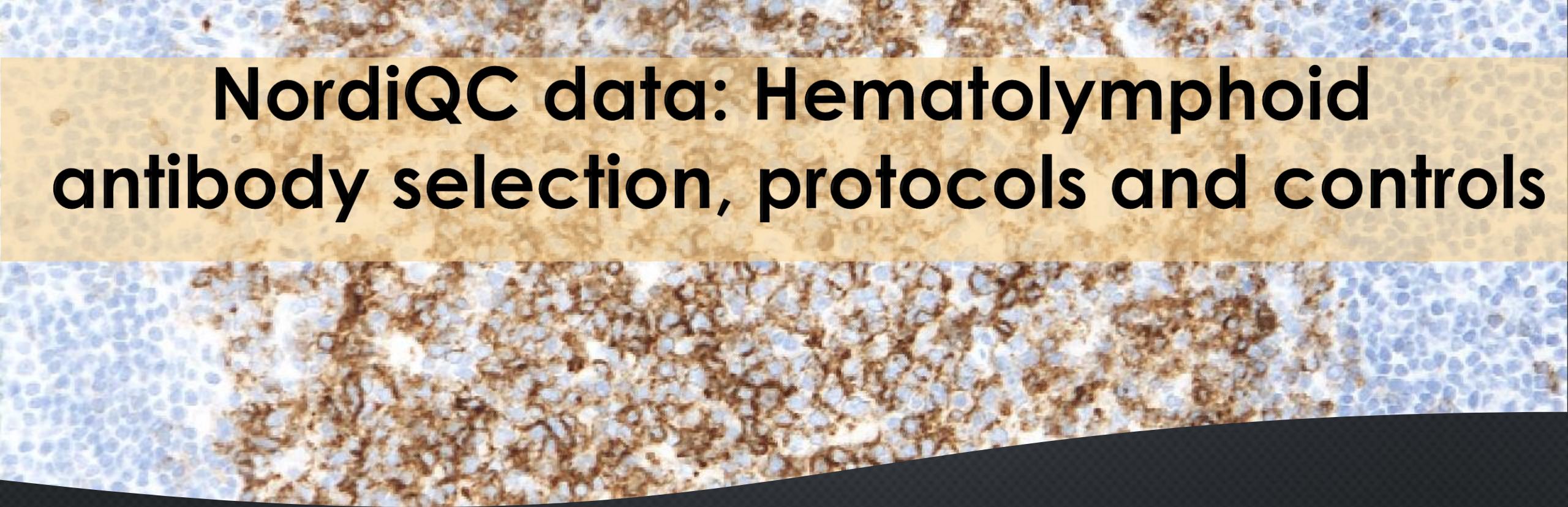


NordiQC data: Hematolymphoid antibody selection, protocols and controls



TANYA JULIO

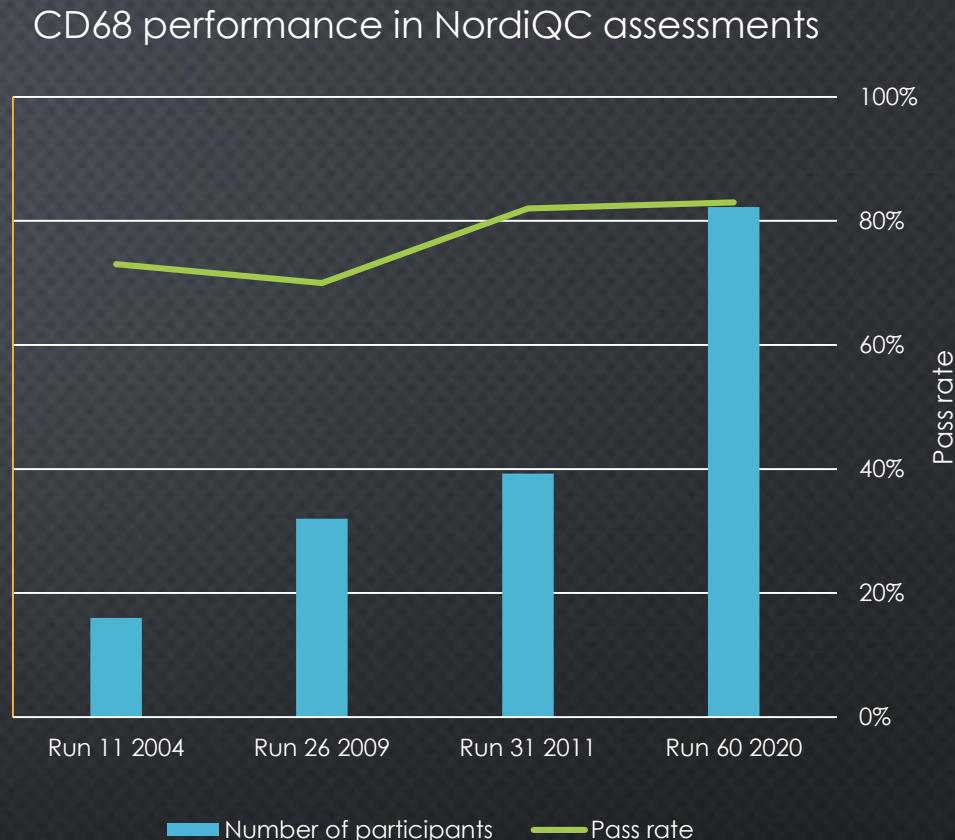
HISTOTECHNOLOGIST

PATHOLOGY DEPARTMENT

AARHUS UNIVERSITY HOSPITAL, DK

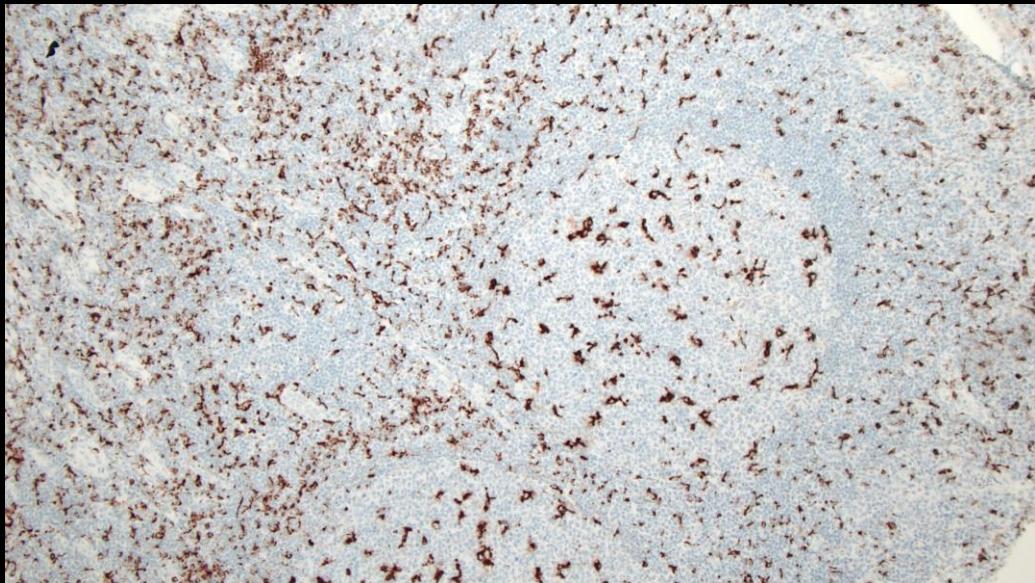
Marker	Specifics	Control	Run	Pass-rate /optimal	Participants
CD45 Membranous staining	Identify haematolymphoid differentiation	Tonsil	59 2020	94% / 79%	296
CD68 Cytoplasmic staining	Macrophages	Brain, tonsil	60 2020	83% / 32%	329
CD15 Membranous staining	Identify classic Hodgkin	Kidney, tonsil	61 2021	86% / 53%	305
BCL-6 Nuclear staining	Diffuse large B-cell of germinal centre B-cell (GCB) vs non-GCB subtype	Tonsil	55 2019	77% / 45%	279
BCL-2 Nuclear staining	Follicular hyperplasia vs. follicular B-cell lymphoma	Tonsil	57 2019	89% / 64%	319
C-MYC Nuclear staining	Identify C-MYC overexpression in large B-cell lymphomas	Tonsil, colon	56 2019	57% / 24% First run	173
MUM1 Nuclear staining	Diffuse large B-cell of germinal centre B-cell (GCB) vs non-GCB subtype	Tonsil	58 2020	73% / 46%	259
CD10 Membranous staining	Diffuse large B-cell of germinal centre B-cell (GCB) vs non-GCB subtype	Tonsil	59 2020	79% / 57%	295

Concentrated antibodies	n	Vendor	Optimal	Good	Borderline	Poor	Suff. ¹	OR ²
mAb clone KP1	34	Dako/Agilent						
	3	Biocare Medical						
	2	Leica Biosystems						
	3	Thermo Scientific						
	1	BioGenex	4	30	7	5	74%	9%
	1	Neomarkers						
	1	Novocastra						
	1	Zeta Corporation						
mAb clone PG-M1	81	Dako/Agilent						
	4	Diagnostic Biosystems	53	22	6	5	87%	62%
	1	Neo Markers						
Ready-To-Use antibodies							Suff. ¹	OR. ²
Ventana	78							
mAb clone KP1, 790-2931 (VRPS) ³	2	Roche/Ventana	-	2	-	-	-	-
mAb clone KP1, 790-2931 (LMPS) ⁴	76	Roche/Ventana	4	55	10	7	78%	5%
Omnis	37							
mAb clone PG-M1, GA613 (VRPS) ³	8	Agilent/Dako	5	3	-	-	100%	63%
mAb clone PG-M1, GA613 (LMPS) ⁴	1	Agilent/Dako	-	-	-	1	-	-
mAb clone KP1, GA609 (VRPS) ³	19	Agilent/Dako	-	18	1	-	95%	-
mAb clone KP1, GA609 (LMPS) ⁴	9	Agilent/Dako	1	4	4	-	56%	11%
Autostainer	52							
mAb clone PG-M1, IR/IS613 (VRPS) ³	12	Agilent/Dako	12	-	-	-	100%	100%
mAb clone PG-M1, IR/IS613 (LMPS) ⁴	31	Agilent/Dako	18	10	2	-	92%	59%
mAb clone KP1, IR/IS609 (VRPS) ³	6	Agilent/Dako	1	3	2	-	67%	17%
mAb clone KP1, IR/IS609 (LMPS) ⁴	3	Agilent/Dako	1	1	1	-	-	-
Bond	17							
mAb clone 514H12, PA0273 (VRPS) ³	12	Leica Biosystems	3	8	1	-	92%	25%
mAb clone 514H12, PA0273 (LMPS) ⁴	5	Leica Biosystems	-	3	1	1	80%	-
Total	329		106	168	35	20		
Proportion			32%	51%	11%	6%	83%	



