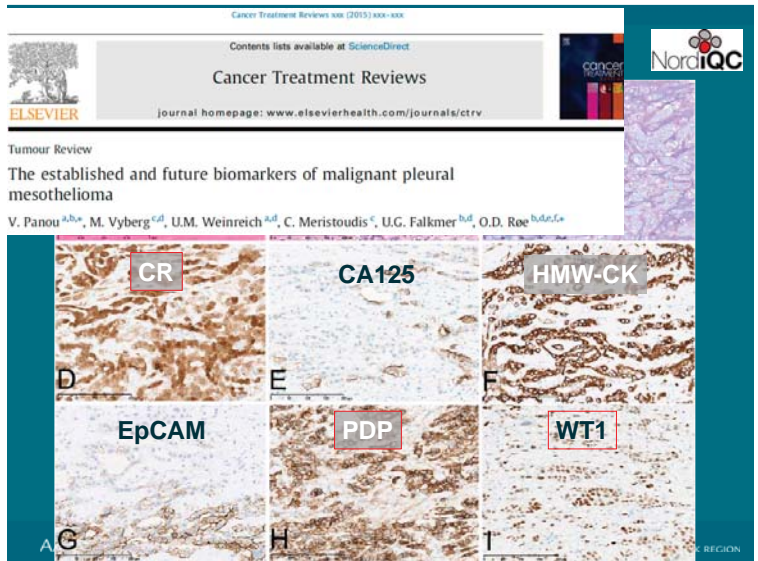


# External quality assurance of malignant mesothelioma analyses



AALBORG UNIVERSITY HOSPITAL

Mogens Vyberg  
professor of clinical pathology

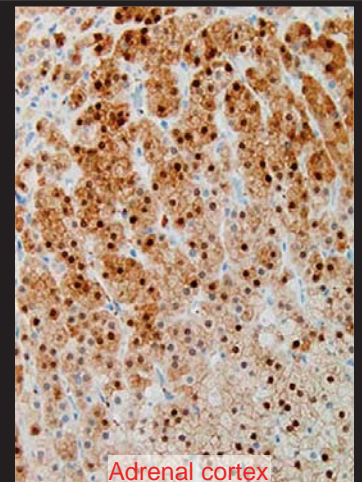
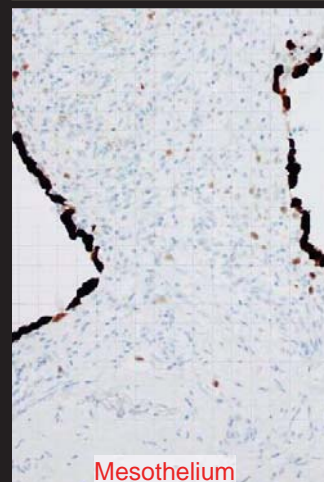


## Calretinin

Calcium-binding protein related to S-100 proteins  
Playing a role in somatosensory transduction

- Neurons
- Mesothelial cells
- Steroid producing cells
  - adrenal cortical cells
  - testicular Leydig and Sertoli cells
  - ovarian theca interna cells and surface epithelium
- Neuroendocrine cells
- Breast glands
- ...

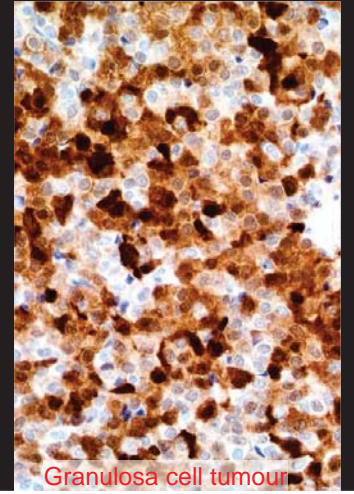
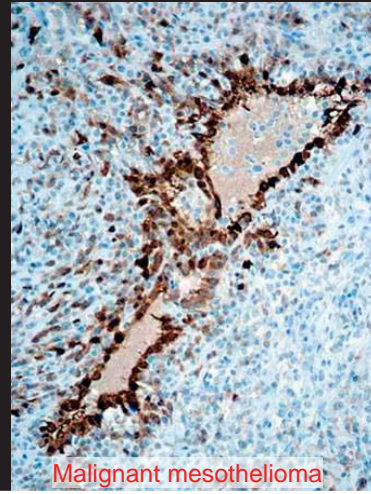
## Calretinin



## Calretinin

- **Malignant mesothelioma** +
- **Steroid producing tumours** +/-
  - adrenal cortical tumour
  - testicular Leydig and Sertoli cell tumour
  - ovarian thecal tumours
- **Squamous cell carcinoma** -/+
- **Various adenocarcinomas** -(+)
- ...

