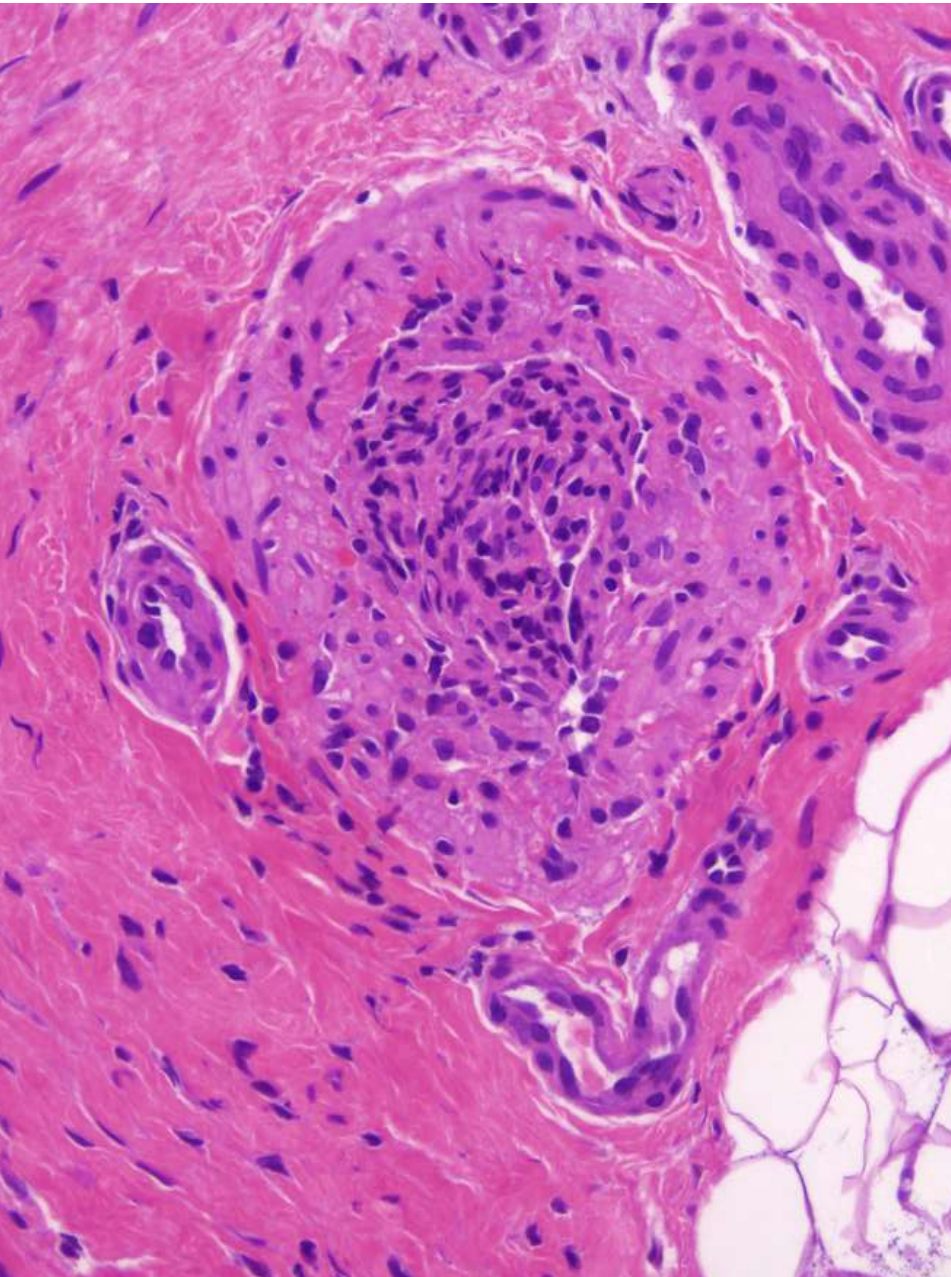
*(Am J Dermatopathol 2010;0:000–000)*

*Pratistadevi K. Ramdial, FCPATH(Anat)SA,\* Yetish Sing, FCPATH(Anat)SA,\**

*Julian Deonarain, MBChB,\* G. P. Hadley, FRCS(Edinb),† and Bhugwan Singh, FCS(SA)‡*

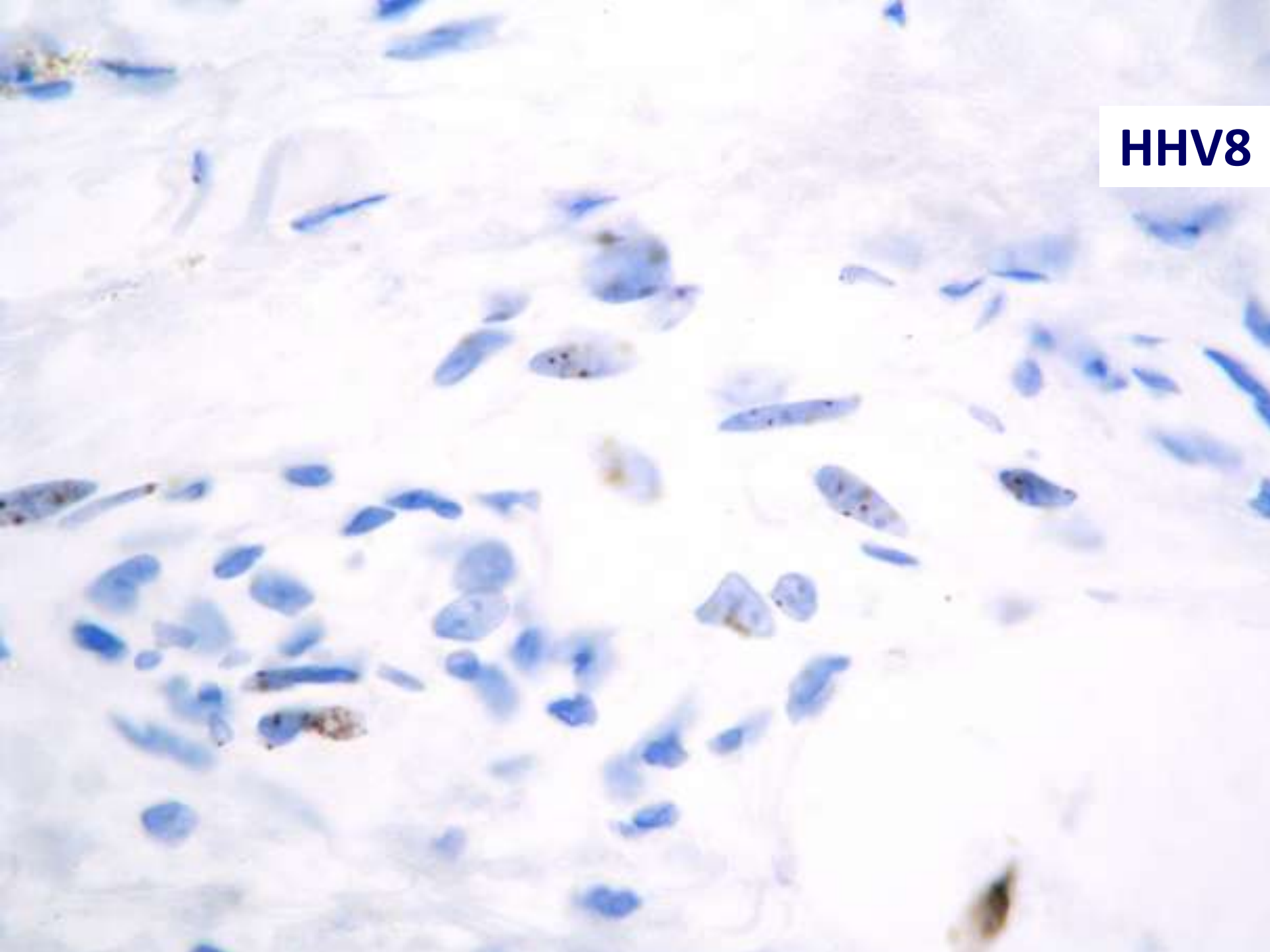


# Sarcoma de Kaposi intravascular en un anciano



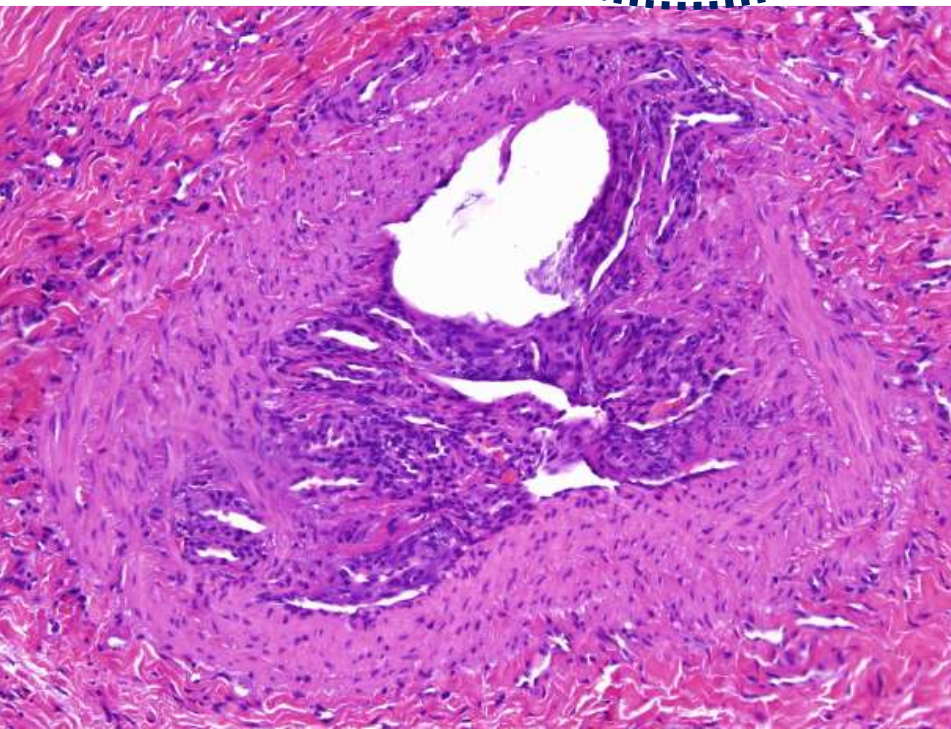
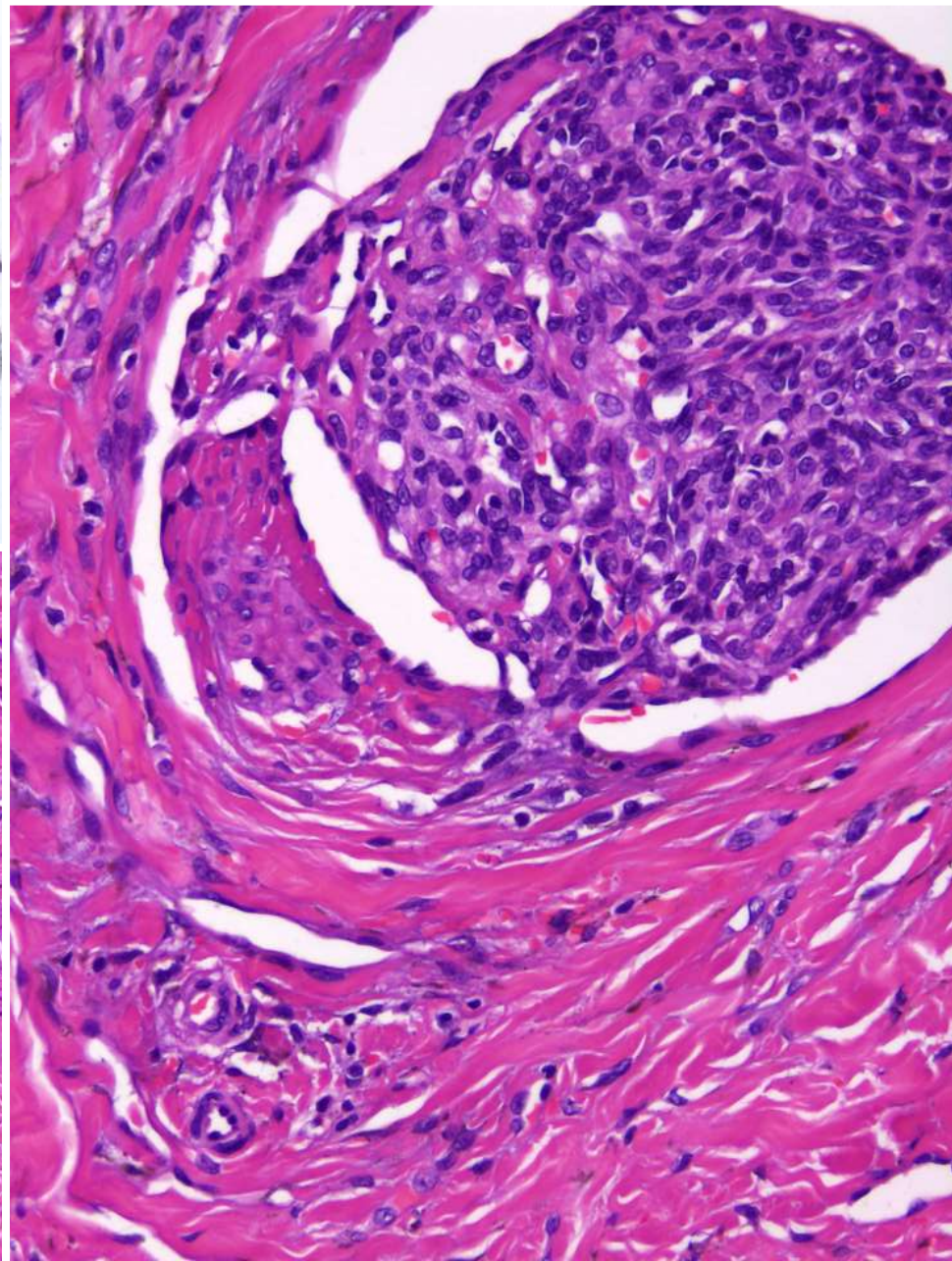
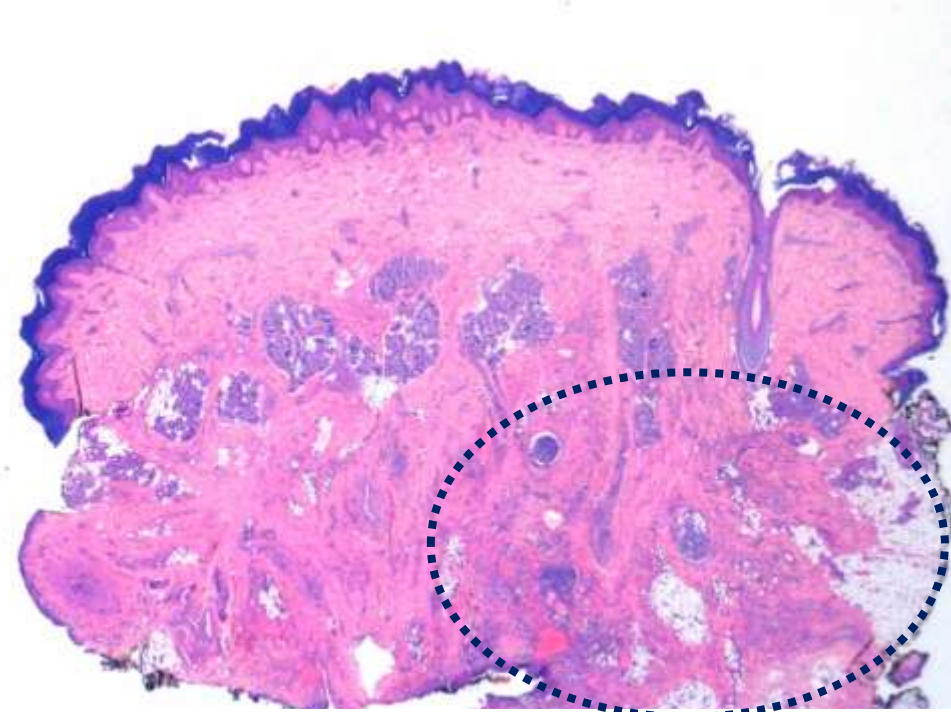
**HHV8**

