# NORDIQC DATA FOR LUNG MARKERS

**Antibody selection, protocols and controls**

**NordiQC Seminar, September 17th - 19th 2025**

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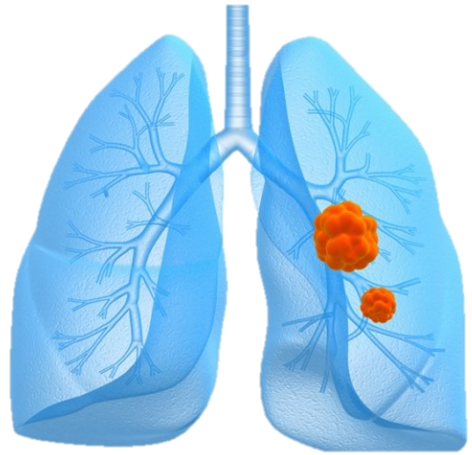
# NORDIQC EQA DATA FOR IHC LUNG MARKERS

| Marker | Purpose | Last run | Pass rate | No of labs |
|---|---|---|---|---|
| TTF1 | Lung vs non-lung<br>Adenocarcinoma vs squam. | Run 68, 2023 | 81% | 401 |
| Napsin A | Lung vs non-lung | Run 66, 2022 | 83% | 321 |
| Calretinin | Lung vs mesothelioma | Run 64, 2022 | 76% | 350 |
| WT1 | Lung vs mesothelioma | Run 55, 2019 | 91% | 291 |
| BAP1 | Reactive mesothelioma vs malignant mesothelioma | Run 71, 2024 | 63% | 224 |
| CLDN4 | Lung vs mesothelioma | Run 74, 2025 | 72% | 97 |
| EpCAM | Lung vs mesothelioma<br>Adenocarcinoma vs squam./basal cell carcinoma | Run 69, 2023 | 48% | 372 |
| INSM1 | NSCLC vs SCLC | Run 71, 2024 | 72% | 156 |
| CGA | NSCLC vs SCLC | Run 70, 2024 | 75% | 370 |
| SYP | NSCLC vs SCLC | Run 73, 2025 | 75% | 429 |
| CD56 | NSCLC vs SCLC | Run 64, 2022 | 72% | 364 |
| p40 | Adenocarcinoma vs squam. | Run 74, 2025 | 94% | 411 |
| CK5 | Adenocarcinoma vs squam. | Run 65, 2022 | 71% | 311 |
| ALK (lung) | Predictive for Crizotinib | Run 73, 2025 | 59% | 307 |
| PD-L1 TPS/CPS | Predictive for Keytruda, Imfinzi, Opdivo…… | Run C17, 2025 | 76% | 273 |

Scheduled for assessment within the next year



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# CLONE PERFORMANCE FOR SELECTED LUNG MARKERS

| Marker | Successful clones | Less successful clones |
|---|---|---|
| TTF1 | mAb SPT24, rmAb SP141 | mAb 8G7G3/1 |
| Napsin A | mAbs IP64 & MRQ-60 | pAbs |
| Calretinin | mAbs DAK-Calret & CAL6, rmAb SP65 | pAbs |
| WT1 | mAbs 6F-H2 & WT49 | - |
| BAP1 | mAb C-4 & BSB-109, rmAb EPR22826-65 | pAbs |
| CLDN4 | mAb 3E2C1, rmAb EP417 | pAbs |
| EpCAM | mAbs BS14, Ber-EP4, MOC-31 & VU-1D9 | mAb Ber-EP4 |
| INSM1 | rmAbs MRQ-70 & ZR395 | mAb A-8 *(might depend on vendor)* |
| CGA | mAb LK2H10 | mAbs DAK-A3 & 5H7 |
| SYP | mAbs DAK-SYNAP & 27G12, rmAbs MRQ-40 & SP11 | - |
| CD56 | rmAb MRQ-42 | mAbs 123C3 & CD564 |
| p40 | mAb BC28, rmAbs DAK-p40 & ZR8 | pAbs |
| CK5 | mAb XM26, rmAb SP27 | mAb D5/16 B4 |
| ALK (lung) | mAbs 5A4 & OTI1A4, rmAb D5F3 | mAb ALK1 |
| PD-L1 TPS/CPS | mAb 22C3, rmAb SP263 | (rmAb SP142) |

# KEY-POINTS FOR BEST PROTOCOLS

- Clone selection
- RTUs – “Plug and Play” or “Play and Plug”?
- Efficient HIER – typically in high pH buffer
- 3 layer detection system

- Use of iCAPS

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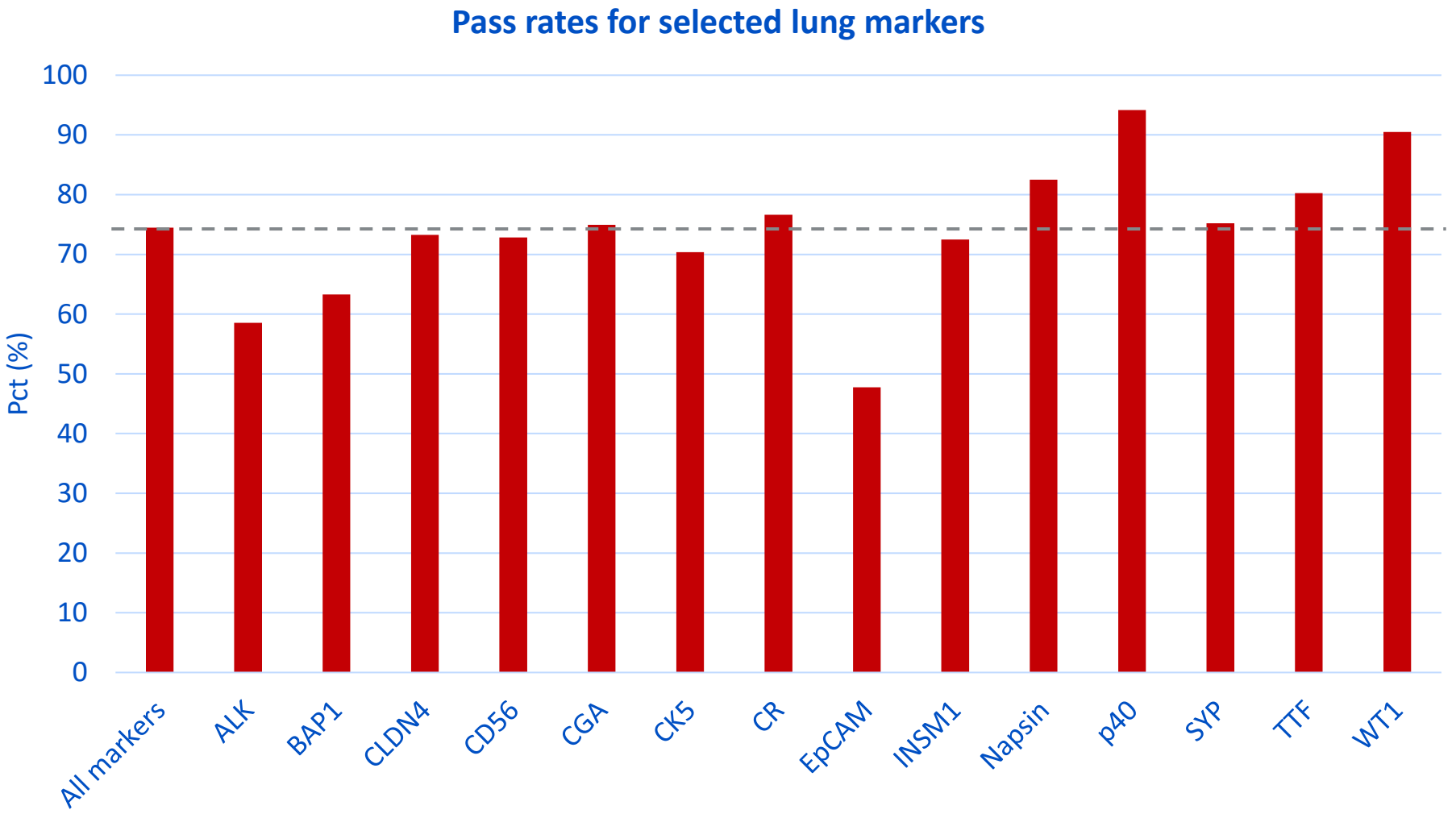
# KEY-POINTS FOR BEST PROTOCOLS




**Lung markers in the General Module:**

Overall pass rate: **74%** (3.368/4.522), ranging from 48% for EpCam till 94% for p40.

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# KEY-POINTS FOR BEST PROTOCOLS

## Lung markers in the General Module:

Overall pass rate: **74%** (3.335/4.522)