## Calretinin in neoplasms



## Calretinin

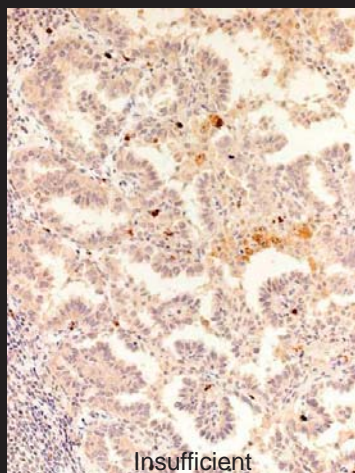
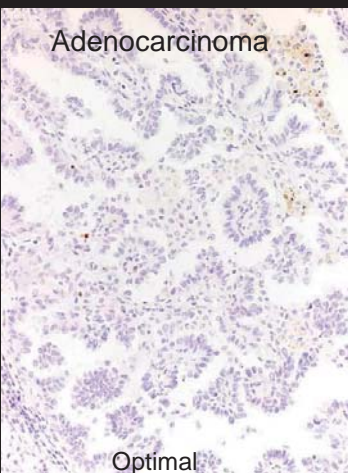
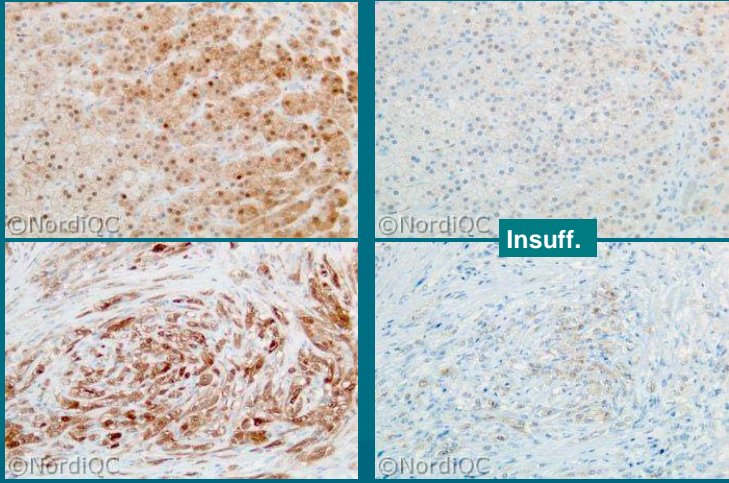


Table 1. Abs and assessment marks for CR, run 33

Concentrated Abs	N	Vendor	Optimal	Good	Borderl.	Poor	Suff. 1	Suff. Ops2
mAb clone 2E7	3	Immunologic	0	2	0	1	-	-
mAb clone 5A5	28	Leica/Novocastra	8	14	10	1	67 %	74 %
	4	Thermo/Neomarkers					Benchmark	
	1	Monosan						
mAb clone DAK-Calret 1	41	Dako	11	17	11	3	67 %	83 %
rmAb clone SP13	3	Thermo/Neomarkers	0	2	2	2	33 %	-
	2	Spring						
	1	Master Diagnostica						
pAb 18-0211	18	Invitrogen/Zymed	10	6	2	0	89 %	100 %
pAb CP092	2	Biocare	0	2	0	0	-	-
pAb E1174	1	Spring	0	1	0	0	-	-
pAb ILM 7696	4	Immunologic	0	2	1	1	-	-
pAb RBK003	1	Zytomed	0	1	0	0	-	-
<b>Ready-To-Use Abs</b>								
mAb clone CAL6 PA0346	3	Leica/Novocastra	2	1	0	0	-	-
mAb clone DAK-Calret 1 IS/IR627	26	Dako	7	11	6	2	69 %	78 %
rmAb clone SP65 790-4467	28	Ventana	24	4	0	0	100 %	100 %
pAb 232A-77/78	2	Cell Marque	0	2	0	0	-	-
pAb 760-2700	3	Ventana/Cell Marque	0	3	0	0	-	-
pAb ZA0026	1	Zhongshan	0	1	0	0	-	-
<b>Total</b>	<b>173</b>		<b>62</b>	<b>69</b>	<b>32</b>	<b>10</b>	<b>-</b>	<b>-</b>
<b>Proportion</b>			<b>36 %</b>	<b>40 %</b>	<b>18 %</b>	<b>6 %</b>	<b>76 %</b>	

