9.45 - 10.15 Overview of the project and its general status



Background

"Next generation precision antibody profiling – from science fiction to reality"



- Vision: diseases are cured by body's own immune system.
- Challenge: cost of developing targeted immunotherapies.
- Ultimate aim: Reducing time/cost of novel immunotherapies.
- **Obstacle**: Understanding how antibodies are produced in humans.
- Antibodies: macro-proteins (130-1000 kDa) binding to targets (antigens) via variable sequences. Astronomical number of sequences exist theoretically, but tiny fraction of all possible sequences are actually generated and selected.
- **Specific aim**: sequencing antibody repertoire and correlating it with disease/antigen to understand the rules of production/selection.

TopSpec's solution to this challenge: top-down mass spectrometry sequencing platform

Characterization of Antibodies

Why Antibodies ?

Immunotherapy

Biotherapeutics & Biosimilars (mAbs, ADC)

Medical Diagnostics (ELISA)

Life Sciences R&D

Why Top-Down?

Degradation products – (DE,PR)

Proteoform Characterization (SS scrambling, Glycans) – (DI, DE, PR)

Structural Characterization - (DI, DE, PR)

mAb Design & De Novo sequencing – (DI)

Pharma - Biologics



Sequencing of Antibodies

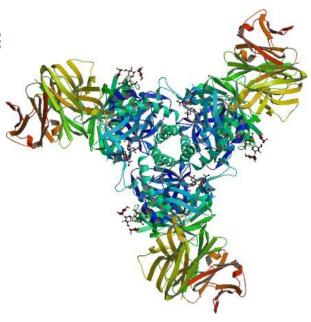
State-of-the-art Limitations

Bottom-Up Protein ID & de novo sequencing

Sub-optimal for determining modification occupancy

Proteoforms are not accessible

Speed & Accuracy



<u>Identification & sequencing of multiple proteins (mAbs) with unknown sequence</u> simultaneously from a complex sample is not possible in bottom-up.

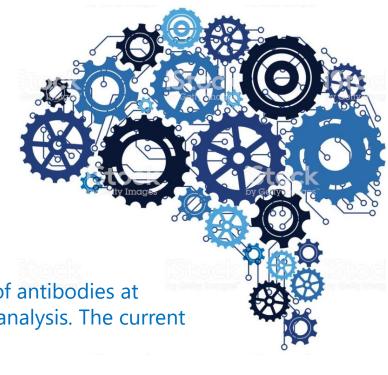
Top-Down *de-novo* sequencing of proteins from complex samples is feasible

TopSpec Platform

We are enabling the future of antibody characterization

We envision:

- Analysis of complex samples de novo sequencing of antibodies at proteoform level in complex samples with top-down analysis. The current state-of-the-art is limited to 3-5 mAbs in a mixture
- Improvements in reliability/speed/cost Today de novo sequencing is time consuming and expensive - reducing analysis time and cost is a major step forward



TopSpec Innovations

- Novel hardware to isolate antibodies and analyze their ions in the gas phase
- Novel ion activation techniques & methods in tandem MS
- Novel signal processing in Fourier transform MS
- Novel data analysis algorithms for top-down sequencing

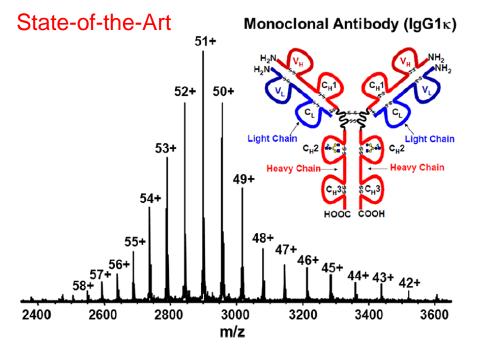


 $1 \quad D - I - Q | H | T | Q | S - P | S | S | L | S - A | S - V - G - D - R | V | T | T | T - C - R | A - 25$ $26 \quad S - Q | D - V - G - I - Y - V - N - W - F - Q | Q - K - P - G - K | A - P - K - R - L - I | Y - R - 50$ $51 \quad A - T - N - L | A - D - G - V - P - S - R | F - S - G | S | R - S - G | T - D - F - T - L | T - I - 75$ $76 \quad S - S - L - Q - P - E | D | F | A - T - Y - Y | C | L | E | F | D | E | H - P | L | T | F | G | G | 100$ $101 \quad G | T | K | V | E | I | K | R | T - V | A | A | P - S | V - F | I | F - P - P | S | D | E | Q | L | 125$ $126 \quad K - S | G | T | A | S - V - V | C - L - L | N - N - F - Y - P - R - E - A - K - V - Q - W - K - V - 150$ $151 \quad D - N - A - L - Q - S - G - N - \frac{S - Q - E - S - V - T - E - Q - D | S - K - D - S - T - Y - S - L - 175$ $176 \quad S - S - T - L - T - L - S - K - A - D - Y - E - K - H - K - V - Y - A - C | E | V - T - H - Q - G - 200$ $201 \quad L - S - S - P - V - T - K - S - F - N - R - G - E - C - C = C = C$