**HHV8**

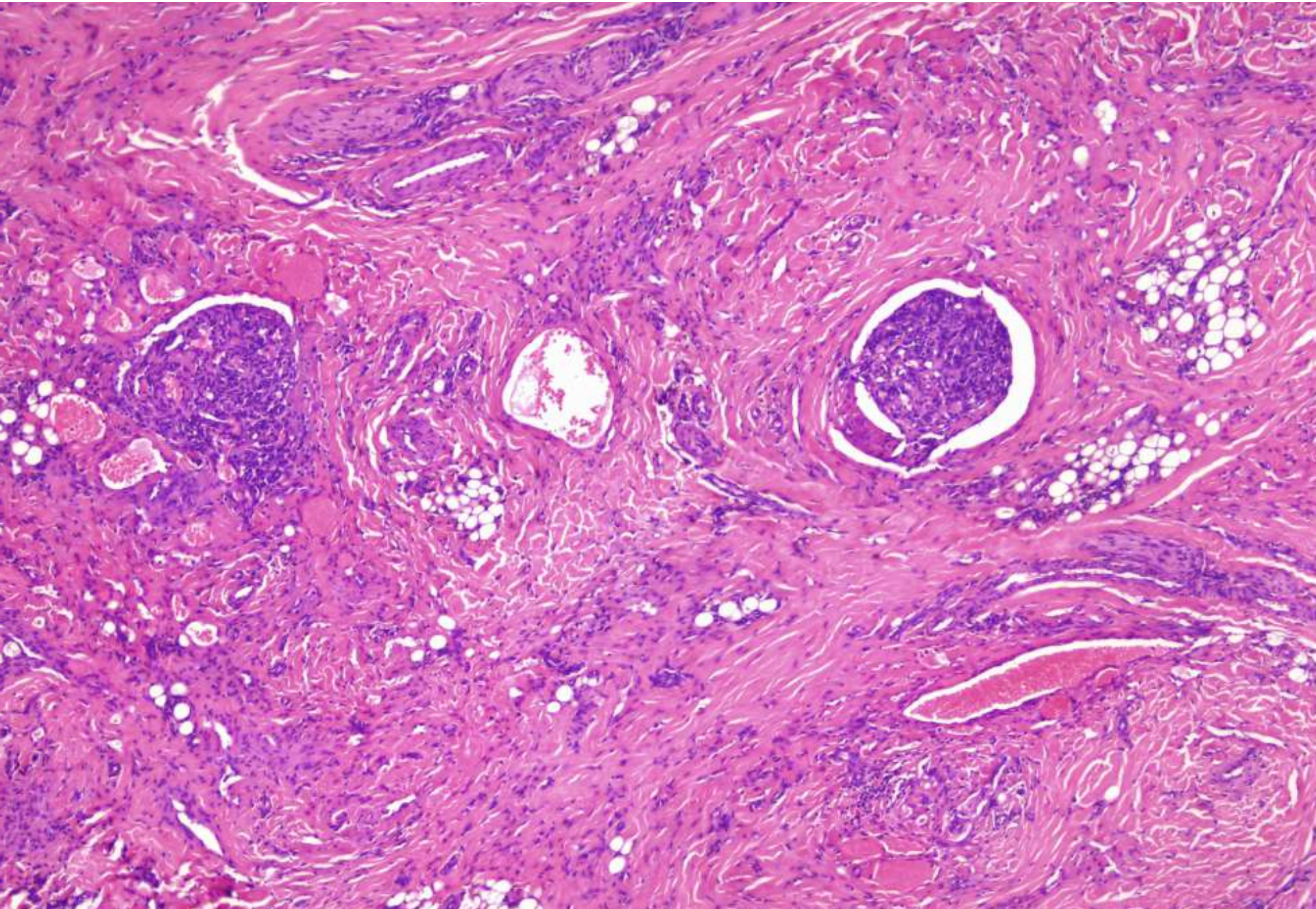




**HHV8 negativo**

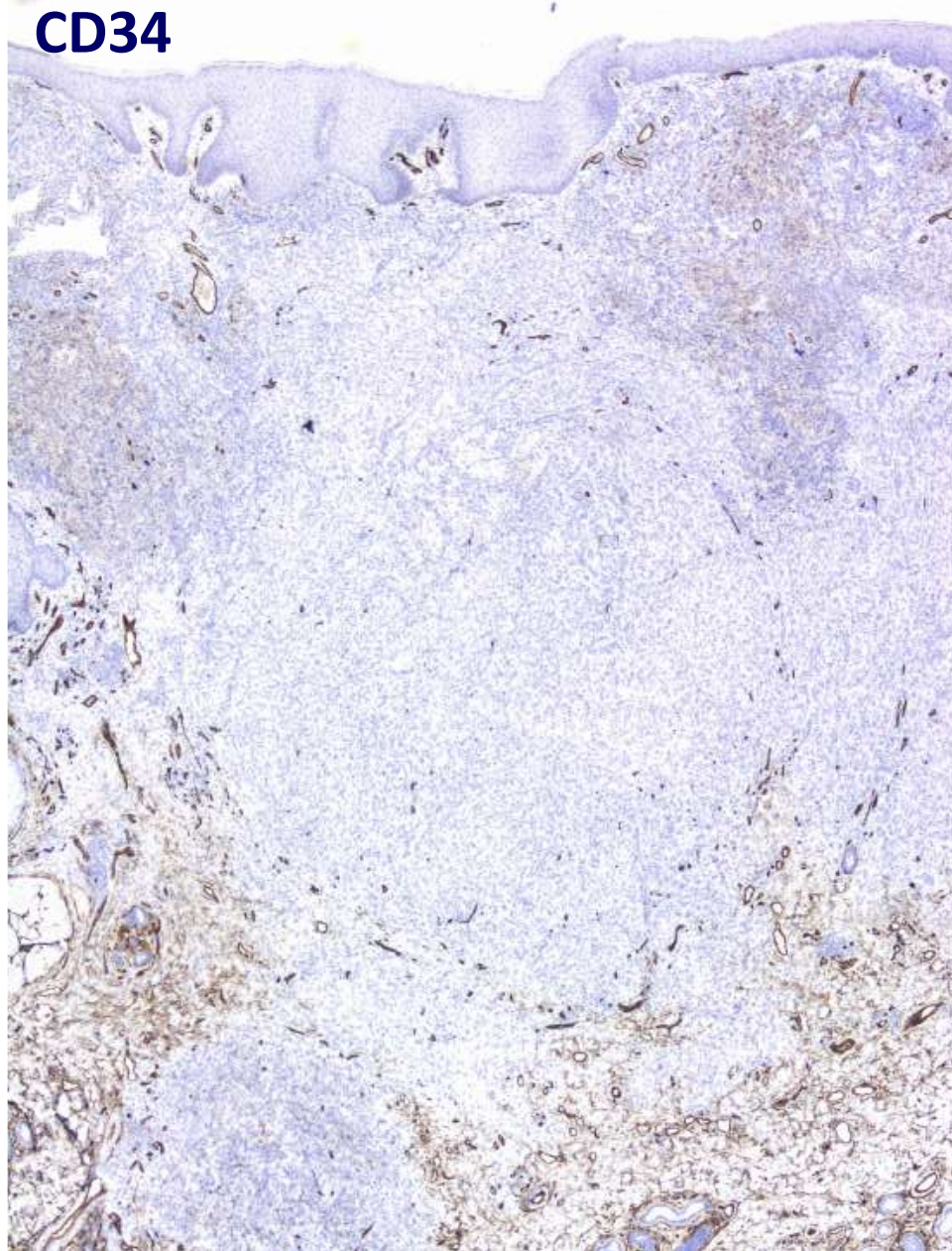
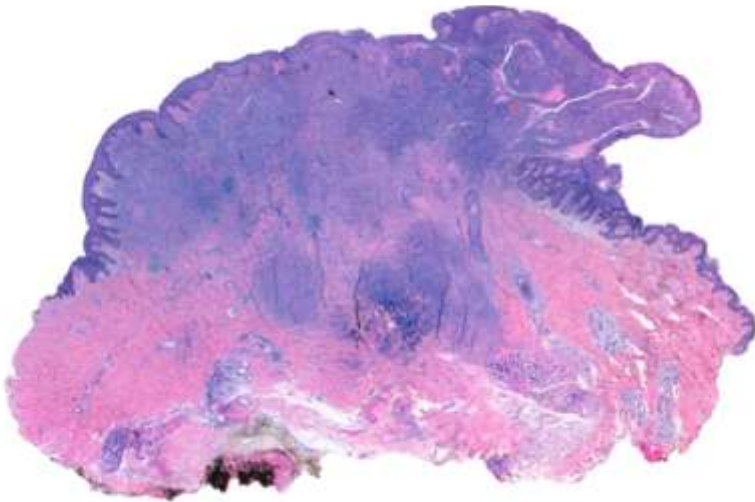


# Hemangioendotelioma kaposiforme



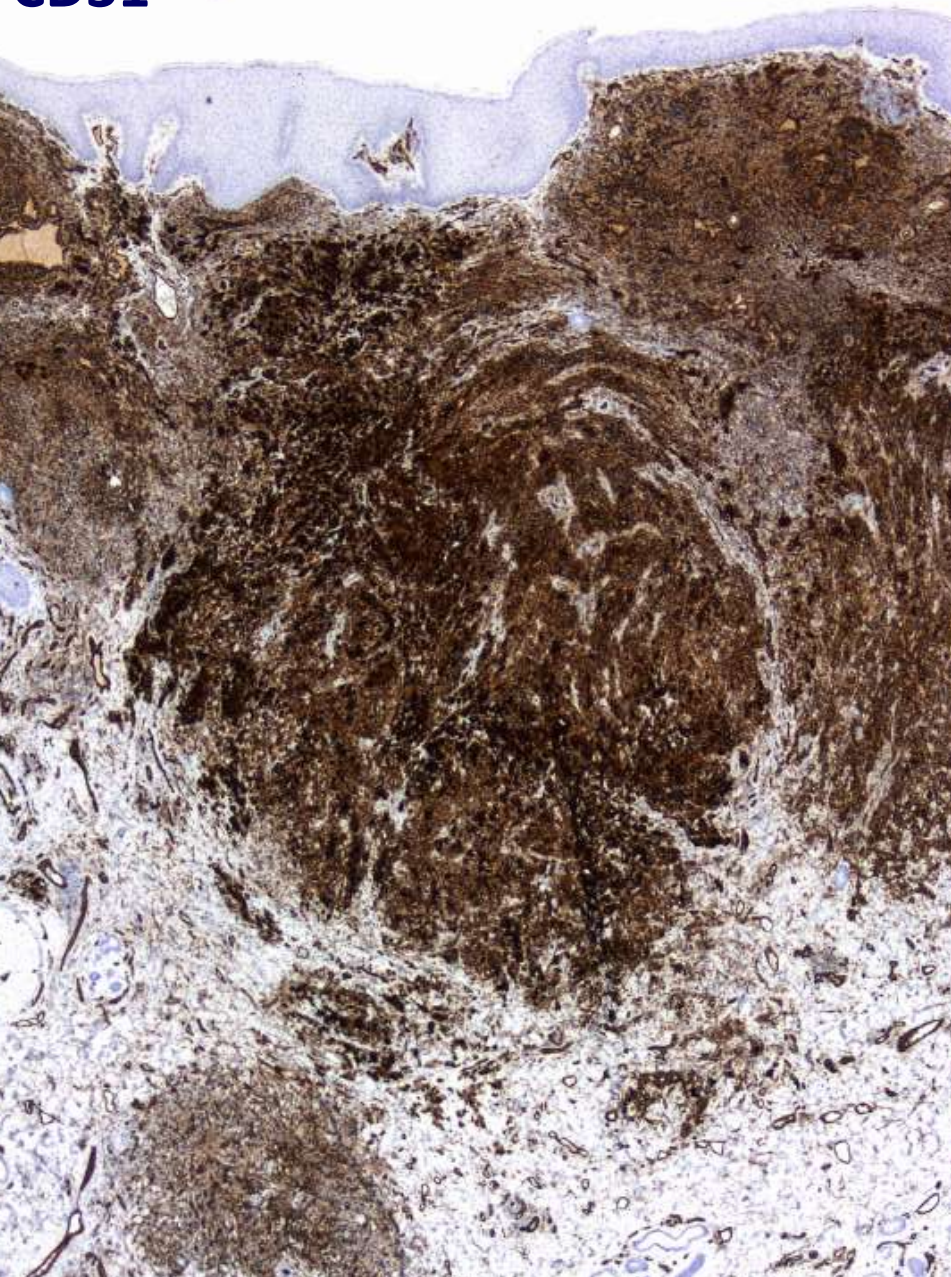
# Tumores vasculares

- CD34
- CD31
- Podoplanina (D2-40)
- VEGFR-3
- Prox1
- FLI-1

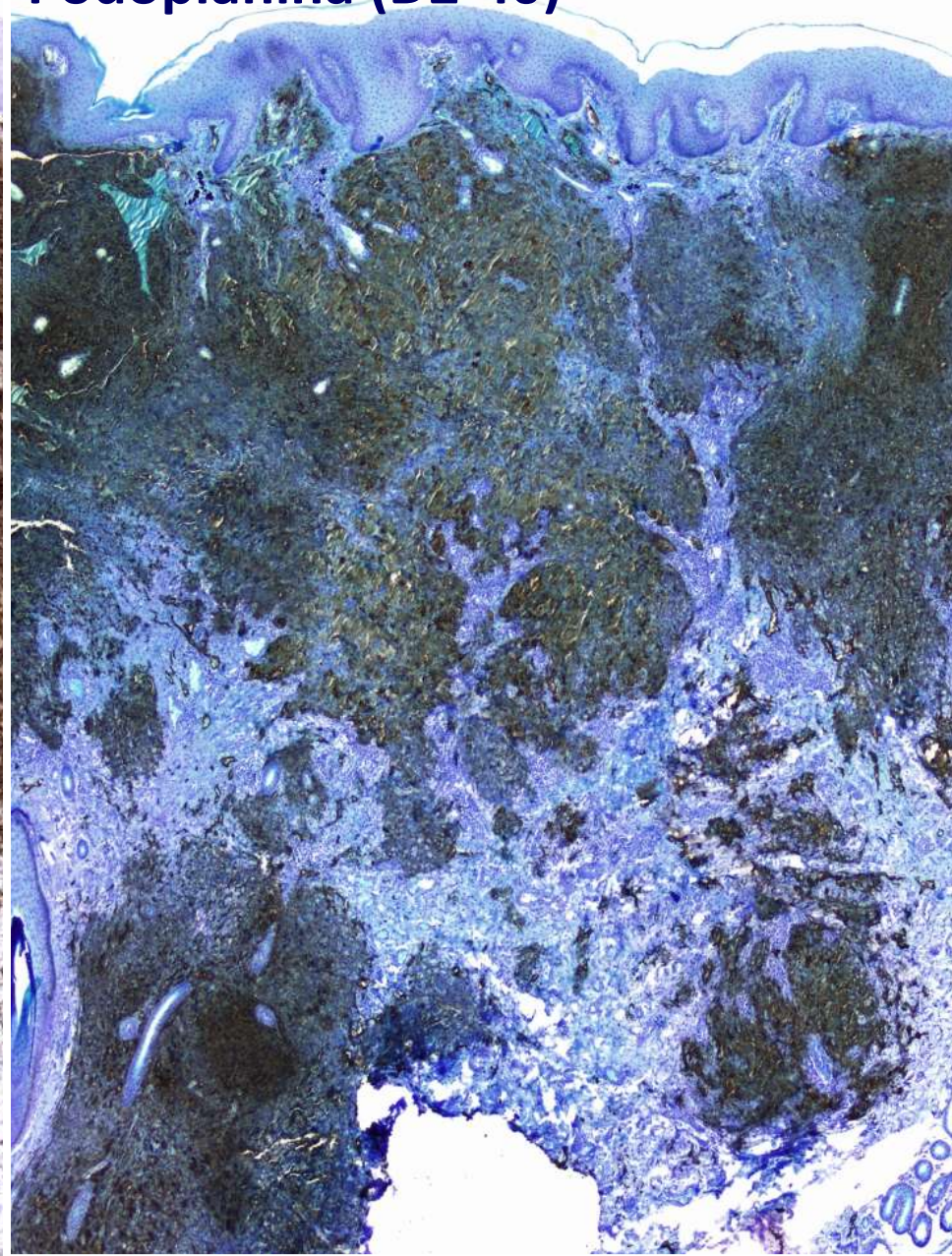


# Hemangioendotelioma compuesto

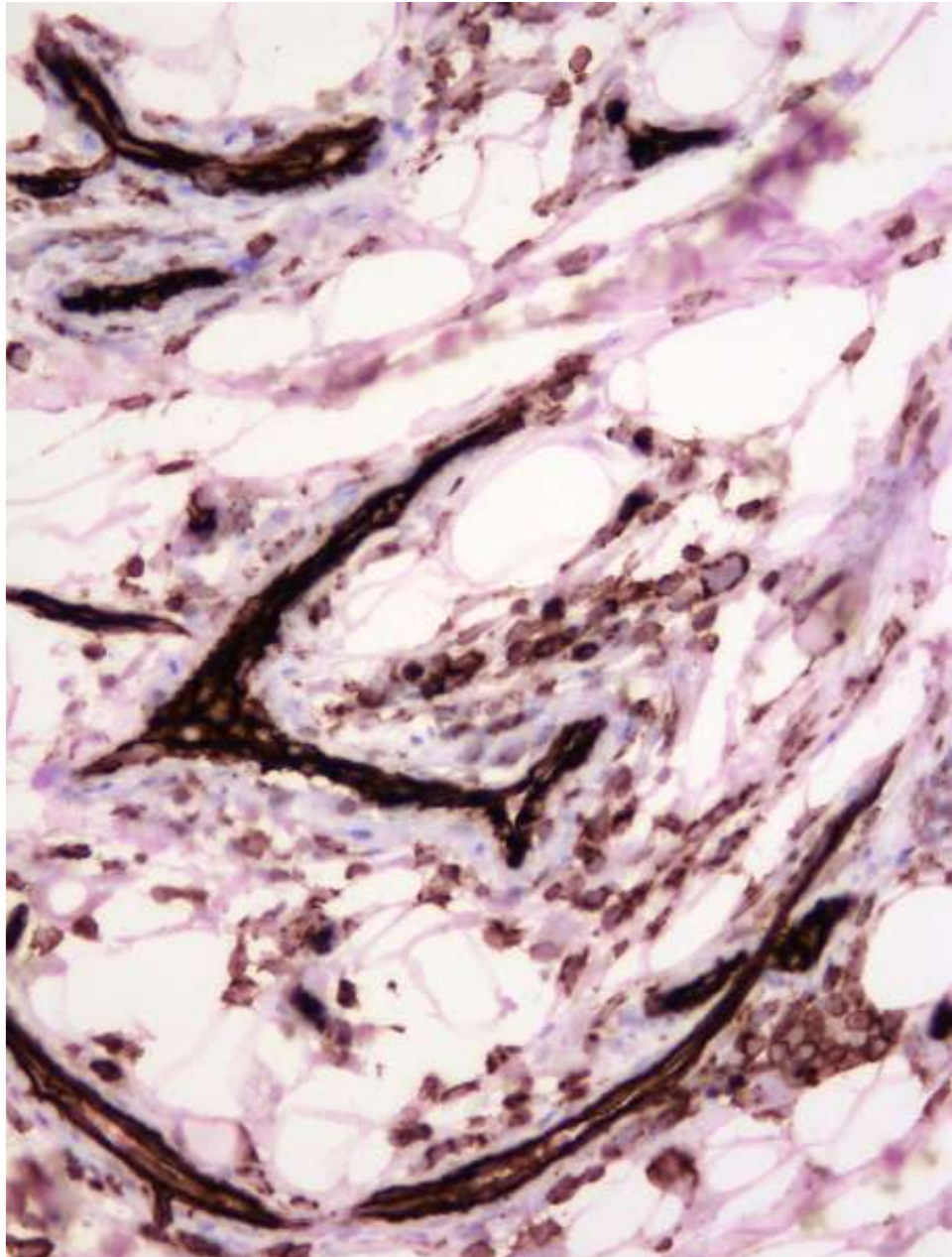
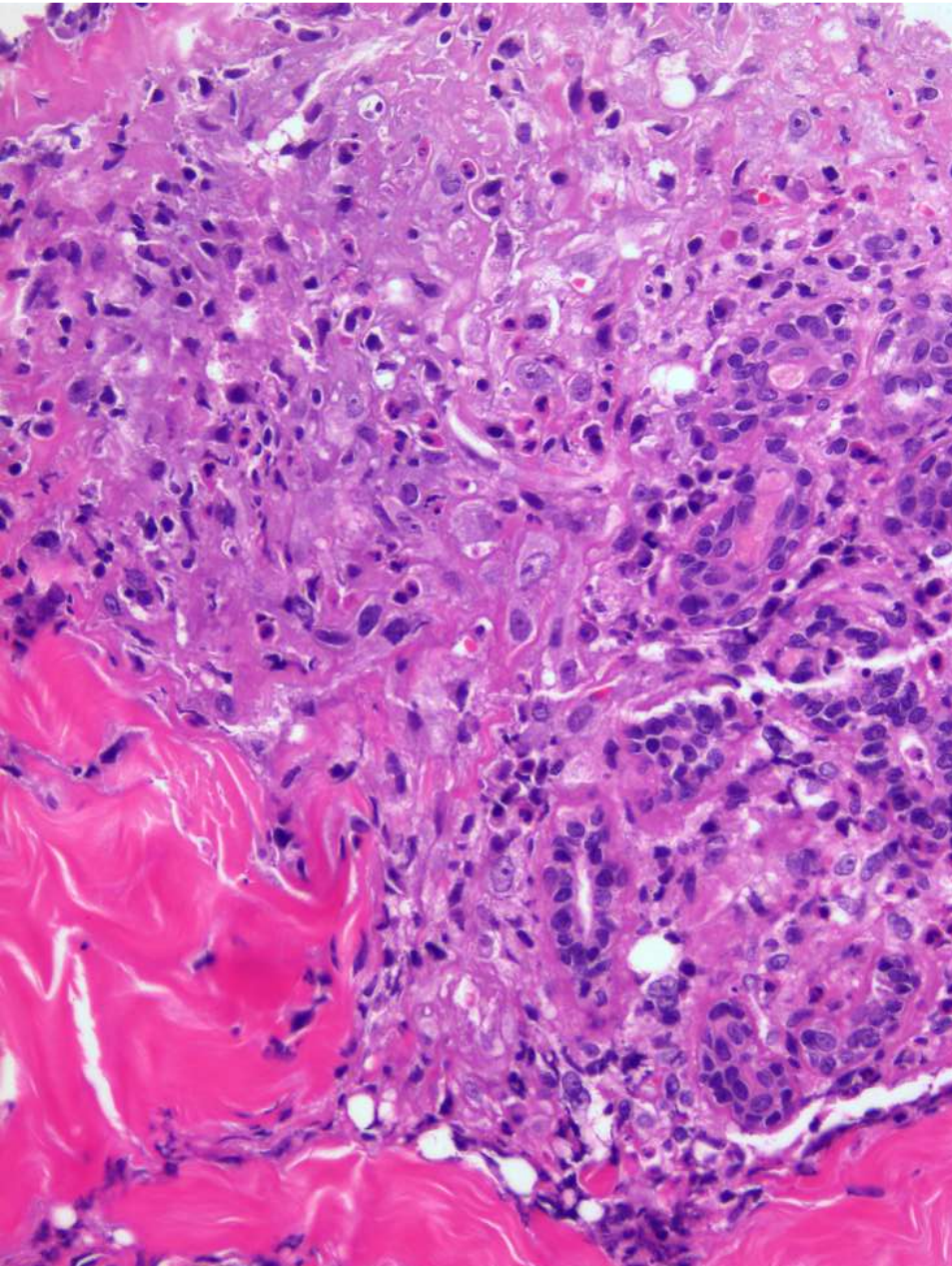
CD31