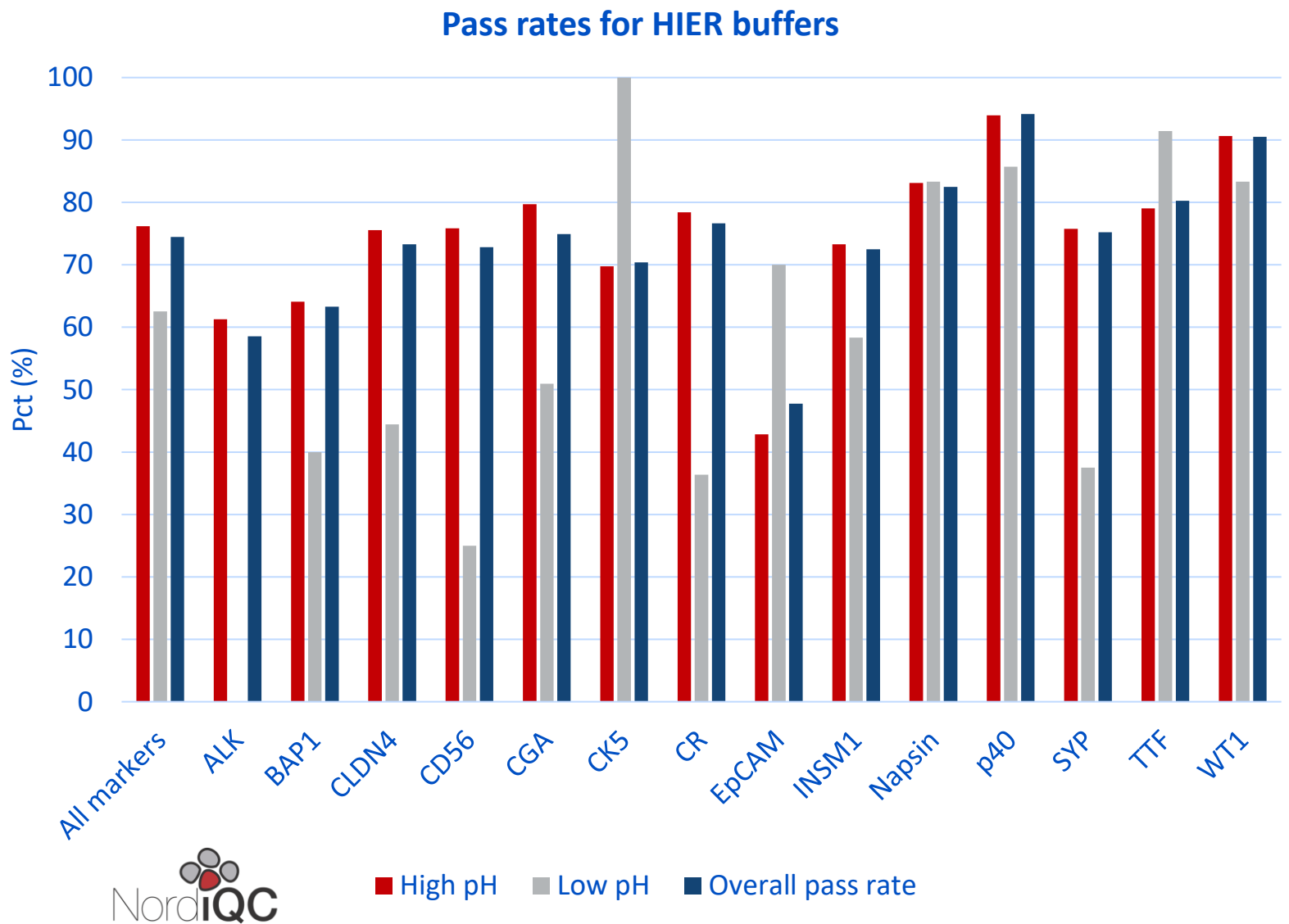
HIER in High pH: **76%**

*Ranging from 43% for EpCAM till 94% for p40*

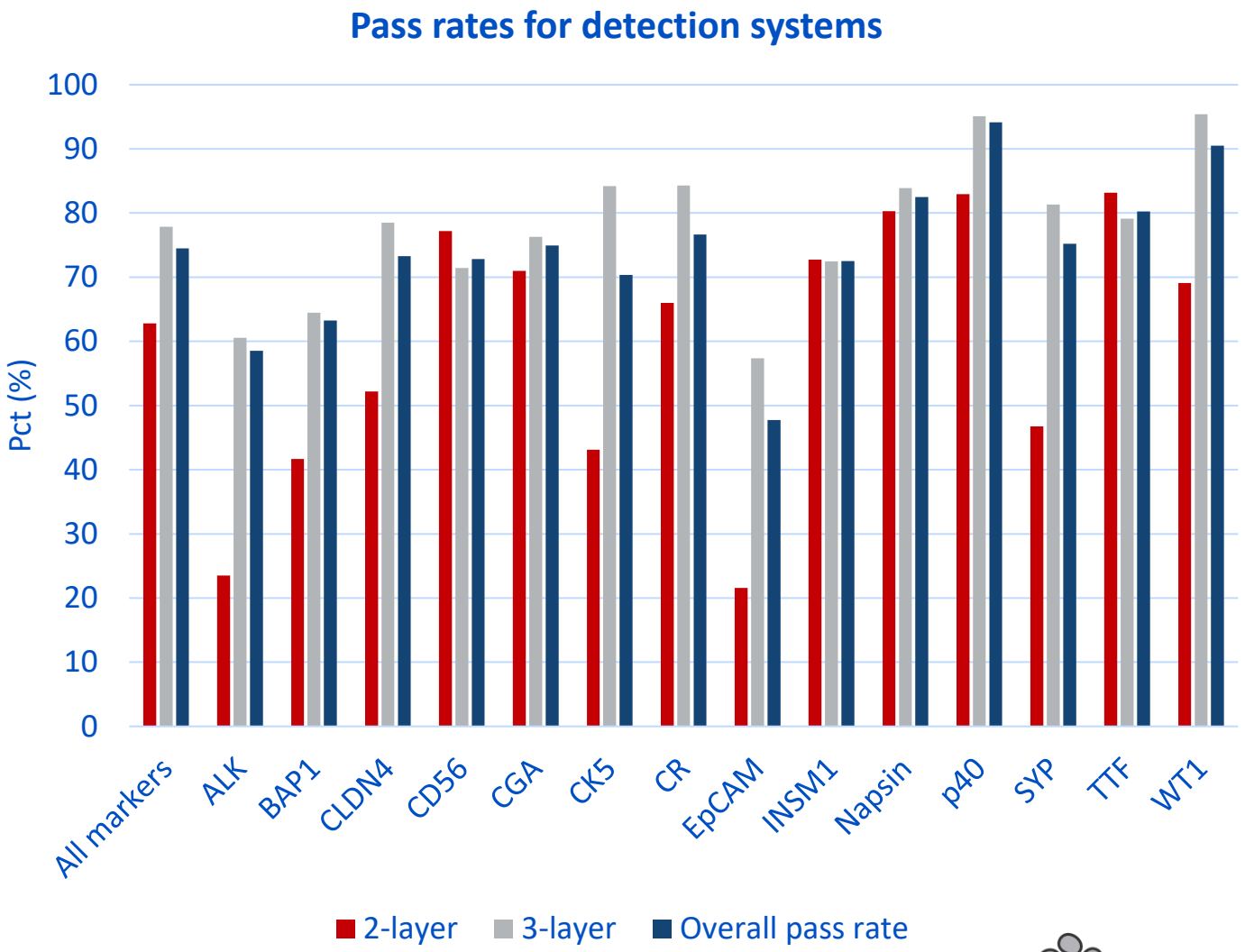
HIER in Low pH: 63%

*Ranging from 0% for ALK till 100% for CK5**

**9/9 participants used a low pH buffer on a Leica platform.*



# KEY-POINTS FOR BEST PROTOCOLS




## Lung markers in the General Module:

3-layer detection system: 78%

- OptiView, UltraView DAB + amplification
- EnVision Flex +, Flex++ (4-layer)
- Bond Refine (despite host of primary Ab)

2-layer detection system: 63%

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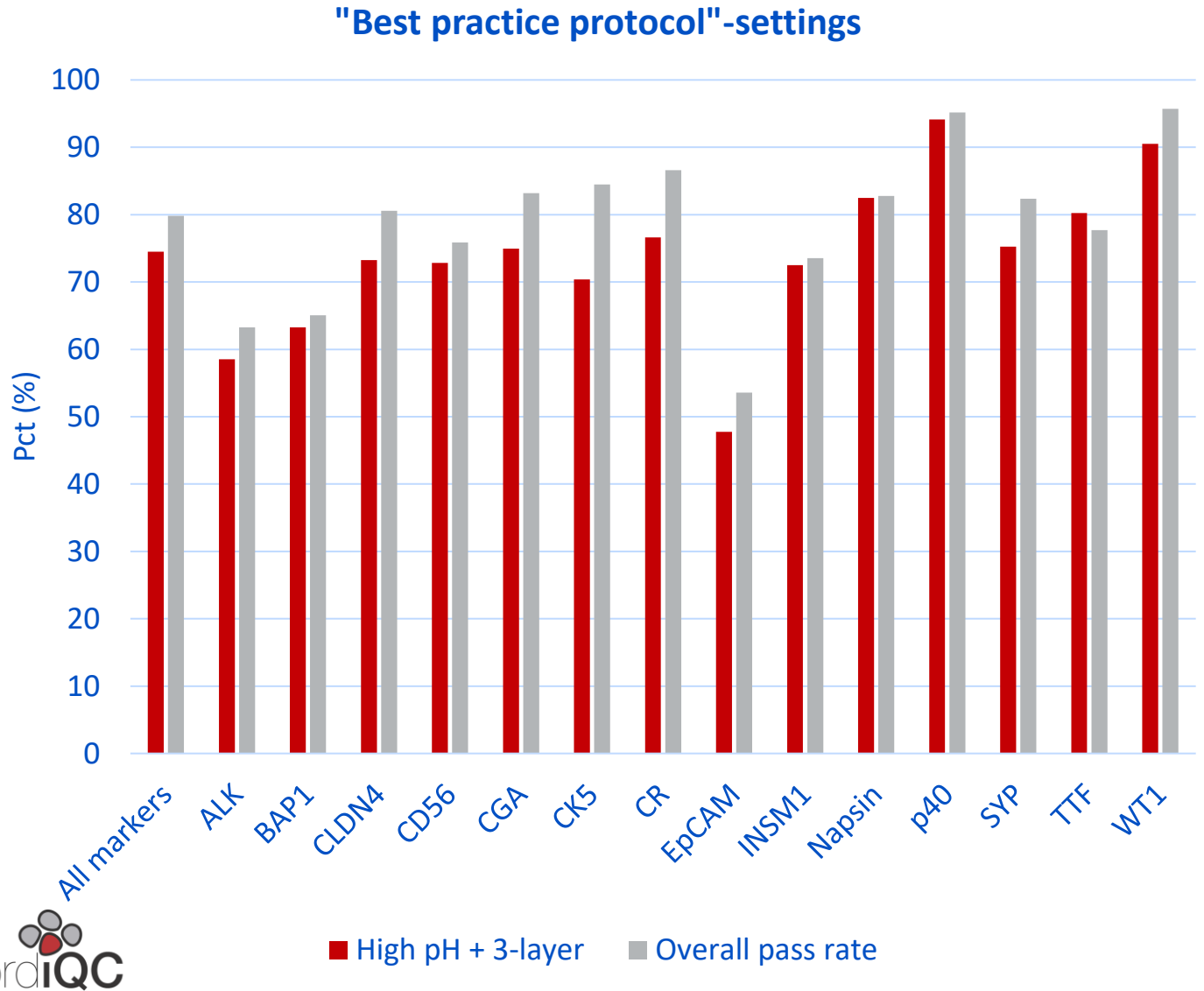
# KEY-POINTS FOR BEST PROTOCOLS

**Lung markers in the General Module:**

- Overall pass rate: **74%**
- "Best practice protocol"*: HIER in a high pH buffer AND a 3-layer detection system: **80%**
- Ranging from 54% for EpCAM till 96% for WT1

*Clone selection is NOT included.