32% Sequence Coverage

1 · E · V · Q L V E S G G G L V Q · P · G G · S · L · R L S Ç · A · A · S 25 26 - G F T - F - N N - Y - W - M - T - W - V - R Q - A - P - G - K G - L - E W - V - A - S - 50 51 - I - D - N S - G - D - N - T - Y - Y - P - D S - V - K - D - R - F - T - I - S - R D N - A - 75 76 KNS-L-Y-L-Q-MN-SLR-A-E-D-T-AV-YY-CARGG 100 101 - D - I - T T G F D - Y - W G Q G T - L - V T - V - S S A - S - T K G 126 - S - V F - P - L A - P - S - S K - S - T - S - G - G - T - A - A - L - G P-E-V 275 · K - F - N - W - Y - V - D - G - V - E - V - H - N - A - K - T - K - P - R - E - E - Q - Y (N) S 300 - V - L - T - V - L - H - Q - D - W - L - N - G K - E Y K - C K V - 325 KGQP-REPQV 350 ES-NGQPENNYKTT 400 YSKLTVDKSRWQQGNVF 425 448 SVMHEALHNHYTQKSLSI 35% Sequence Coverage

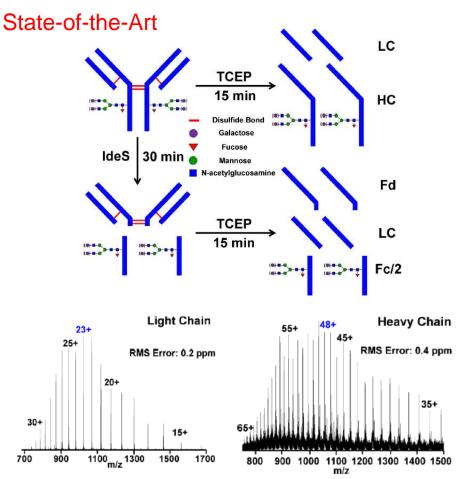
Top Down Sequencing of Antibodies



Fragments are mainly localized:

- a. in the variable region of light and heavy chains
- b. between variable and constant domains in both chains
- c. between heavy chain constant domains $C_{\rm H}2$ and $C_{\rm H}3$
- d. In the S-S linked heavy chain constant domain $C_{\rm H}3$