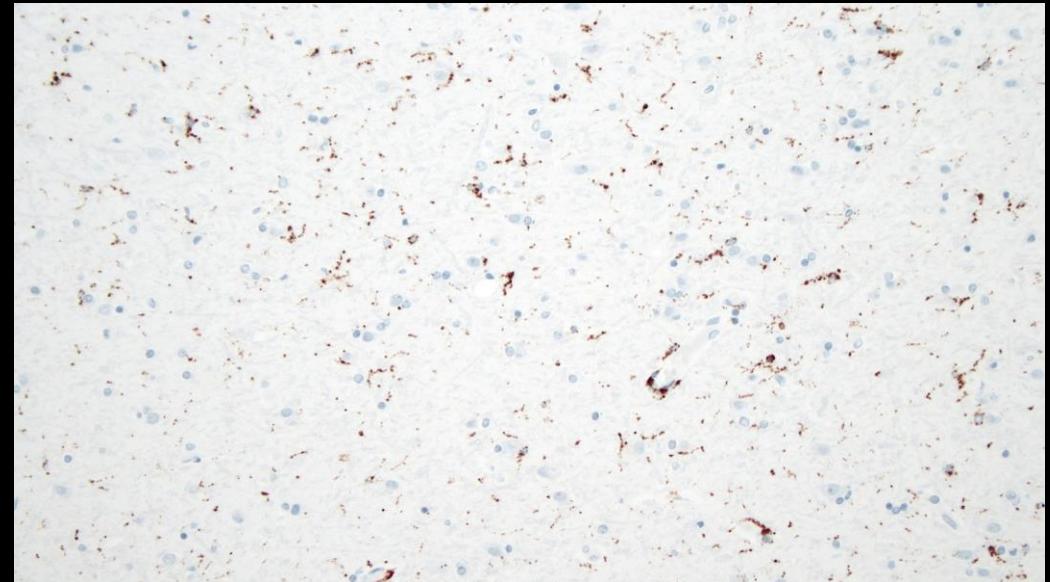
CD68

Clone	n	Optimal	Good	Borderline	Poor	Suff.	OR
mAb clone PG-M1	137	88	35	8	6	90%	64%
mAb clone KP1	161	11	113	25	12	77%	6%

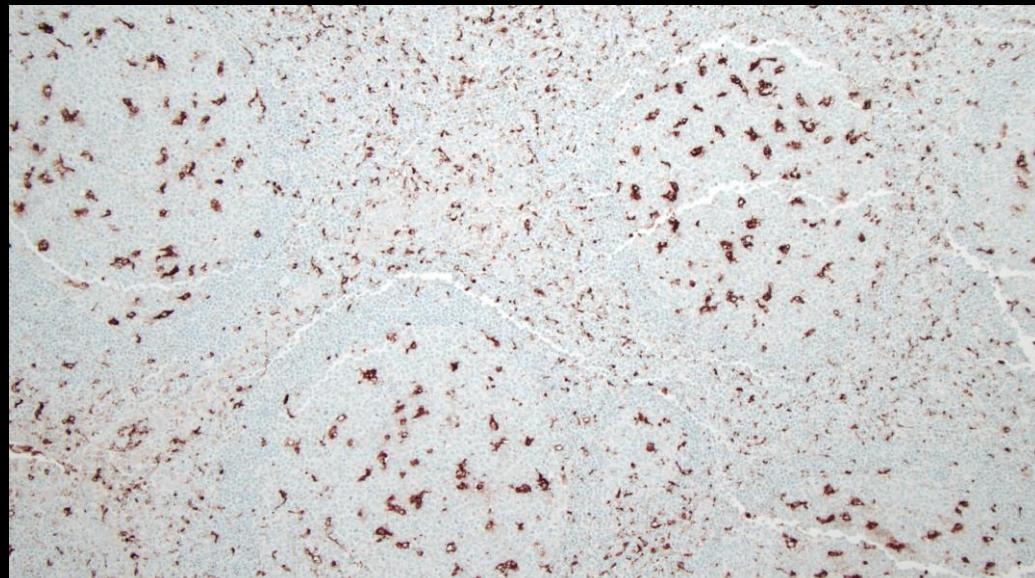


Tonsil –Interfollicular macrophages

Optimal PGM1 RTU on AS



Brain – microglial cells



Insufficient KP1 RTU Ventana



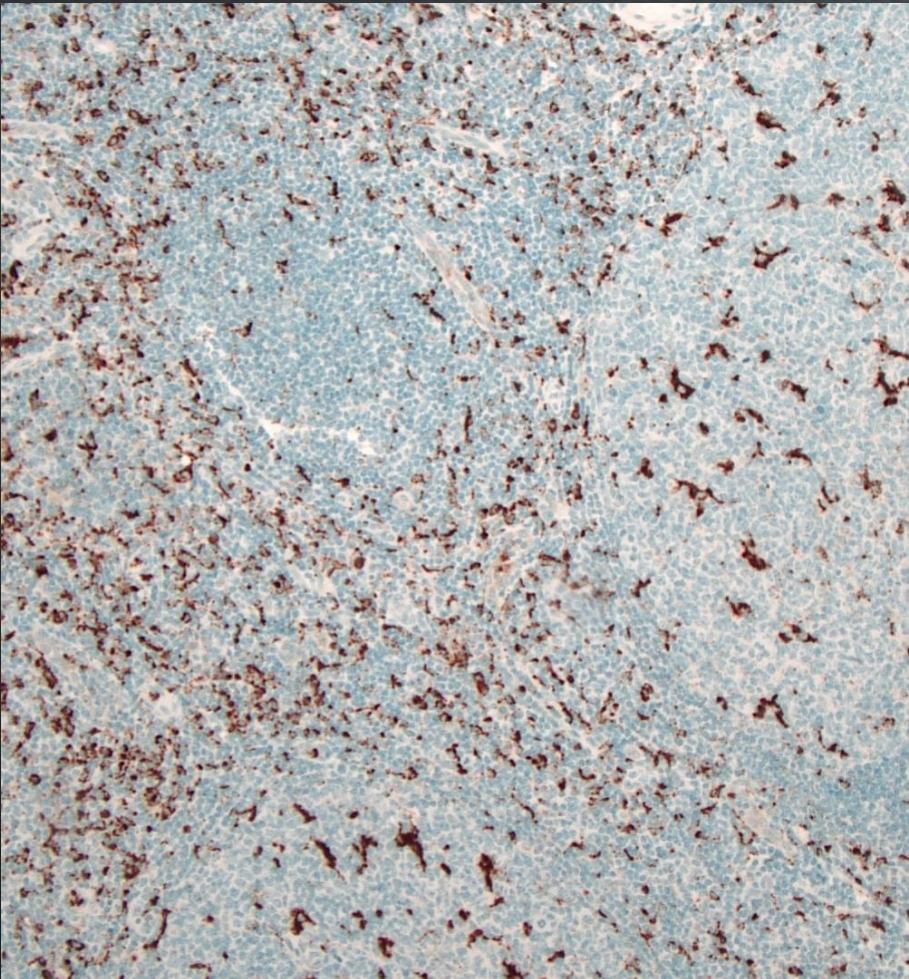
VRPS 93% pass-rate, LMPS 79%

✓ M-Linker with CD68

Concentrated antibodies	n	Vendor	Optimal	Good	Borderline	Poor	Suff. ¹	OR ²
mAb clone KP1	34	Dako/Agilent						
	3	Biocare Medical						
	2	Leica Biosystems						
	3	Thermo Scientific						
	1	BioGenex	4	30	7	5	74%	9%
	1	Neomarkers						
	1	Novocastra						
	1	Zeta Corporation						
mAb clone PG-M1	81	Dako/Agilent						
	4	Diagnostic Biosystems	53	22	6	5	87%	62%
	1	Neo Markers						
Ready-To-Use antibodies							Suff. ¹	OR. ²
Ventana	78							
mAb clone KP1, 790-2931 (VRPS) ³	2	Roche/Ventana	-	2	-	-	-	-
mAb clone KP1, 790-2931 (LMPS) ⁴	76	Roche/Ventana	4	55	10	7	78%	5%
Omnis	37							
mAb clone PG-M1, GA613 (VRPS) ³	8	Agilent/Dako	5	3	-	-	100%	63%
mAb clone PG-M1, GA613 (LMPS) ⁴	1	Agilent/Dako	-	-	-	1	-	-
mAb clone KP1, GA609 (VRPS) ³	19	Agilent/Dako	-	18	1	-	95%	-
mAb clone KP1, GA609 (LMPS) ⁴	9	Agilent/Dako	1	4	4	-	56%	11%
Autostainer	52							
mAb clone PG-M1, IR/IS613 (VRPS) ³	12	Agilent/Dako	12	-	-	-	100%	100%
mAb clone PG-M1, IR/IS613 (LMPS) ⁴	31	Agilent/Dako	18	10	2	-	92%	59%
mAb clone KP1, IR/IS609 (VRPS) ³	6	Agilent/Dako	1	3	2	-	67%	17%
mAb clone KP1, IR/IS609 (LMPS) ⁴	3	Agilent/Dako	1	1	1	-	-	-
Bond	17							
mAb clone 514H12, PA0273 (VRPS) ³	12	Leica Biosystems	3	8	1	-	92%	25%
mAb clone 514H12, PA0273 (LMPS) ⁴	5	Leica Biosystems	-	3	1	1	80%	-
Total	329		106	168	35	20		
Proportion			32%	51%	11%	6%	83%	

Short Ab time

Low HIER is a no no!



CD68	Retrieval buffer	Titer	Detection system	AB format	Detection
CD68 PGM1	High pH HIER/(low too)	1:50-200	2 and 3-step	Conc and RTU	EnVision Flex(+) Bond Refine OptiView
CD68 KP1	High pH 24-64 min CC1	1:500-10.000	2 and 3-step	Conc and RTU 8-12 min	EnVision Flex(+) Bond Refine OptiView(+amp) Ultra View
CD68 514H12	Low pH	1:100	3-step	Conc and RTU	Bond Refine

Table 4. Proportion of sufficient and optimal results for CD68 for the most commonly used RTU IHC systems

RTU systems	Recommended protocol settings*		Laboratory modified protocol settings**	
	Sufficient	Optimal	Sufficient	Optimal
Dako AS mAb PG-M1 IS/IR613	100% (12/12)	100% (12/12)	88% (7/8)	50% (4/8)
Dako Omnis mAb PG-M1 GA613	100% (8/8)	63% (5/8)	(0/1)	(0/1)
Dako AS mAb KP1 IS/IR609	67% (4/6)	17% (1/6)	(2/2)	(1/2)
Dako Omnis mAb KP1 GA609	95% (18/19)	0% (0/19)	50% (4/8)	11% (1/8)
VMS Ultra/XT mAb KP1 790-2931	(2/2)	(0/2)	78% (59/76)	5% (4/76)
Leica BOND MAX/III mAb 514H12 PA0273	83% (10/12)	25% (3/12)	60% (3/5)	(0/5)

* 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.

Optimal KP1 RTU Ventana
HIER CC1 40 min, Ab 12 min
OptiView with amp.

