2nd NordiQC Conference on Applied Immunohistochemistry

Aalborg Culture & Congress Centre
9th – 12th June 2015

AALBORG UNIVERSITY HOSPITAL

Welcome to Aalborg
welcomes participants, speakers and exhibitors
~ 300 attendees from 35 countries
welcomes participants, speakers and exhibitors
~ 300 attendees from 30 countries
Nordic immunohistochemical Quality Control
NordiQC – Established in 2003

Participants


AALBORG UNIVERSITY HOSPITAL
NordiQC runs

Run 43 (general module), B19 (breast cancer module) and H7 (HER-2 ISH module) opened by 10th December, deadline for protocol submission was 7th January. Results are available by 22 April, see Newsletter

Run 44 (general module) opened by 26 February, deadline for protocol submission was 16 March. Results are available by 8 July

Run 45 (general module), B20 (breast cancer module) and H8 (HER-2 ISH module) opens by 12 August. Deadline for protocol submission is 10 September

NordiQC teaching events

The 2nd NordiQC Conference on Applied Immunohistochemistry
Aalborg, Denmark, June 9-12, 2015

NordiQC Workshop in Diagnostic Immunohistochemistry
Aalborg, Denmark, 16-18 September 2015
All seat taken. Enrollment for 2016 will soon be available

NordiQC Academy of Immunohistochemistry
Krakow, Poland, October 12-13, 2015

Run 43: WT1 staining of normal kidney using clone 6F-H2 in two labs. See how you can avoid the unwanted cytoplasmic reaction on WT1

Update: 2015.04.28

NordiQC is an independent scientific organization, promoting the quality of immunohistochemistry by arranging schemes for pathology laboratories, assessing tissue stains, giving guidelines for improvement and providing good protocols.
<table>
<thead>
<tr>
<th>Marker</th>
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<tbody>
<tr>
<td>Anaplastic lymphoma kinase (ALK)</td>
<td>Alpha-smooth muscle actin (ASMA)</td>
</tr>
<tr>
<td>Alpha-methylacyl-CoA racemase (AMACR)</td>
<td>bcl-2 protein (bcl-2)</td>
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<tr>
<td>Pax5 (BSAP)</td>
<td>bcl-6 protein (bcl-6)</td>
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<tr>
<td>Cancer antigen 125 (CA125)</td>
<td>Calretinin (CR)</td>
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<tr>
<td>CD3</td>
<td>CD4</td>
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<td>CD5</td>
<td>CD8</td>
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<td>CD138</td>
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<tr>
<td>CD163</td>
<td>CDX2</td>
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<tr>
<td>Chromogranin (CGA)</td>
<td>CyclinD1 (CyD1)</td>
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<td>Cytokeratin CK-HMW</td>
<td>Cytokeratin CK-LMW</td>
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<td>Cytokeratin CK-Pan</td>
<td>Cytokeratin 5 (CK5)</td>
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<td>Cytokeratin 7 (CK7)</td>
<td>Cytokeratin19 (CK19)</td>
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<tr>
<td>Cytokeratin 20 (CK20)</td>
<td>Desmin (DES)</td>
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<tr>
<td>E-cadherin (ECAD)</td>
<td>Epithelial cell adhesion mol. (Ep-CAM)</td>
</tr>
<tr>
<td>Epithelial membrane antigen (EMA)</td>
<td>Estrogen receptor (ER)</td>
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</tbody>
</table>