Podoplanina (D2-40)



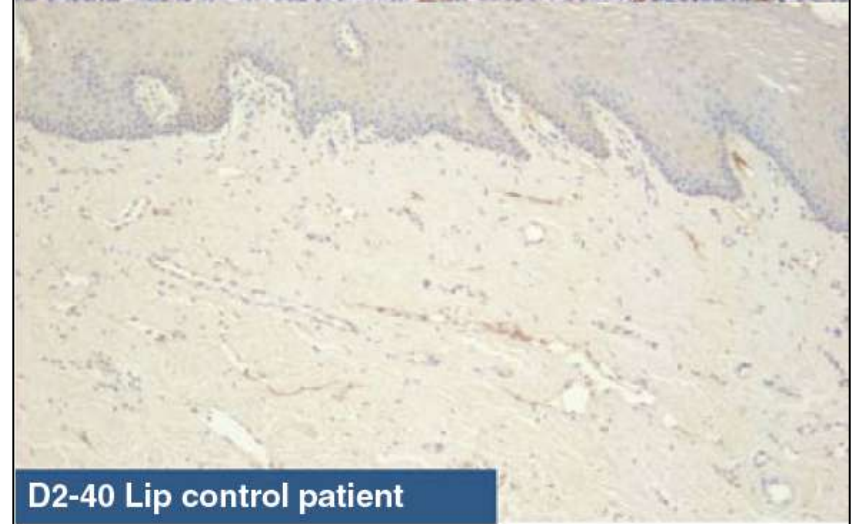
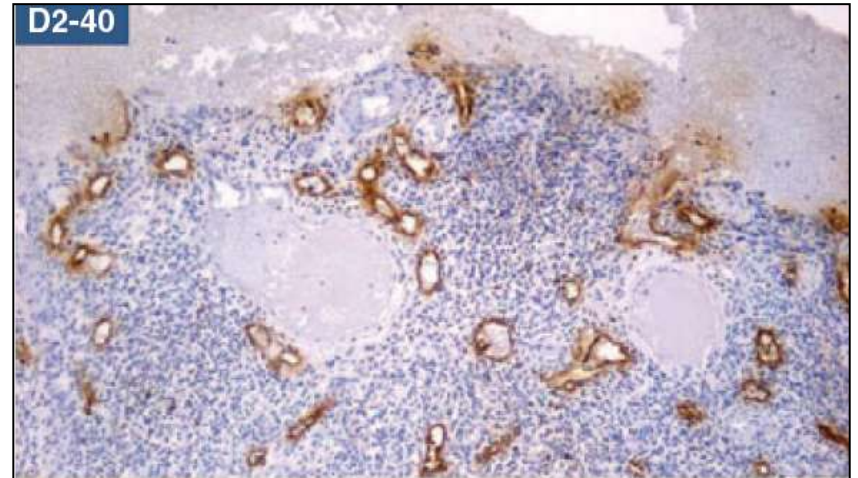
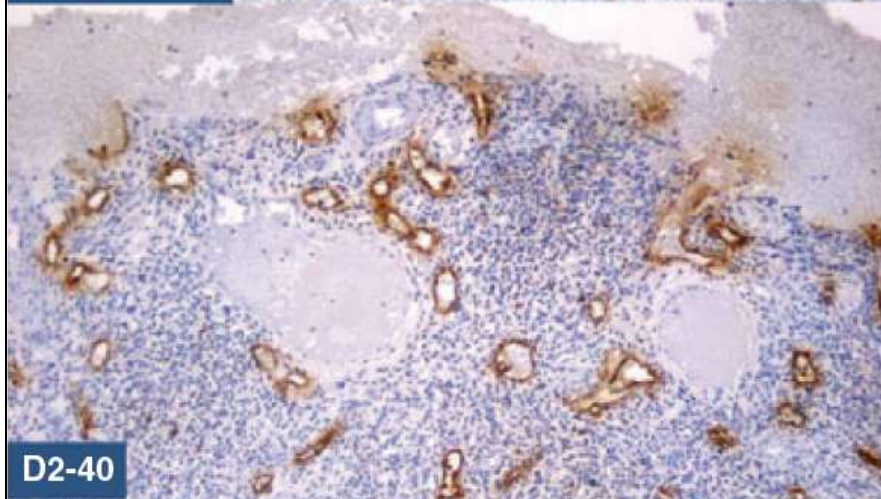
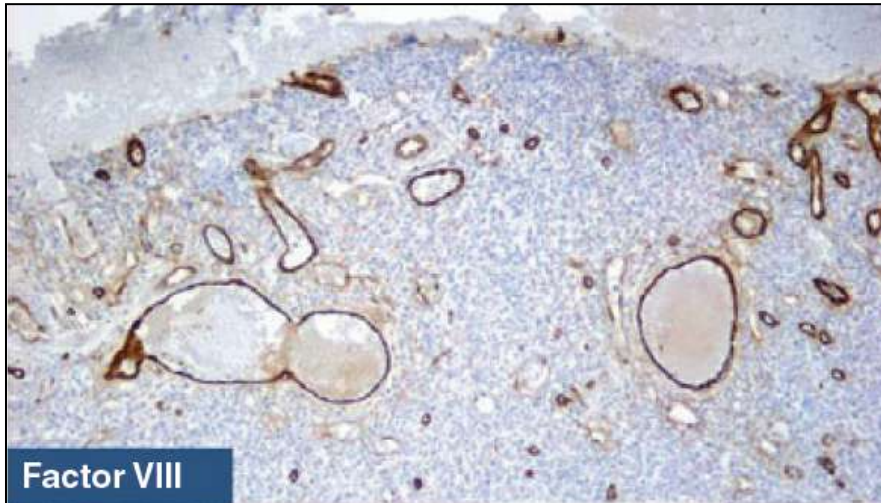
## CD31 positivo en macrófagos



# D2-40 highlights lymphatic vessel proliferation of angiolymphoid hyperplasia with eosinophilia

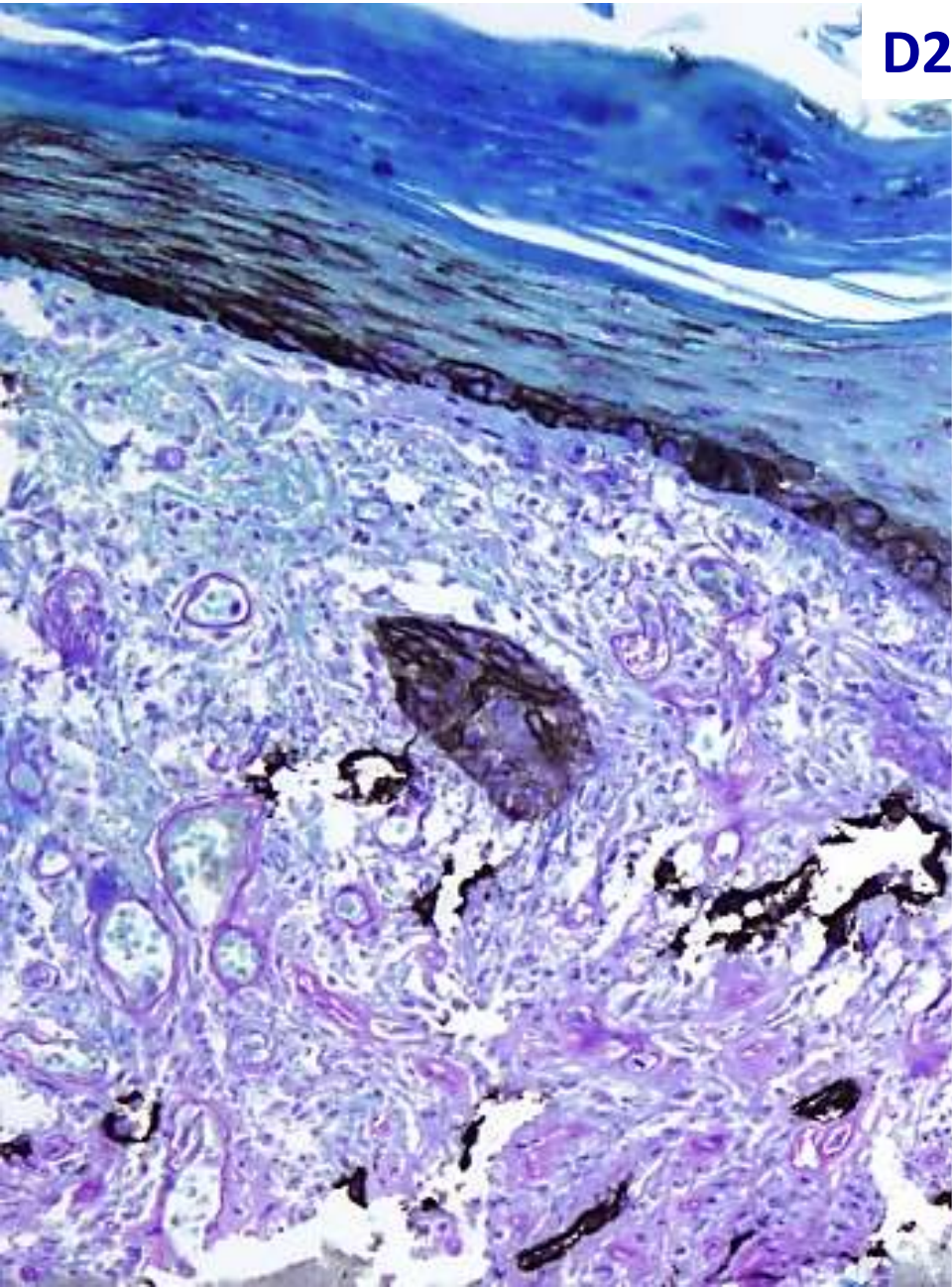
M. Miteva<sup>1</sup>, M. L. Galimberti<sup>2</sup>,  
C. Ricotti<sup>1</sup>, T. Breza<sup>3</sup>, R. Kirsner<sup>1</sup>  
and P. Romanelli<sup>1</sup>

*J Cutan Pathol* 2009; 36: 1316–1322

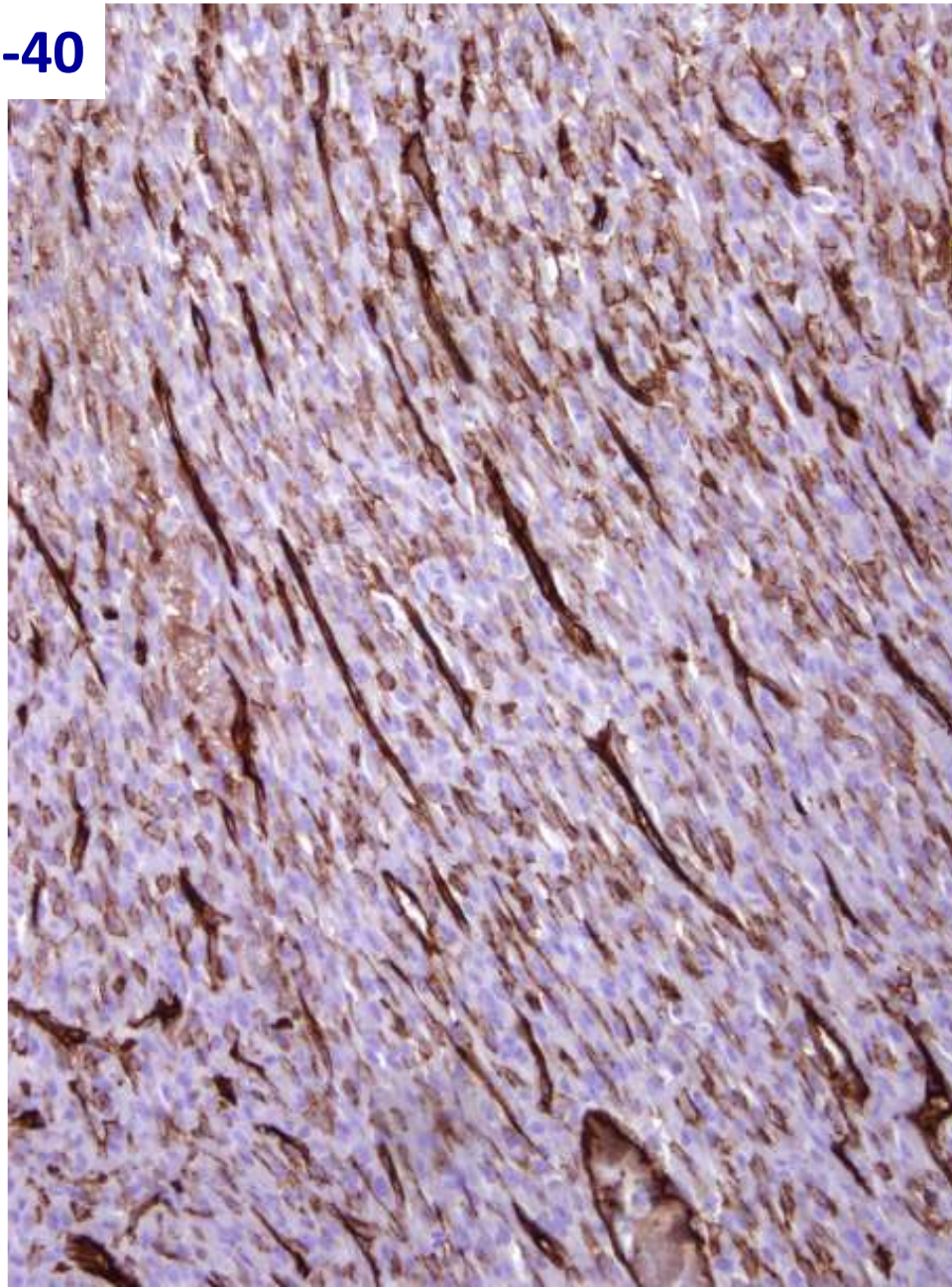


## Tumores y células epiteliales

## Metástasis oral de mesotelioma



D2-40



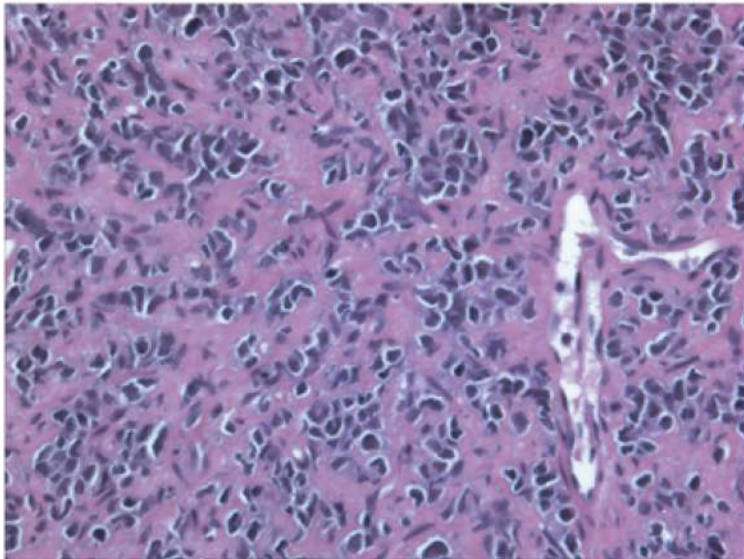
# FLI-1 Distinguishes Ewing Sarcoma From Small Cell Osteosarcoma and Mesenchymal Chondrosarcoma