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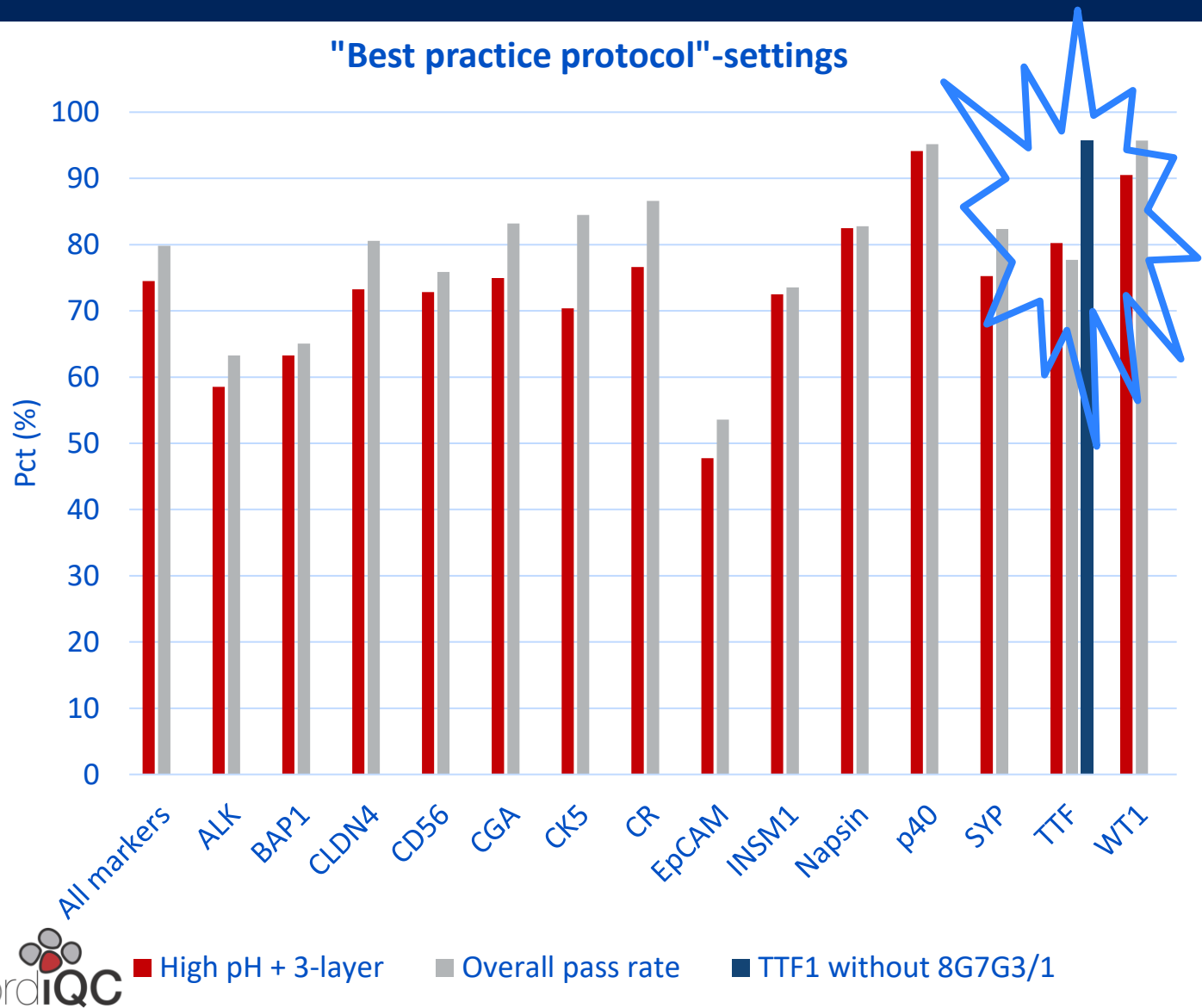
# KEY-POINTS FOR BEST PROTOCOLS

**Lung markers in the General Module:**

- Overall pass rate: **74%**
- "Best practice protocol"*: HIER in a high pH buffer AND a 3-layer detection system: **80%**
- Ranging from 54% for EpCAM till 96% for WT1

*Clone selection is NOT included.

- E.g. TTF; if not counting participant using the less successful clone 8G7G3/1, the "best practice protocol" pass rate would be **96%** compared to 80% if including the clone.



# NOW TIME TO LOOK AT SOME SPECIFIC MARKERS

# CLDN4 – NEW MARKER IN NORDIQC

Table 1b. **Concentrated antibodies and assessment marks for CLDN4, run 74**

| Concentrated antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **3E2C1** | 15 | Biocare Medical | 3 | 7 | 4 | 1 | 67% | 20% |
| | 24 | Invitrogen | 3 | 15 | 3 | 3 | 75% | 13% |
| mAb clone **A-12** | 2 | Gennova | 0 | 0 | 0 | 2 | - | - |
| rmAb clone **EP417** | 8 | BioSB | 1 | 4 | 2 | 1 | 63% | 13% |
| | 8 | Cell Marque | 6 | 2 | 0 | 0 | 100% | 75% |
| rmAb clone **EPRR17575** | 4 | Abcam | 1 | 1 | 2 | 0 | - | - |
| rmAb clone **QR137** | 1 | Quartett | 1 | 0 | 0 | 0 | - | - |
| pAb, **ab15104** | 4 | Abcam | 1 | 1 | 2 | 0 | - | - |
| pAb, **PA580481** | 1 | ThermoFisher | 0 | 0 | 0 | 1 | - | - |
| pAb, **16195-1-AP** | 1 | Proteintech | 0 | 0 | 0 | 1 | - | - |
| Total | 68 | | 16 | 30 | 13 | 9 | | |
| Proportion | | | 24% | 44% | 19% | 13% | 68% | |

1) Proportion of sufficient stains (optimal or good) (>5 assessed protocols)

Table 1c. **Ready-To-Use antibodies and assessment marks for CLDN4, run 74**

| Ready-To-Use antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **3E2C1 MAB-1106** | 1 | Fuzhou Maixin | 0 | 1 | 0 | 0 | - | - |
| mAb clone **3E2C1 API 3121 AA** | 8 | Biocare Medical | 5 | 2 | 0 | 1 | 88% | 63% |
| mAb clone **A-12 AMB08-5M** | 1 | BioGenex | 0 | 0 | 0 | 1 | - | - |
| mAb clone **AA11 MFM-0188** | 1 | Bioin Biotechnology | 0 | 1 | 0 | 0 | - | - |
| mAb clone **GM104 GT2339** | 1 | Gene Tech | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **EP417 BSB 3792-3/7/15** | 7 | Bio SB | 0 | 5 | 1 | 1 | 71% | 0% |
| rmAb clone **EP417 468-17/18** | 9 | Cell Marque | 5 | 3 | 1 | 0 | 89% | 56% |
| Ab clone **172D5F1 PA616** | 1 | Abcarta | 1 | 0 | 0 | 0 | - | - |
| Total | 29 | | 12 | 12 | 2 | 3 | | |
| Proportion | | | 41% | 41% | 7% | 11% | 82% | |

1) Proportion of sufficient stains (optimal or good) (≥5 assessed protocols)

Table 2. **Proportion of optimal results for CLDN4 for the most commonly used antibody concentrates on the four main IHC systems***

| Concentrated antibodies | Dako/Agilent Autostainer[1] | | Dako/Agilent Omnis | | Ventana/Roche BenchMark[2] | | Leica Biosystems Bond[3] | |
|---|---|---|---|---|---|---|---|---|
| | TRS pH 9.0 | TRS pH 6.1 | TRS pH 9.0 | TRS pH 6.1 | CC1 pH 8.5 | CC2 pH 6.0 | BERS2 pH 9.0 | BERS1 pH 6.0 |
| mAb clone **3E2C1** | 0/1** | - | 5/10 (50%) | - | 1/18 (6%) | 0/1 | 0/3 | - |
| rmAb clone **EP417** | 2/2 | - | 0/2 | 1/1 | 4/10 (40%) | - | - | - |

3E2C1 on Omnis:
HIER in TRS High & EnVision Flex+ gave a 100% pass rate (10/10)

EP417 on BenchMark:
HIER in CC1 & OptiView gave a 90% pass rate (9/10)

Bond: HIER in BERS2: 100% pass rate (5/5)
Omnis: HIER in TRS High, EnVision Flex+: 1/1 optimal

BenchMark: HIER in CC1 & OptiView: 100% pass rate (3/3)
Omnis: HIER in TRS High, EnVision Flex+: 1/1 optimal

# CALRETININ – PITFALLS

Table 1. **Antibodies and assessment marks for CR, run 64**

| Concentrated antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **2E7** | 1 | BioGenex | 0 | 0 | 1 | 0 | - | - |
| mAb clone **5A5** | 1 | Monosan | 1 | 0 | 0 | 0 | - | - |
| mAb clone **ZM85** | 1 | Zeta Corporation | 0 | 1 | 0 | 0 | - | - |
| mAb clone **CAL6** | 19 | Leica Biosystems | 12 | 4 | 1 | 2 | 84% | 63% |
| mAb clone **DAK-Calret 1** | 25<br>1 | Dako/Agilent<br>Thermo Scientific | 6 | 12 | 6 | 2 | 69% | 23% |
| rmAb clone **BSR235** | 1 | Nordic Biosite | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **SP13** | 1<br>1<br>1<br>1<br>1<br>1 | Cell Marque<br>Zytomed Systems<br>Abcam<br>Epredia<br>Diagnostic Biosystems<br>Zeta Corporation | 0 | 2 | 2 | 2 | 33% | - |
| pAb **18-0211** | 6<br>1 | Invitrogen/Thermo S.<br>Zymed | 5 | 1 | 1 | 0 | 86% | 71% |
| pAb **232A** | 1 | Cell Marque | 0 | 0 | 0 | 1 | - | - |
| pAb **61-0006** | 1 | Genemed | 1 | 0 | 0 | 0 | - | - |
| pAb, **CP092C** | 1 | Biocare Medical | 0 | 1 | 0 | 0 | - | - |
| pAb **RBK003** | 1 | Zytomed Systems | 0 | 1 | 0 | 0 | - | - |
| pAb **CR7696** | 1 | Swant | 0 | 0 | 0 | 1 | - | - |
| Ready-To-Use antibodies | | | | | | | | |
| mAb clone **CAL6 PA0346**[3] | 8 | Leica Biosystems | 4 | 4 | 0 | 0 | 100% | 50% |
| mAb clone **CAL6 PA0346**[4] | 10 | Leica Biosystems | 3 | 3 | 3 | 1 | 60% | 30% |
| mAb clone **DAK-Calret 1 IS/IR627**[3] | 16 | Dako/Agilent | 3 | 5 | 7 | 1 | 50% | 19% |
| mAb clone **DAK-Calret 1 IS/IR627**[4] | 43 | Dako/Agilent | 5 | 15 | 11 | 12 | 47% | 12% |
| mAb clone **C5G4 CCM-0222** | 1 | Celnovte Biotechnology | 1 | 0 | 0 | 0 | - | - |
| mAb clone **IHC523 IHC523** | 1 | GenomeMe | 1 | 0 | 0 | 0 | - | - |
| rmAb **SP13 232R** | 4 | Cell Marque | 2 | 0 | 1 | 1 | - | - |
| rmAb **SP13 MAD-000315QD** | 1 | Master Diagnostica | 0 | 0 | 1 | 0 | - | - |
| rmAb **BSR235 MAD-000784QD** | 2 | Master Diagnostica | 0 | 0 | 1 | 1 | - | - |
| rmAb **RM324 8522-C010** | 2 | Sakura Finetek | 2 | 0 | 0 | 0 | - | - |
| rmAb clone **SP65 790-4467**[3] | 2 | Ventana/Roche | 2 | 0 | 0 | 0 | - | - |
| rmAb clone **SP65 790-4467**[4] | 177 | Ventana/Roche | 120 | 38 | 18 | 1 | 89% | 68% |
| pAb **232A** | 2 | Cell Marque | 0 | 0 | 1 | 1 | - | - |
| pAb **IP092** | 1 | Biocare Medical | 0 | 0 | 1 | 0 | - | - |
| pAb **HAP134** | 1 | PathnSitu | 0 | 1 | 0 | 0 | - | - |
| pAb **08-1211** | 1 | Invitrogen/Thermo S. | 0 | 0 | 1 | 0 | - | - |
| Total | 339 | | 169 | 88 | 56 | 26 | - | |
| Proportion | | | 50% | 26% | 16% | 8% | 76% | |

