Tissue Cytometry :
FACS Language, Tissue Story

用流式細胞儀的語言，訴說組織切片的故事

TissueFAXS

類流式組織細胞定量分析儀

Cell-Bio 尚博生物科技
Cell-Bio Biotechnology Co., Ltd.

TISSUEGNOSTICS

TissueGnostics

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Headquarter

TissueGnostics , Vienna (2003)

International Offices

TissueGnostics Romania SRL, Iasi, Romania (2005)

TissueGnostics USA Inc., Los Angeles (2007)

TG Representation New York, US East coast (2013)

TissueGnostics China Division, Beijing (2014)

Distribution partners for 30+ countries.

2025: TG celebrates 22nd Anniversary!

It´s official: TG wins at the
3rd International Scanner Contest!
First Prize in "Image Analysis"

Principles of TissueFAXS

TISSUEGNOSTICS
PRECISION THAT INSPIRES

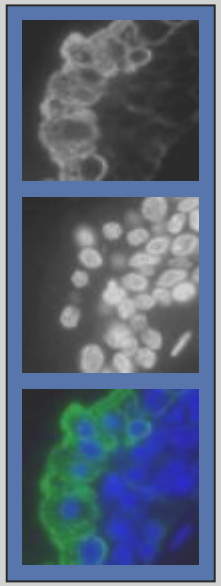
Image

樣本種類:
各類組織切片
組織微陣列TMA
細胞抹片

全自動高速拍攝:
可見光/螢光樣本
自動對焦拍攝
全景無縫拼接