CD15

Concentrated antibodies	n	Vendor	Optimal	Good	Borderline	Poor	Suff. ¹	OR ²
mAb clone Carb-3	57	Dako/Agilent	24	19	12	2	75%	42%
	11	Cell Marque						
	5	Becton Dickinson						
	1	Biocare medical						
mAb clone MMA	1	DBS	7	8	5	2	68%	32%
	1	Leica Biosystems						
	3	Thermo/NeoMarkers						
	1	Zeta Corporation						
Ready-To-Use antibodies								
mAb clone Carb-3 IS/IR062³	15	Dako/Agilent	8	5	1	1	87%	53%
mAb clone Carb-3 IS/IR062⁴	18	Dako/Agilent	10	2	6	-	67%	56%
mAb clone Carb-3 GA062³	29	Dako/Agilent	15	12	1	1	93%	52%
mAb clone Carb-3 GA062⁴	20	Dako/Agilent	10	9	1	-	95%	50%
mAb clone MMA 760-2504³	14	Ventana/Roche	6	7	1	-	93%	43%
mAb clone MMA* 760-2504⁴	98	Ventana/Roche	64	28	5	1	94%	64%
mAb clone Carb-1 PA0039³	2	Leica Biosystems	1	-	-	1	-	-
mAb clone Carb-1 PA0039⁴	1	Leica Biosystems	1	-	-	-	-	-
mAb clone MMA PA0473³	3	Leica Biosystems	3	-	-	-	-	-
mAb clone MMA PA0473⁴	10	Leica Biosystems	6	4	-	-	100%	60%
mAb clone MMA 8256-C010	4	Sakura Finetek	1	3	-	-	-	-
Total	305		161	101	34	9		
Proportion			53%	33%	11%	3%	86%	



VS

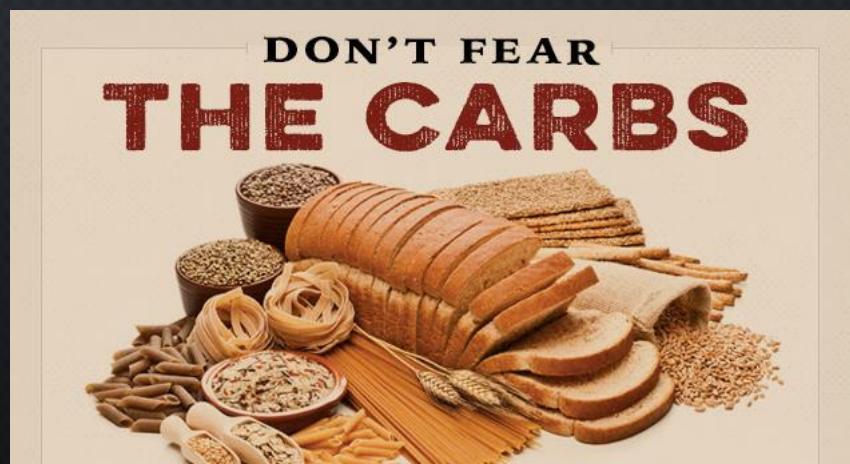


Table 3. Proportion of sufficient and optimal results for CD15 for the most commonly used RTU IHC systems

RTU systems	Recommended protocol settings*		Laboratory modified protocol settings**	
	Sufficient	Optimal	Sufficient	Optimal
Dako AS48 mAb Carb-3 IR062	87% (13/15)	53% (8/15)	82% (9/11)	73% (8/11)
Dako Omnis mAb Carb-3 GA062	93% (27/29)	52% (15/29)	95% (17/18)	50% (9/18)
VMS Ultra/XT mAb MMA 760-2504	93% (13/14)	43% (6/14)	94% (92/98)	64% (64/98)
Leica BOND MAX/III mAb Carb-1 PA0039	1/1	1/1	1/2	1/2
Leica BOND MAX/III mAb MMA PA0473	(3/3)	(3/3)	100% (8/8)	63% (5/8)

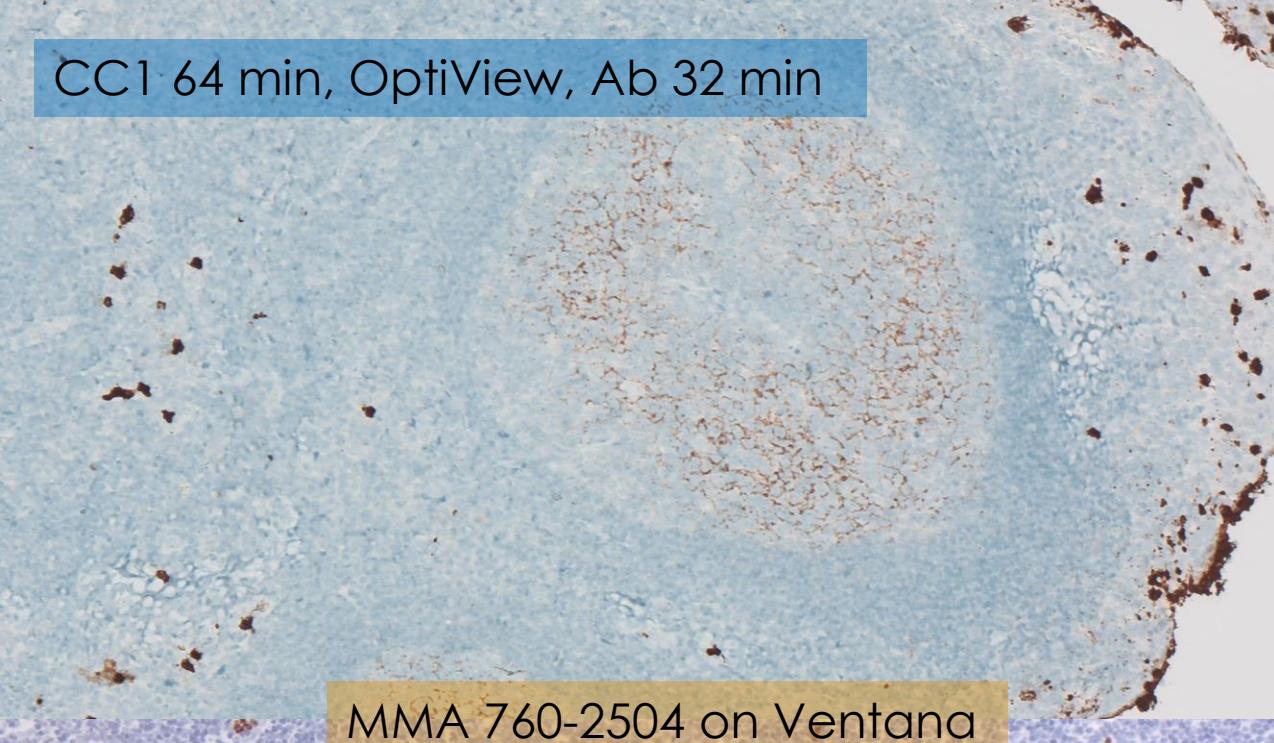
Carb-3 IR062 increase Ab to 25-30 min.

Carb-3 GA062 no need to try low pH HIER, it does not work! Instead go with Ab for 20 min.

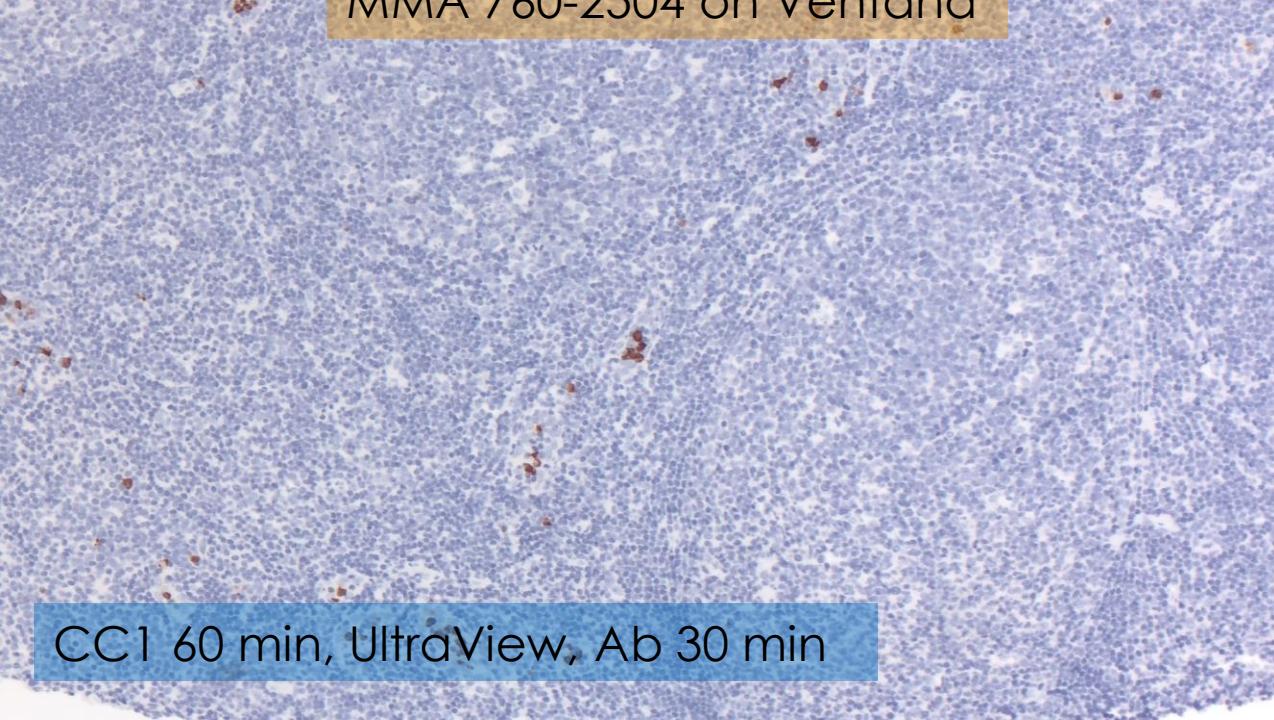
MMA 760-2504 use OptiView instead of UltraView.

MMA PA0473 use vendor recommend protocol.