Table 2. **Proportion of optimal results for CR for the most commonly used antibodies as concentrates on the 4 main IHC systems***

| Concentrated antibodies | Dako Autostainer Link / Classic | | Dako Omnis | | Ventana BenchMark GX / XT / Ultra | | Leica Bond III / Max | |
|---|---|---|---|---|---|---|---|---|
| | TRS pH 9.0 | TRS pH 6.1 | TRS pH 9.0 | TRS pH 6.1 | CC1 pH 8.5 | CC2 pH 6.0 | ER2 pH 9.0 | ER1 pH 6.0 |
| mAb clone **CAL6** | - | - | 10/10 ** (100%) | - | - | - | 1/1 | - |
| mAb clone **DAK-Calret 1** | 1/1 | - | 0/4 | - | 0/2 | - | 2/4 | 1/2 |
| pAb **18-0211** | 1/1 | - | 2/2 | - | 1/3 | - | 1/1 | - |

* Antibody concentration applied as listed above, HIER buffers and detection kits used as provided by the vendors of the respective systems.
** (number of optimal results/number of laboratories using this buffer)

Less successful performance on the fully-automated Dako Omnis and Ventana BenchMark platforms for the most widely used conc. Abs

RTU products for Ventana and Leica users

Omnis users cannot use the Autostainer RTU: 36% pass rate (12/33)

Table 3. **Proportion of sufficient and optimal results for CR for the most commonly used RTU IHC systems**

| RTU systems | Recommended protocol settings* | | Laboratory modified protocol settings** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| Leica BOND mAb CAL6 **PA0346** | 100% (8/8) | 50% (4/8) | 63% (5/8) | 25% (2/8) |
| Dako AS mAb DAK-Calret 1 **IR/IS627** | 50% (8/16) | 19% (3/16) | 75% (6/8) | 38% (3/8) |
| VMS Ultra/XT rmAb SP65 **790-4467** | (2/2) | (2/2) | 89% (154/173) | 67% (116/173) |

* Protocol settings recommended by vendor – Retrieval method and duration, Ab incubation times, detection kit, IHC stainer/equipment.
** Significant modifications: retrieval method, retrieval duration and Ab incubation time altered, detection kit – only protocols performed on the specified vendor IHC stainer are integrated.

UltraView:
88% pass rate (65% optimal)

OptiView:
100% pass rate (78% optimal)

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# WT1 – PITFALLS

Table 1. **Antibodies and assessment marks for WT1, Run 55**

| Concentrated Antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | Suff. OPS[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **6F-H2** | 52<br>13<br>2<br>2<br>2<br>2<br>1 | Dako/Agilent<br>Cell Marque<br>BioCare<br>DCS<br>Diagnostic BioSystems<br>Immunologic<br>Zeta | 36 | 31 | 6 | 1 | 91% | 92% |
| mAb clone **WT49** | 13<br>1 | Leica<br>Immunologic | 11 | 2 | 0 | 1 | 93% | 100% |
| rmAb clone **D8I7F** | 3 | Cell Signaling | 3 | 0 | 0 | 0 | - | - |
| rmAb clone **EP122** | 3<br>1 | Epitomics<br>Cell Marque | 3 | 1 | 0 | 0 | - | - |
| pAb **RB-9367-P** | 1 | Neomarkers | 0 | 0 | 1 | 0 | - | - |
| Ready-To-Use Antibodies | | | | | | | | |
| mAb clone **6F-H2 760-4397** | 92 | Ventana/Cell Marque | 40 | 37 | 14 | 1 | 84% | 94% |
| mAb clone **6F-H2 IR055/IS055** | 33 | Dako/Agilent | 30 | 3 | 0 | 0 | 100% | 100% |
| mAb clone **6F-H2 IR055/IS055** [3] | 25 | Dako/Agilent | 21 | 3 | 1 | 0 | 96% | - |
| mAb clone **6F-H2 IR055/IS055** [4] | 9 | Dako/Agilent | 5 | 3 | 1 | 0 | - | - |
| mAb clone **6F-H2 348M-98** [5] | 14 | Cell Marque | 5 | 7 | 2 | 0 | 86% | - |
| mAb clone **6F-H2 MAD-005671QD** | 2 | Master Diagnostica | 2 | 0 | 0 | 0 | - | - |
| mAb clone **MX012 MAB-0678** | 1 | Maixin | 1 | 0 | 0 | 0 | - | - |
| mAb clone **WT49 PA0562** | 17 | Leica | 17 | 0 | 0 | 0 | 100% | 100% |
| mAb clone **WT49 PA0562** [6] | 1 | Leica | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **EP122 8340** | 1 | Sakura | 1 | 0 | 0 | 0 | - | - |
| Total | 291 | | 176 | 87 | 25 | 3 | - | |
| Proportion | | | 60% | 30% | 9% | 1% | 90% | |

1) Proportion of sufficient stains (optimal or good)
2) Proportion of sufficient stains with optimal protocol settings only, see below.
3) RTU system developed for the Dako/Agilent semi-automatic system (Dako Autostainer), but used by laboratories on the Dako/Agilent full-automatic platform (Dako Omnis)
4) RTU system developed for the Dako/Agilent semi-automatic system (Dako Autostainer), but used by laboratories on different platforms (e.g. Ventana Benchmark, BioCare IntelliPath and Leica Bond).
5) RTU format not developed for a specific platform, but used by laboratories on the Ventana Benchmark platform.
6) RTU system developed for the Leica Bond system, but used on the Ventana Benchmark platform.

Table 4. **Proportion of sufficient and optimal results for WT1 for the most commonly used RTU IHC systems**

| RTU systems | **Recommended protocol settings*** | | **Laboratory modified protocol settings**** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| Ventana Benchmark mAb clone **6F-H2, 760-4397** | 80% (20/25) | 20% (5/25) | 85% (57/67) | 52% (35/67) |
| Dako AS mAb clone **6F-H2, IR055/IS055** | 100% (21/21) | 95% (20/21) | 100% (12/12) | 83% (10/12) |
| Leica Bond mAb clone **WT49, PA0562** | 100% (8/8) | 100% (8/8) | 100% (9/9) | 100% (9/9) |

* Protocol settings recommended by vendor – Retrieval method and duration, Ab incubation times, detection kit, IHC stainer/equipment.
** Significant modifications: retrieval method, retrieval duration and Ab incubation time altered >25%, detection kit – only protocols performed on the specified vendor IHC stainer integrated.

The most successful modifications were based on combined retrieval and use of OptiView, giving a pass rate of 96% with 66% optimal.

Concentrated Abs can be used on Omnis, but limited data..

Table 3. **Proportion of optimal results for WT1 for the most commonly used antibodies as concentrates on the four main IHC systems***

| Concentrated antibodies | **Dako Autostainer Link / Classic** | | **Dako Omnis** | | **Ventana BenchMark GX / XT / Ultra** | | | **Leica Bond III / Max** | |
|---|---|---|---|---|---|---|---|---|---|
| | TRS pH 9.0 | TRS pH 6.1 | 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 **6F-H2** | 8/9** 89% | 1/1 | 2/6 33% | - | 10/24 42% | 4/12 33% | - | 8/13 62% | 1/2 |
| mAb clone **WT49** | 2/3 | - | 1/1 | - | 4/5 80% | - | - | 3/4 | - |

* Antibody concentration applied as listed above, HIER buffers and detection kits used as provided by the vendors of the respective systems.
** Number of optimal results/number of laboratories using this buffer

# WT1 – PITFALLS

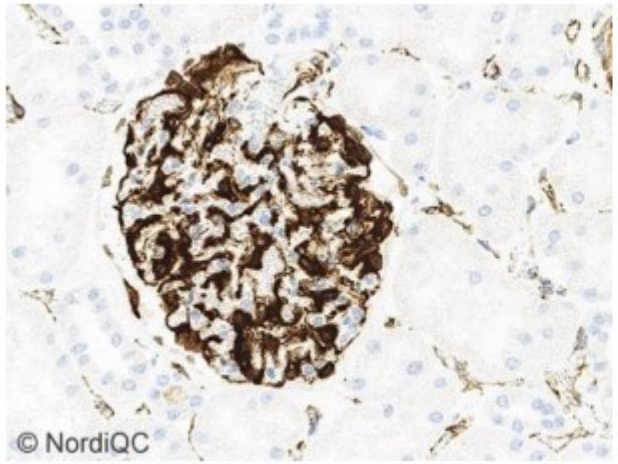

Fig. 7a (x300)

If using HIER as single pre-treatment, both a nuclear and cytoplasmic staining reaction is seen.

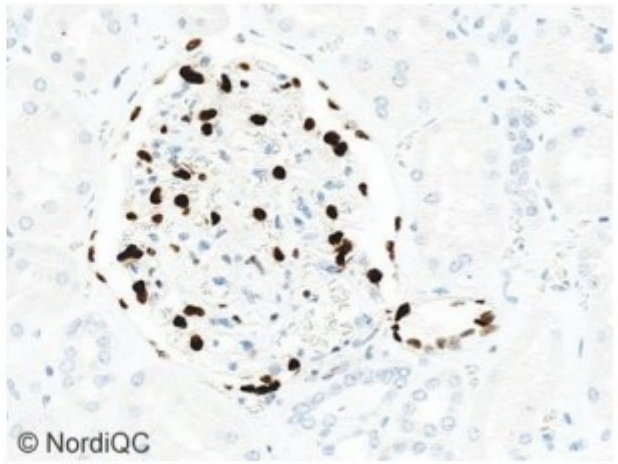

Fig. 7b (x300)

If using a combined pre-treatment using HIER followed by a weak proteolysis, only a nuclear staining reaction is seen.

**mAb clone 6F-H2:**
**Pre-treatment method determines the outcome.**

Depending on the purpose of the test, a combined pre-treatment is making the interpretation easier.

A cytoplasmic cross-reaction can be used for vascular lesions, that will be negative if using the combined pre-treatment.

Int J Clin Exp Pathol 2014;7(5):2536-2543
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*Original Article*