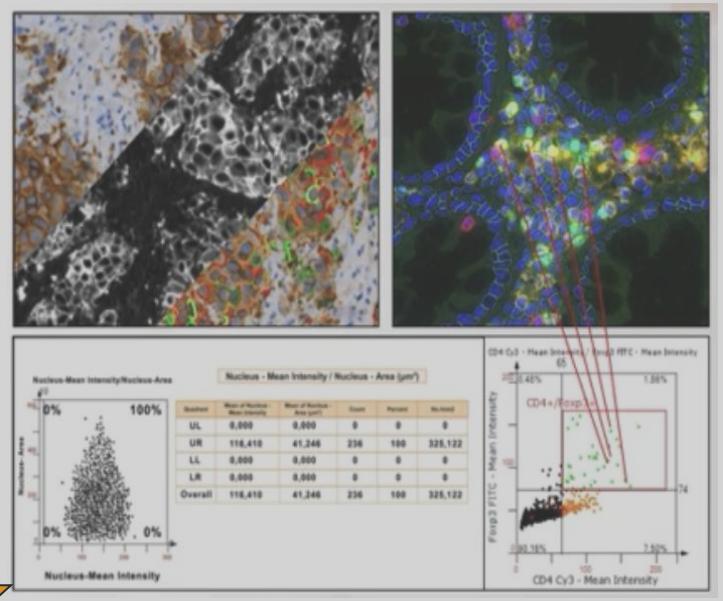
Analysis

Result I



影像分析:
全彩IHC自動分色
專利組織細胞辨識
18種強度及型態量化參數

Result II

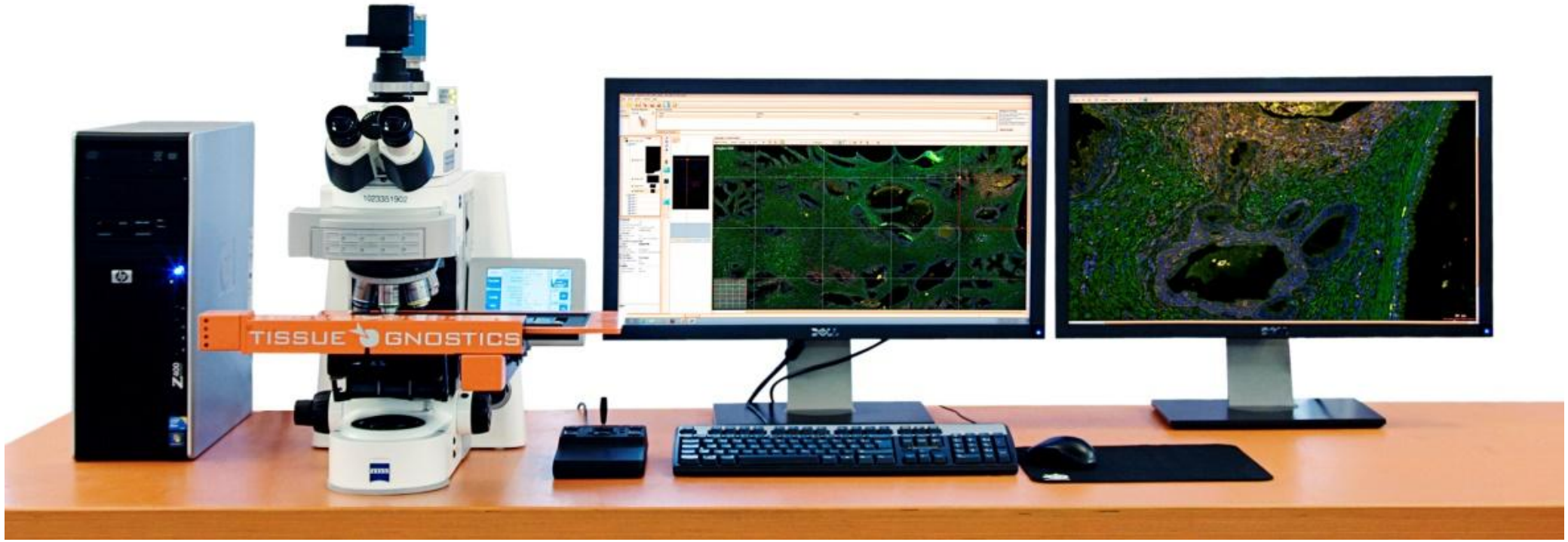


流式數據報告產出:
功能性二維散點圖
數據 ←→ 細胞聯動
ROI分析自動報告輸出

The TissueFAXS™ product family

TISSUEGNOSTICS
PRECISION THAT INSPIRES

TissueFAXS is a microscope based slide scanner with ultimate flexibility and image quality



Automatic scan IHC and/or IF sample with different configuration by user demand.

Tissuegnostics High Throughput Scanning Solution for Immunohistochemistry sample

TISSUEGNOSTICS
PRECISION THAT INSPIRES

1cm^2 tissue only 47s !

- Focus strategy = 7X7
- Exposure time 2.5ms

Tissuegnostics High Throughput Scanning Solution for Immunofluorescence sample

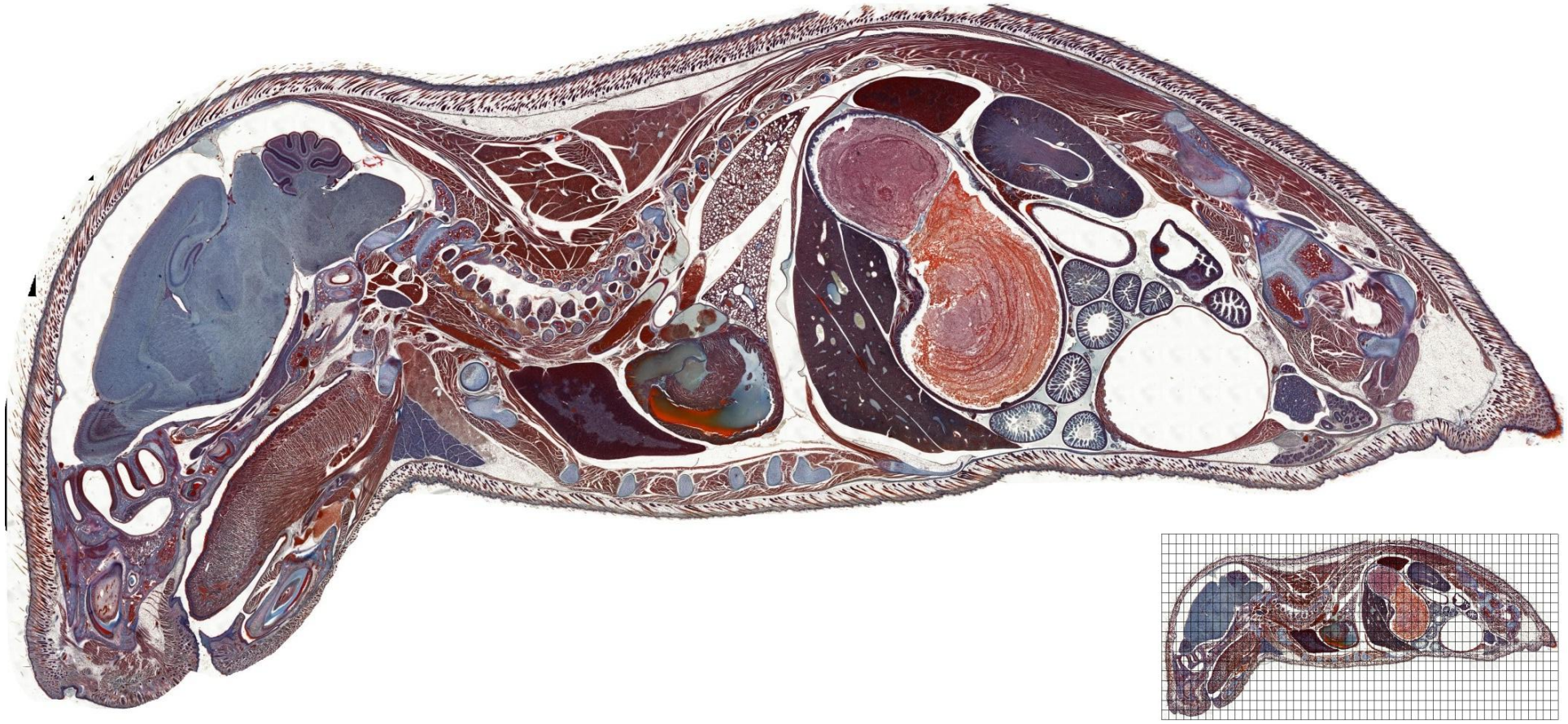
TISSUEGNOSTICS
PRECISION THAT INSPIRES

1cm^2 tissue with 4 FL less than 12 mins!