*Anna F. Lee, MD, CM, PhD,\* Malcolm M. Hayes, MB, ChB,†  
David LeBrun, MD,‡ Inigo Espinosa, MD,§ G. Petur Nielsen, MD,  
Andrew E. Rosenberg, MD,|| and Cheng-Han Lee, MD, PhD\**

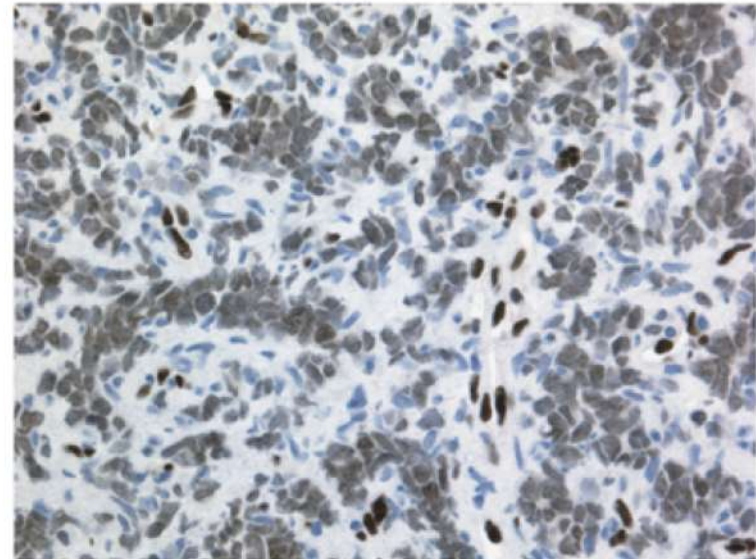
*Appl Immunohistochem Mol Morphol 2010;00:000–000*

Tumor type	FLI-1 Positive Cases	Total No. Cases	% With FLI-1 Immunopositivity
Small cell osteosarcoma	0	10	0
Mesenchymal chondrosarcoma	0	10	0
Ewing sarcoma	6	8	75
Small cell carcinoma	0	2	0
Rhabdomyosarcoma	0	5	0
Neuroblastoma	2	2	0
Lymphoma*	2†	48	4

## Ewing sarcoma



H&E



FLI-1



# Prox-1 and VEGFR3 Antibodies Are Superior to D2-40 in Identifying Endothelial Cells of Lymphatic Malformations—A Proposal of a New Immunohistochemical Panel to Differentiate Lymphatic from Other Vascular Malformations

EUMENIA COSTA DA CUNHA CASTRO AND CSABA GALAMBOS\*

Pediatric and Developmental Pathology 12, 187–194, 2009

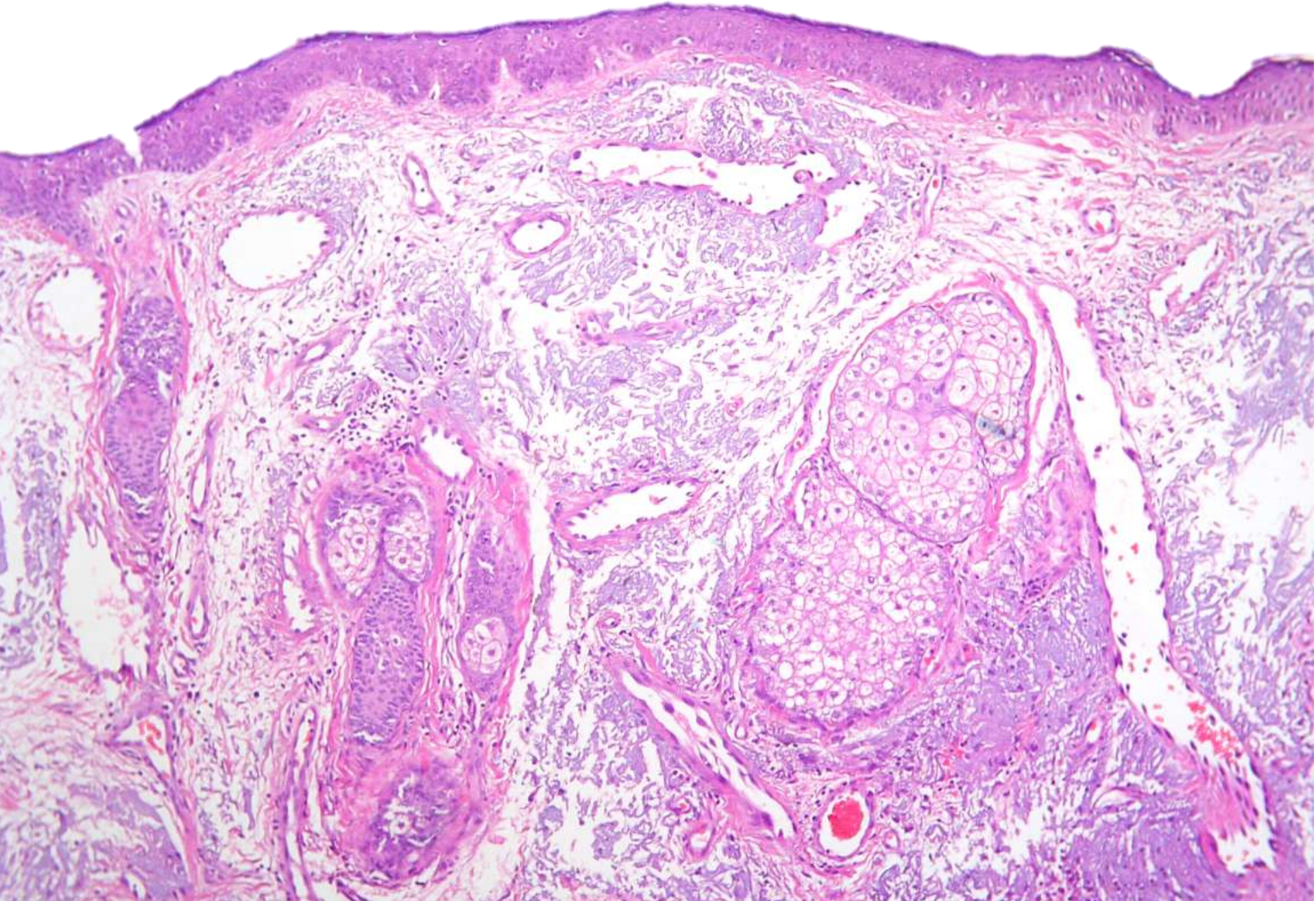
Can lymphangiosarcoma be resurrected? A clinicopathological and immunohistochemical study of lymphatic differentiation in 49 angiosarcomas

*Histopathology* 2010, 56, 364–371.

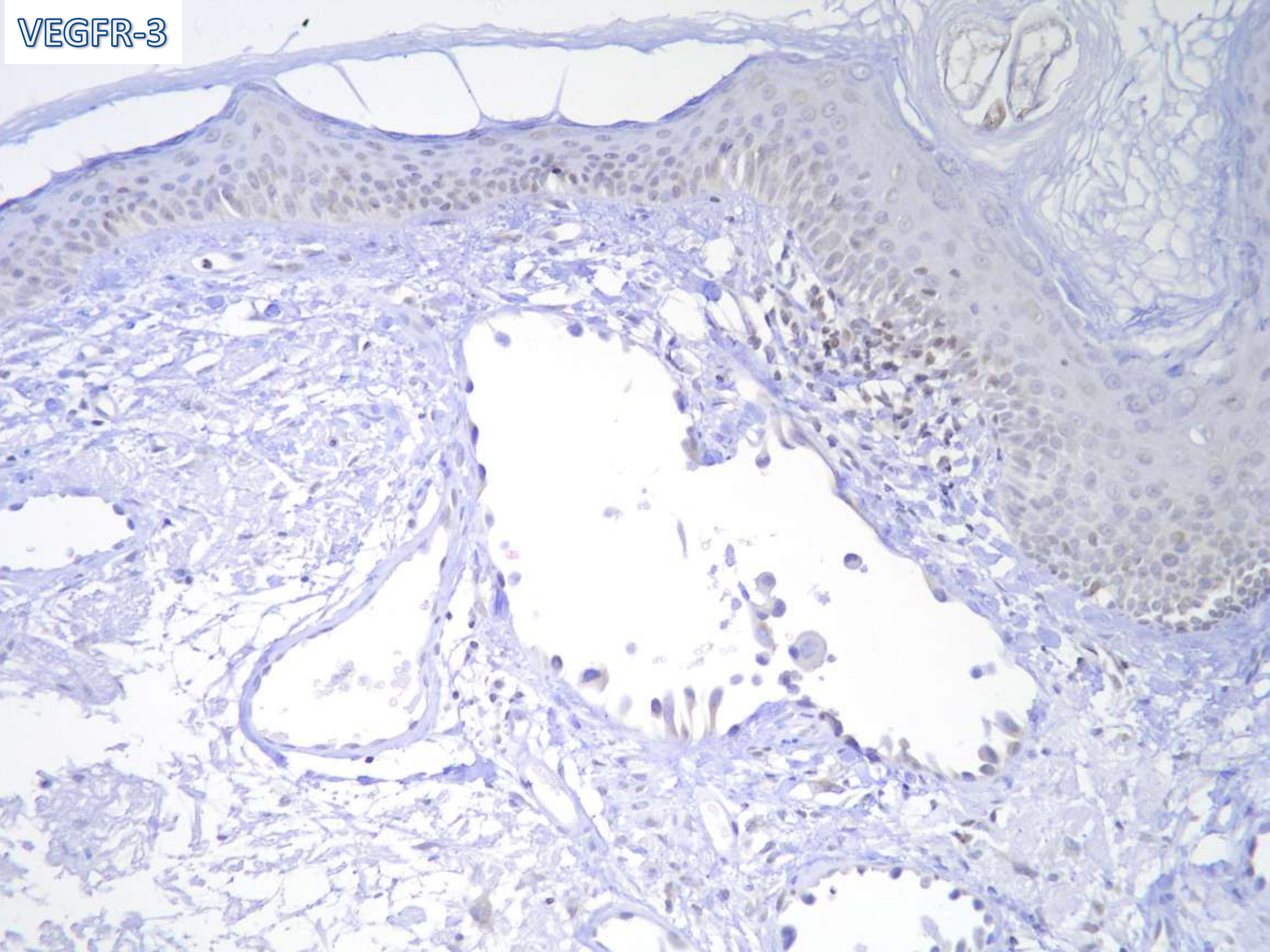
Cohra C Mankey, Jonathan B McHugh, Dafydd G Thomas & David R Lucas

*Conclusions:* Lymphatic differentiation is common in angiosarcoma, certain subsets show greater lymphatic differentiation than others, and lymphangiosarcoma may be defined pathologically, rather than clinically.

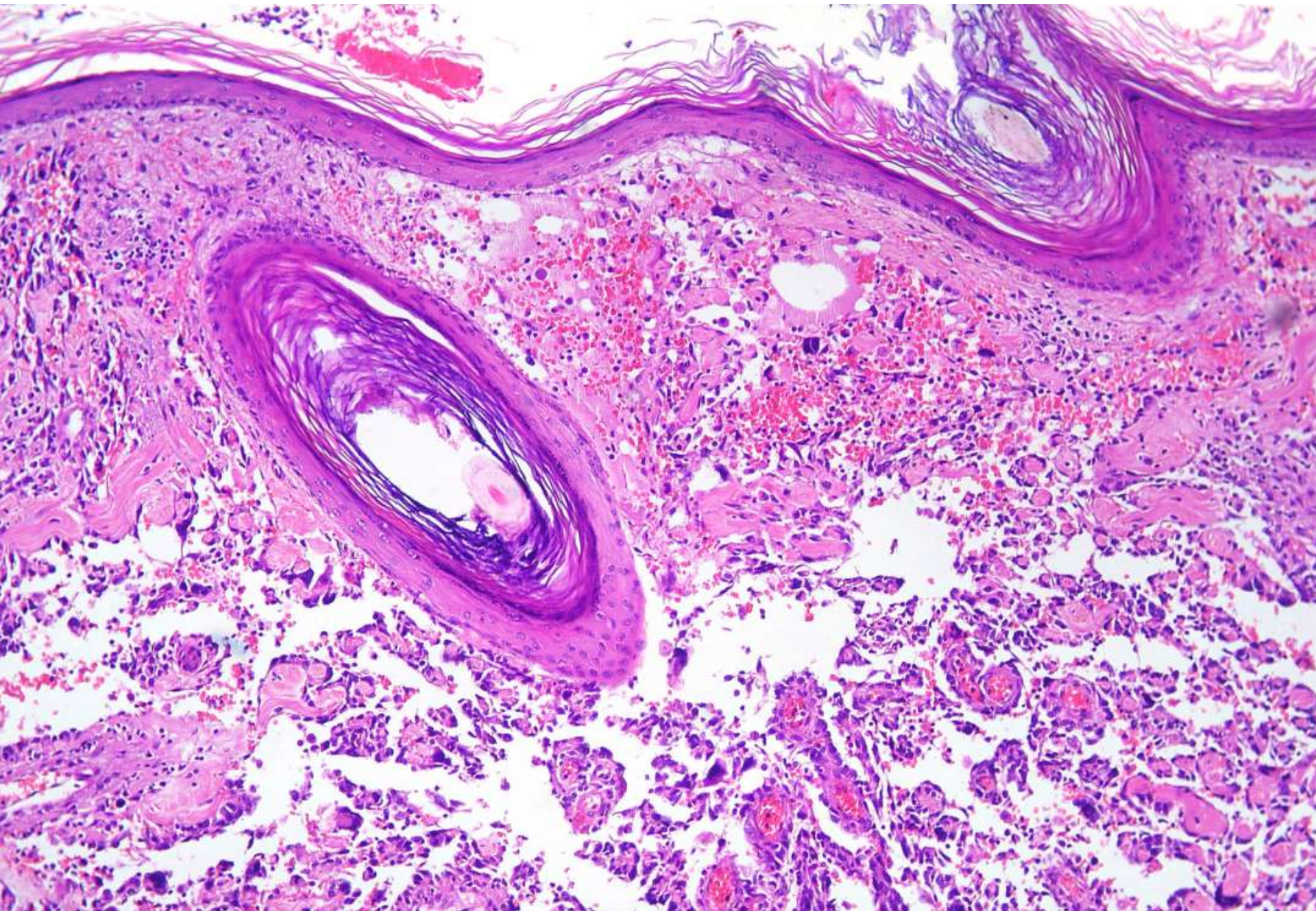
# Angiosarcoma



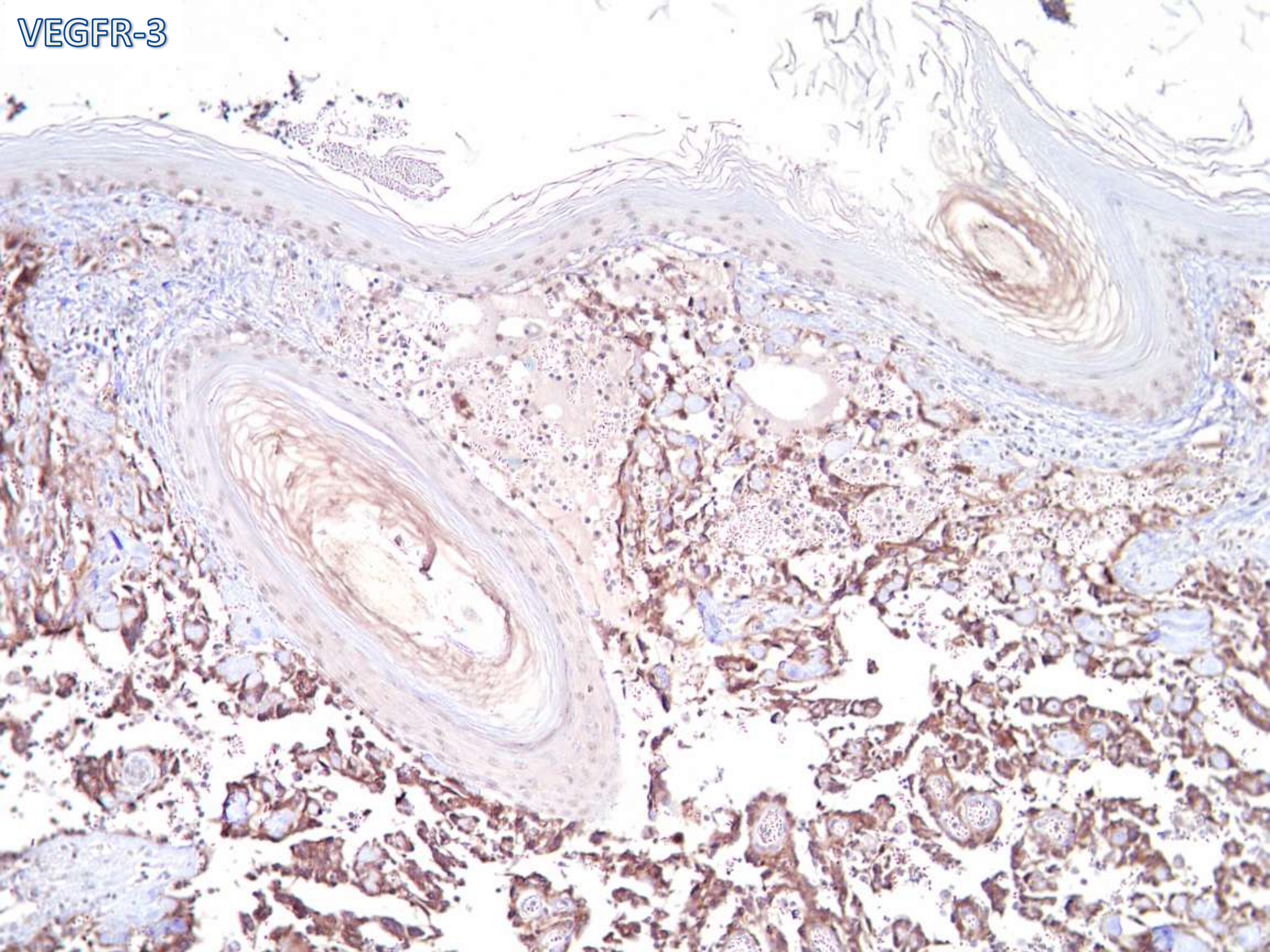
VEGFR-3



# Linfangiosarcoma (?)



VEGFR-3

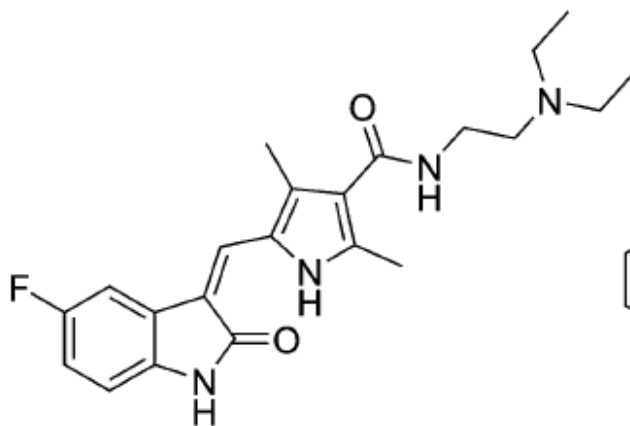
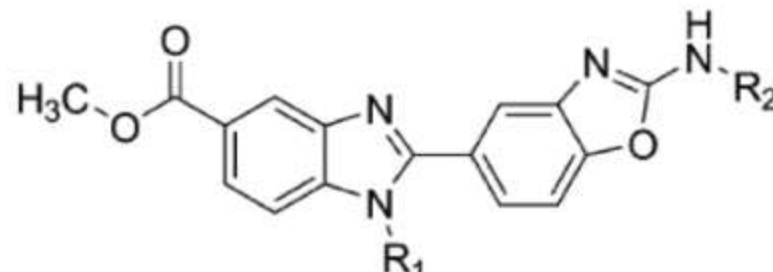