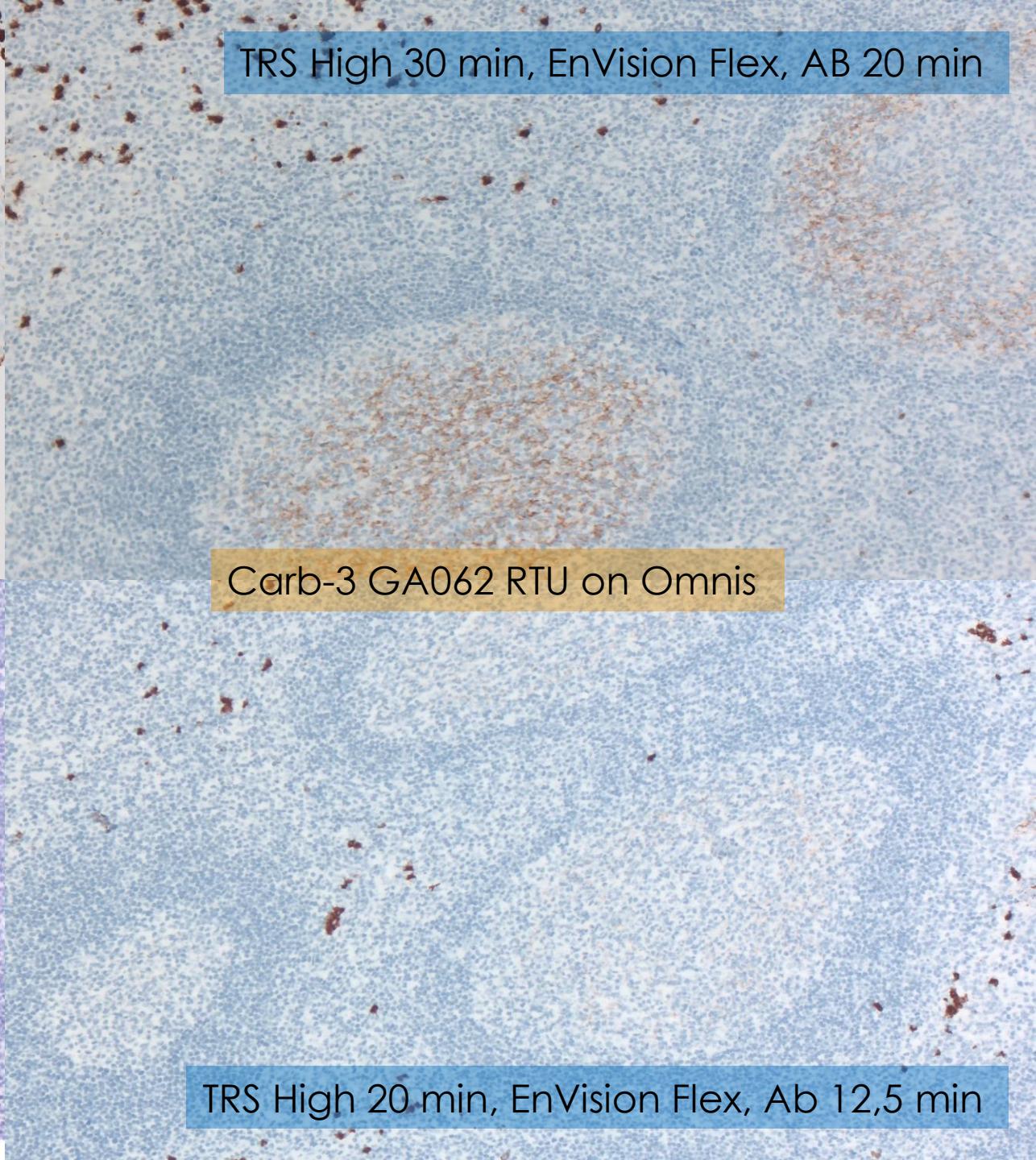
CC1 64 min, OptiView, Ab 32 min



MMA 760-2504 on Ventana



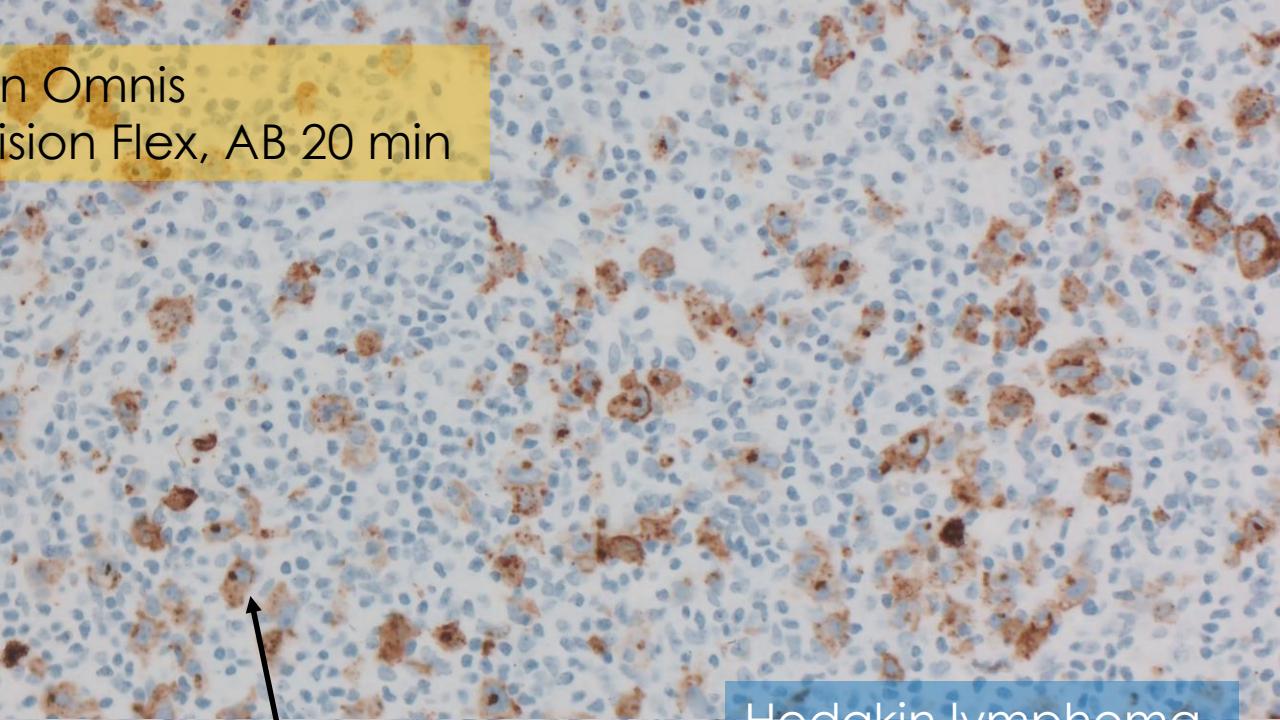
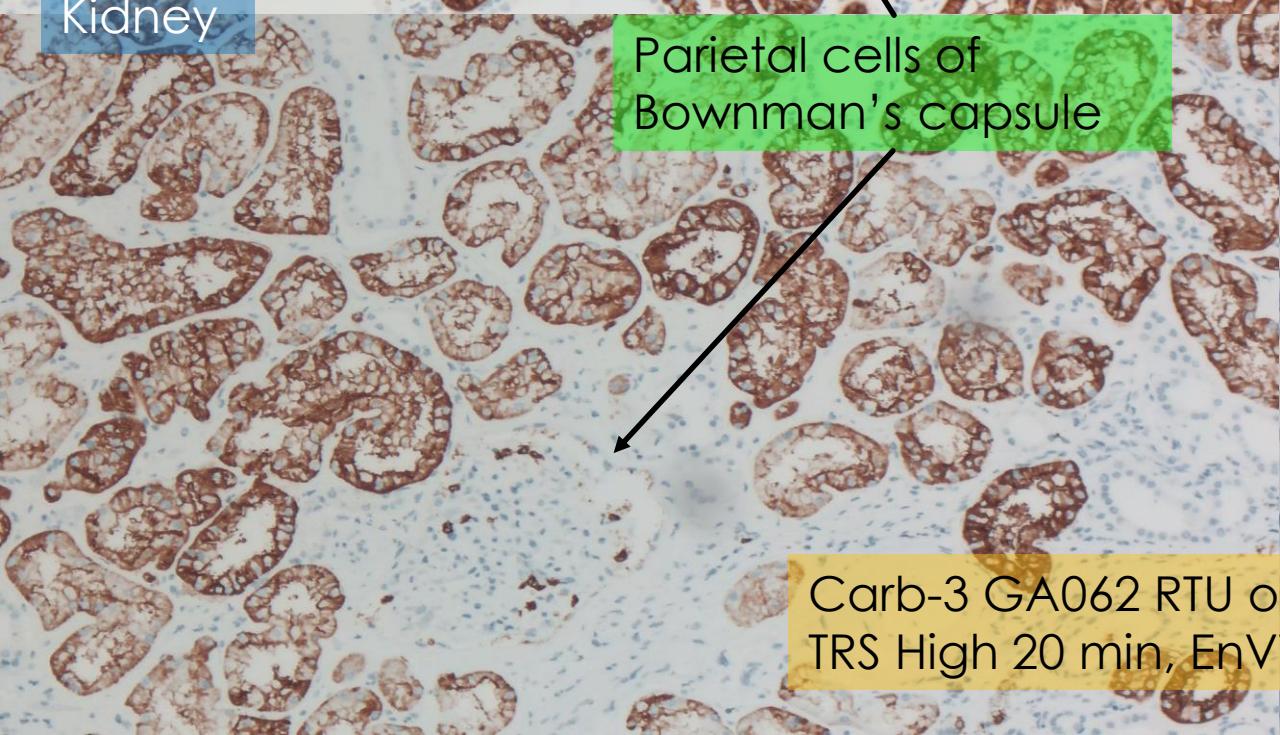
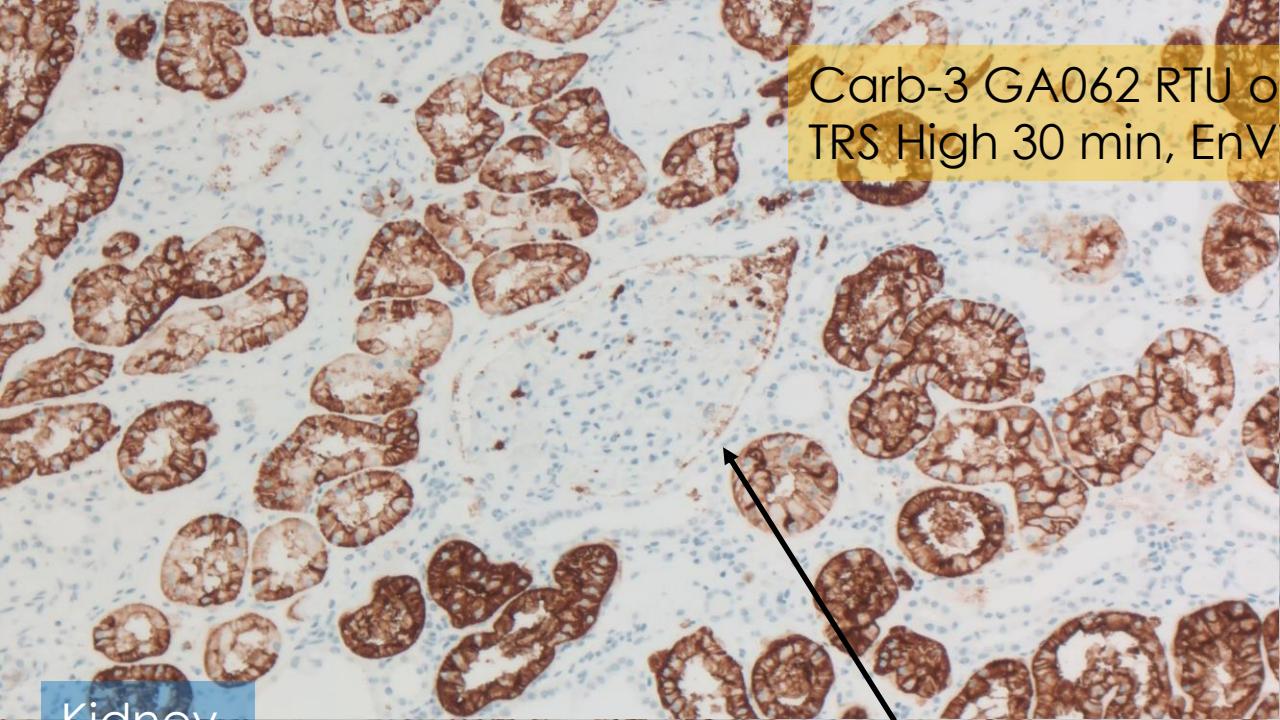
CC1 60 min, UltraView, Ab 30 min