## Calretinin

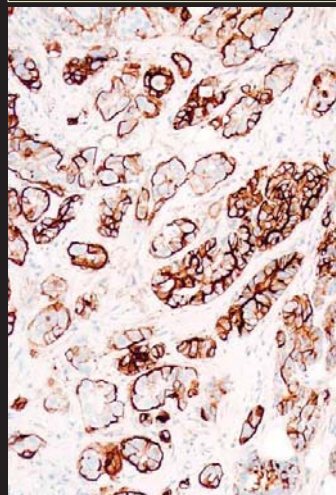


## Podoplanin – a mucin like differentiation antigen

- Lymphatic endothelium
- Fibroblasts, osteocytes
- Smooth and striated muscle cells
- Myoepithelial cells, Cajal cells
- Basal squamous epithelial cells
- Gastric crypt c., prostatic basal c.
- Immature Sertoli c. and gonocytes
- Renal glomerular podocytes
- Mesothelium (reactive)
- Follicular dendritic cells
- Some lymphocytes
- Glial/Schwann cells



## Podoplanin



Mal. Mesothelioma  
Many other tumours  
but rarely adenocarcinomas

Malignant mesothelioma

## Podoplanin



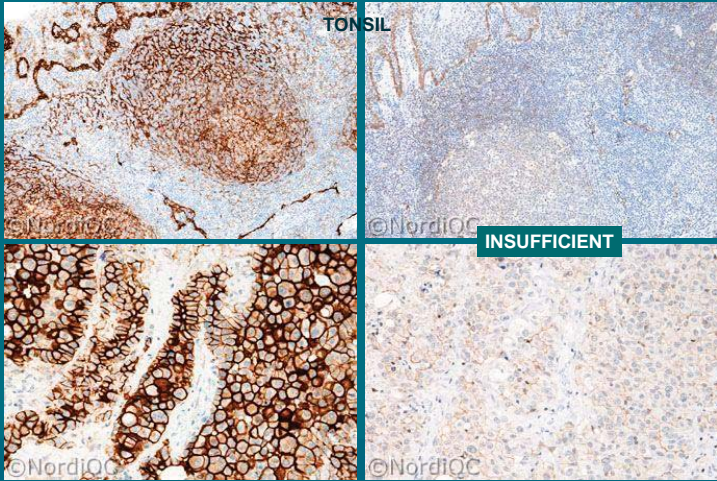
Table 1. Abs and assessment marks for Podop, run 36

Concentrated Abs	N	Vendor	Optimal	Good	Borderl.	Poor	Suff. 1	Suff. Ops2
mAb clone D2-40	48	Dako	10	20	22	4	54 %	56 %
	3	Signet						
	2	Biocare						
mAb clone 18H51	1	Acris	0	0	0	1	-	-
rmAb clone EP215	1	Epitomics	0	0	1	0	-	-
<b>Ready-To-Use Abs</b>								
mAb clone D2-40 Is/IR072	15	Dako	11	4	0	0	100 %	100 %
mAb clone D2-40 N1607	3	Dako	0	3	0	0	-	-
mAb clone D2-40 760-4395	21	Ventana/Cell Marque	0	8	13	0	38 %	-
mAb clone D2-40 322M-17/18	2	Cell Marque	0	1	1	0	-	-
mAb clone D2-40 MON-RTU1092	1	Monosan	0	1	0	0	-	-
mAb clone D2-40 MAD-000402QD	1	Master Diagnostica	0	1	0	0	-	-
<b>Total</b>	<b>102</b>		<b>21</b>	<b>39</b>	<b>37</b>	<b>5</b>	<b>-</b>	<b>-</b>
<b>Proportion</b>			<b>21 %</b>	<b>38 %</b>	<b>36 %</b>	<b>5 %</b>	<b>59 %</b>	