**Diagnostic utility of WT-1 cytoplasmic stain in variety of vascular lesions**

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# EP-CAM – PITFALLS

Table 1. **Antibodies and assessment marks for EpCAM, run 69**

| Concentrated antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **BS14** | 25 | Nordic Biosite | 19 | 6 | 0 | 0 | 100% | 76% |
| mAb clone **Ber-Ep4** | 40<br>8<br>1 | Dako/Agilent<br>Cell Marque<br>Thermo Scientific | 5 | 11 | 30 | 3 | 33% | 10% |
| mAb clone **MOC-31** | 16<br>1<br>2<br>1 | Dako/Agilent<br>Biocare Medical<br>Cell Marque<br>Leica Biosystems | 1 | 14 | 4 | 1 | 75% | 5% |
| mAb clone **VU-1D9** | 9<br>1<br>4<br>1 | Thermo Scientific<br>Merck Millipore<br>Diagnostic Biosystems<br>Monosan | 4 | 8 | 2 | 1 | 80% | 27% |
| mAb clone **C-10** | 2 | Santa Cruz | 0 | 0 | 2 | 0 | - | - |
| mAb clone **ZM131** | 1 | Zeta Corporation | 0 | 0 | 0 | 1 | - | - |
| Ready-To-Use antibodies | | | | | | | | |
| mAb clone **Ber-Ep4 760-4383**[3] | 13 | Ventana/Roche | 0 | 0 | 13 | 0 | 0% | 0% |
| mAb clone **Ber-Ep4 760-4383**[4] | 86 | Ventana/Roche | 1 | 20 | 60 | 5 | 24% | 1% |
| mAb clone **Ber-Ep4 248M-98** | 15 | Cell Marque | 0 | 1 | 13 | 1 | 7% | 0% |
| mAb clone **Ber-Ep4 IR/IS637**[3] | 1 | Dako/Agilent | 0 | 0 | 1 | 0 | - | - |
| mAb clone **Ber-Ep4 IR/IS637**[4] | 15 | Dako/Agilent | 3 | 2 | 10 | 0 | 33% | 20% |
| mAb clone **Ber-Ep4 GA637**[3] | 44 | Dako/Agilent | 12 | 30 | 2 | 0 | 95% | 27% |
| mAb clone **Ber-Ep4 GA637**[4] | 16 | Dako/Agilent | 3 | 8 | 5 | 0 | 69% | 19% |
| mAb clone **Ber-Ep4 PM107** | 3 | Biocare Medical | 0 | 0 | 1 | 2 | - | - |
| mAb clone **Ber-Ep4 MAD-001709QD** | 3 | Master Diagnostica | 0 | 0 | 2 | 1 | - | - |
| mAb clone **Ber-Ep4 PDM131** | 2 | Diagnostic Biosystems | 0 | 0 | 0 | 2 | - | - |
| mAb clone **Ber-Ep4 P-E002** | 1 | Quartett | 0 | 0 | 0 | 1 | - | - |
| mAb clone **Ber-Ep4 BMS048** | 1 | Zytomed Systems | 0 | 1 | 0 | 0 | - | - |
| mAb clone **Ber-Ep4 GM080402** | 2 | Gene Tech | 0 | 1 | 1 | 0 | - | - |
| mAb clone **MOC-31 790-4561**[3] | 3 | Ventana/Roche | 0 | 1 | 2 | 0 | - | - |
| mAb clone **MOC-31 790-4561**[4] | 10 | Ventana/Roche | 2 | 6 | 2 | 0 | 80% | 20% |
| mAb clone **MOC-31 248M-18** | 4 | Cell Marque | 0 | 1 | 3 | 0 | - | - |
| mAb clone **MOC-31 CEM-0051** | 1 | Celnovte | 0 | 0 | 1 | 0 | - | - |
| mAb clone **VU-1D9 PDM077** | 2 | Diagnostic Biosystems | 0 | 1 | 0 | 1 | - | - |
| mAb clone **VU-1D9 8230-C010** | 3 | Sakura FineTek | 0 | 1 | 2 | 0 | - | - |
| mAb clone **BS14 8377-C010** | 1 | Sakura FineTek | 1 | 0 | 0 | 0 | - | - |
| mAb clone **SPM491 ab228023** | 1 | abcam | 0 | 0 | 0 | 1 | - | - |
| mAb clone **MX066 MAB-0850** | 1 | Fuzhou Maxin | 0 | 1 | 0 | 0 | - | - |
| mAb clone **BP6056 BX50051** | 1 | Biolynx | 0 | 0 | 1 | 0 | - | - |
| mAb clone **IHC567 IHC567-7/25** | 1 | GenomeMe | 0 | 0 | 1 | 0 | - | - |
| rmAb clone **EP155 AN820** | 1 | BioGenex | 0 | 0 | 0 | 1 | - | - |
| rmAb clone **BY118 BFM-0436** | 1 | Bioin Biotechnology | 0 | 0 | 1 | 0 | - | - |
| rmAb clone **DA056 RMA1A068** | 1 | Shenzhen Dartmon Biotechnology | 0 | 0 | 0 | 1 | - | - |
| Total | 345 | | 51 | 113 | 159 | 22 | | |
| Proportion | | | 15% | 33% | 46% | 6% | 48% | |

Table 2. **Proportion of optimal results for EpCAM for the most commonly used antibodies as concentrate on the four main IHC systems***

| Concentrated antibodies | Dako Autostainer Link/Classic | | Dako Omnis | | Ventana BenchMark GX /XT/ Ultra / Ultra Plus | | | Leica Bond III / Max | |
|---|---|---|---|---|---|---|---|---|---|
| | TRS pH 9.0 | TRS pH 6.1 | TRS pH 9.0 | TRS pH 6.1 | CC1 pH 8.5 | CC1 pH 8.5 + Protease 2/3 | CC2 pH 6.0 | ER2 pH 9.0 | ER1 pH 6.0 |
| mAb clone **BS14** | - | - | 1/2** | - | 6/7 (86%) | 10/13 (77%) | - | 1/2 | - |
| mAb clone **Ber-EP4** | 0/1 | 1/1 | - | 5/6 (83%) | 0/2 | 0/4 | 0/1 | 0/1 | 0/2 |
| mAb clone **MOC-31** | 0/1 | - | - | 1/3 | 0/4 | - | - | - | 0/1 |
| mAb clone **VU-1D9** | - | - | | 0/1 | 4/5 (80%) | | - | 0/1 | - |

Table 3. **Proportion of sufficient and optimal results for EpCAM for the most commonly used RTU IHC systems**

| RTU systems | Recommended protocol settings* | | Laboratory modified protocol settings** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| BenchMark XT/Ultra mAb Ber-EP4 **760-4383** | 0% (0/13) | 0% (0/13) | 25% (21/85) | 1% (1/85) |
| Autostainer +/Link mAb Ber-EP4 **IS/IR637** | (0/1) | (0/1) | 40% (4/10) | 30% (3/10) |
| Omnis mAb Ber-EP4 **GA637** | 95% (42/44) | 27% (12/44) | 73% (11/15) | 27% (3/11) |
| BenchMark XT/Ultra mAb MOC-31 **790-4561** | (1/3) | (0/3) | 80% (8/10) | 20% (2/10) |

Less successful performance of the Ventana RTU.
Conc. formats of e.g. mAb BS14 and VU-1D9 can be used on BenchMark platforms.

RTU for Dako Omnis a obtained high pass rate, but few optimal.
Use of a 3-layer detection system for IR637 increases sufficient results.

NordiQC

# CK5 – PITFALLS

Table 1. **Antibodies and assessment marks for CK5, run 65**

| Concentrated antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **D5/16 B4*** | 35<br>2<br>1<br>1<br>2 | Dako/Agilent<br>Cell Marque<br>Millipore<br>Epredia<br>Zytomed | 6 | 15 | 19 | 1 | 51% | 15% |
| mAb clone **XM26** | 2<br>3<br>64<br>3 | Abcam<br>Diagnostic BioSystems<br>Leica Biosystems<br>Monosan | 56 | 11 | 4 | 1 | 93% | 78% |
| mAb clone **IHC556*** | 1 | GenomeMe | 0 | 0 | 1 | 0 | - | - |
| mAb clone **ZM186** | 1 | Zeta Corporation | 0 | 0 | 1 | 0 | - | - |
| rmAb clone **BSR55** | 2 | Nordic Biosite | 1 | 0 | 1 | 0 | - | - |
| rmAb clone **EP1601Y** | 3 | Cell Marque | 0 | 1 | 2 | 0 | - | - |
| rmAb clone **EP24/EP67*** | 2 | Cell Marque | 0 | 2 | 0 | 0 | - | - |
| rmAb clone **EP24** | 1 | Epitomics | 0 | 1 | 0 | 0 | - | - |
| rmAb clone **EP42** | 1 | Epitomics | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **SP27** | 1 | Immunologic | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **QR027** | 1 | Quartett | 0 | 1 | 0 | 0 | - | - |
| mAb clone **XM26/SF13**** | 1 | DCS Innovative Diagnostik-Systeme | 0 | 1 | 0 | 0 | - | - |
| Ready-To-Use antibodies | | | | | | | | |
| mAb clone **D5/16 B4* 790-4554[3]** | 6 | Ventana/Roche | 0 | 3 | 3 | 0 | 50% | 0% |
| mAb clone **D5/16 B4* 790-4554[4]** | 46 | Ventana/Roche | 9 | 23 | 11 | 3 | 70% | 20% |
| mAb **D5/16 B4* GA780[3]** | 13 | Dako/Agilent | 0 | 1 | 12 | 0 | 8% | 0% |
| mAb **D5/16 B4* GA780[4]** | 26 | Dako/Agilent | 0 | 9 | 16 | 1 | 35% | 0% |
| mAb clone **D5/16 B4* IR/IS780[3]** | 4 | Dako/Agilent | 0 | 1 | 2 | 1 | - | - |
| mAb clone **D5/16 B4* IR/IS780[4]** | 9 | Dako/Agilent | 1 | 1 | 4 | 3 | 22% | 11% |
| mAb clone **D5/16 B4* 8295-C010** | 1 | Sakura Finetek | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **RM226 8408-C010** | 1 | Sakura Finetek | 0 | 1 | 0 | 0 | - | - |
| mAb clone **XM26 PA0468[3]** | 7 | Leica Biosystems | 2 | 4 | 1 | 0 | 86% | 29% |
| mAb clone **XM26 PA0468[4]** | 9 | Leica Biosystems | 8 | 1 | 0 | 0 | 100% | 89% |
| mAb clone **XM26 PM234** | 3 | Biocare Medical | 2 | 1 | 0 | 0 | - | - |
| rmAb clone **EP1601Y 305R-17/18** | 4 | Cell Marque | 0 | 2 | 2 | 0 | - | - |
| rmAb clone **EP42 AN853-10M** | 1 | BioGenex | 0 | 1 | 0 | 0 | - | - |
| rmAb clone **EP24/EP67* MAD-000651QD** | 1 | Master Diagnostica | 1 | 0 | 0 | 0 | - | - |
| rmAb clone **EP24/EP67* MRH1159** | 1 | PathnSitu | 0 | 1 | 0 | 0 | - | - |
| rmAb clone **SP27 760-4935[3]** | 21 | Ventana/Roche | 21 | 0 | 0 | 0 | 100% | 100% |
| rmAb clone **SP27 760-4935[4]** | 29 | Ventana/Roche | 26 | 3 | 0 | 0 | 100% | 90% |
| rmAb clone **C9E33 CCR-0973** | 1 | Celnovte | 0 | 0 | 1 | 0 | - | - |
| mAb clone **150A8C1 PA018** | 1 | Abcarta | 0 | 0 | 1 | 0 | - | - |
| Total | 311 | | 136 | 84 | 81 | 10 | | |
| Proportion | | | 44% | 27% | 26% | 3% | 71% | |

Table 2. **Proportion of optimal results for CK5 for the most commonly used antibodies as concentrates on the four main IHC systems***

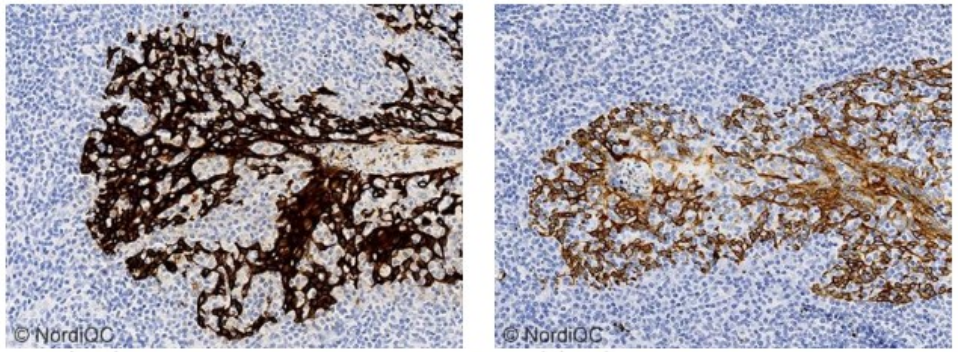
| Concentrated antibodies | Dako Autostainer Link / Classic | | Dako Omnis | | Ventana BenchMark GX / XT / Ultra | | | Leica Bond III / Max | |
|---|---|---|---|---|---|---|---|---|---|
| | TRS pH 9.0 | TRS pH 6.1 | TRS pH 9.0 | TRS pH 6.1 | CC1 pH 8.5 | CC1 pH 8.5 + Protease 3 | CC2 pH 6.0 | BERS2 pH 9.0 | BERS1 pH 6.0 |
| mAb clone **D5/16 B4** | 0/2 | - | 0/2 | - | 5/12 (42%) | 1/1 | - | 0/5 (0%) | 0/2 |
| mAb clone **XM26** | 1/4 | - | 24/26 (92%) | - | 17/24 (71%) | 1/1 | - | 12/12 (100%) | 1/1 |

* Antibody concentration applied as listed above, HIER buffers and detection kits used as provided by the vendors of the respective systems.
** (number of optimal results/number of laboratories using this buffer).