**Markers in NordiQC Runs Tested 1-15 times**
<table>
<thead>
<tr>
<th>Marker</th>
<th>Tested 1-15 times</th>
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</thead>
<tbody>
<tr>
<td>Factor VIII related antigen (FVIII)</td>
<td>GATA3</td>
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<tr>
<td>Glial fibrillary acidic protein (GFAP)</td>
<td>Glypican 3 (GLP3)</td>
</tr>
<tr>
<td>Gross cystic dis. fluid protein-15 (GCDFP)</td>
<td>HER-2 IHC Breast</td>
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<tr>
<td>HER-2 IHC Gastric</td>
<td>Hepatocyte antigen (HEPA)</td>
</tr>
<tr>
<td>Human chorionic gonadotropin (HCG)</td>
<td>Immunoglobulin kappa (IgK)</td>
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<td>Immunoglobulin lambda (IgL)</td>
<td>Immunoglobulin M (IgM)</td>
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<tr>
<td>Ki-67</td>
<td>Mammaglobin</td>
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<tr>
<td>Melan-A (MLA)</td>
<td>Melanosoma specific Ag. (MSA,HMB45)</td>
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<tr>
<td>MLH1</td>
<td>MSH2</td>
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<td>MSH6</td>
<td>MUM1</td>
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<tr>
<td>Myosin (SMH)</td>
<td>Napsin A</td>
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<tr>
<td>Neurofilament protein (NFP)</td>
<td>OCT3/4</td>
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<td>p16ink4a</td>
<td>p40</td>
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<tr>
<td>p53</td>
<td>p57</td>
</tr>
<tr>
<td>p63</td>
<td>Paired box gene-2 protein (PAX2)</td>
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<tr>
<td>Paired box gene-8 protein (PAX8)</td>
<td>Placental alkaline phosphatase (PLAP)</td>
</tr>
<tr>
<td>PMS2</td>
<td>Podoplanin (Pdp)</td>
</tr>
<tr>
<td>Prostate specific acid phosphatase (PSAP)</td>
<td>Prostate specific antigen (PSA)</td>
</tr>
<tr>
<td>Prostein (P501s)</td>
<td>Progesterone receptor (PR)</td>
</tr>
<tr>
<td>S-100 protein beta (S100)</td>
<td>Sal-like protein 4 (SALL4)</td>
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<tr>
<td>SOX10</td>
<td>Synaptophysin (SYP)</td>
</tr>
<tr>
<td>Terminal deoxynucleotidyl transf, (TdT)</td>
<td>Thyroid transcription factor-1 (TTF1)</td>
</tr>
<tr>
<td>Vimentin (VIM)</td>
<td>Wilm’s tumour-1 protein (WT1)</td>
</tr>
</tbody>
</table>
NordiQC assessment results 2003 – 2014

General module ~ 20,000 slides (~100,000 core sections)

- Insufficient: 32%
- Optimal: 35%
- Good: 33%
- Borderline: 11%
- Poor: 0%

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NORTH DENMARK REGION
Breast cancer module ~ 9,000 slides (~35,000 core sections)

NordiQC assessment results 2003 – 2014

- Optimal: 58%
- Good: 21%
- Borderline: 9%
- Poor: 12%
- Insufficient: 21%
Serial sections stained for Estrogen receptor

Lab. A

Lab. B

ER in ductal breast carcinoma
Serial sections stained for Estrogen receptor

Lab. A

Lab. B

False neg.
Serial sections stained for Estrogen receptor

Control: uterine cerv

Lab. A

Lab. B

False neg.
Serial sections stained for Estrogen receptor

Control: uterine cervix

Clone SP1/EP1/1D5 in 225 labs

Clone 6F11 in 15/37 labs

False pos.
NordiQC runs for HER2 IHC

Optimal
- Ampl. 3+
- Ampl. 2+
- Unampl. 2+
- Unampl. 0

Poor
- Ampl. 3+
- Ampl. 1+
- Unampl. 1+
- Unampl. 0
NordiQC runs for HER2 IHC

Ampl. 3+  Ampl. 2+  Unampl. 2+  Unampl. 0  
Optimal

Ampl. 3+  Ampl. 2+  Unampl. 3+  Unampl. 1  
Poor

Unampl. 3+  Unampl. 1
IHC quality problem

IHC is technically complex, and no aspect of this complexity can be ignored, from the moment of collecting the specimen to issuance of the final report

(Clive Taylor, 2000)
IHC quality problem

- Staining patterns and quality varies between different laboratories - depending on the expertise and individual selection of reagents and methods.