# Polymer supported synthesis of novel benzoxazole linked benzimidazoles under microwave conditions: *In vitro* evaluation of VEGFR-3 kinase inhibition activity†

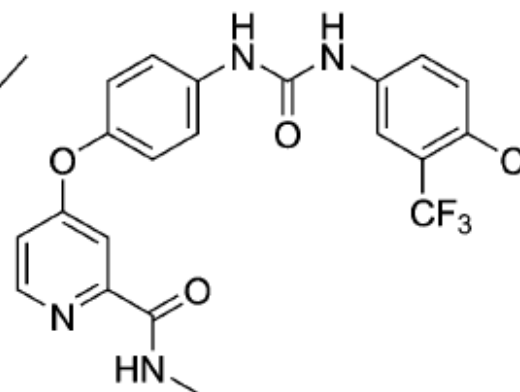
Kaushik Chanda,<sup>a</sup> Barnali Maiti,<sup>a</sup> Gorakh S. Yellol,<sup>a</sup> Ming-Hsien Chien,<sup>b</sup> Min-Liang Kuo<sup>c</sup> and Chung-Ming Sun<sup>\*a</sup>

*Org. Biomol. Chem.*, 2011, **9**, 1917

Nuevo inhibidor de VEGFR-3



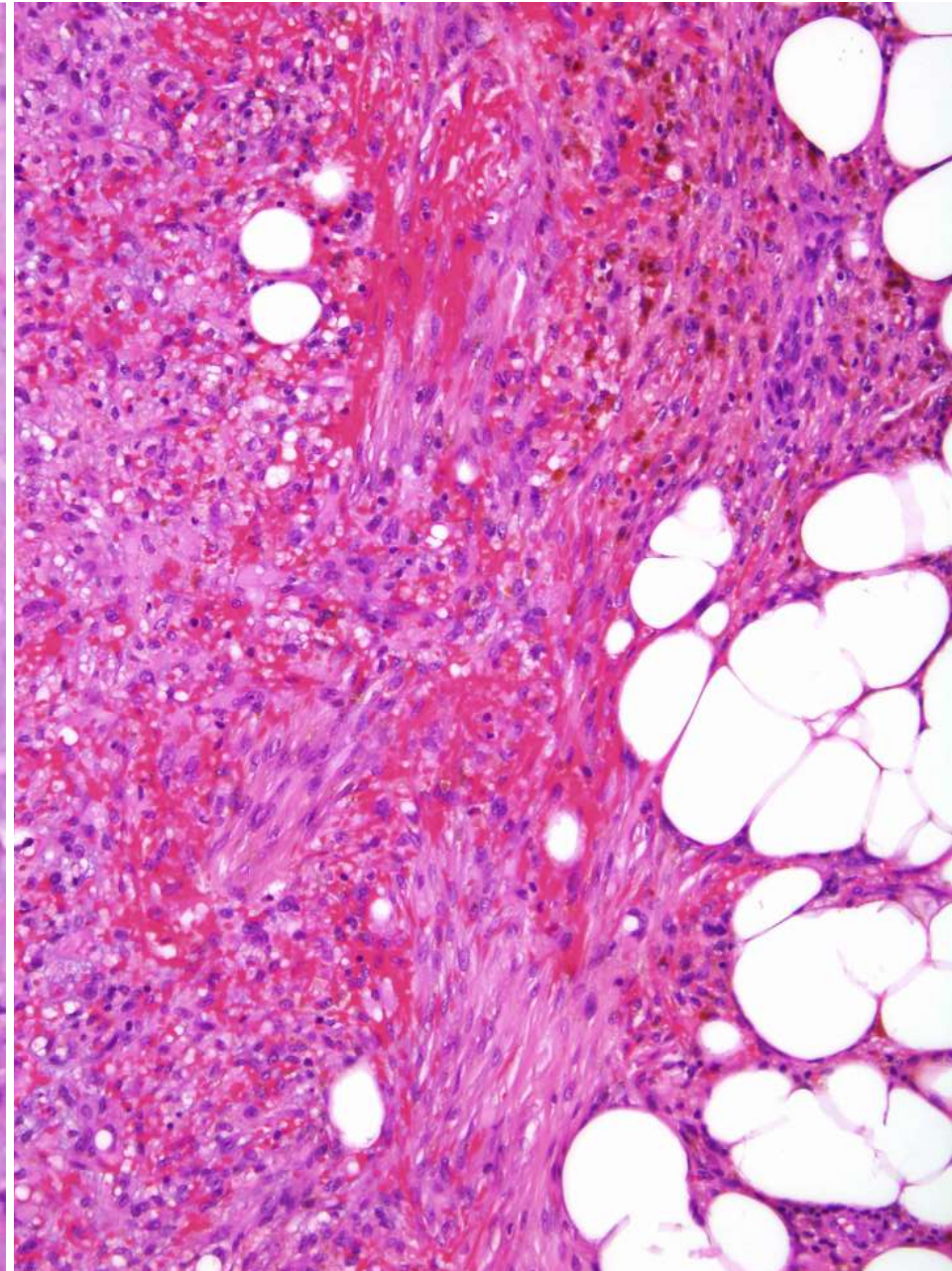
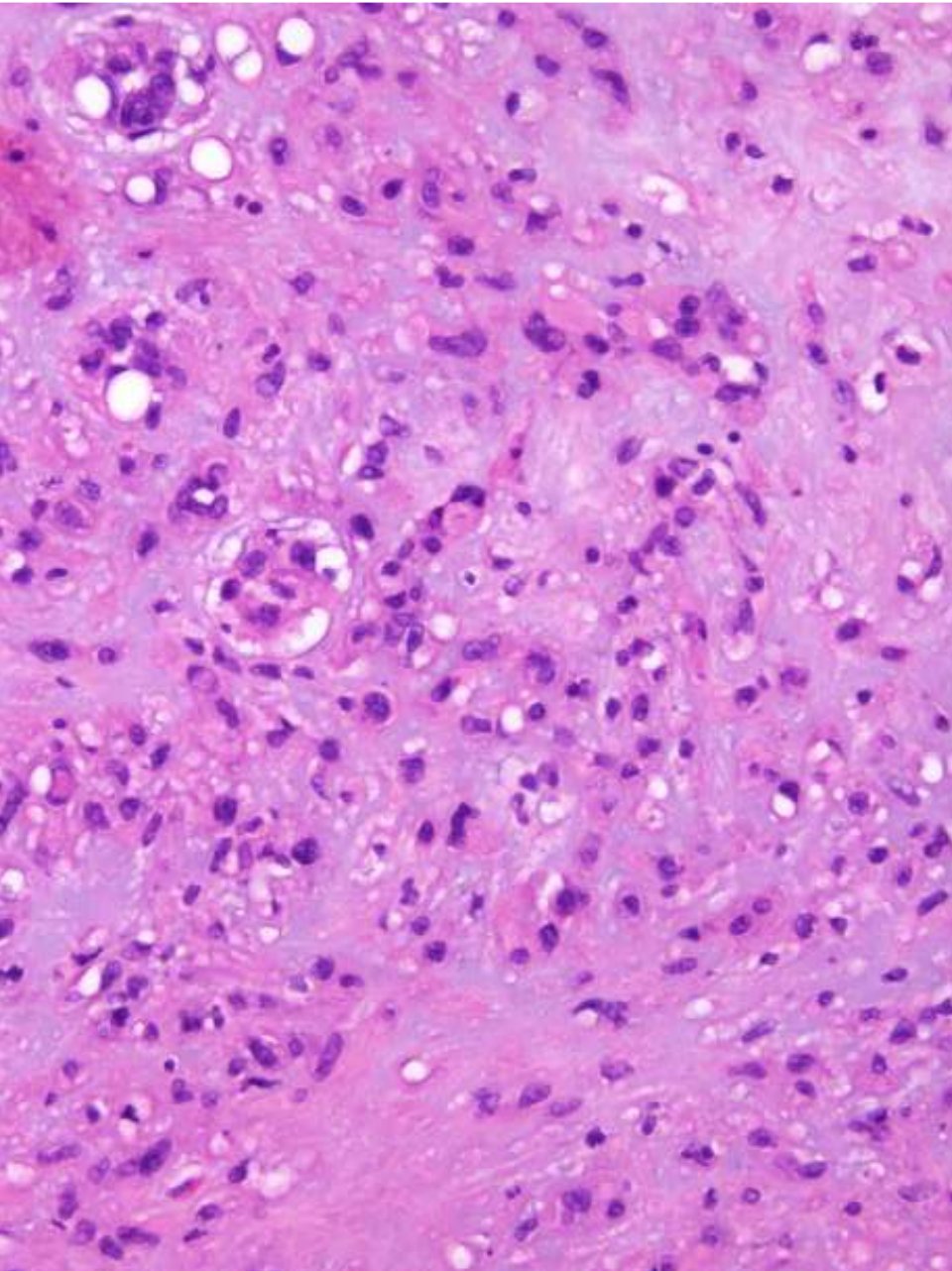
Sunitinib (A)

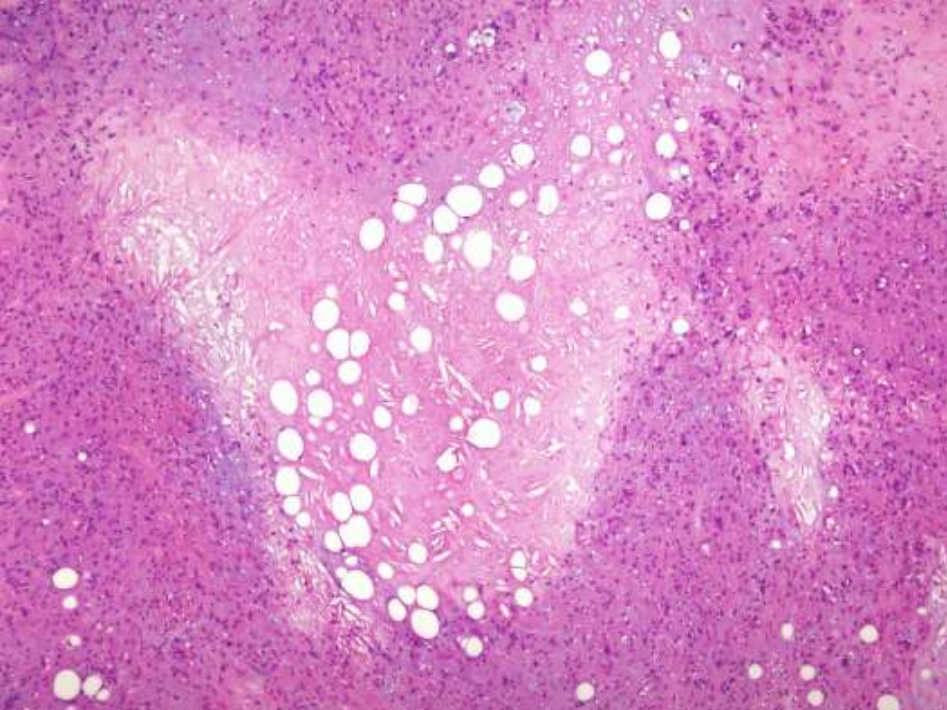


Sorafenib (B)

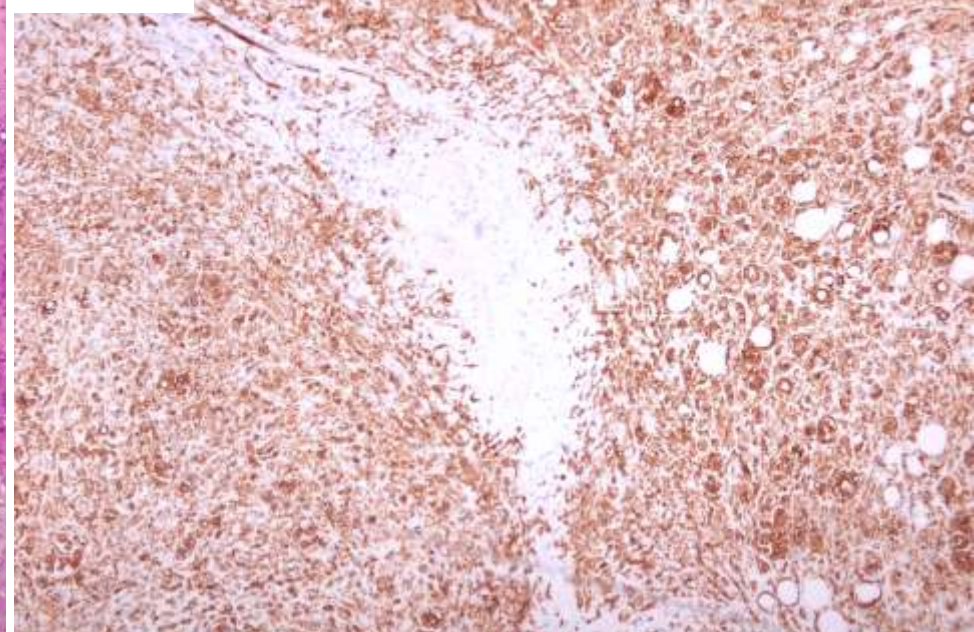
Fig. 1 Examples of small molecule kinase inhibitors.