TRS High 30 min, EnVision Flex, AB 20 min

Carb-3 GA062 RTU on Omnis

TRS High 20 min, EnVision Flex, Ab 12,5 min



C-MYC A NEWCOMER



Concentrated antibodies	n	Vendor	Optimal	Good	Borderline	Poor	Suff. ¹	Suff. OPS ²
mAb clone 9E10	2	Diagnostic BioSystems	0	0	0	2	-	-
	26	Cell Marque						
	15	Epitomics						
rmAb clone EP121	12	Biocare Medical	17	20	13	5	67%	72%
	1	Abcam						
	1	Sakura Finetek						
rmAb clone Y69	39	Abcam	12	14	5	9	65%	79%
	1	Eurobio						
Ready-To-Use antibodies								
rmAb clone EP121 PME 415	2	Biocare Medical	1	0	0	1	-	-
rmAb clone EP121 PME 415 ³	2	Biocare Medical	0	1	0	1	-	-
rmAb clone EP121 395R-18 ⁴	5	Cell Marque	3	1	1	0	-	-
rmAb clone EP121 RMA-0803	1	Maixin	0	1	0	0	-	-
rmAb clone Y69 MAD-000487QD-7/N	2	Master Diagnostica	0	1	1	0	-	-
rmAb clone Y69 790-4628	61	Ventana/Roche	8	19	16	18	44%	60%
rmAb clone Y69 790-4628 ⁵	3	Ventana/Roche	0	1	1	1	-	-
Total	173		41	58	37	37	-	
Proportion			24%	33%	21,5%	21,5%	57%	

Method		
Procedure Type	XT	ULTRA
Deparaffinization	Selected	Selected
Cell Conditioning (Antigen Unmasking)	CC1 64 minutes	ULTRA CC1 64 minutes, 100°C
Pre-Primary Peroxidase Inhibitor	Selected	Selected
Antibody (Primary)	16 minutes, 37°C	16 minutes, 36°C
OptiView HQ Linker	8 minutes (default)	8 minutes (default)
OptiView HRP Multimer		

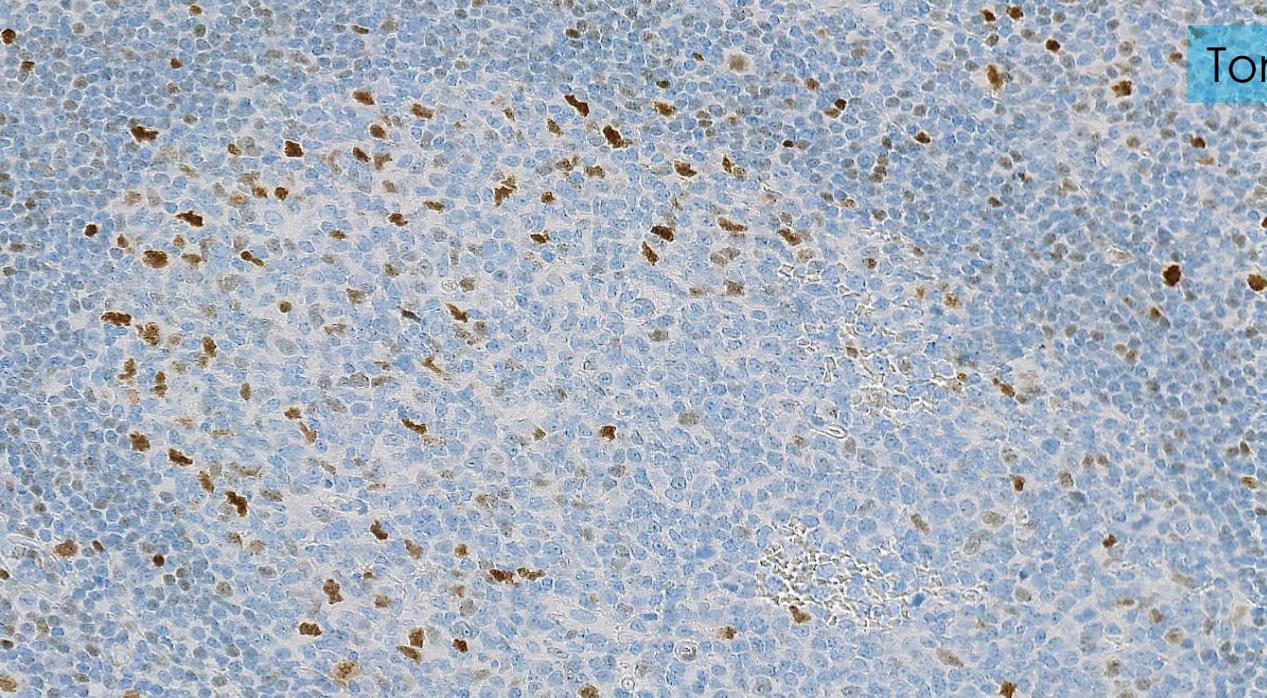
Concentrated antibodies	Dako Autostainer Link / Classic	Dako Omnis		Ventana BenchMark XT / Ultra		Leica Bond III / Max		
	TRS pH 9.0	TRS pH 6.1	TRS pH 9.0	TRS pH 6.1	CC1 pH 8.5	CC2 pH 6.0	ER2 pH 9.0	ER1 pH 6.0
rmAb clone EP121	0/8 (0%)	-	5/15 (33%)	-	7/21 (33%)	-	2/6 (33%)	-
Sufficient	-	-	80%	-	62%		83%	
rmAb clone Y69	3/9 (33%)	0/2	0/4	-	7/16*** (44%)	-	2/5 (20%)	-

RTU-systems	Recommended protocol settings*		Laboratory modified protocol settings**	
	Sufficient	Optimal	Sufficient	Optimal
VMS Ultra/XT/GX rmAb Y69 790-4628	41% (7/17)	6% (1/17)	45% (20/44)	16% (7/44)

Positive changes: >32 min Ab incubation, using UltraView+amp or OptiView = increasing pass-rate to 69%, 27% optimal.

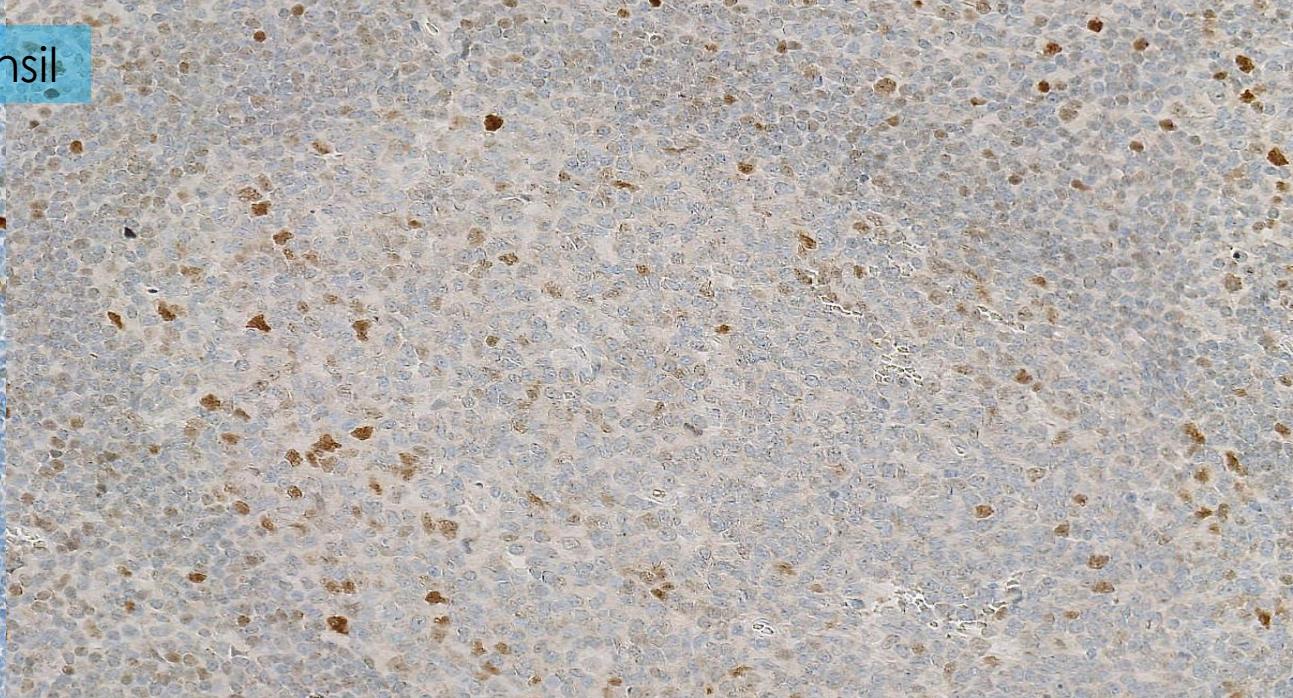
Negative changes: < 48 min HIER and/or using UltraView without amp.

Problems: 59% of cases with UltraView+amp showed background or poor-signal-to-noise.



Tonsil

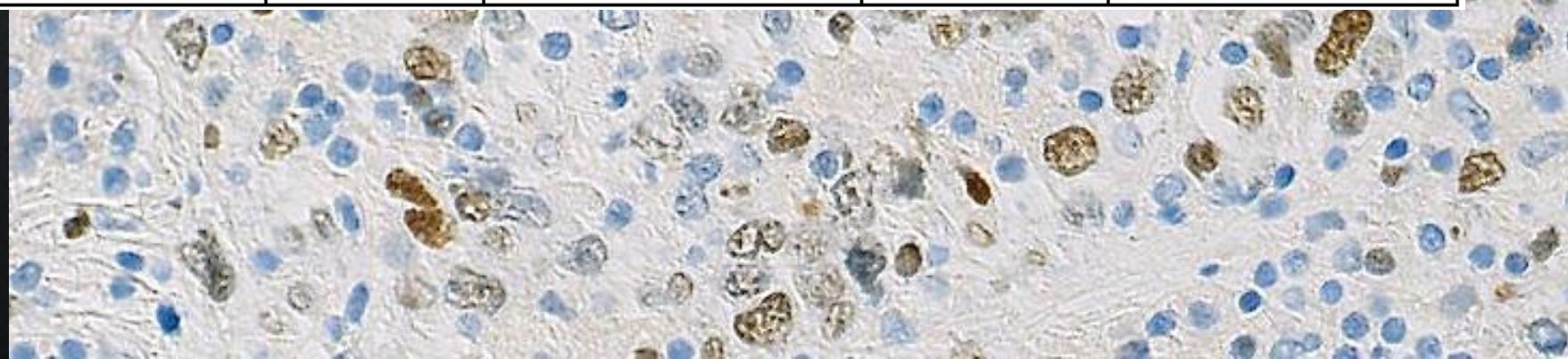
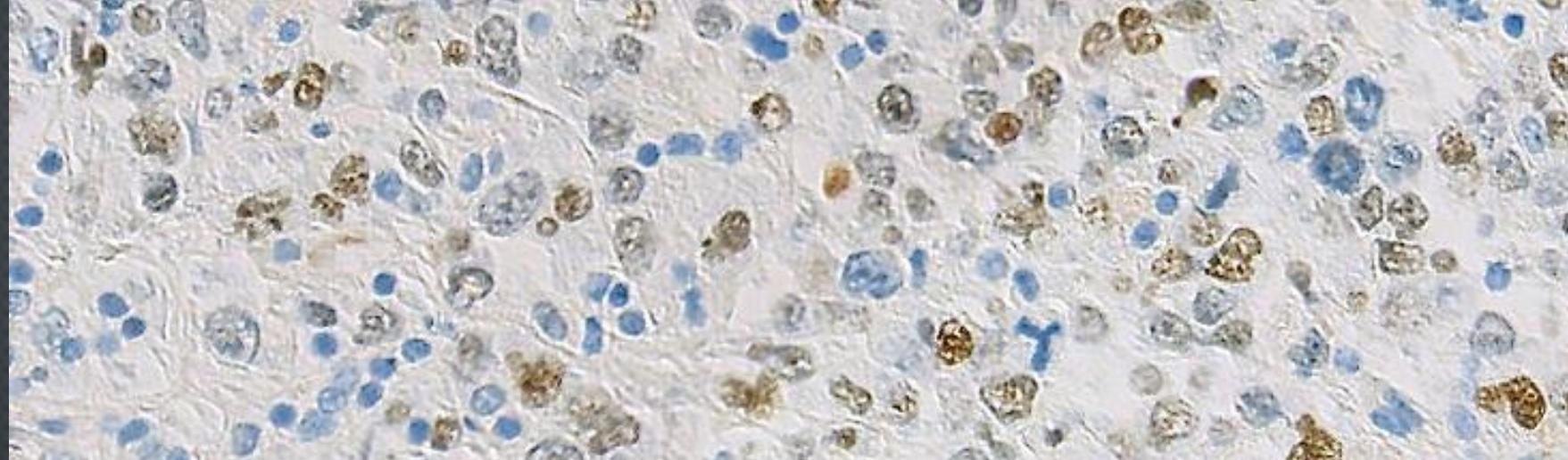
rmAb clone EP121, CC1, OptiView, Ventana