- Different antibodies, visualization systems, chromogenes, platforms and guidelines often give different results.

- Internal quality control will often not identify a poorly calibrated IHC system or varying quality of products giving insufficient or aberrant staining results.

- EQA objectively compares a large number of stains, reagents and protocols to identify optimal and suboptimal products.
**Immunohistochemical protocol trap**

### Processing
- Decalcification

### Fixation
- Delay, time, type, volume

### Tissue
- Type, dimensions, biological variation (tumour dediff.)
- Cauterization

### Pre-analytic
- **Pre-treatment**
  - Proteolysis, HIER, time, temp, pH...

### Sections
- Thickness
- Drying
- Storage

### Analytic
- **Platform**
  - Manual
  - Stainer type

### Visualization system
- Sensitivity, specificity enhancement

### Primary antibody
- Clone, dilution buffer, time, temp

### Post-analytic
- **Reporting**
  - Diagnostic context

### Interpretation
- Quantification
- Localization
- Pos./neg. def.
- Cut-off level

### Control
- Internal/external
- Critical stain quality indicators

### Chromogene
- Sensitivity, localization
Immunohistochemical protocol trap

Processing
- decalcification

Fixation
- delay, time, type, volume

Pre-analytic
- Tissue: type, dimensions, biological variation (tumour dediff.), cauterization

Pre-treatment
- proteolysis, HIER, time, temp, pH ...

Sections
- thickness

Platform
- manual

Analytic
- Primary antibody: clone, dilution buffer, time, temp

Interpretation
- quantification, localization pos./neg. def. - cut-off level
- panels, algorithms

Control
- internal/external critical stain quality indicators

Number of protocols with 3 choices per parameter: 27, 59.049, 205.891.132.094.649, 717.897.987.691.853.000.000.000.000

Protocol parameters: 3, 10, 30, 50
Immunohistochemistry

Processing
decalciﬁcation

Fixation
delay, time, type, volume

EQA

Pre-treatment
proteolysis, HIER, time, temp, pH …

Primary antibody
clon, dilution buffer, time, temp

Platform
manual stainer type

Visualization system
sensitivity, specificity enhancement

Chromogene
sensitivity, localization

Interpretation
quantification localization pos./neg. def. - cut-off level panels algorithms

Control
internal/external critical stain quality indicators

Reports
diagnostic context

Pre-analytic

Tissue
type, dimensions, biological variation (tumor dediff.) cauterization

Sections
thickness dehydration storage

Post-analytic

Control
internal/external critical stain quality indicators

Reporting
diagnostic context
Major causes of insufficient stains in ~ 9,000 slides

- Less successful antibodies/RTUs: 17%
- Inappropriate antibody dilution: 20%
- Inappropriate epitope retrieval: 27%
- Inappropriate detection kit: 19%
- Other inappropriate lab. performance: 17%

- Endogenous biotin reaction (EBR)
- Section drying-out after HIER
- Technical platform error
- . . . .
- Unexplained
Enjoy your stay in Aalborg
Wednesday 10th
18:00 – 19:30
(6 – 7:30 PM)

Reception at House of Music

Please, wear your name badge

- Snacks and drinks
- Light jazz music
- Deputy Mayor’s welcome
Wednesday 10th
18:00 – 19:30
(6 – 7.30 PM)

Reception at House of Music

• Snacks and drinks
• Light jazz music
• Deputy Mayor’s welcome

Please, wear your name badge
Thursday 11th
18:30 – (6:30 PM – )
Conference dinner
at Restaurant Fusion

Tickets available until
16:00 (4 PM) today
DKK 375 (EUR 50)

Please, present your ticket
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