# Hemangioendotelioma sarcoma epithelioid-like?

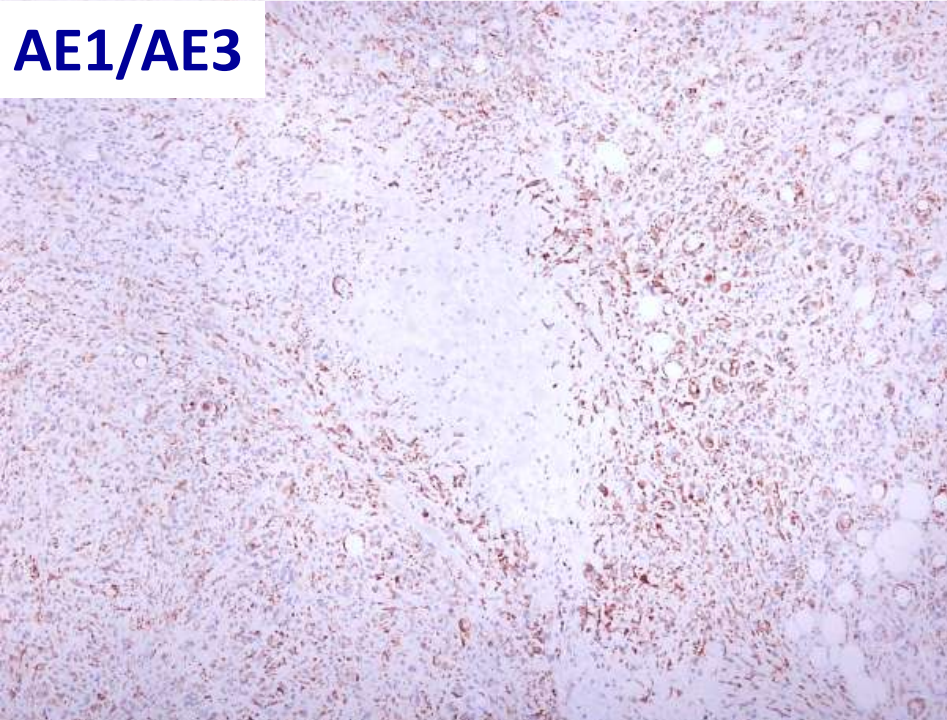




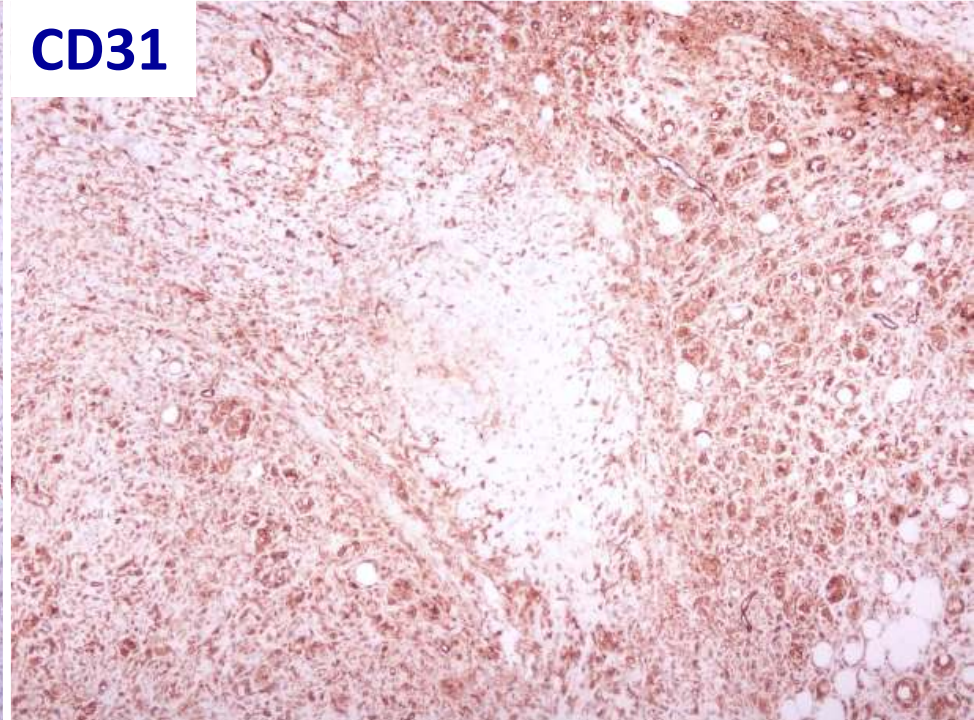
**CD34**



**AE1/AE3**



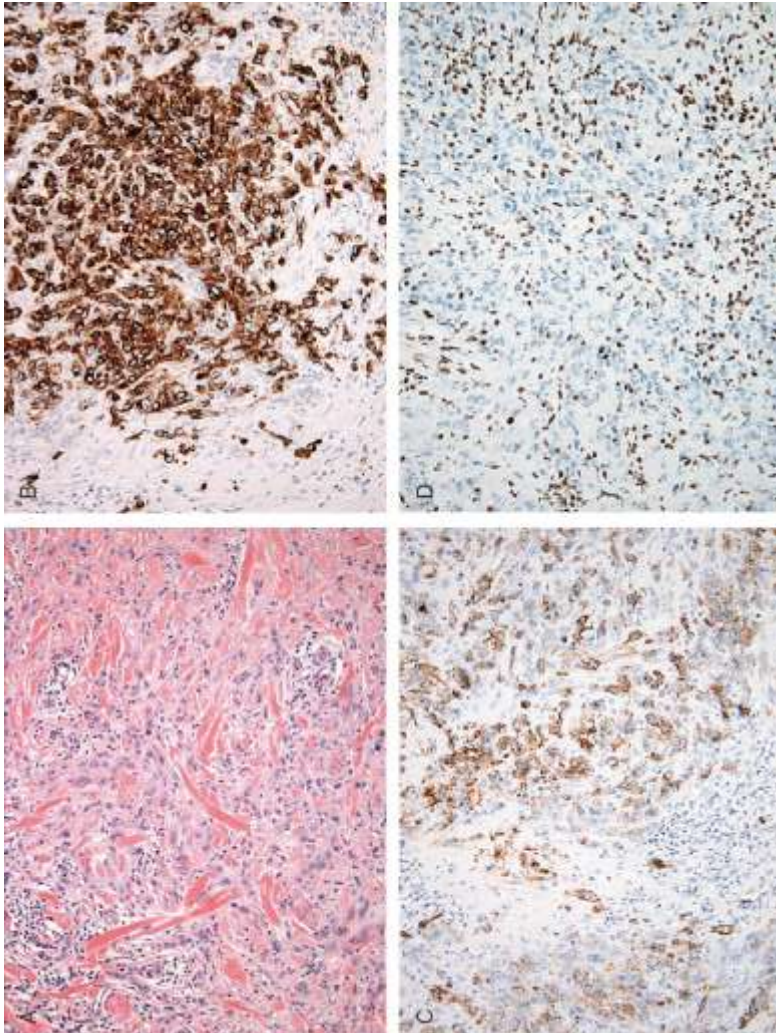
**CD31**





# Loss of INI1 Expression is Characteristic of Both Conventional and Proximal-type Epithelioid Sarcoma

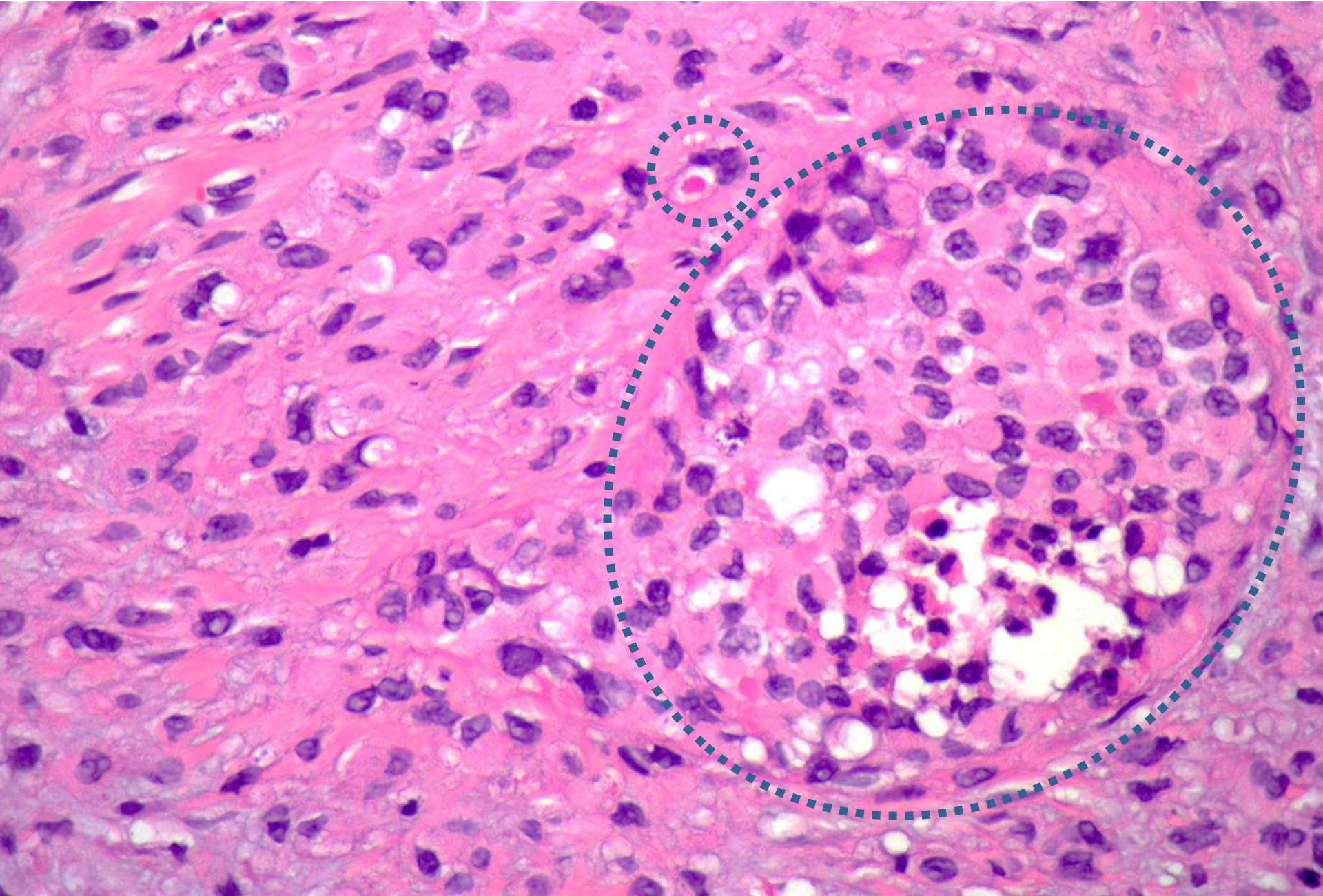
Jason L. Hornick, MD, PhD, Paola Dal Cin, PhD, and Christopher D.M. Fletcher, MD, FRCPath  
*Am J Surg Pathol* 2009;33:542–550



**TABLE 1.** Summary of INI1 Immunohistochemistry

Tumor	Total Cases	Absence of INI1 (%)
Malignant rhabdoid tumor	10	10 (100)
Epithelioid sarcoma (total)	136	127 (93)
Conventional (“distal”) type	64	58 (91)
Proximal type	64	61 (95)
Hybrid type	8	8 (100)
Epithelioid angiosarcoma	20	0 (0)
Epithelioid hemangioendothelioma	10	0 (0)
Epithelioid MPNST	24	12 (50)
Myoepithelial carcinoma of soft tissue	22	2 (9)
Histiocytic sarcoma	5	0 (0)
Anaplastic large cell lymphoma	7	0 (0)
Diffuse large B-cell lymphoma	10	0 (0)
Epithelioid mesothelioma	20	0 (0)
Metastatic melanoma	20	0 (0)
Metastatic carcinoma (total)	54	0 (0)
Nonsmall cell lung	22	0 (0)
Breast	6	0 (0)
Colorectum	5	0 (0)
Stomach	6	0 (0)
Kidney	5	0 (0)
Prostate	5	0 (0)
Pancreas	5	0 (0)
Metastatic embryonal carcinoma (testis)	12	0 (0)

# Sarcoma epitelioide tipo proximal



# Proximal-type Epithelioid Sarcoma of the Vulva: Relationship to Malignant Extrarenal Rhabdoid Tumor

Ashok Tholpady, M.D., M.S.P.H., Cheryl L. Lonergan, M.D., and Mark R. Wick, M.D.

*International Journal of Gynecological Pathology*

29:600-604 © 2010 International Society of Gynecological Pathologists

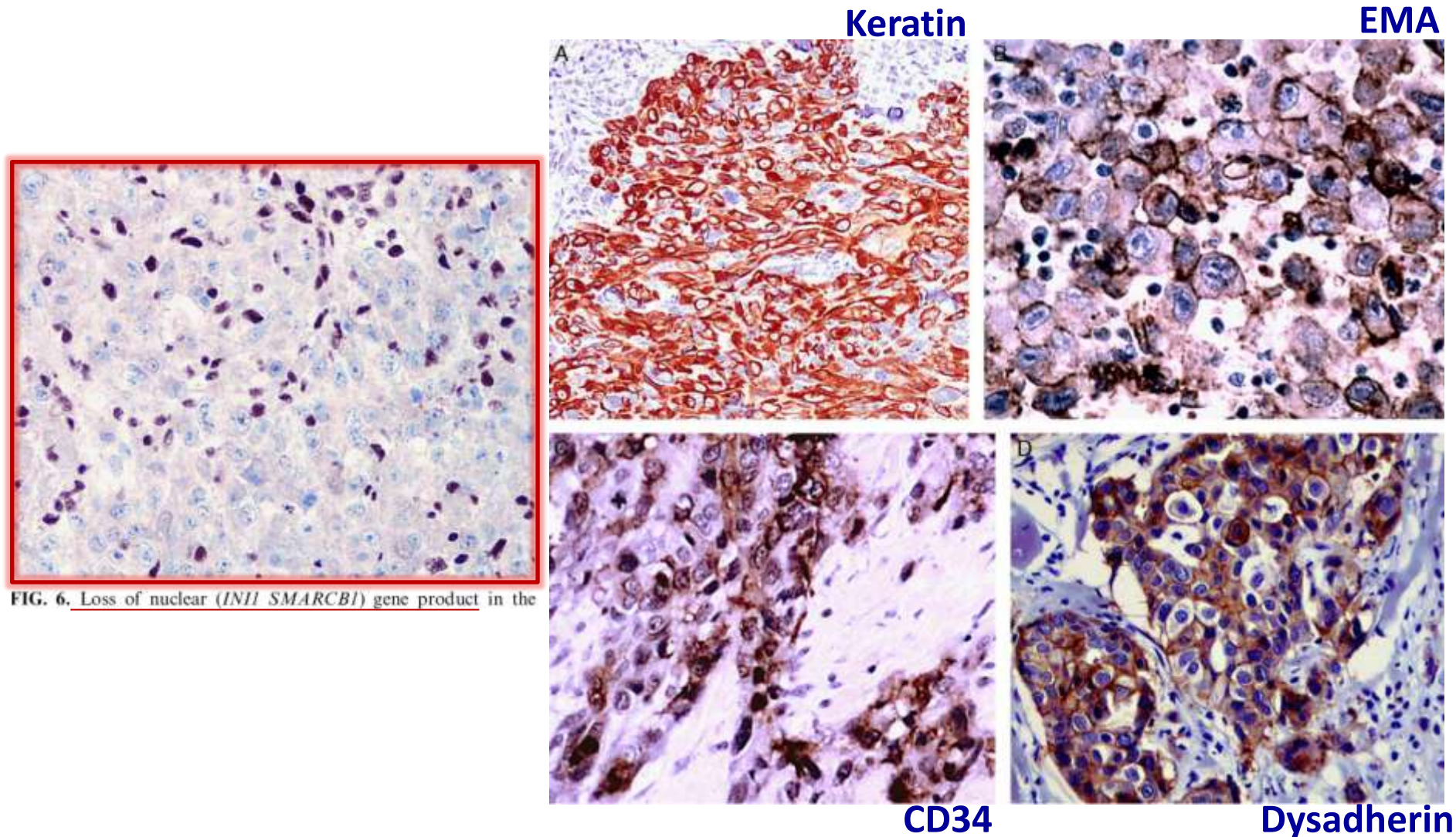


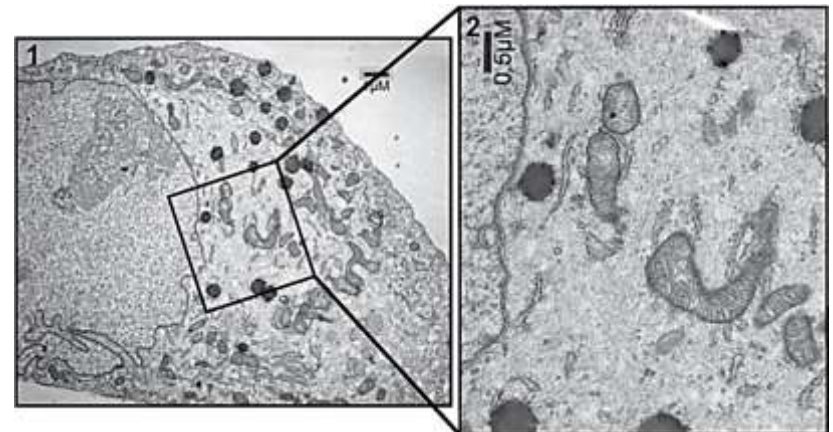
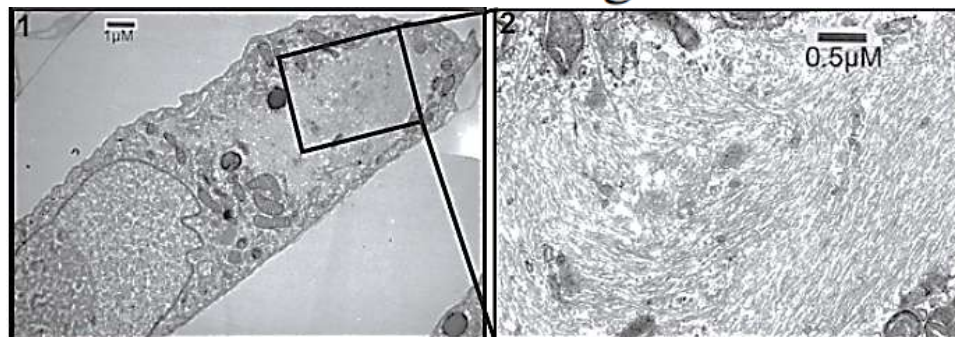
FIG. 6. Loss of nuclear (INI1/SMARCB1) gene product in the

# Therapeutically targeting cyclin D1 in primary tumors arising from loss of *Ini1*

Melissa E. Smith<sup>a</sup>, Velasco Cimica<sup>a</sup>, Srinivasa Chinni<sup>a</sup>, Suman Jana<sup>b</sup>, Wade Koba<sup>b</sup>, Zhixia Yang<sup>a</sup>, Eugene Fine<sup>b,c</sup>, David Zagzag<sup>d</sup>, Cristina Montagna<sup>a,c</sup>, and Ganjam V. Kalpana<sup>a,c,1</sup>

PNAS | January 4, 2011 | vol. 108 | no. 1 | 319–324

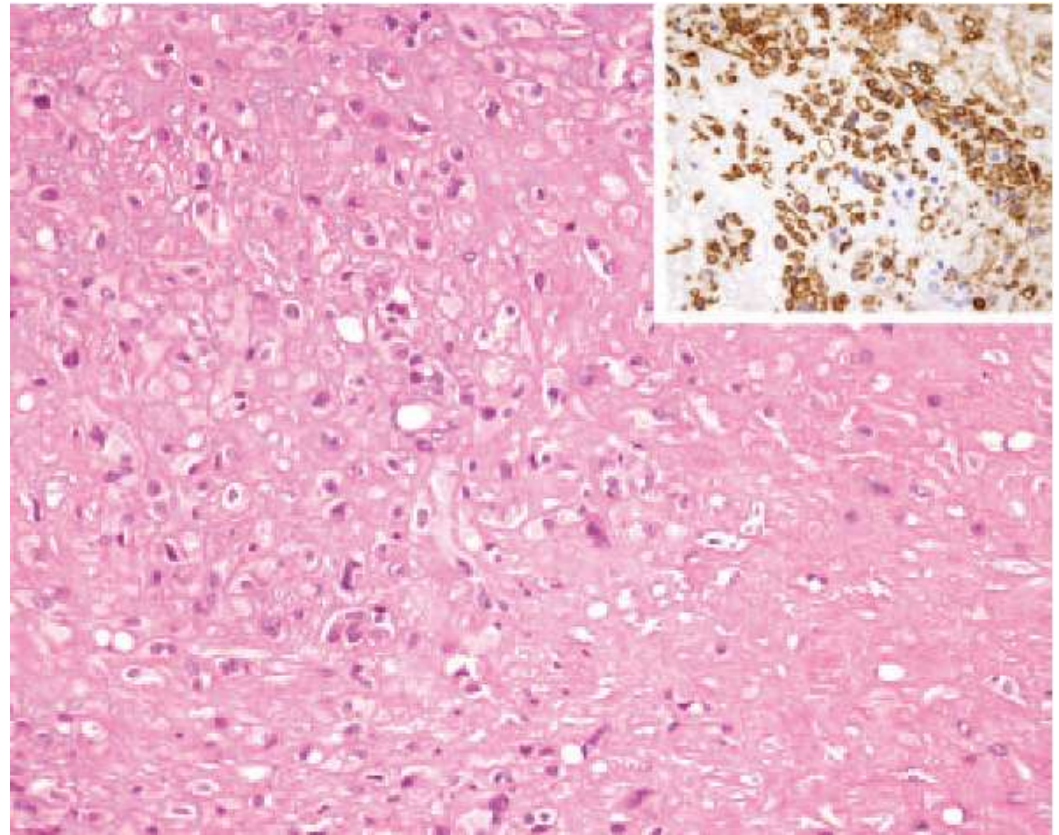
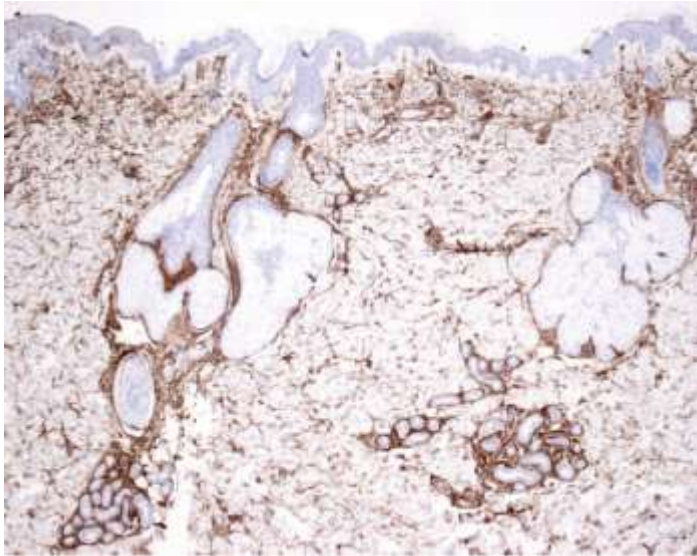
Flavopiridol may be effective in eliminating not only RTs but other tumors that have lost *INI1* and express moderate levels of cyclin D1. RTs and other tumors that express higher levels of cyclin D1 could be treated with flavopiridol in combination with other drugs. Further analysis of such drug combinations that improve the efficacy of flavopiridol may provide a much-needed therapeutic strategy for RTs, which are notoriously resistant to current treatment regimens.