rmAb clone Y69 RTU, CC1, UltraView+amp, Ventana

PROTOCOLS

C-MYC	Retrieval buffer	Titer	Detection system	AB	Detection
EP121	High pH	1:10-100	3-step	Conc	EnVision Flex+ Bond Refine OptiView
Y69	High pH	1:40-100	3-step	Conc	EnVision(+) Bond Refine OptiView
Y69	High pH	-	3-step	RTU	OptiView



MUM1 – CLIMBING THE ROPES

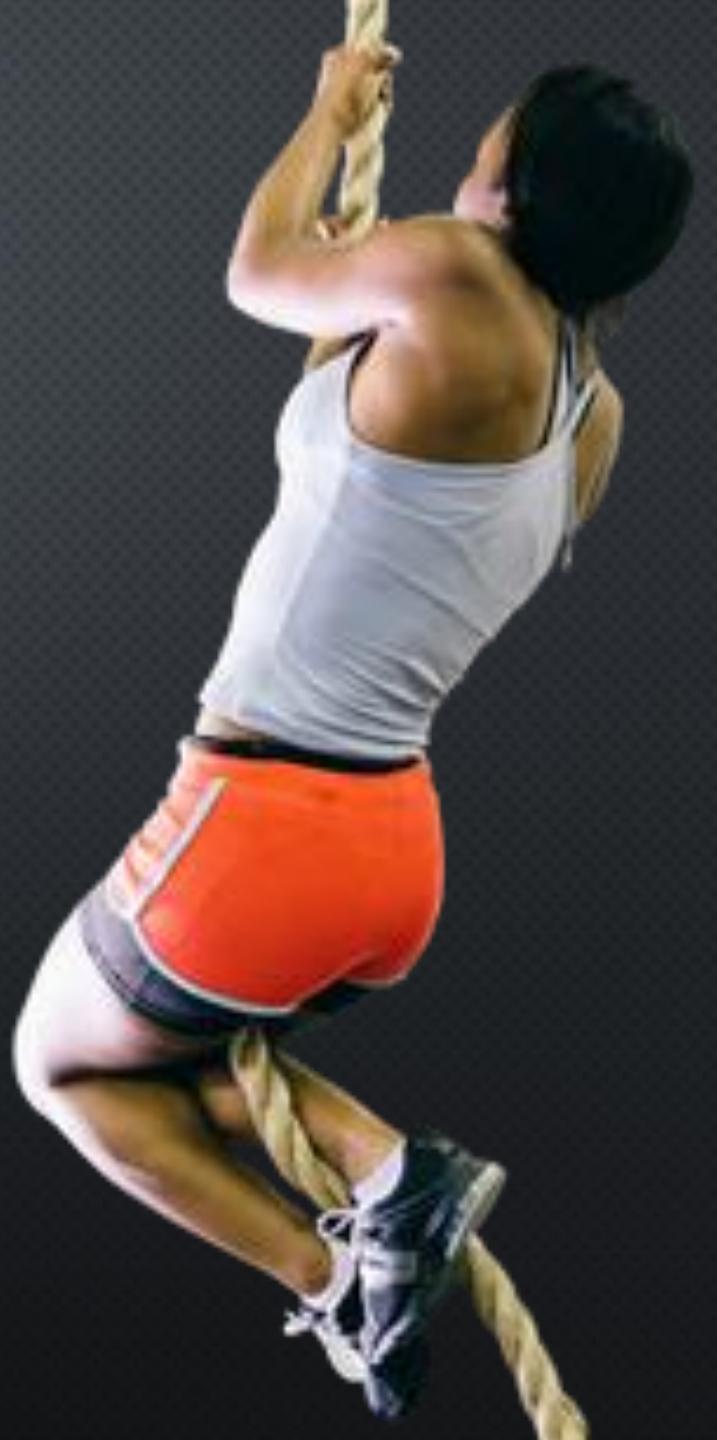
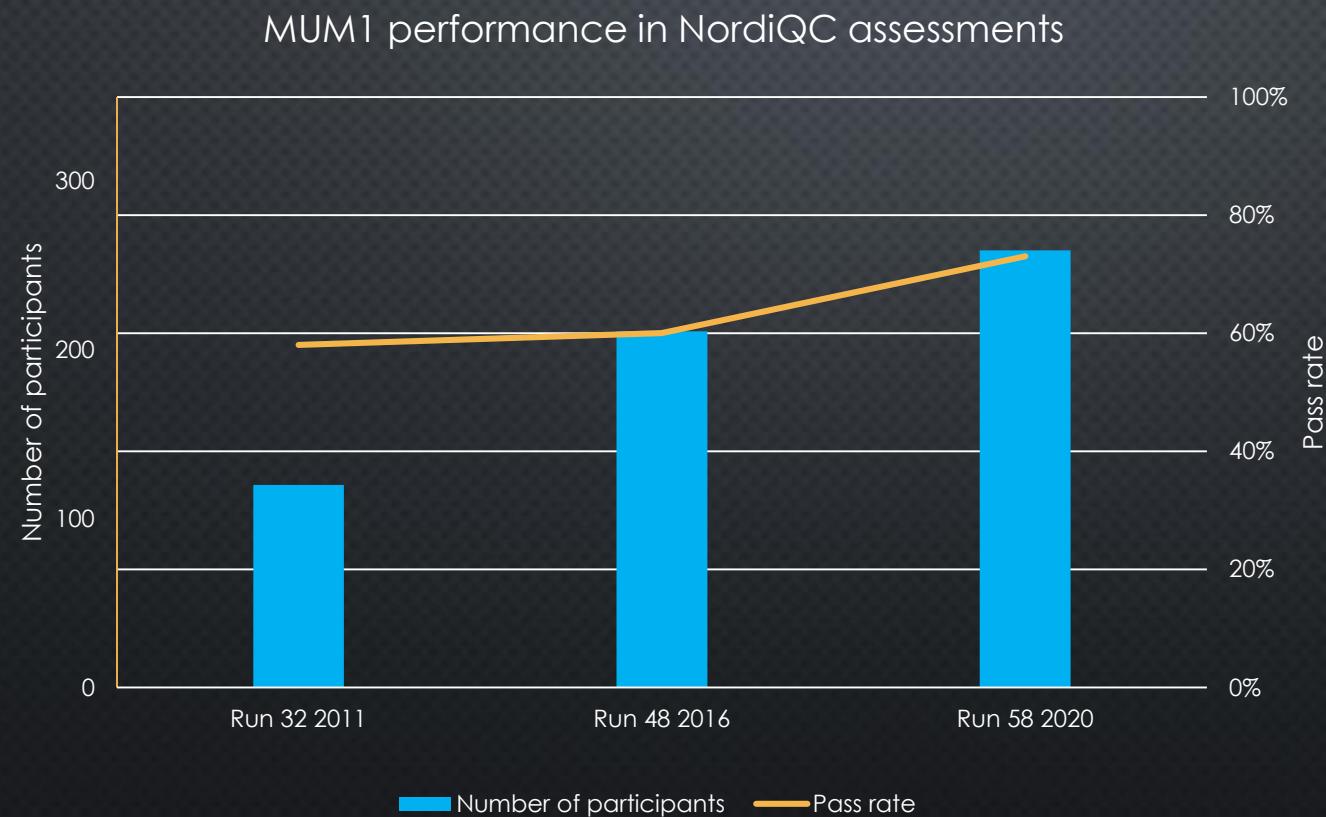


Table 1. Antibodies and assessment marks for MUM1, run 58

Concentrated antibodies n Vendor

			Optimal	Good	Borderline	Poor	Suff. ¹	OR ²
mAb clone MUMp1	93	Agilent/Dako	67	17	10	3	87%	69 %
	3	Diagnostic Biosystem						
	1	Thermo Scientific						
Ready-To-Use antibodies							Suff. ¹	OR ²
mAb clone MUMp1 GA644 (VRPS) ³	32	Agilent/Dako	19	12	1	0	97%	59 %
mAb clone MUMp1 GA644 (LMPS) ⁴	13	Agilent/Dako	6	5	2	0	85%	46%
mAb clone MUMp1 IR/IS644 (VRPS) ³	10	Agilent/Dako	2	8	0	0	100%	20%
mAb clone MUMp1 IR/IS644 (LMPS) ⁴	19	Agilent/Dako	12	6	1	0	95%	63%
mAb clone EAU32 PA0129 (VRPS) ³	6	Leica Biosystems	1	3	2	0	67%	17%
mAb clone EAU32 PA0129 (LMPS) ⁴	7	Leica Biosystems	0	4	2	1	57%	0%
rmAb clone MRQ-43 760-4529 (VRPS) ³	3	Ventana/Roche	0	0	3	0	-	-
rmAb clone MRQ-43 760-4529 (LMPS) ⁴	23	Ventana/Roche	1	0	22	0	4%	4%
rmAb clone EP190 760-6082 (VRPS) ³	8	Ventana/Roche	4	3	1	0	88%	50%
rmAb clone EP190 760-6082 (LMPS) ⁴	9	Ventana/Roche	1	4	4	0	56%	11%
Total Proportion	259		119	70	61	9	-	-
			46%	27%	24%	3%	73%	-
Not laboratory Total	529		40%	20%	30%	13%	-	-
Total (Sums)			111	61	41	11	-	-

Results assessed as insufficient were characterized by poor-signal-to noise ratio and/or false positive staining reactions. The same pattern was seen in assays applying laboratory modified protocol settings for the RTU system.