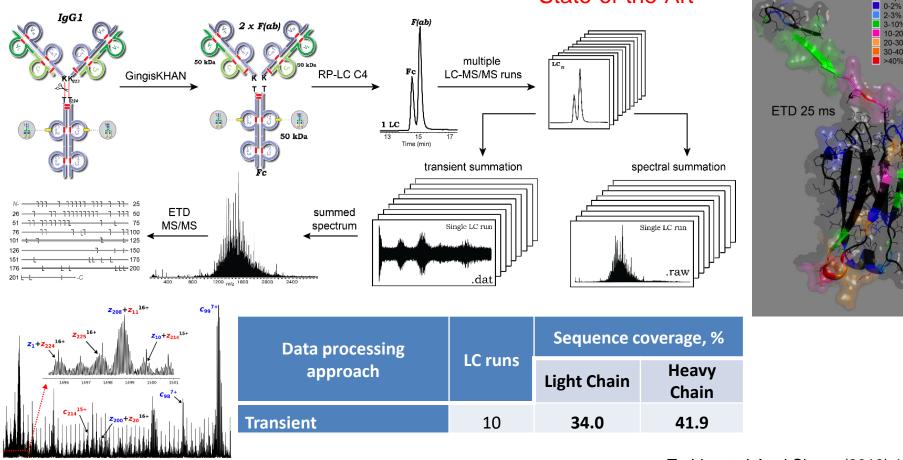
Middle Down Sequencing of Antibodies



DLIQMTQSPSSLSASVGDRVTITCRA 25 26 SOGIIRNYLAWYOOK PGKA PKLLLIYA 50 A A S T L L Q S G V P S R F S G S G S G T D F T L T 75 ⁷⁶ SSLLQP EDIVALT YY C Q R YNRA P YLTFGQ 100 101 GTKVELIKRT VAA P SVFIFFPPSDEQ L 125 126 KSGT ASVVCLLLNNF Y P REAKVQ WKV 150 151 DINIALLQISIGINISIQIELSIVITLEQUDISIKUSITLYISIL 175 176LSLSLTLLLTLLSKADYELKHKVVY ALCLEV THQG 200 201 LLSSPVITIKSIFINIR G E C C Light Chain 81% Sequence Coverage EVQLVESGGGLVQPGRSLRLSCAAS 26 G FT F DDY AMHWVRQA PGK GLEWVSA 50 ITWNS GHIDYADS VEGRETIS RONA 76 KNSLYLOMNSLRAEDTAVYYCAKVS 100 101 YLSTASSLDYWGQGTLVTVSSASTK 125 126 G P S V F P L A P S S K S T S G G T A A L G C L V 150 151 K D Y F P E P V T V S W N S G A L T S G V H T F P 175 176 A V L Q S S G L Y S L S S V V T V[P] S S S L G T Q 200 201 TYICNVNHKPSNTKVDKKVEPKSCD 225 226 KTHTCPPCPAPELLGGPSVFLFPPK 250 251 PKDTLMISRTPEVTCVVVDVSHEDP 275 276 EVKFNWYVDGVEVHNAKTKPREEQY 300 ³⁰¹ NSTYRVVSVLTVLHQDWLLNGKEYKC ³²⁵ 326 K V S N K A L P A P I E K T I S K A K G Q P R E P 350 351 Q V YT L P P S R D E L T K N Q V S L T C L V K G 375 376 FY PSDIALVEWESNGQPENNYKTTPP 400 401 VLLD S DLG SLFLFL Y S KLLTVD KLS RWQQGN 425 426 V F S C S V M H E A L H N H Y T O K S L S L S P G C_ Heavy Chain 38% Sequence Coverage

Marshall A et al, J Am Soc Mass Spec, 2017, 28, 827

Middle Down Sequencing of mAbs: Light and Heavy Chain Pairing (50 kDa) State-of-the-Art



1530 1540

1510

1500

1520

m/z

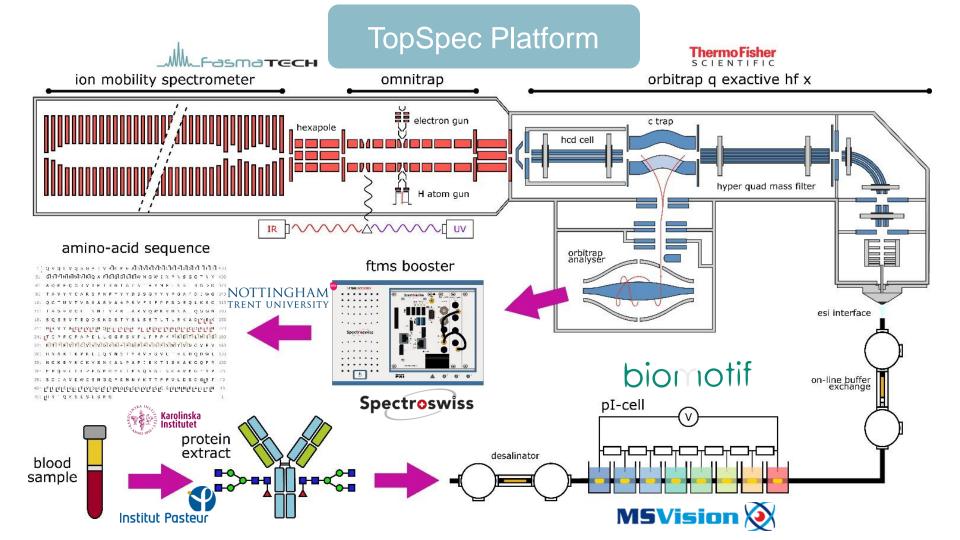
Tsybin et al, Anal Chem, (2018) 12527

no product ion

2-3%

>40%

3-10% 10-20% 20-30% 30-40%



TopSpec Work Packages

WP**1** Omnitrap development and testing FT, TF: 3 deliverables WP**2** Implementation of CAD, ECD, HECD, UV, IR, KI, FT, TF, TNTU, IP: 3 deliverables PD, and EID MS/MS techniques in Omnitrap Development and application of H-atom WP3 FT, KI, TF, TNTU, IP: 2 deliverables bombardment (HAB MS/MS techniques) WP**4** Development and application of Coulomb KI, FT, B, TNTU, IP: 2 deliverables explosion MS/MS technique WP5 Development of pI-Trap-ESI combination B, KI, TF, TNTU, IP, MV: 2 deliverables WP**6** Modification of the Orbitrap mass TF, KI: 2 deliverables spectrometer Signal detection and data processing S, KI, FT, TNTU, IP: 3 deliverables WP**7** WP**8** Dissemination, Communication & Exploitation **Project Management and Administration** WP**9**