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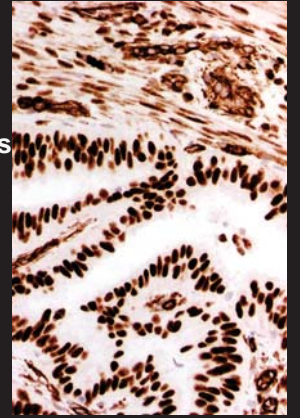
## Podoplanin



## Wilms' tumour-1 (WT1) protein

Transcription factor for development of the genitourinary system

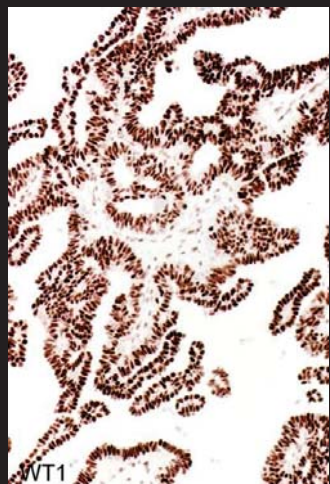
- Mesothelium
- Ovary (surface / inclusion cysts)
- Fallopian tube
- Female genital tract: **stromal cells**
- Bone marrow stem cells



Fallopian tube

## Wilms' tumour-1 (WT1) protein

- Serous carcinoma +
- Mal. mesothelioma +/-
- Endometrioid carcinoma +/-
- Other carcinomas -(+)



Serous carcinoma WT1

## WT1



Table 1. Antibodies and assessment marks for WT1, run 43

Concentrated antibodies	n	Vendor	Optimal	Good	Borderline	Poor	Suff. <sup>1</sup>	Suff. OPS <sup>2</sup>
mmAb clone <b>6F-H2</b>	70	Dako	23	41	17	3	76%	81%
	7	Cell Marque						
	2	Immunologic						
	1	BioSB						
	1	Genemed						
mmAb clone <b>WT49</b>	20	Leica/Novocastra	9	8	2	2	81%	88%
	1	Monosan						
	1	Epitomics						
rmAb clone <b>EP122</b>	1	Epitomics	0	1	0	0	-	-
pAb, <b>C-19</b>	1	Santa Cruz	0	0	1	0	-	-
pAb, <b>RB-9267-P1</b>	1	Thermo Fisher	0	0	0	1	-	-
Ready-To-Use antibodies								
mmAb clone <b>6F-H2 IR055/IS055</b>	51	Dako	40	8	2	1	94%	100%
mmAb clone <b>6F-H2 760-4397</b>	45	Ventana/Cell Marque	4	33	5	3	82%	97%

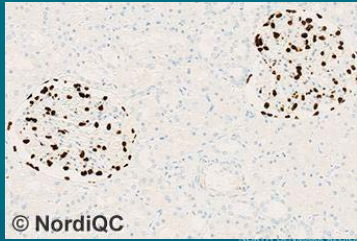
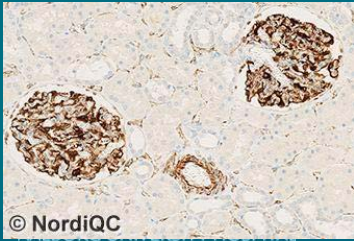
# WT1



**Table 3. Proportion of optimal results for WT1 using concentrated antibodies on the 3 main IHC systems\***

Concentrated antibodies	Dako Autostainer Link / Classic / Omnis		Ventana BenchMark XT / Ultra			Leica Bond III / Max	
	TRS pH 9.0	TRS pH 6.1	CC1 pH 8.5	CC1 pH 8.5 + Protease 3	CC2 pH 6.0	ER2 pH 9.0	ER1 pH 6.0
mAb clone <b>6F-H2</b>	9/13 (69%)**	-	3/38 (8%)	2/4	0/1	4/6 (67%)	-
mAb clone <b>WT49</b>	3/6 (50%)	-	2/4	-	-	4/7 (57%)	-

\* Antibody concentration applied as listed above, HIER buffers and detection kits used as recommended by the vendors of the respective platforms.



2<sup>nd</sup> NordiQC Conference on Applied Immunohistochemistry



## External quality assurance of malignant mesothelioma analyses

Questions or comments ?



AALBORG UNIVERSITY HOSPITAL

Mogens Vyberg  
professor of clinical pathology