Table 3. **Proportion of sufficient and optimal results for CK5 for the most commonly used RTU IHC systems**

| RTU systems | Vendor recommended protocol settings* | | Laboratory modified protocol settings** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| Ventana Benchmark mAb clone **D5/16 B4, 790-4554** | 50% (3/6) | 0% (0/6) | 70% (32/46) | 20% (9/46) |
| Dako Omnis mAb clone **D5/16 B4, GA780** | 8% (1/13) | 0% (0/13) | 36% (9/25) | 0% (0/25) |
| Dako Autostainer mAb clone **D5/16 B4, IR/IS780** | (1/4) | (0/4) | 0% (0/6) | 0% (0/6) |
| Leica Bond mAb clone **XM26, PA0468** | 86% (6/7) | 29% (2/7) | 100% (9/9) | 89% (8/9) |
| Ventana Benchmark rmAb clone **SP27, 760-4935** | 100% (21/21) | 100% (21/21) | 100% (27/27) | 89% (24/27) |

* Protocol settings recommended by vendor – Retrieval method and duration, Ab incubation times, detection kit, IHC stainer/equipment.
** Significant modifications: retrieval method, retrieval duration and Ab incubation time altered >25%, detection kit – only protocols performed on the specified vendor IHC stainer integrated.




Less successful performance of the mAb D5/16 B4 both as RTU and Conc.

mAb XM26 obtained optimal results on the main systems.

rmAb SP27 with a pass rate of 100%. However, the specificity is reduced compared to e.g. XM26…

OPEN

NordiQC Assessments of Keratin 5 Immunoassays

*Christian Thomsen, MD,* Ole Nielsen, HT,† Søren Nielsen, HT,* Rasmus Røge, MD,*‡ and Mogens Vyberg, MD*‡*

Left: XM26 // Right: D5/16 B4

# ALK-LUNG – PITFALLS

Table 1b. **Concentrated antibodies and assessment marks for ALK (lung), run 73**

| Concentrated antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **5A4** | 1 | Abcam | 0 | 0 | 1 | 0 | - | - |
| | 1 | Biocare Medical | 0 | 0 | 1 | 0 | - | - |
| | 1 | Diagnostic BioSystems | 0 | 0 | 1 | 0 | - | - |
| | 17 | Leica Biosystems | 1 | 8 | 8 | 0 | 39% | 4% |
| | 1 | Master Diagnostica | 0 | 0 | 0 | 1 | - | - |
| | 1 | Monosan | 0 | 0 | 1 | 0 | - | - |
| | 1 | Zytomed Systems | 0 | 0 | 1 | 0 | - | - |
| mAb clone **OTI1A4*** | 7 | Origene | 3 | 4 | 0 | 0 | 100% | 43% |
| mAb clone **IHC509** | 1 | GenomeMe | 0 | 0 | 1 | 0 | - | - |
| rmAb clone **D5F3** | 18 | Cell Signaling | 0 | 10 | 8 | 0 | 56% | 0% |
| rmAb clone **ALK1** | 5 | Dako/Agilent | 0 | 1 | 0 | 4 | 20% | 0% |
| rmAb clone **QR017** | 1 | Quartett | 0 | 1 | 0 | 0 | - | - |
| rmAb clone **ZR305** | 1 | Zeta Corporation | 0 | 0 | 0 | 1 | - | - |
| Total | 56 | | 4 | 24 | 22 | 6 | | |
| Proportion | | | 7% | 43% | 39% | 11% | 50% | |

Table 1c. **Ready-To-Use antibodies and assessment marks for ALK (lung), run 73**

| Ready-To-Use antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **5A4 PA0831 (VRPS)[3]** | 9 | Leica Biosystems | 4 | 4 | 1 | 0 | 89% | 44% |
| mAb clone **5A4 PA0831 (LMPS)[4]** | 15 | Leica Biosystems | 2 | 10 | 1 | 2 | 80% | 13% |
| mAb clone **5A4 API3041** | 1 | BioCare | 0 | 0 | 1 | 0 | - | - |
| mAb clone **5A4 CAM-0170** | 1 | Celnovte | 0 | 1 | 0 | 0 | - | - |
| mAb clone **5A4 MAD-001720QD** | 2 | Master Diagnostica | 0 | 0 | 1 | 1 | - | - |
| mAb clone **ALK1 GA641 (VRPS)[3]** | 4 | Dako/Agilent | 0 | 0 | 0 | 4 | - | - |
| mAb clone **ALK1 GA641 (LMPS)[4]** | 6 | Dako/Agilent | 0 | 0 | 1 | 5 | 0% | 0% |
| mAb clone **ALK1 IR641** | 3 | Dako/Agilent | 0 | 0 | 0 | 3 | - | - |
| mAb clone **ALK1 790/800-2918 (VRPS)[3]** | 1 | Ventana/Roche | 0 | 0 | 0 | 1 | - | - |
| mAb clone **ALK1 790/800-2918 (LMPS)[4]** | 10 | Ventana/Roche | 0 | 1 | 1 | 8 | 10% | 0% |
| mAb clone **ALK1 204M-17/18** | 1 | Cell Marque | 0 | 0 | 0 | 1 | - | - |

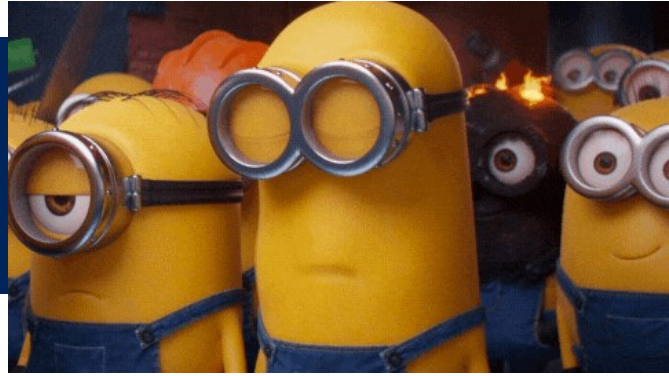
rmAb clone ALK1 is **not** ”fit for purpose” for lung diagnostic!

In run 73, a pass rate of 7% was obtained (2 of 30).

- Be sure to order the right product as both Dako and Ventana have different clones on the market!

NordiQC

# ALK-LUNG – PITFALLS



## Run 65, 2022

Table 4. **Proportion of sufficient and optimal results for ALK (lung) for the most commonly used RTU IHC systems**

| RTU-systems | Recommended protocol settings* | | Laboratory modified protocol settings** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| VMS Ultra/XT rmAb D5F3 **790-4794** | 95% (69/73) | 85% (62/73) | 93% (41/44) | 80% (35/44) |
| Dako Omnis mAb OTI1A4 **GA785** | 100% (12/12) | 100% (12/12) | (4/4) | (4/4) |
| Leica BOND mAb 5A4 **PA0306/PA0831** | (2/2) | (1/2) | 75% (6/8) | 50% (4/8) |

* Protocol settings recommended by vendor – Retrieval method and duration, Ab incubation times, detection kit, IHC stainer/equipment.
** Significant modifications: retrieval method, retrieval duration and Ab incubation time altered >25%, detection kit – only protocols performed on the specified vendor IHC stainer integrated.

## Run 73, 2025

Table 4. **Proportion of sufficient and optimal results for ALK (lung) for the most commonly used RTU IHC systems**

| RTU-systems | Recommended protocol settings* | | Laboratory modified protocol settings** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| VMS Ultra/XT rmAb D5F3 **790-4794/970-4796/741-7157** | 57% (63/110) | 13% (14/110) | 45% (14/31) | 16% (5/31) |
| Dako Omnis mAb OTI1A4 **GA785** | 100% (32/32) | 84% (27/32) | 89% (8/9) | 67% (6/9) |
| Leica BOND mAb 5A4 **PA0831** | 89% (8/9) | 44% (4/9) | 83% (10/12) | 17% (2/12) |

* Protocol settings recommended by vendor – Retrieval method and duration, Ab incubation times, detection kit, IHC stainer/equipment.
** Modifications included: retrieval method, retrieval duration, retrieval reagents, Ab incubation time and detection kit. Only protocols performed on the specified vendor IHC stainer were included.

NordiQC

RTU products for the automated systems, *usual* works as plug-and-play…

However, in run 73, the Ventana RTU gave an aberrant cytoplasmic staining reaction in epithelial cells of appendix, seen in 79% (111 of 141).

VENTANA®

Roche

**SUBJECT Important Information Regarding Optiview DAB Detection Kit (760-700 / 06396500001)**

Dear Valued Customer,

We are writing to inform you about an observation of specific off-target mucin staining with certain lots of our OptiView DAB Detection Kit (Product Code: 760-700 / 06396500001). The affected lot numbers are as follows: M17402, M18297, M21054, M21187, M23649, M25973, M25974, M28116, M29508, N01440, and N02309.

Our investigation indicates that this off-target staining is associated with a raw material used in the OptiView HQ Universal Linker component. Despite this observation, we want to assure you that these affected lots are deemed acceptable for use.