Table 1. Antibodies and assessment marks for MUM1, run 48

Concentrated antibodies n Vendor

			Optimal	Good	Borderline	Poor	Suff. ¹	OR ²
mAb clone MUMp1	84	Agilent/Dako	52	19	11	4	83%	60%
	1	Diagnostic Biosystem						
	1	GeneMed						
Ready-To-Use antibodies								
mAb clone MUMp1 GA644	18	Agilent/Dako	8	7	2	1	83%	44%
mAb clone MUMp1 IR/IS644	28	Agilent/Dako	13	12	3	0	89%	46%
mAb clone EAU32 PA0129	6	Leica Biosystems	5	1	0	0	100%	83%
rmAb clone MRQ-43 760-4529	31	Ventana/Roche	0	0	25	6	0%	0%
Total Proportion	211		84	43	66	18	-	-
			40%	20%	31%	9%	60%	-
Not laboratory Total	529		40%	20%	30%	13%	-	-
Total (Sums)			111	61	41	11	-	-

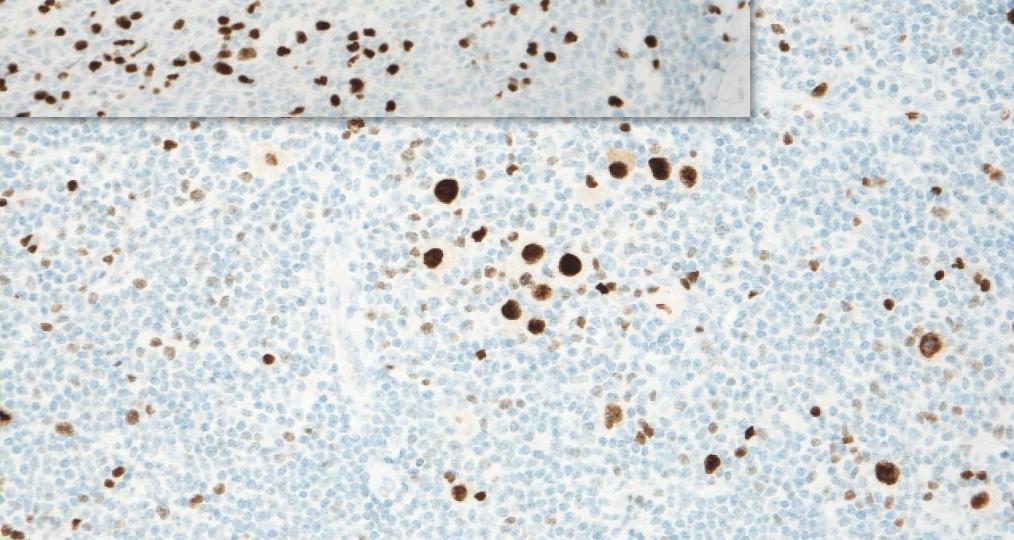
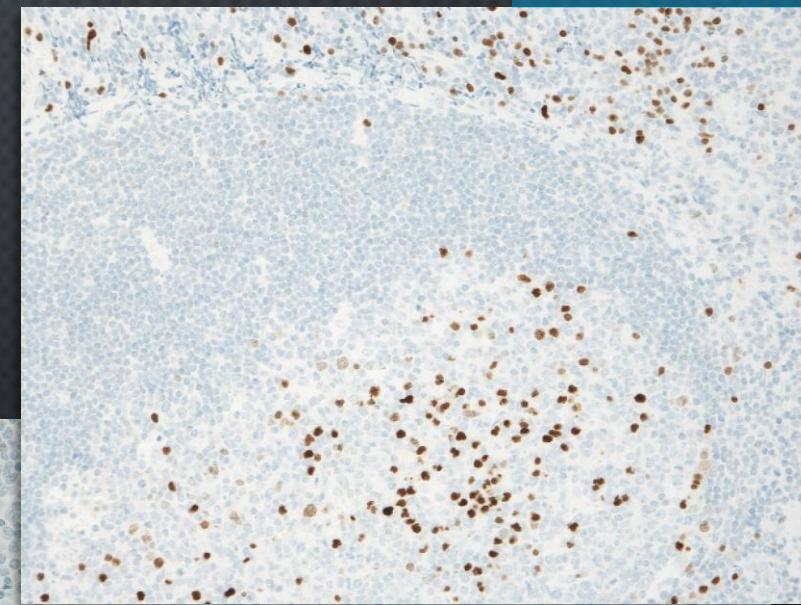
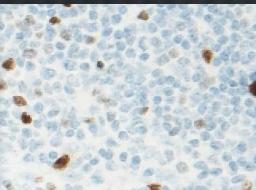
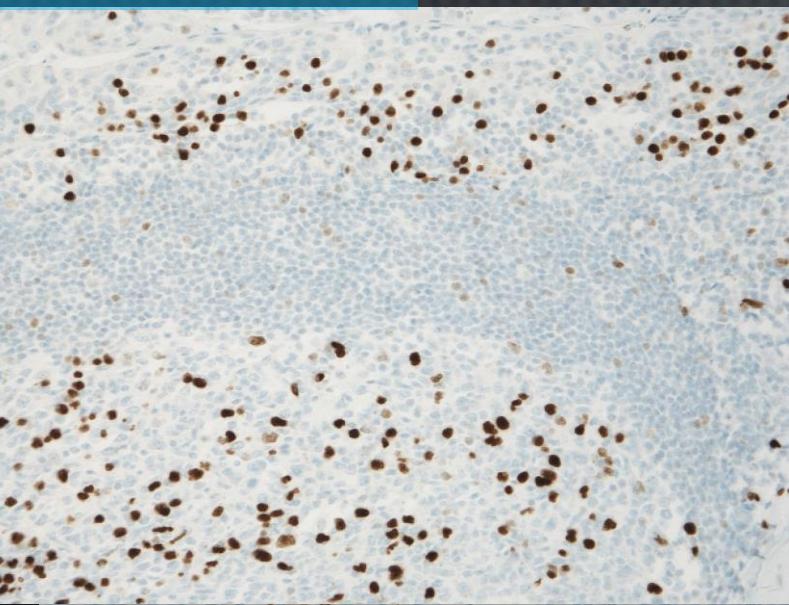
MUM1	Retrieval buffer	Titer	Detection system	AB	Detection
MUMp1	High pH average time 40 min	1:25-200	3-step	conc	EnVision Flex+ Bond Refine OptiView

Settings like above with 2-step detection kit gave a pass-rate of 79% (15/19) 37% optimal (7/19). With 3-step detection it was improved to 93% (54/58) and 84% (49/58) optimal.

Optimal diluted

Too diluted

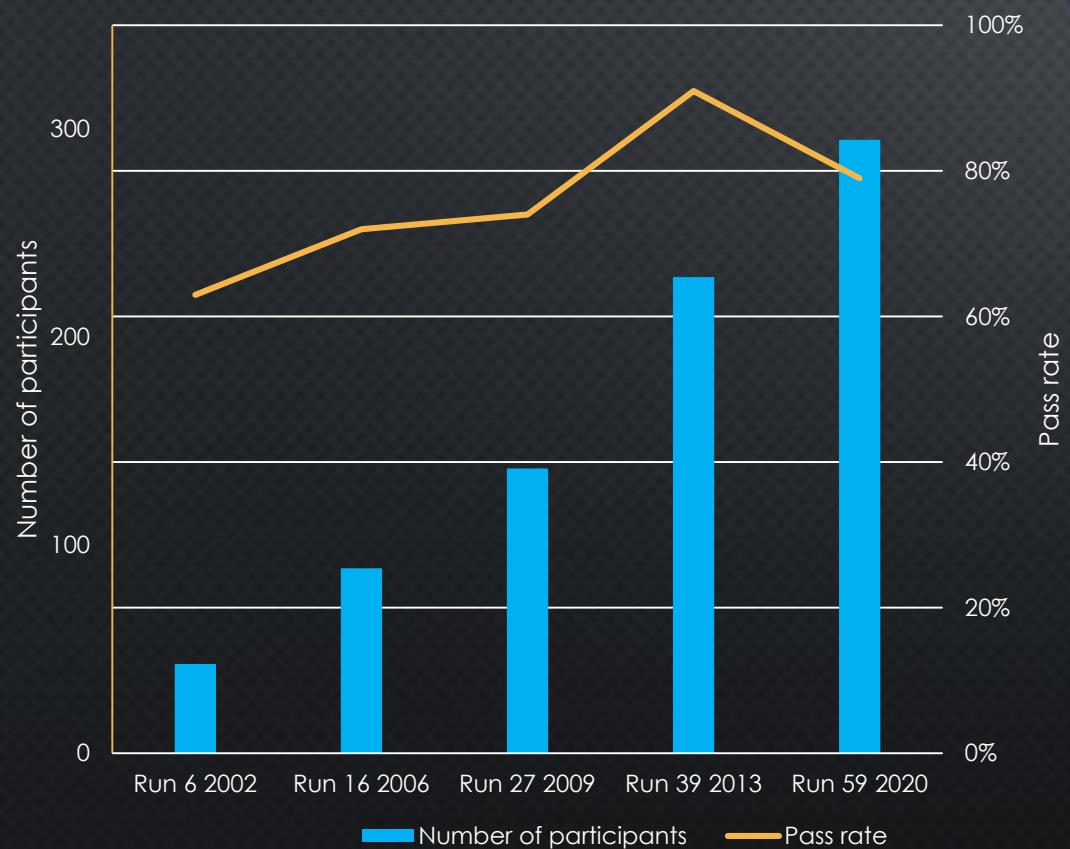
MUMp1 conc. on Ventana
CC1, and OptiView