MV, KI, FT, TF, S, B, TNTU, IP: 8 deliverables KI, FT, TF, S, B, TNTU, IP MV: 4 deliverables



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		D1.1 : Two fully equipped Omnitraps & one IMS installed																1.1																	ł
		D1.2: Modified Omnitraps with updated software																														1.2			
		D1.3: Fully serviced, functioning Omnitraps & IMS										1							_	-															1.3
1	mnitrap development and testing	2. Omnitraps & IMS Electronics design											2																						ľ
		4. Omnitraps & IMS P.O.s sent to suppliers											4																						ľ
	FASMATECH, THERMO FISHER	5. Omnitraps & IMS Mechanical design											5																						ł
		9. Interfacing pl-Trap-Orbitrap OMNI-ORBI combination											1													9									ľ
	nplementation of CAD, ECD, HECD	 D2.1: in situ testing of the optimized CAD MS/MS protocol 																2.1																	
	IV, IR, PD, and EID MS/MS echniques in Omnitrap	D2.2: Protocol of in situ testing of the optimized CAD																		2.2															ľ
	(I, FASMATECH, THERMO FISHER, TNTU, IP	D2.3: in situ testing optimized ECD, HECD and EID MS/MS																						2.3											i
	evelopment and application of H-	D3.1: Prototype of the HAB gun installed and tested protocol													3	1																			
	tom bombardment (HAB MS/MS echniques	D3.2: Optimized HAB guns installed and tested - protocols																						3.2											i
	ASMATECH, KI, THERMO FISHER, TNTU, IP	7. Suffic HAB MS/MS demonstrated																					7												ľ
	evelopment and application of	D4.1: Protocol- CED gun prototype installed and tested																						4.1											
	oulomb explosion MS/MS echnique	D4.2: Protocols: CED guns installed and tested																														4.2			ľ
	KI, FASMATECH, BIOMOTIF, TNTU, IP	12. Development of CED MS/MS																																	12
	evelopment of pl-Trap-ESI	D5.1: Prototype pI-Trap-ESI installed and tested – protocol																		5.1								T							
	ombination	D5.2: Two tested, optimized pl-Trap-ESI installed and tested																											1						5.2
5	BIOMOTIF, KI, THERMO FISHER, TNTU, IP,	8. Interfacing pl-Trap- Orbitrap																								8		Т							
	MS VISION	13. All technologies interfaced		_																															13
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Milestones:T2/T5. Omnitraps & IMS Electronics design (FT, Dec 31, 2019)





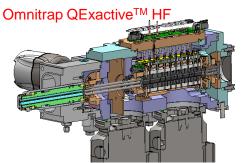
Precursor Omnitrap Designed ✓ Installed ✓ Tested ✓ Revisions ✓

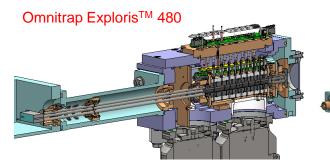
Precursor IM drift cell

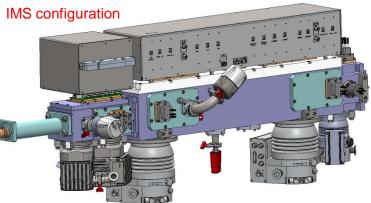
Designed ✓

Tested 🗸

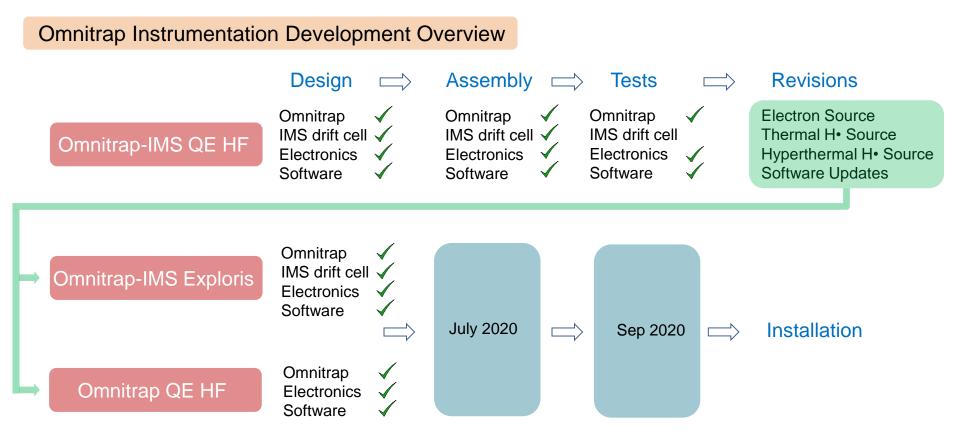
Revisions \checkmark







Milestone: T1.2 – T1.5. Omnitraps & IMS Electronics design (FT, Dec 31, 2019)