*May 2025*

# INSM1 – (RELATIVELY) NEW MARKER IN NORDIQC

Table 1b. **Concentrated antibodies and assessment marks for INSM1, run 71**

| Concentrated antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb clone **A-8** | 1 | Diagnostic Biosystems | 1 | - | - | - | - | - |
| | 5 | Gennova | 1 | 2 | 1 | 1 | 60% | 20% |
| | 1 | Master Diagnostica | - | - | 1 | - | - | - |
| | 1 | Monosan | 1 | - | - | - | - | - |
| | 2 | Nordic Biosite | - | 1 | 1 | - | - | - |
| | 50 | Santa Cruz | 10 | 15 | 13 | 12 | 50% | 20% |
| | 5 | Zeta Corporation | 4 | 1 | - | - | 100% | 80% |
| mAb clone **BSB-123** | 3 | Bio SB | - | 3 | - | - | - | - |
| | 1 | LS Bio | - | 1 | - | - | - | - |
| rmAb clone **MSVA-456R** | 1 | MS Validated Antibodies | - | 1 | - | - | - | - |
| rmAb clone **BP6240** | 1 | Biolynx Biotechnology | 1 | - | - | - | - | - |
| rmAb clone **EPR23199-37-6-1** | 1 | Abcam | - | - | 1 | - | - | - |
| rmAb clone **MRQ-70** | 27 | Cell Marque | 19 | 6 | 2 | - | 93% | 70% |
| rmAb clone **QR116** | 1 | Quartett | - | - | - | 1 | - | - |
| rmAb clone **RBT-INSM1** | 2 | Bio SB | - | 1 | 1 | - | - | - |
| rmAb clone **ZR395** | 2 | Zeta Corportation | 2 | - | - | - | - | - |
| Total | 104 | | 39 | 31 | 20 | 14 | | |
| Proportion | | | 38% | 30% | 19% | 13% | 68% | |

Table 2. **Proportion of optimal results for INSM1 for the most commonly used antibody concentrates on the four main IHC systems***

| Concentrated antibodies | **Dako/Agilent Autostainer[1]** | | **Dako/Agilent Omnis** | | **Ventana/Roche BenchMark[2]** | | **Leica Biosystems Bond[3]** | |
|---|---|---|---|---|---|---|---|---|
| | TRS pH 9.0 | TRS pH 6.1 | TRS pH 9.0 | TRS pH 6.1 | CC1 pH 8.5 | CC2 pH 6.0 | BERS2 pH 9.0 | BERS1 pH 6.0 |
| mAb clone **A-8** | 2/5** (40%) | 1/1 | 6/12 (50%) | 0/2 | 2/30 (7%) | 1/2 | 5/10 (50%) | 0/1 |
| rmAb clone **MRQ-70** | 1/2 | - | 5/9 (56%) | - | 12/14 (86%) | - | 1/2 | - |

The performance and stability of mAb clone A-8 seems to depend on the vendor.
Many different lot numbers from the Santa Cruz Ab were submitted, with varying results:

- Optimal
- Good – poor signal-to-noise ratio, weak
- Borderline/poor – false positive and/or false negative

NordiQC

# INSM1 – (RELATIVELY) NEW MARKER IN NORDIQC

Table 1c. **Ready-To-Use antibodies and assessment marks for INSM1, run 71**

| Ready-To-Use antibodies | n | Vendor | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|---|
| mAb **A-8 AMB44-5M** | 2 | BioGenex | 1 | - | - | 1 | - | - |
| mAb clone **A-8 MAD-000777QD** | 10 | Master Diagnostica/ Vitro SA | 2 | 6 | 2 | - | 80% | 20% |
| mAb clone **A-8 PDM586** | 3 | Diagnostic Biosystems | 1 | 1 | - | 1 | - | - |
| mAb clone **A-8 MAB-1017** | 1 | Fuzhou Maixin | - | 1 | - | - | - | - |
| mAb clone **BSB-123 BSB 3553/4/5** | 11 | Bio SB | - | 7 | 2 | 2 | | |
| mAb clone **DA267 DMRD0168** | 1 | Dartmon Biotechnology | 1 | - | - | - | - | - |
| mAb clone **BY059 BFM-0177** | 1 | Bioin Biotechnology | - | 1 | - | - | - | - |
| rmAb clone **IHC741 IHC741** | 1 | GenomeMe | - | 1 | - | - | - | - |
| rmAb clone **BLR272L API3299** | 1 | Biocare Medical | - | 1 | - | - | - | - |
| rmAb clone **315I4E7 PA598** | 1 | Abcarta | - | 1 | - | - | - | - |
| rmAb clone **GR013 GT246802** | 1 | Gene Tech | 1 | - | - | - | - | - |
| rmAb clone **INSM1/6286R ANC07-5M** | 1 | BioGenex | - | - | - | 1 | - | - |
| rmAb clone **MRQ-70 475-97/98** | 16 | Cell Marque | 9 | 6 | - | 1 | 94% | 56% |
| rmAb clone **RBT-INSM1 BSB-3780-3/7/15** | 1 | Bio SB | - | 1 | - | - | - | - |
| rmAb clone **ZR395 Z2751RP** | 1 | Zeta Corporation | 1 | - | - | - | - | - |
| Total | 52 | | 16 | 26 | 4 | 6 | | |
| Proportion | | | 31% | 50% | 8% | 11% | 81% | |

No RTUs from “main” vendors

Applied on BenchMark Ultra and Dako Omnis

Applied on BenchMark Ultra, Dako Omnis and Leica Bond

NordiQC

# PD-L1 TPS/CPS

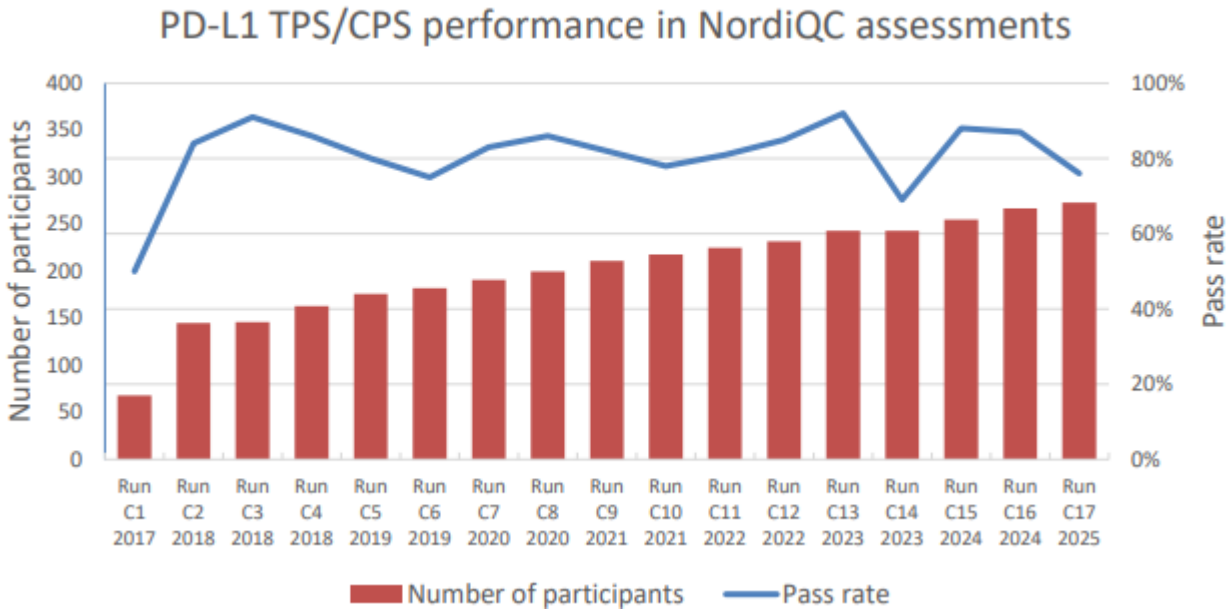
Table 2a. **Overall results for PD-L1 TPS/CPS, run C17**

| | n | Optimal | Good | Borderline | Poor | Suff.[1] | OR[2] |
|---|---|---|---|---|---|---|---|
| CE-IVD / FDA approved PD-L1 assays* | 168 | 56 | 79 | 29 | 4 | 80% | 33% |
| Laboratory developed PD-L1 assays based on concentrated antibodies | 56 | 14 | 26 | 10 | 6 | 71% | 25% |
| PD-L1 assays based on Ready-To-Use antibodies without predictive claims | 49 | 6 | 26 | 11 | 6 | 67% | 13% |
| Total | 273 | 76 | 131 | 50 | 16 | | |
| Proportion | | 28% | 48% | 18% | 6% | 76% | |

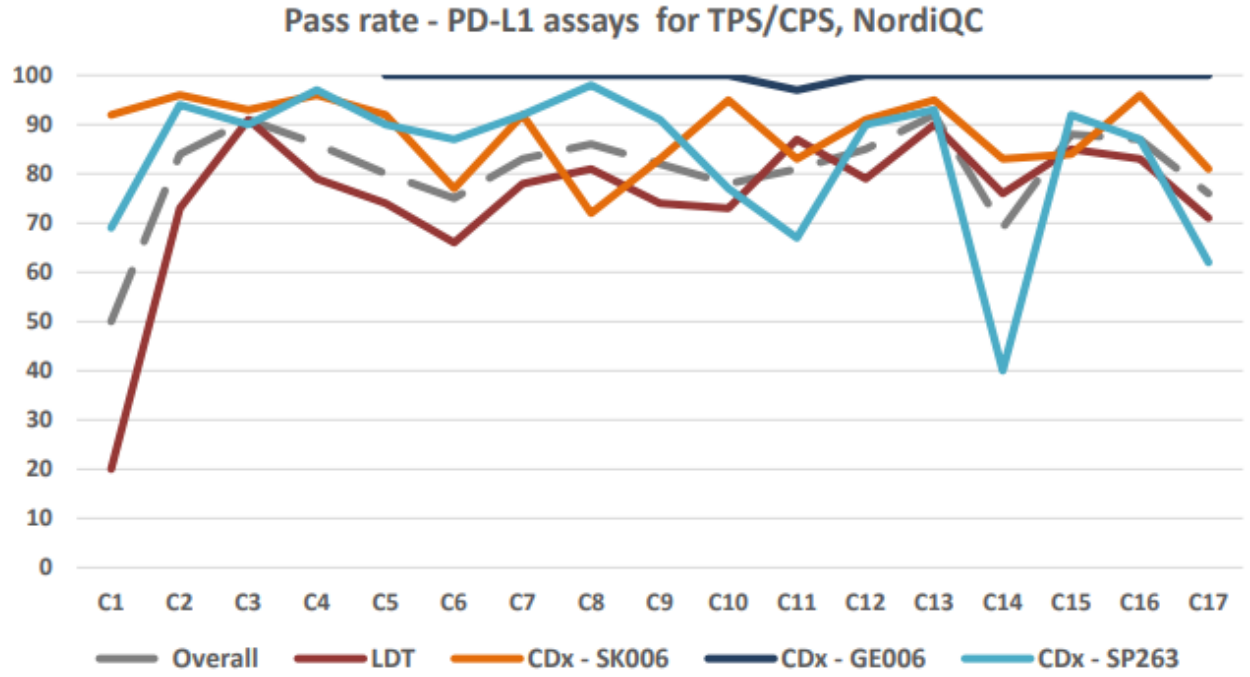
Table 3. **Comparison of pass rates for vendor recommended and laboratory modified protocols**

| CDx assay* | Vendor recommended protocol settings* | | Laboratory modified protocol settings** | |
|---|---|---|---|---|
| | Sufficient | Optimal | Sufficient | Optimal |
| Ventana BenchMark XT, GX, Ultra rmAb SP263, **741-4905** | 32/45 (71%) | 3/45 (7%) | - | - |
| Ventana BenchMark Ultra rmAb SP263, **740-4907** | 4/13 (31%) | 0/13 (0%) | - | - |
| Dako Autostainer Link 48+ mAb 22C3 pharmDX, **SK006** | 17/21 (81%) | 6/21 (29%) | 11/13 (85%) | 4/13 (31%) |
| Dako Omnis mAb 22C3 pharmDX, **GE006** | 48/48 (100%) | 34/48 (71%) | 8/8 (100%) | 7/8 (88%) |
| Dako Autostainer Link 48+ rmAb 28-8 pharmDX, **SK005** | 1/1 | 0/1 | - | - |

Graph 1. **Proportion of sufficient results for PD-L1 TPS/CPS (KEYTRUDA®) in the NordiQC runs performed.**