# CD34-reactive tumors of the skin. An updated review of an ever-growing list of lesions

Juan C. Tardío

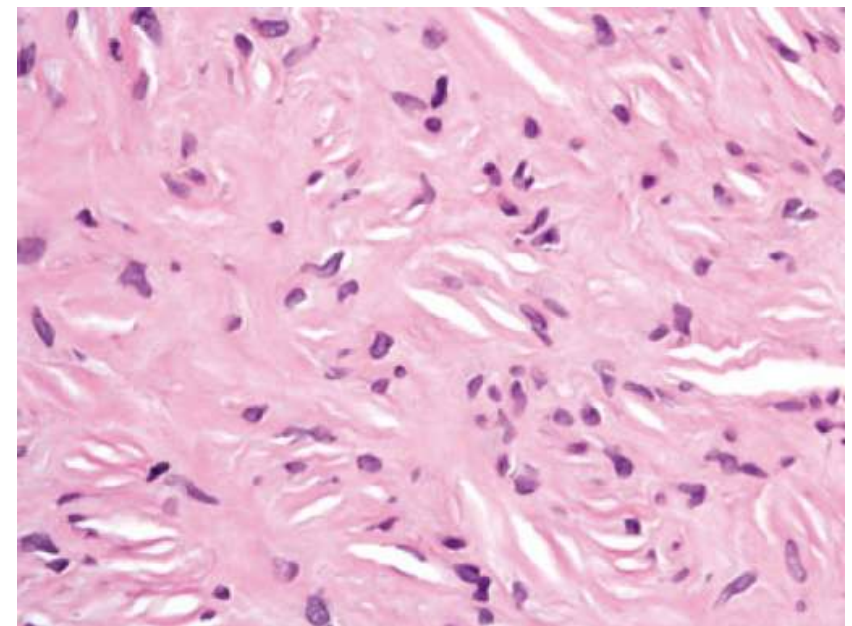
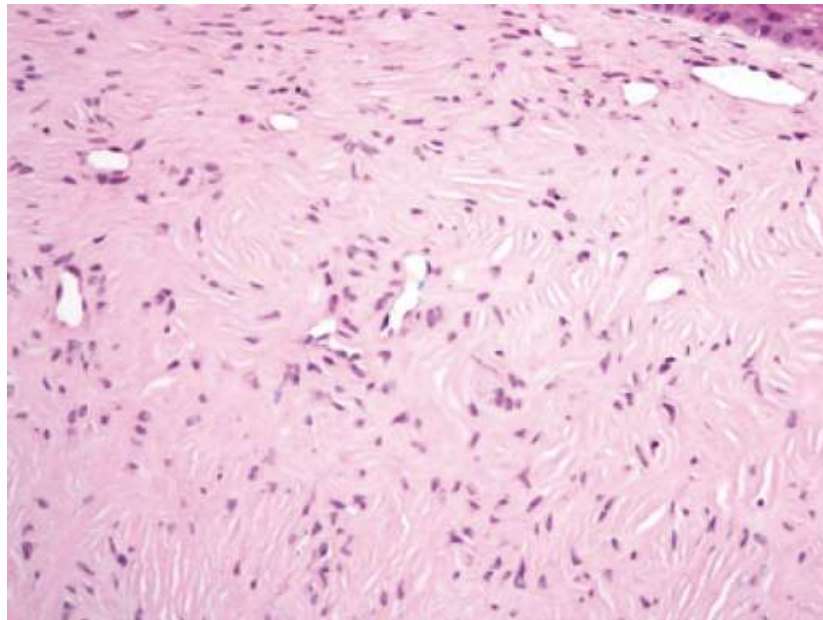
J Cutan Pathol 2008; 36: 1079–1092.



# Extra-acral cutaneous/soft tissue sclerosing perineurioma: an under-recognized entity in the differential of CD34-positive cutaneous neoplasms

Melanie D. Fox<sup>1</sup>, Briana C. Gleason<sup>2</sup>, Antoinette B. Thomas<sup>1</sup>, Thomas A. Victor<sup>1</sup> and Thomas L. Cibull<sup>1</sup>

*J Cutan Pathol* 2010; 37: 1053–1056



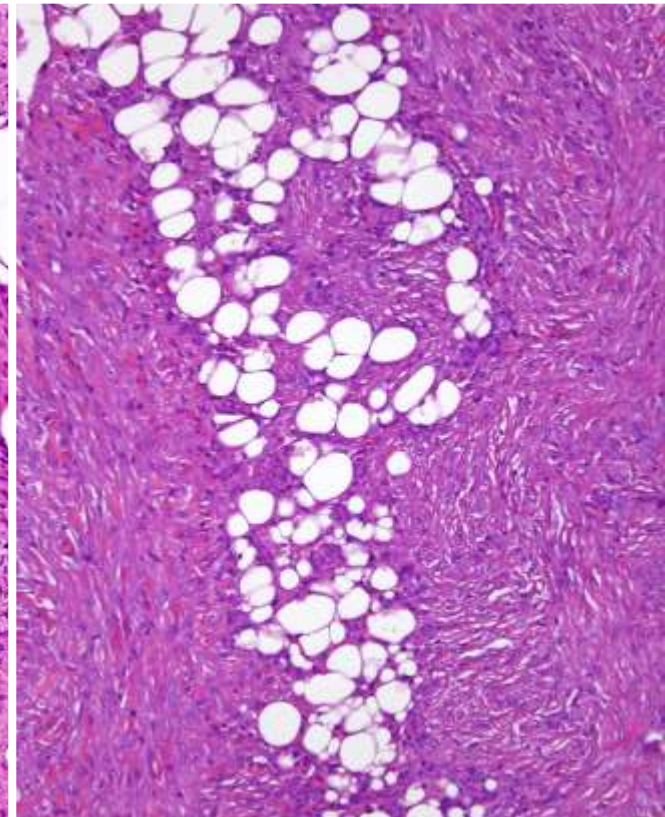
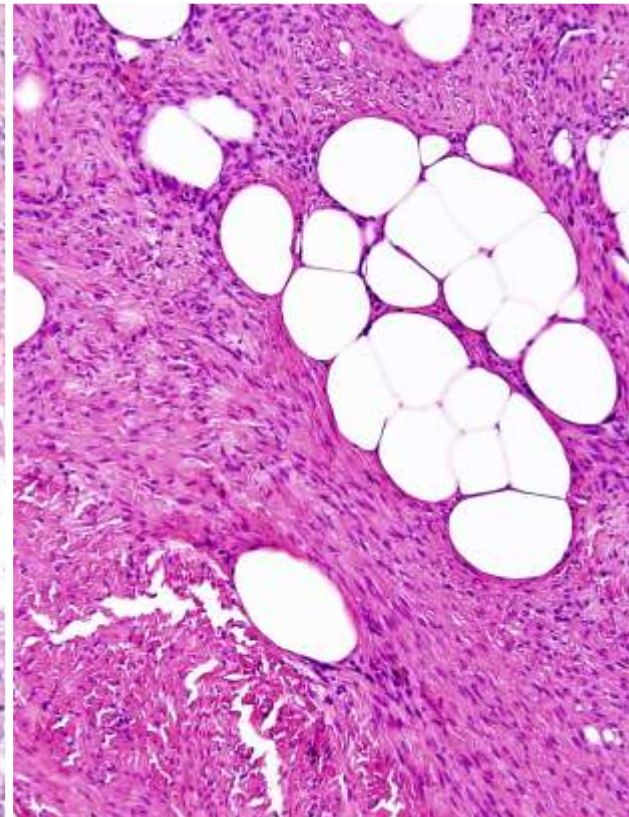
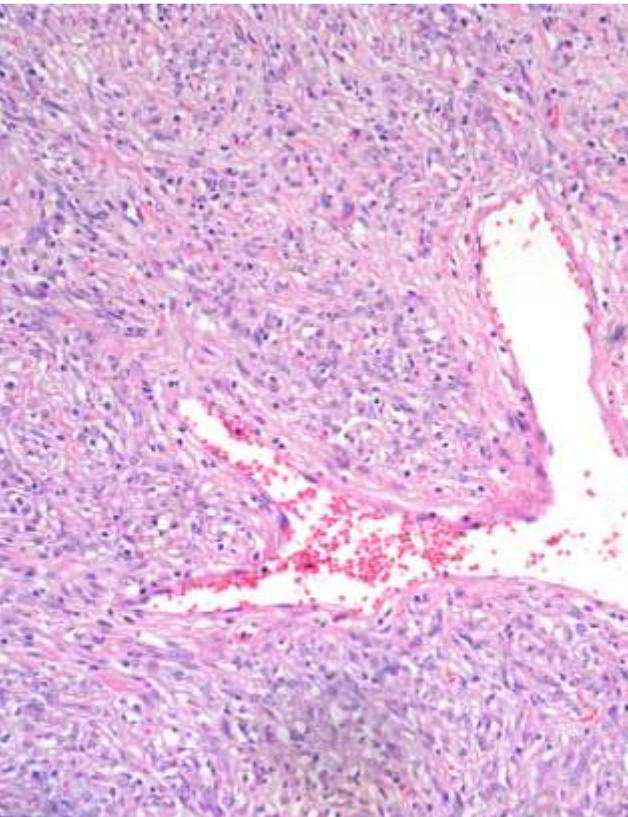
Site	Sex	Age	EMA	CD34	S-100	Sclerosis	Cytology
Forearm	F	46	+ (focal)	+ (diffuse)	–	+ (focal)	Spindle
Lower lateral leg	F	60	+ (diffuse)	+ (diffuse)	–	+ (diffuse)	Spindle
Upper lip	F	84	+ (diffuse)	+ (diffuse)	–	+ (diffuse)	Spindle

Focal >25%–75%, diffuse >75%.

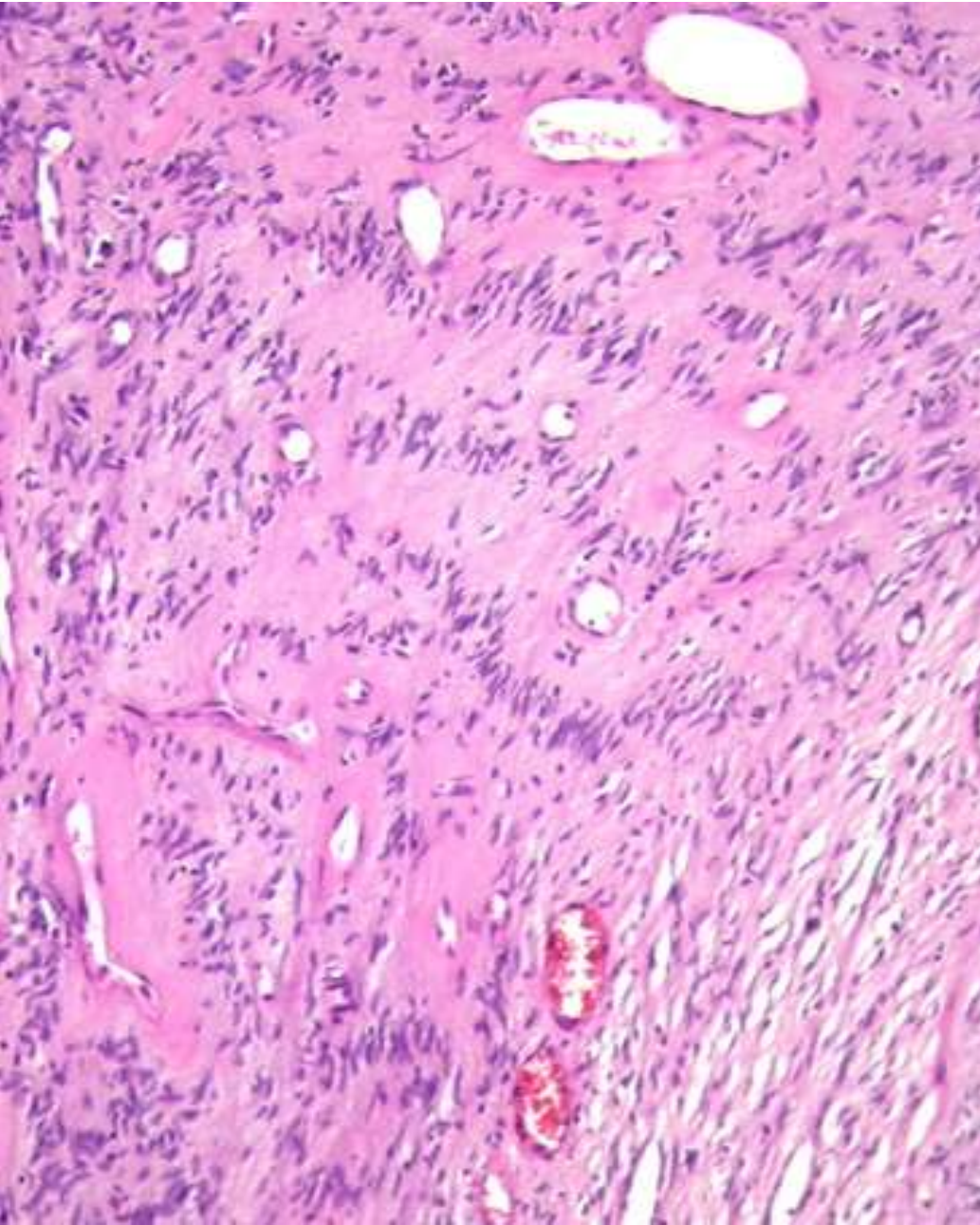
# Cutaneous CD34+ Spindle Cell Neoplasms: Histopathologic Features Distinguish Spindle Cell Lipoma, Solitary Fibrous Tumor, and Dermatofibrosarcoma Protuberans

*Lance Wood, MD,\* Thomas J. Fountaine, MD,\* Lorraine Rosamilia, MD,\*  
Klaus F. Helm, MD,\*† and Loren E. Clarke, MD\*†*