ThermoFisher SCIENTIFIC

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		9. Interfacing pl-Trap-Orbitrap OMNI-ORBI combination											\mathbf{X}				1									9	9								
		D7.1: Two Prototype FTMS Booster installed and tested-protocol											1						7.1				Т							\square					
		D7.2: Top-down analysis software																											7.2						
		D7.3: Optimized FTMS Boosters test protocols																															7.3		
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	SPECTROSWISS, KI, FASMATECH, TNTU, IP	 Data analysis algorithms and software for simulated and experimental topdown data analysis 																											10						
		11. Two FTMS Booster prototypes are designed, implemented, and e																															11		
		D8.1: IP protection strategy finalized			8.1																														
		D8.2: Draft Exploitation plan and Business strategy document											8.2																						
8	issemination, Communication &	D8.3: Young scientist TopSpec technology workshop																															8.3		
U E	xploitation	D8.4: Public demonstrations of TopSpec technology																															8.4		
	AS VISION, KI, FASMATECH, THERMO FISHER,	D8.5: Scientific reports and publications																																	8.5
	SPECTROWISS, BIOMOTIF, TNTU, IP	D8.6: Exploitation plan and Business strategy document															_																		8.6
	roject Management and dministration	D9.1: Logo and Website launch and public accessibility		9.1																															
9		D9.2: Data management plan						9.2																											
	KI, FASMATECH, THERMO FISHER, PECTROSWISS, BIOMOTIF, TNTU, IP,	D9.3: Technical/scientific review meeting documents												9.3																					
	VISION	D9.4: Review meetings																																	9.4

Deliverable: D6.1. Installation of QE for Omnitrap development (FT, Dec 31, 2019)



QExactive[™] HF Mass Spec installed in Athens (Sept 2019)

HCD External Ir	nstrument Mode *	On
🗄 Emeter/CTCD		
Averaging		0
🛨 Processing		
🛨 Ion transfer		
🖃 HCD event		
HCD Time * (n	ns)	20
Purge Time * (ms)	5.0
HCD Field Grad	lient Purge * (V)	20.0
Ext. Instr. Mod	e - HCD Offset to External	11
Ext. Instr. Mode	e - HCD Offset from External	3
Ext. Instr. Mod	e - HCD Gradient to External	-50
Ext. Instr. Mod	e - HCD Gradient from External	25
Ext. Instr. Mod	e - HCD and C-Trap exit lens	35
Ext. Instr. Mode	e - HCD exit lens open to	25
Ext. Instr. Mode	e - HCD exit lens open from	-25
Ext. Instr. Mode	e - HCD ion transfer* (ms)	50
Ext. Instr. Mod	e - HCD Waiting for External	100
HCD Exit Lens 1	Trigger Voltage Iow* (V)	35
HCD Exit Lens 1	Trigger Voltage high* (V)	-35
Intact Protein mo	de	Off
HMR mode		On
Trapping gas pres	sure setting *	Override: 0
Spectrum data typ)e	Profile
C-Trap Charge De	tector Support *	On