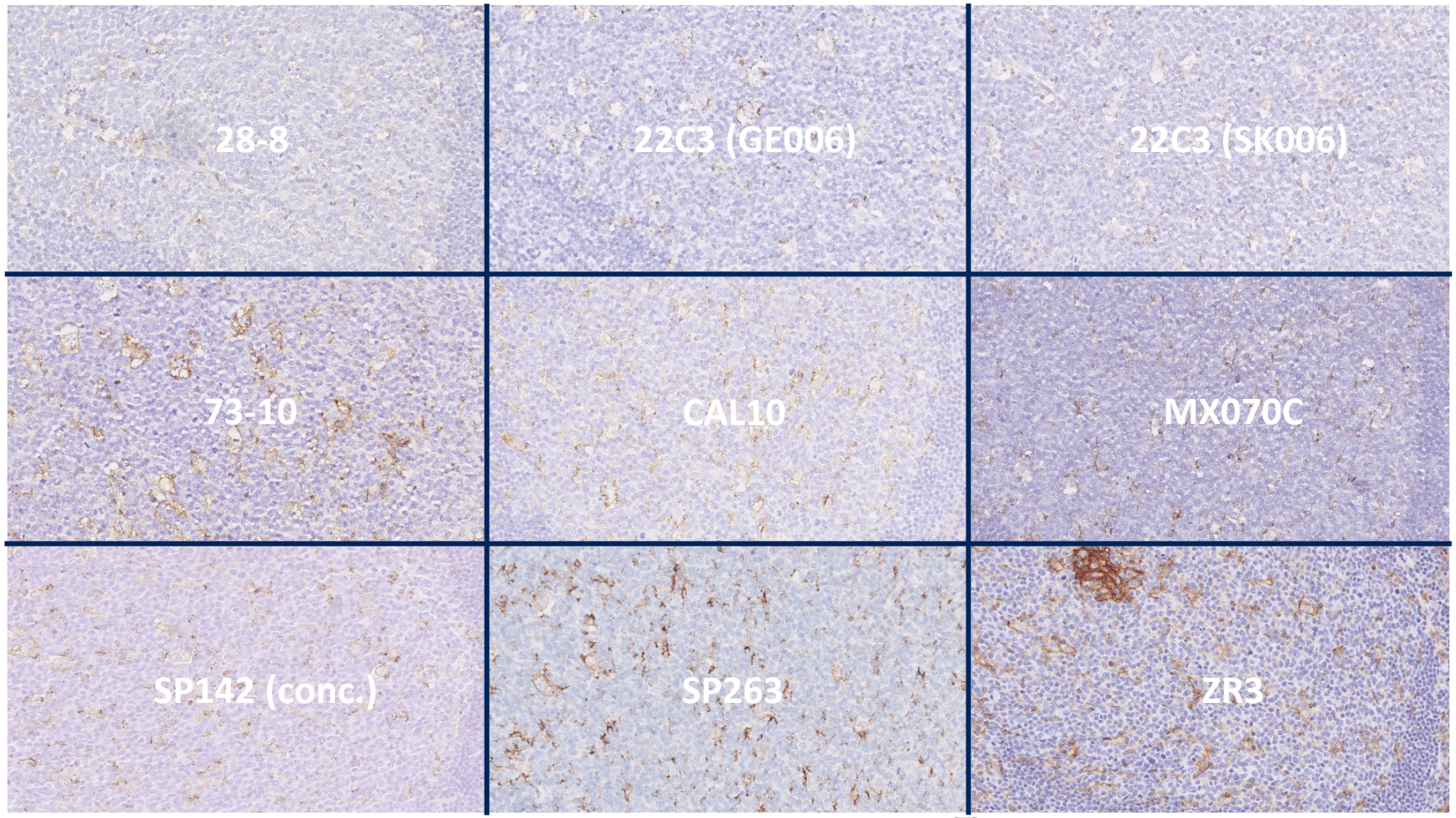



Graph 3. **Proportion of pass rates for PD-L1 TPS/CPS IHC assays in the NordiQC runs performed.**




NordiQC

# PD-L1 – ICAPS - TONSIL




In tonsil, a weak to moderate staining reaction in germinal center macrophages should be seen.

Different assays → different staining patterns.

All 9 assays achieved an optimal score for PD-L1 TPS/CPS.

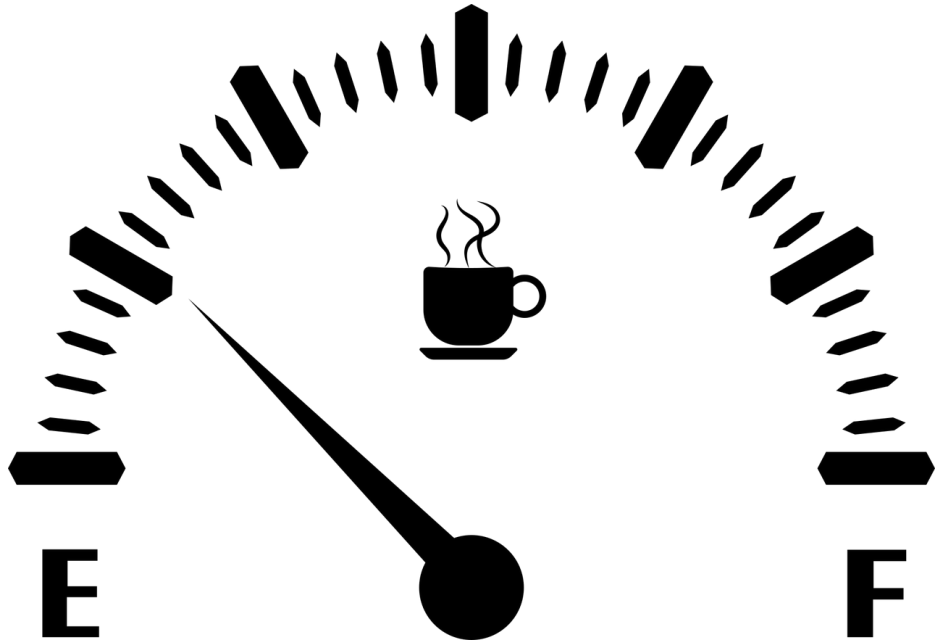
NordiQC

# ICAPS FOR SELECTED LUNG MARKERS

| Marker | IHC critical assay performance controls<br>**Low expression** | Negative tissue controls<br>**No expression** |
|---|---|---|
| TTF1 | Lung: Columnar epithelial cells of terminal bronchi. | Tonsil: All cell types. |
| Napsin A | Kidney: Epithelial cells of proximal tubules. | Appendix/Colon: Epithelial cells and macrophages. |
| Calretinin | Adrenal gland: Cortical epithelial cells. | Appendix/Colon: Epithelial cells. |
| WT1 | Kidney: Podocytes and parietal epithelial cells of Bowman's capsule. | Kidney: Epithelial cells of the tubules. |
| BAP1 | Tonsil: Mantle zone lymphocytes and germinal centre lymphocytes. | Malignant Mesothelioma: Neoplastic cells |
| CLDN4 | Placenta: Cytotrophoblasts. | Appendix: Lymphocytes and smooth muscle cells. |
| INSM1 | Pancreas: Endocrine islets of Langerhans. | Appendix: Columnar epithelial cells and smooth muscle cells. |
| CGA | Appendix/Colon: Axons and ganglion cells in the nerve plexus. | Appendix/Colon: Epithelial cells and smooth muscle cells. |
| SYP | Appendix/Colon: Neuroendocrine and scattered goblet cells in epithelial mucosa. | Appendix/Colon: Smooth muscle cells |
| CD56 | Tonsil: NK-cells and scattered T-cells. | Appendix/Colon: Epithelial cells. |
| p40 | Placenta: Dispersed cytotrhophoblastic cells. | Tonsil: Lymphocytes. |
| CK5 | Pancreas: Scattered epithelial cells of intercalated ducts. | Liver. All cell types. |
| ALK (lung) | Appendix/Colon: Dispersed axons of nerve cells. | Tonsil: All cell types. |
| PD-L1 TPS/CPS | Tonsil: Germinal center macrophages and T-cells. | Tonsil: Stratified normal squamous epithelial cells and vast majority of lymphocytes. |

NordiQC

# THANK YOU FOR YOUR ATTENTION!



NordiQC

# BONUS – ROS1

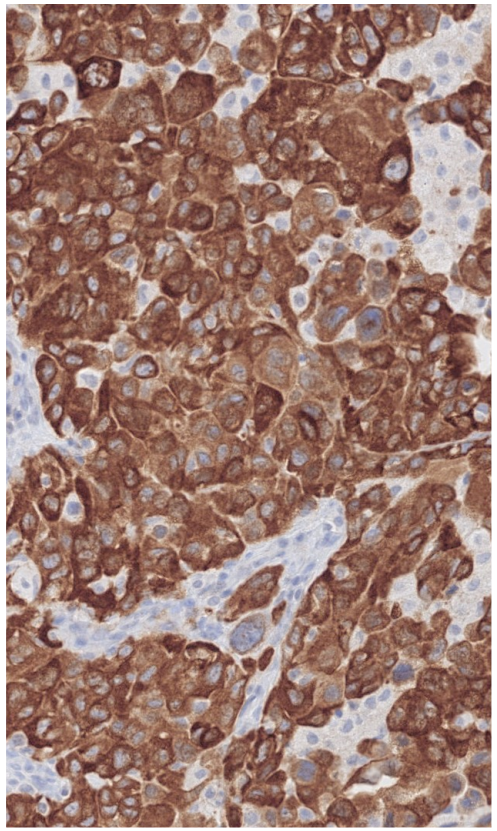
No NordiQC data available for ROS1.

For these stains, the Ventana RTU based on rmAb SP384 is used.

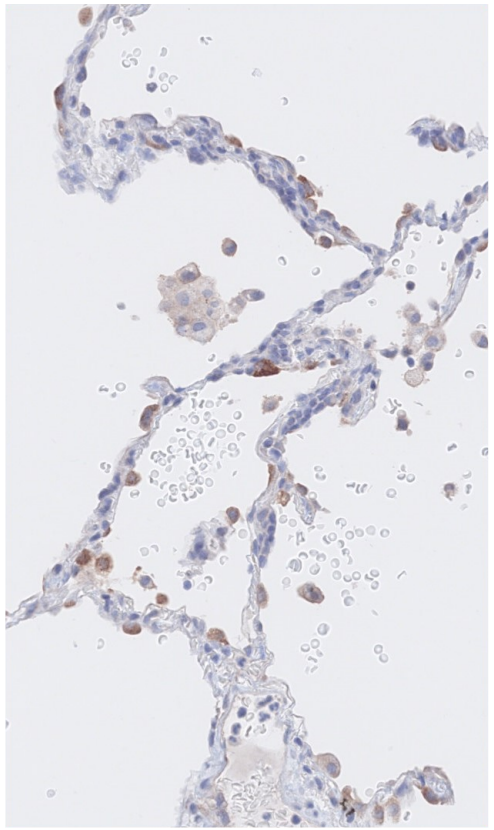
Positive controls:
Tumor with known ROS1-translocation
Type II-pneumocytes in normal lung

Negative control:
Appendix

Tumor with ROS1-translocation (lung adenocarc.)



Normal lung



Appendix