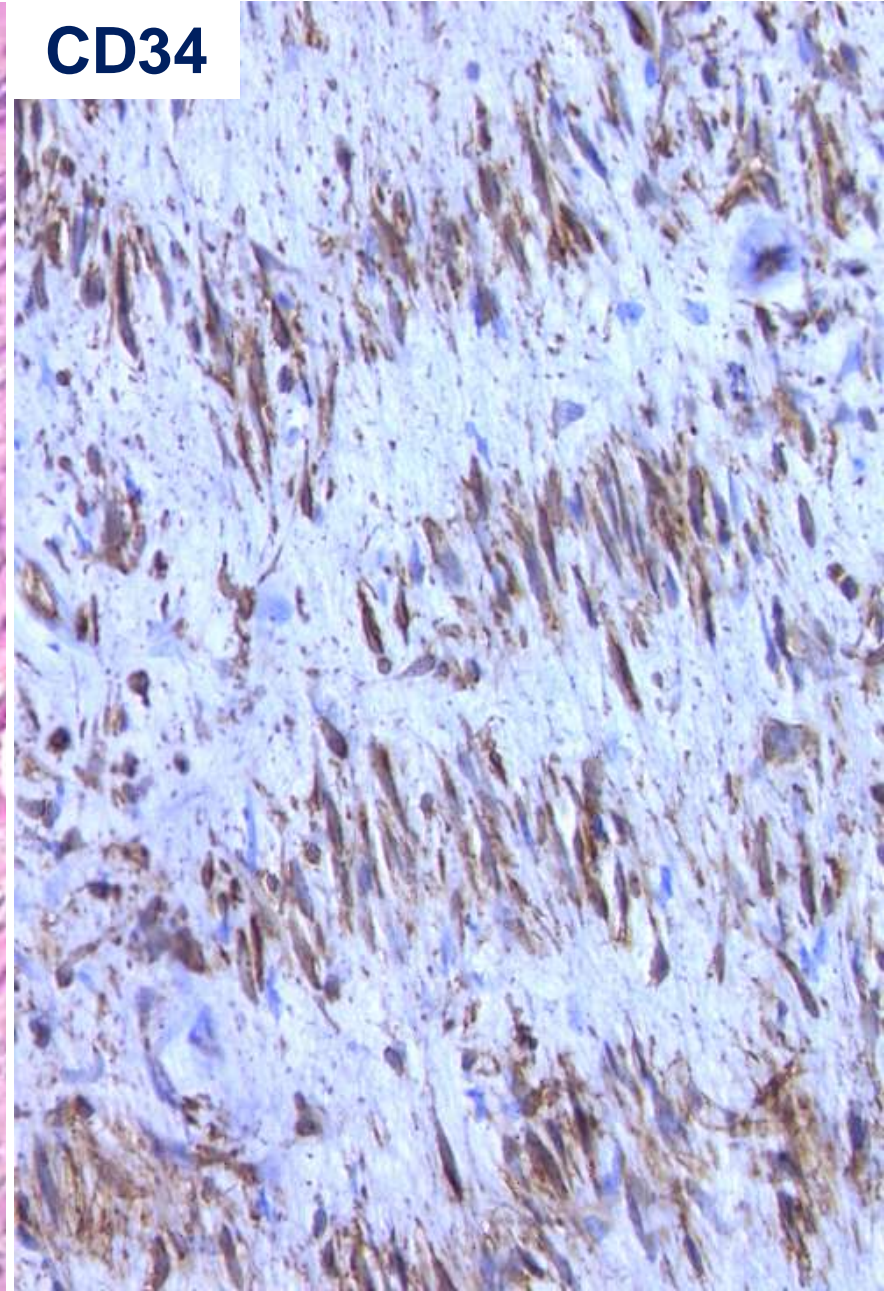
*Am J Dermatopathol 2010;32:764–768*



# DFSP con cuerpos de Verocay

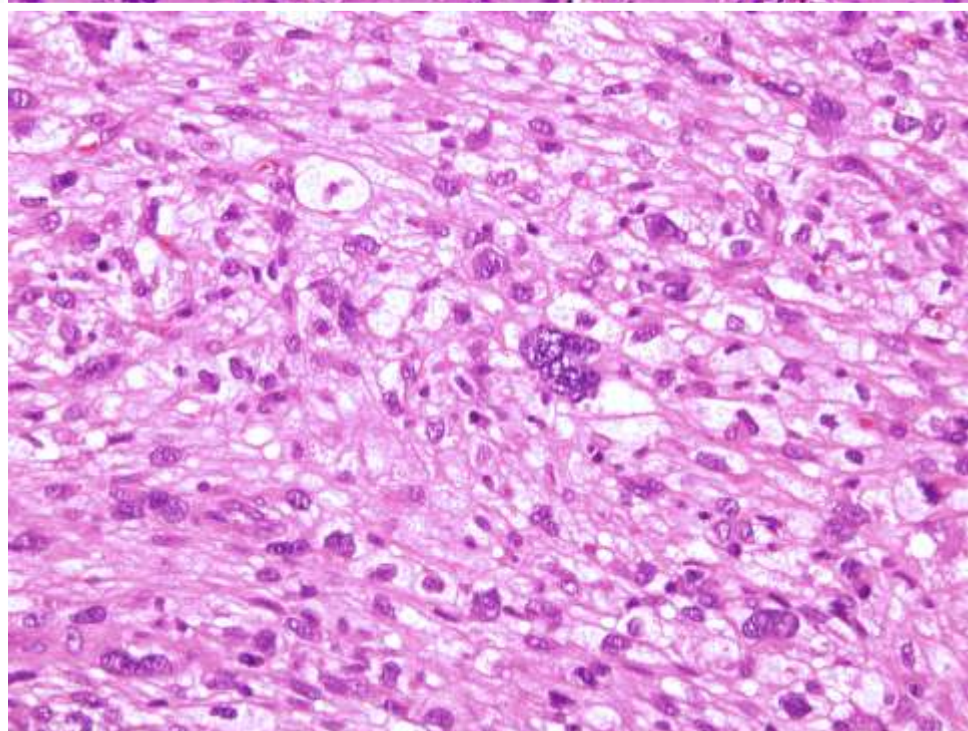
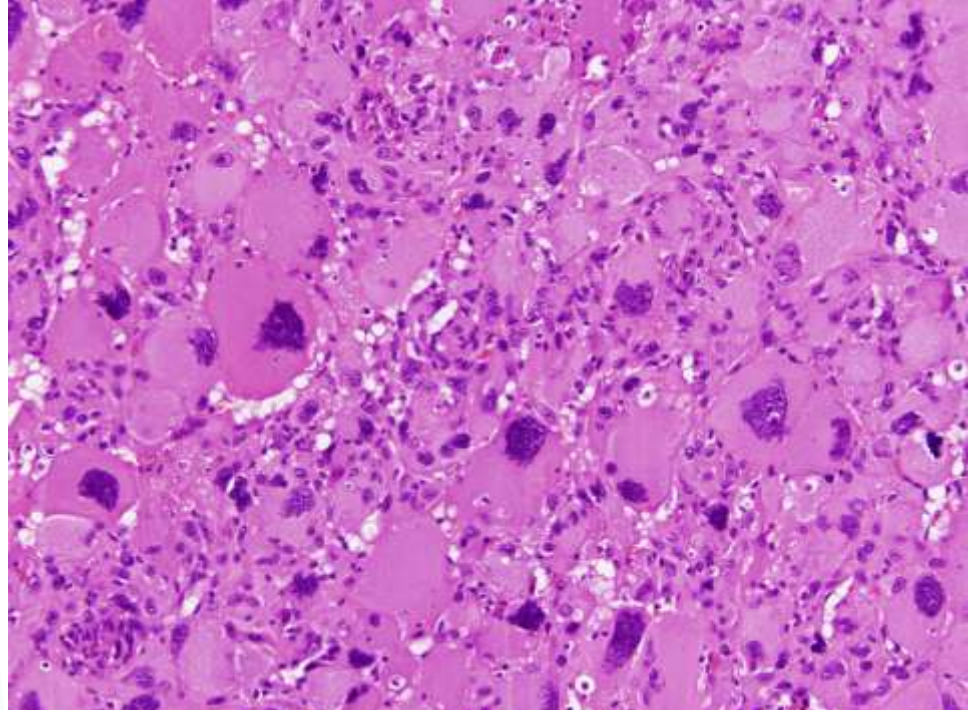
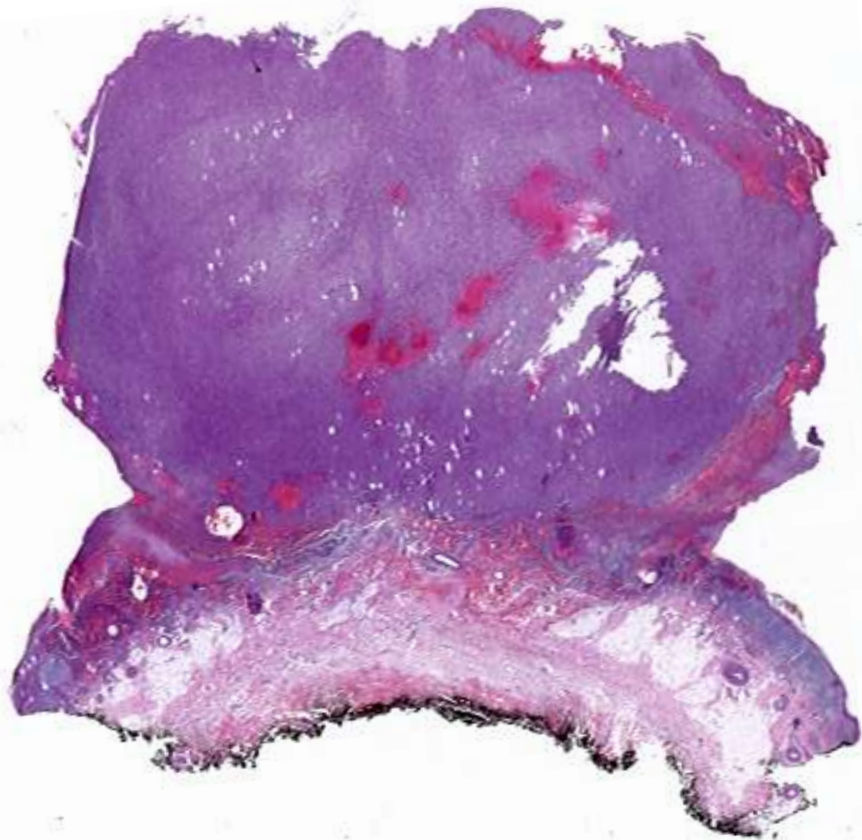


CD34





# Fibroxantoma atípico



# Atypical fibroxanthoma: A clinicopathological study of 89 cases

Basit Mirza<sup>1</sup> and David Weedon

*Australasian Journal of Dermatology* (2005) 46, 235–238

## Evaluation of CD10 and Procollagen 1 Expression in Atypical Fibroxanthoma and Dermatofibroma

*Am J Surg Pathol* 2008;32:1111–1122

*Sebastien de Feraudy, MD, Natalie Mar, MD, and Timothy H. McCalmont, MD*

### Positivo

- CD10
- Procolágeno 1
- CD99

### Ocasional

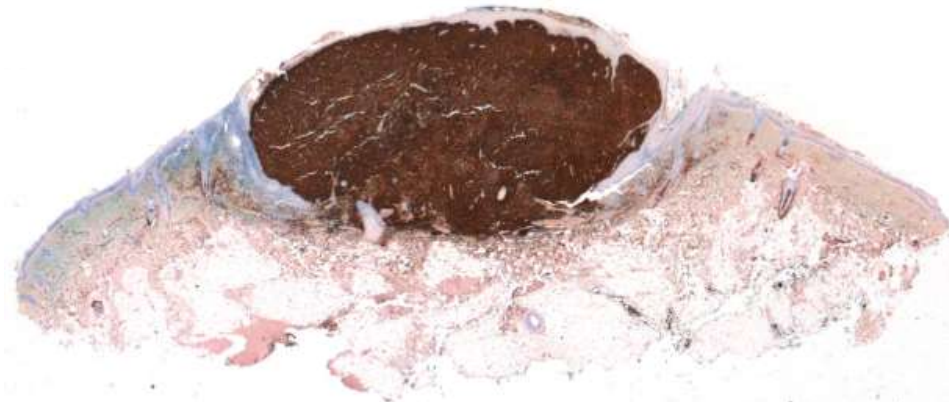
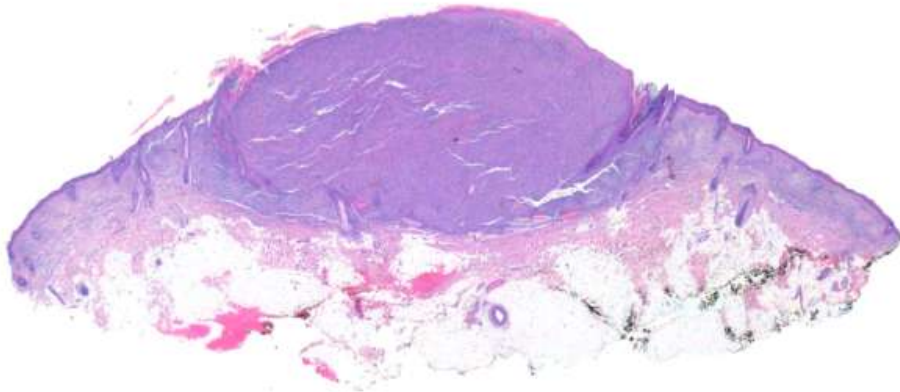
- Actina
- Queratina

### Negativo

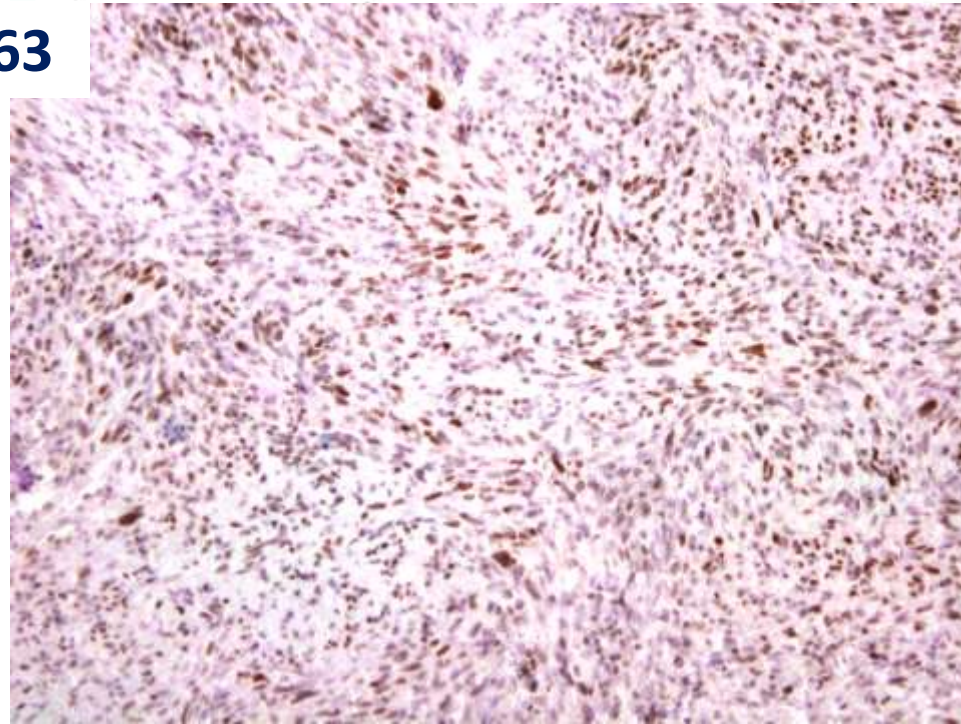
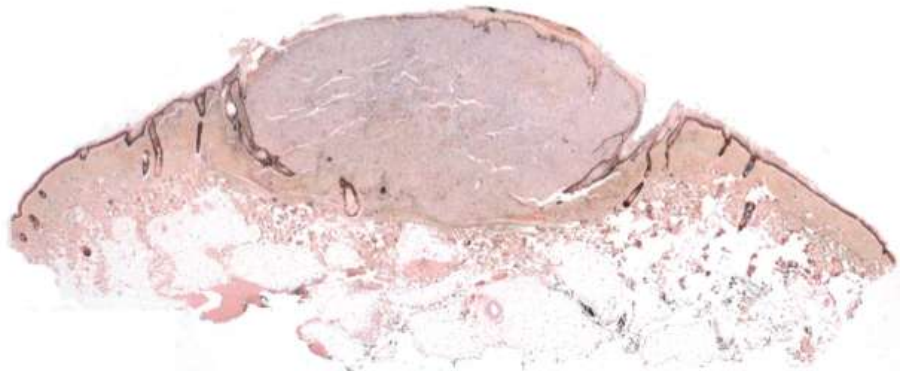
- S100
- Sox-10
- p63

# Tumor fusocelular CD10+ y p63+

CD10



p63

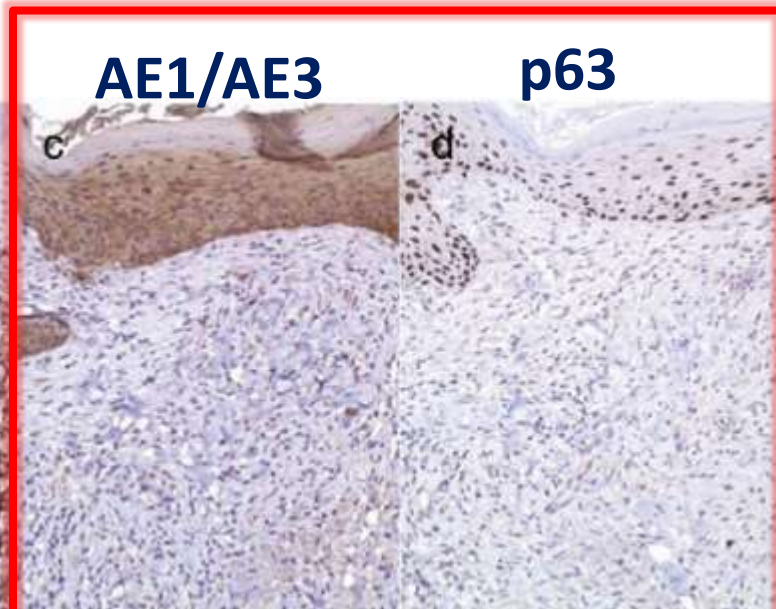
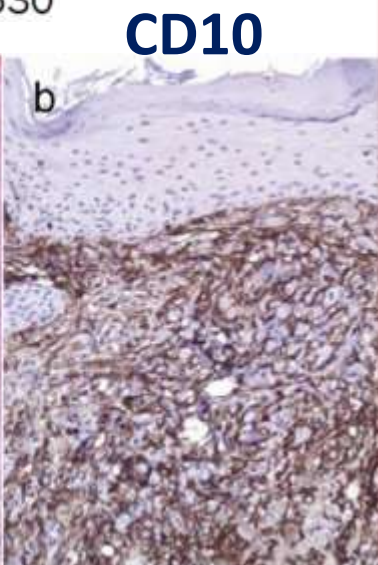
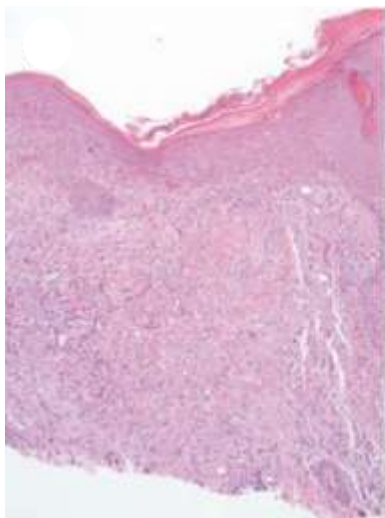


# Diagnostic Utility of P63 and CD10 in Distinguishing Cutaneous Spindle Cell/Sarcomatoid Squamous Cell Carcinomas and Atypical Fibroxanthomas

Jordan M. Hall<sup>1</sup>, Jeff S. Saenger<sup>1</sup> and Oluwole Fadare

Int J Clin Exp Pathol (2008) 1, 524-530

**FXA**



**Ca Escamoso  
Fusocel.**