Tune s/w modifications
Debugging

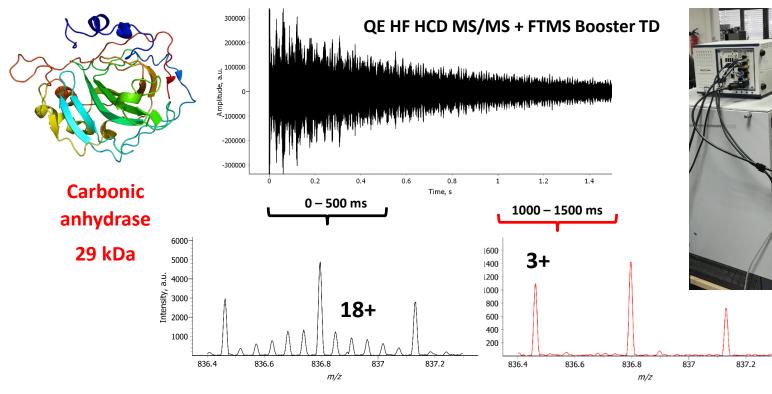


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1 1	Modification of the Orbitrap mass spectrometer	D6.1: Installation of Q Exactive instrument for Omnitrap development										6.1																				_
6		D6.2: Modified Orbitrap QExactive HF X installed										4						_				_					_					6.2
-	THERMO FISHER, KI	3. Installation of Q Exactive instrument for Omnitrap development																														
		9. Interfacing pI-Trap-Orbitrap OMNI-ORBI combination																						9								
		D7.1: Two Prototype FTMS Booster installed and tested-protocol															7.1															
		D7.2: Top-down analysis software																								7.2						
		D7.3: Optimized FTMS Boosters test protocols																												7.3		
	Signal detection and data processing	1. Demonstrated effectiveness of product ion isotopic distribution deconvolution										1	\mathbf{D}					Τ			Τ											
	processing	 Data processing algorithms and software for simulated and experimental topdown mass spectra and time-domain data 															6															
	SPECTROSWISS, KI, FASMATECH, TNTU, IP	10. Data analysis algorithms and software for simulated and experimental topdown data analysis										11														10						
		11. Two FTMS Booster prototypes are designed, implemented, and e																												11		
		D8.1: IP protection strategy finalized			8.1							┍┺┛			Т			Т			Τ											
		D8.2: Draft Exploitation plan and Business strategy document										8.2	Í																			
	Dissemination, Communication &	D8.3: Young scientist TopSpec technology workshop		-								<u> </u>																		13		
	Exploitation	D8.4: Public demonstrations of TopSpec technology		_	_																								a	14		
	MS VISION, KI, FASMATECH, THERMO FISHER,	D8.5: Scientific reports and publications										- 1																				8.5
	SPECTROWISS, BIOMOTIF, TNTU, IP	D8.6: Exploitation plan and Business strategy document																														8.6
	Project Management and	D9.1: Logo and Website launch and public accessibility		9.1		Т		Т		Т					Т			Т			Т											
	Administration	D9.2: Data management plan					9.2																									
9	KI, FASMATECH, THERMO FISHER, SPECTROSWISS, BIOMOTIF, TNTU, IP,	D9.3: Technical/scientific review meeting documents											9.3													1						
	MS VISION	D9.4: Review meetings						-										1			1	1				1						9.4
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Milestone: T7.1. Demonstrated ion isotopic distribution deconvolution (SPS, Dec 31, 2019) Hypothesis: Information on product ion signal decay rate could help deconvolve complex top-down spectra Milestone M1: mobility-like resolution of ~7.1 is achieved, further improvements are being researched

> 557-11:119 70:012

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	ometer	D6.2: Modified Orbitrap QExactive HF X installed																														6.2
6 THERM	MO FISHER, KI	3. Installation of Q Exactive instrument for Omnitrap development																														
		9. Interfacing pl-Trap-Orbitrap OMNI-ORBI combination																						9								
		D7.1: Two Prototype FTMS Booster installed and tested-protocol															7.1															
		D7.2: Top-down analysis software																								7.2						
		D7.3: Optimized FTMS Boosters test protocols																												7.3	1	
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		D8.2: Draft Exploitation plan and Business strategy document		~	-						(8.2																				
8 Dissen	nination, Communication &	D8.3: Young scientist TopSpec technology workshop		-	介						-																		1	3		
^o Exploit	tation	D8.4: Public demonstrations of TopSpec technology			Ш						_																		1	.4		
	SION, KI, FASMATECH, THERMO FISHER,	D8.5: Scientific reports and publications																														8.5
SPECTI	ROWISS, BIOMOTIF, TNTU, IP	D8.6: Exploitation plan and Business strategy document																														8.6
-	t Management and histration	D9.1: Logo and Website launch and public accessibility		9.1																												
9	istration	D9.2: Data management plan					9.2																									
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MS VISIO	DN	D9.4: Review meetings																														9.4

Deliverable: D8.1 IP protection strategy (MSV, Mar 31, 2019)



TopSpec

Project Deliverable Report

D8.1 TopSpec Intellectual Property Protection Strategy

Version: 1.2

Author: Jan Commandeur (MS)

Contributors: -

Internal reviewers: -

Deliverable due date: 2019-04-01

Actual submission date:

Work package: WP8

Task: T8.5

Dissemination level: Confidential (CO)*

Lead beneficiary: MS

Status: Progress

D8.1 IP protection str	ategy
Created	\checkmark
Reviewed	\checkmark
Submitted	\checkmark

Covers:

- IP Strategy and Policy
- Use and ownership IP
- Background / foreground IP
- IP Asset Register

Deliverable: D8.2: Draft Exploitation plan & Business strategy (MSV, Dec 31, 2019)