Hodgkin
lymphoma

CD10

CD10 performance in NordiQC assessments



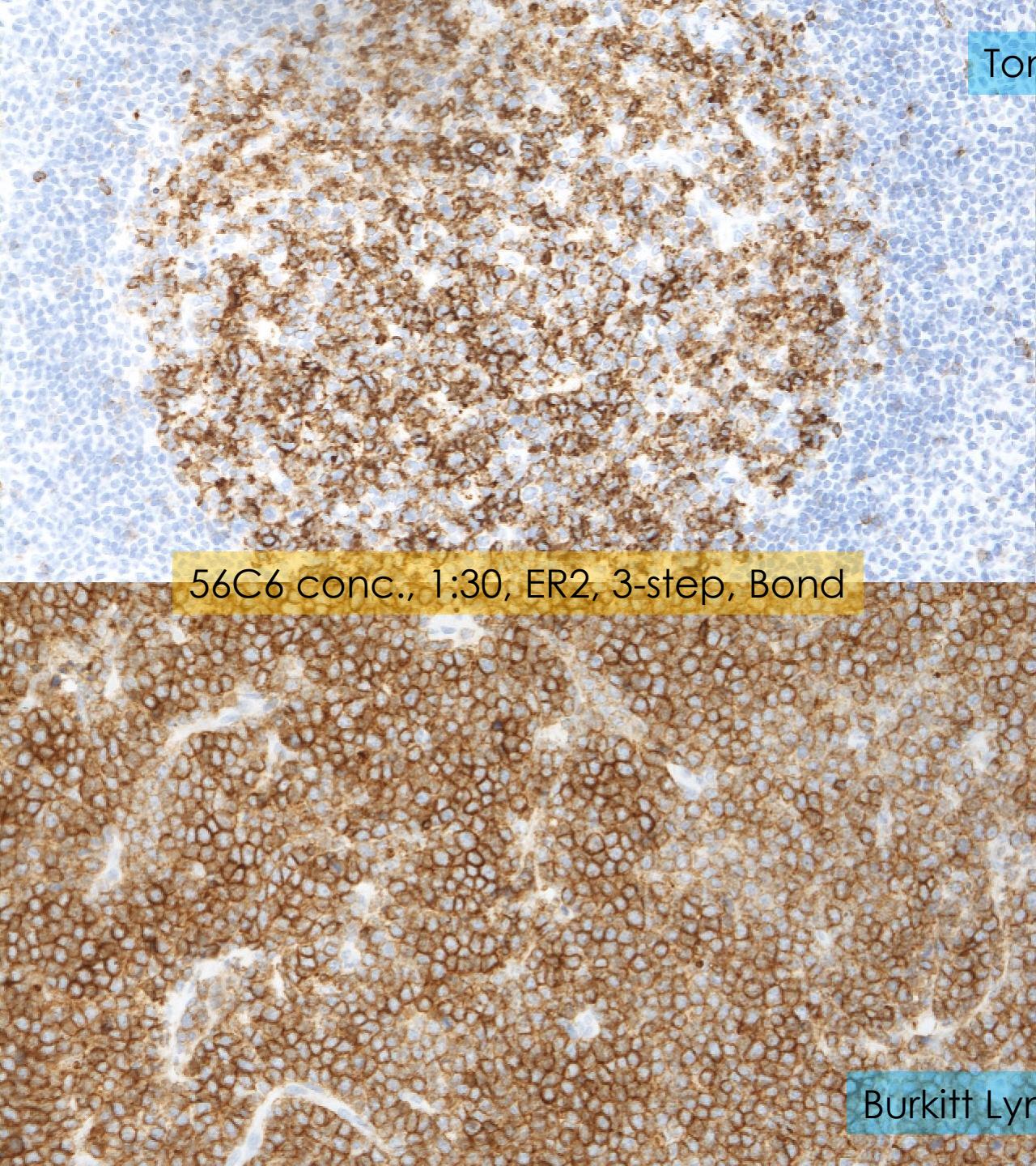
Concentrated antibodies	n	Vendor	Optimal	Good	Borderline	Poor	Suff. ¹	OR ²
mAb clone 56C6	67	Leica/Novocastra						
	10	Cell marque						
	7	Biocare Medical						
	5	Agilent/Dako						
	4	Monosan/Sanbio						
	2	Thermo Scientific						
	1	Diagnostic Biosystem						
	1	Immunologic						
	1	Zytomed Systems						
Ready-To-Use antibodies								
mAb clone 56C6 GA648 (VRPS)³	33	Agilent/Dako	31	2	0	0	100%	94 %
mAb clone 56C6 GA648 (LMPS)⁴	23	Agilent/Dako	21	1	1	0	97%	91%
mAb clone 56C6 IR/IS648 (VRPS)³	3	Agilent/Dako	0	1	2	0	-	-
mAb clone 56C6 IR/IS648 (LMPS)⁴	17	Agilent/Dako	15	2	0	0	100%	88%
mAb clone 56C6 PA0270/0131 (VRPS)³	11	Leica Biosystems	10	1	0	0	100%	91%
mAb clone 56C6 PA0270/0131 (LMPS)⁴	13	Leica Biosystems	10	2	1	0	92%	77%
rmAb clone SP67 790-4506 (VRPS)³	4	Ventana/Roche	0	2	1	1	-	-
rmAb clone SP67 790-4506 (LMPS)⁴	83	Ventana/Roche	19	30	28	6	59%	23%
Total	295		167	64	48	16	-	
Proportion			57%	22%	16%	5%	79%	

Concentrated antibody	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 56C6	2/3**	-	4/6 (67%)	-	35/50 (70%)	-	9/13 (69%)	0/1



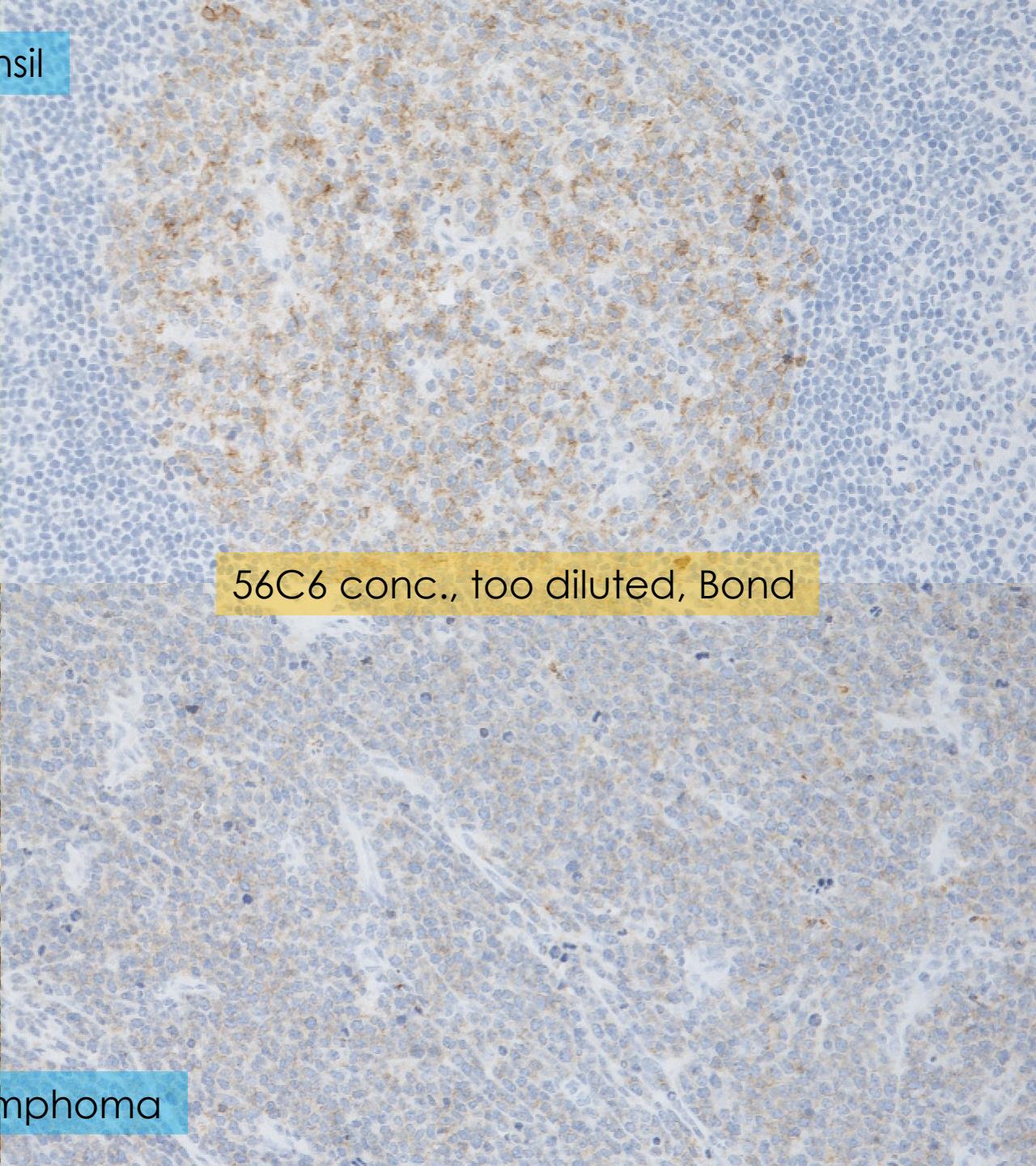
Conc mAb clone 56C6 recommendations

Platform	Ab	Epitope Retrieval	Detection system
Autostainer	1:50, 30 min	TRS pH 9.0 20 min 97°C	EnVision Flex+
Omnis	1:50, 30 min	TRS pH 9.0 30 min 97°C	EnVision Flex+
Bond	1:30, 15 min	ER2 pH 9.0 40 min 100°C	Bond Refine
Ventana	1:10, 32 min	CC1 pH 8,5 32 min 100°C	OptiView



Tonsil

56C6 conc., 1:30, ER2, 3-step, Bond



56C6 conc., too diluted, Bond

Burkitt Lymphoma



Table 2. Recommended staining protocol for VENTANA anti-CD10 (SP6) OptiView DAB IHC Detection Kit on BenchMark IHC/ISH instruments.

Procedure Type	Method		
	GX	XT	ULTRA
Deparaffinization	Selected	Selected	Selected
Cell Conditioning (Antigen Unmasking)	CC1, 92 minutes. 95°C	CC1, 92 minutes. 100°C	ULTRA CC1, 92 minutes, 100°C
Pre-Primary Peroxidase Inhibitor	Selected	Selected	Selected
Antibody (Primary)	32 minutes, 37°C	12 minutes, 37°C	28 minutes, 36°C
OptiView HQ Linker	8 minutes (default)		
OptiView HRP Multimer	8 minutes (default)		
OV AMP H2O2, OV Amplifier	8 minutes	12 minutes	8 minutes
OV AMP Multimer	8 minutes	12 minutes	8 minutes
Counterstain	Hematoxylin II, 4 minutes		
Post Counterstain	Bluing, 4 minutes		

RTU systems	Recommended protocol settings*		Laboratory modified protocol settings**	
	Sufficient	Optimal	Sufficient	Optimal
Dako Omnis mAb 56C6 GA648	100% (33/33)	94% (31/33)	100% (21/21)	95% (20/21)
Dako AS mAb 56C6 IR648	1/3	0/3	100% (13/13)	85% (11/13)
Leica Bond III/Max mAb 56C6 PA270/0131	100% (11/11)	91% (10/11)	90% (9/10)	70% (7/10)
VMS Ultra/XT/GX rmAb SP67 790-4506	2/4	0/4	59% (49/83)	23% (19/83)

Immunostainer	Ventana Benchmark Ultra
Type:	
Primary antibody	SP67
Clone:	Ventana/Roche
Producer:	790-4506 / F20122
Product no. / lot no.:	Ready-To-Use (prediluted)
Format:	16 min. / 36°C
Incubation time / temperature:	
Epitope retrieval, HIER	
Device:	On Board / On Machine
Buffer:	Ventana CC1
Heating time at max. temp.:	64 min.
Maximum heating temp.:	100°C
Visualization system	
Producer:	Ventana
Product / no:	OptiView DAB IHC Detection Kit / 760-700
Incubation time linker:	8 min.
Incubation time polymer:	8 min.
Incubation temperature:	36°C



Diffuse Large B-cell Lymphoma

Insufficient
RTU 790-4506, Ventana,
CC1 16 min, Ab 32 min,
OptiView+amp

Tonsil

Burkitt Lymphoma

COMING UP!

NordiQC assessment scheme 2022

Module	Winter	Spring	Autumn	Autum
General	Run 64 <u>PAX8</u> <u>CD56</u> <u>SATB2</u> <u>DES</u> <u>CR</u>	Run 65 <u>BAP1</u> <u>CK8/18</u> <u>AMACR</u> <u>Ki67</u> <u>ALK</u> (lung) <u>CD30</u>	Run 66 <u>SYP</u> <u>SMH</u> <u>CD4</u> <u>PRAME</u> <u>Napsin A</u>	Run 63 <u>CK5</u> <u>CD79a</u> <u>p53</u> <u>CD3</u> <u>GATA3</u>
Breast		Run B33 <u>PR</u> <u>HER2</u> <u>IHC</u> <u>ER</u>		
HER2		Run H21 <u>HER2</u> <u>ISH</u>		
Companion		Run C11 <u>PD-L1 (IC)</u> <u>PD-L1</u> (<u>TPS/CPS</u>)		