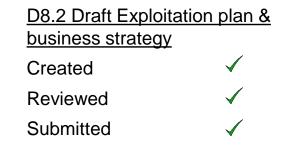


TopSpec

Project Deliverable Report

D8.2 Draft Exploitation and Dissemination Plan

Version:	1.1
Author:	Remco Swart (MS)
Contributors:	Susanna Lundström (KI), Jan Commandeur (MS)
Internal reviewers:	-
Deliverable due date:	2019-12-31
Actual submission date:	2019-12-19
Work package:	WP8
Task:	T8.2
Dissemination level:	Public
Lead beneficiary:	MS
Status:	Progress



Covers:

- Tools for tracking activities
- Marketing collaterals
- Social media communication
- Meetings and conferences
- Interaction with partners
- Connect with potential users
- Exploitation of results



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	Work Package	Deliverables/Milestones							- F		Ÿ	7								er	-	-		\square					<u> </u>		4	<u> </u>
	Modification of the Orbitrap mass spectrometer	D6.1: Installation of Q Exactive instrument for Omnitrap development										6.1																				
6	spectrometer	D6.2: Modified Orbitrap QExactive HF X installed																														6.2
Ů	THERMO FISHER, KI	3. Installation of Q Exactive instrument for Omnitrap development																														
		9. Interfacing pl-Trap-Orbitrap OMNI-ORBI combination																						9								
		D7.1: Two Prototype FTMS Booster installed and tested-protocol															7.	1														
		D7.2: Top-down analysis software																								7.2						
		D7.3: Optimized FTMS Boosters test protocols																												7.3		
	Signal detection and data	1. Demonstrated effectiveness of product ion isotopic distribution deconvolution										1						Т								Τ			\neg			
	processing	6. Data processing algorithms and software for simulated and						-									6															
	SPECTROSWISS, KI, FASMATECH, TNTU, IP	experimental topdown mass spectra and time-domain data 10. Data analysis algorithms and software for simulated and						_																		10						
		experimental topdown data analysis 11. Two FTMS Booster prototypes are designed, implemented, and e											_			_														11		
		D8.1: IP protection strategy finalized			8.1		Г		T	T								Т								T			—			-
		D8.2: Draft Exploitation plan and Business strategy document			<u> </u>							8.2																				
	Dissemination, Communication &	D8.3: Young scientist TopSpec technology workshop		-																									8.3			
8	Exploitation	D8.4: Public demonstrations of TopSpec technology		_	-							-																	8.			
		D8.5: Scientific reports and publications			_																											8.5
	MS VISION, KI, FASMATECH, THERMO FISHER, SPECTROWISS, BIOMOTIF, TNTU, IP	D8.6: Exploitation plan and Business strategy document			_																											8.6
	Project Management and	D9.1: Logo and Website launch and public accessibility	6	9.1					T									Т						— ——								
	Administration	D9.2: Data management plan				1	9.2																									
9	KI, FASMATECH, THERMO FISHER,	D9.3: Technical/scientific review meeting documents		$\mathbf{\Lambda}$									9.3																			
	SPECTROSWISS, BIOMOTIF, TNTU, IP, MS VISION	D9.4: Review meetings		╟			$\mathbf{\Lambda}$						3.3																			9.4
		Dolar nearch meetings		L			╢																									

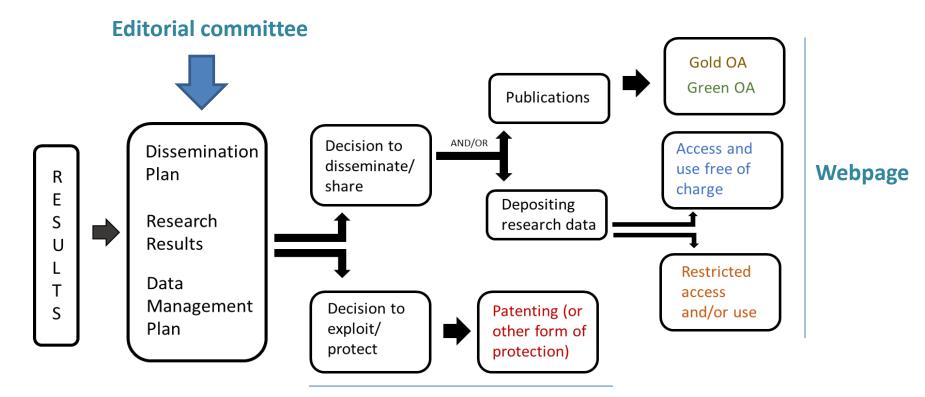
Deliverable D9.1 Logo and Website launch and public accessibility (KI, Feb 28, 2019)

Logo:



Website: <u>https://topspec.ki.se</u>

Deliverable D9.2 Data Management Plan (KI, June 30, 2019)



IP description

Summary:

All deliverables and milestones have been reached by the TopSpec Consortium in full and in time

Prospects for 2020-2021

- No major deviation from the working plan content is foreseen
- No major deviation from the time schedule is foreseen

Unplanned findings useful for TopSpec

- Tandem pl-fractionation promises higher resolution in shorter time
- Deconvolution based on transient decay seems to exceed expectations, reaching the resolution 6-7 instead of 2-3.

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<u>۱</u>	Vork Package	Deliverables/Milestones								er		er	4								er		<u>۽</u>	¥ .								er	er	er.
		D1.1 : Two fully equipped Omnitraps & one IMS installed																1.1																
		D1.2: Modified Omnitraps with updated software																														1.2		
		D1.3: Fully serviced, functioning Omnitraps & IMS																																1.3
1 0	Omnitrap development and testing	2. Omnitraps & IMS Electronics design											2																					
		4. Omnitraps & IMS P.O.s sent to suppliers											4																					
	FASMATECH, THERMO FISHER	5. Omnitraps & IMS Mechanical design											5																					
		9. Interfacing pl-Trap-Orbitrap OMNI-ORBI combination																								9								
1	mplementation of CAD, ECD, HECD	 D2.1: in situ testing of the optimized CAD MS/MS protocol 																2.1																
a	IV, IR, PD, and EID MS/MS echniques in Omnitrap	D2.2: Protocol of in situ testing of the optimized CAD																		2.2														
	KI, FASMATECH, THERMO FISHER, TNTU, IP	D2.3: in situ testing optimized ECD, HECD and EID MS/MS																					2	.3										
		D3.1: Prototype of the HAB gun installed and tested protocol													3	.1																		
	tom bombardment (HAB MS/MS echniques	D3.2: Optimized HAB guns installed and tested - protocols																			ĺ		3	.2										
	FASMATECH, KI, THERMO FISHER, TNTU, IP	7. Suffic HAB MS/MS demonstrated																					7											
	evelopment and application of	D4.1: Protocol- CED gun prototype installed and tested																					4	.1										
4 t	oulomb explosion MS/MS echnique	D4.2: Protocols: CED guns installed and tested																														4.2		
	KI, FASMATECH, BIOMOTIF, TNTU, IP	12. Development of CED MS/MS																																12
	evelopment of pl-Trap-ESI	D5.1: Prototype pI-Trap-ESI installed and tested – protocol																		5.1														
	ombination	D5.2: Two tested, optimized pl-Trap-ESI installed and tested																																5.2
5	BIOMOTIF, KI, THERMO FISHER, TNTU, IP, MS VISION	8. Interfacing pl-Trap- Orbitrap																								8								
	NIS VISION	13. All technologies interfaced																																13
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	لل ا		February January	April	June May	July	September	November	December	January	February	April March	May	June	August July	September	October	November	December	February	March	May	June	July	September August	October	December November
	Work Package	Deliverables/Milestones					14									, i		-							¥		<u> </u>
	Modification of the Orbitrap mass spectrometer THERMO FISHER, 10	D6.1: Installation of Q Exactive instrument for Omnitrap developmen D6.2: Modified Orbitrap QExactive HF X installed 3. Installation of Q Exactive instrument for Omnitrap development				_			6.1																		6.2
		9. Interfacing pl-Trap-Orbitrap OMNI-ORBI combination										1								9							i i
		D7.1: Two Prototype FTMS Booster installed and tested-protocol D7.2: Top-down analysis software												7.1								7.2					
7	Signal detection and data processing SPECTROSWISS, KI, FASMATECH, TNTU, IP	D7.3: Optimized FTMS Boosters test protocols 1. Demonstrated effectiveness of product ion isotopic distribution deconvolution 6. Data processing algorithms and software for simulated and experimental topdown mass spectra and time-domain data 10. Data analysis algorithms and software for simulated and							1					6								10				7.3	
		experimental topdown data analysis 11. Two FTMS Booster prototypes are designed, implemented, and e																								11	
	Dissemination, Communication & Exploitation	D8.1: IP protection strategy finalized D8.2: Draft Exploitation plan and Business strategy document D8.3: Young scientist TopSpec technology workshop D8.4: Public demonstrations of TopSpec technology		8.1					8.2																8.3		
	MS VISION, KI, FASMATECH, THERMO FISHER, SPECTROWISS, BIOMOTIF, TNTU, IP	D8.5: Scientific reports and publications D8.6: Exploitation plan and Business strategy document																									8.5
9	Project Management and Administration KI, FASMATECH, THERMO FISHER, SPECTROSWISS, BIOMOTIF, TNTU, IP,	D9.1: Logo and Website launch and public accessibility D9.2: Data management plan D9.3: Technical/scientific review meeting documents	9.1		9.2					9.3																	
	MS VISION	D9.4: Review meetings																									9.4