- Focus strategy = 7X7
- Exposure time < 50 ms

The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

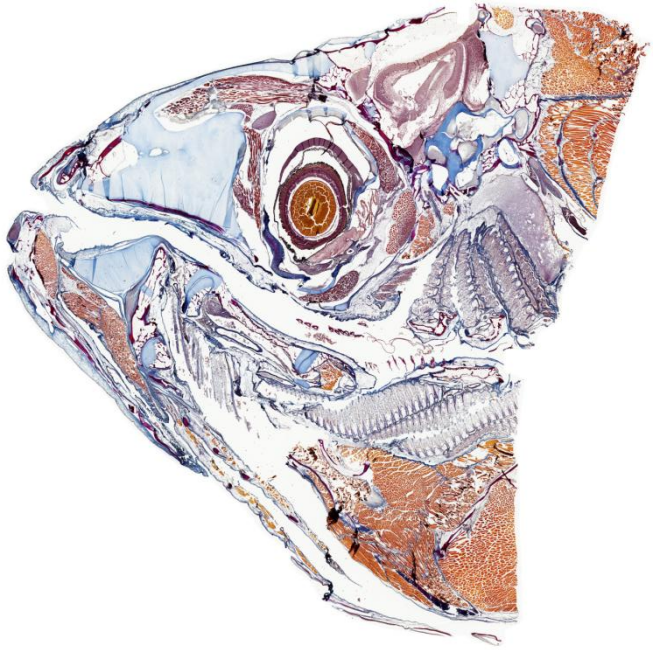


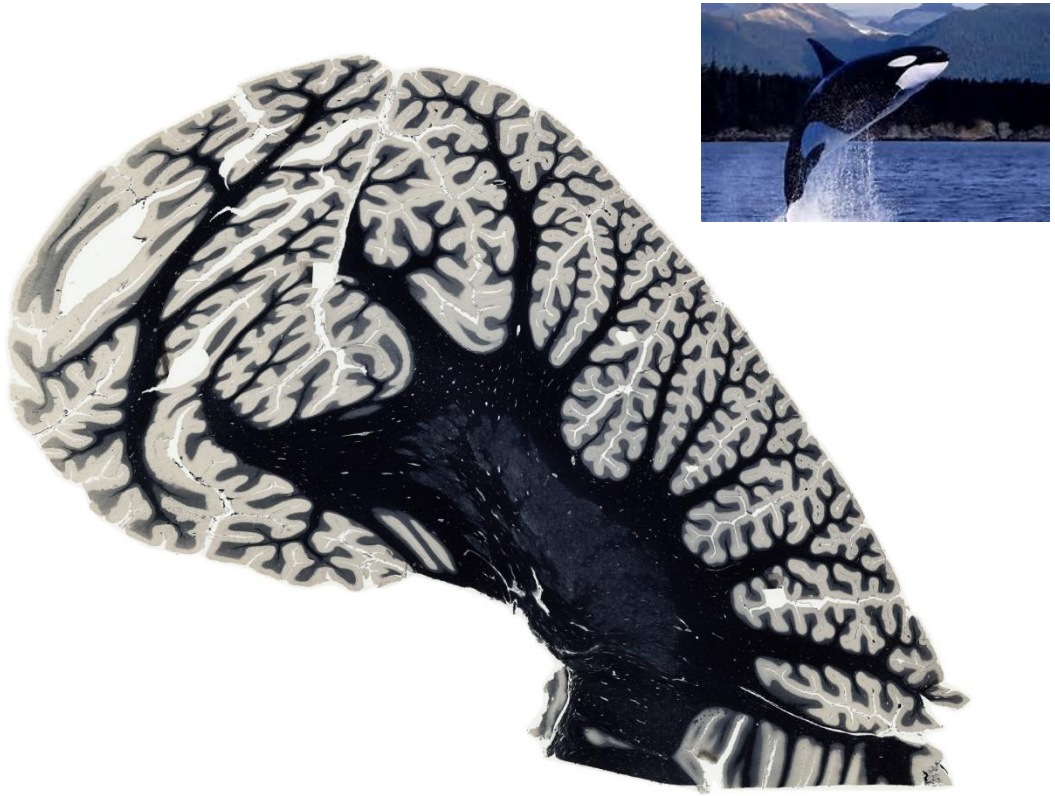
The *digital sample / virtual slide* might consist of thousands of individual fields of view!

The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Over-sized slide





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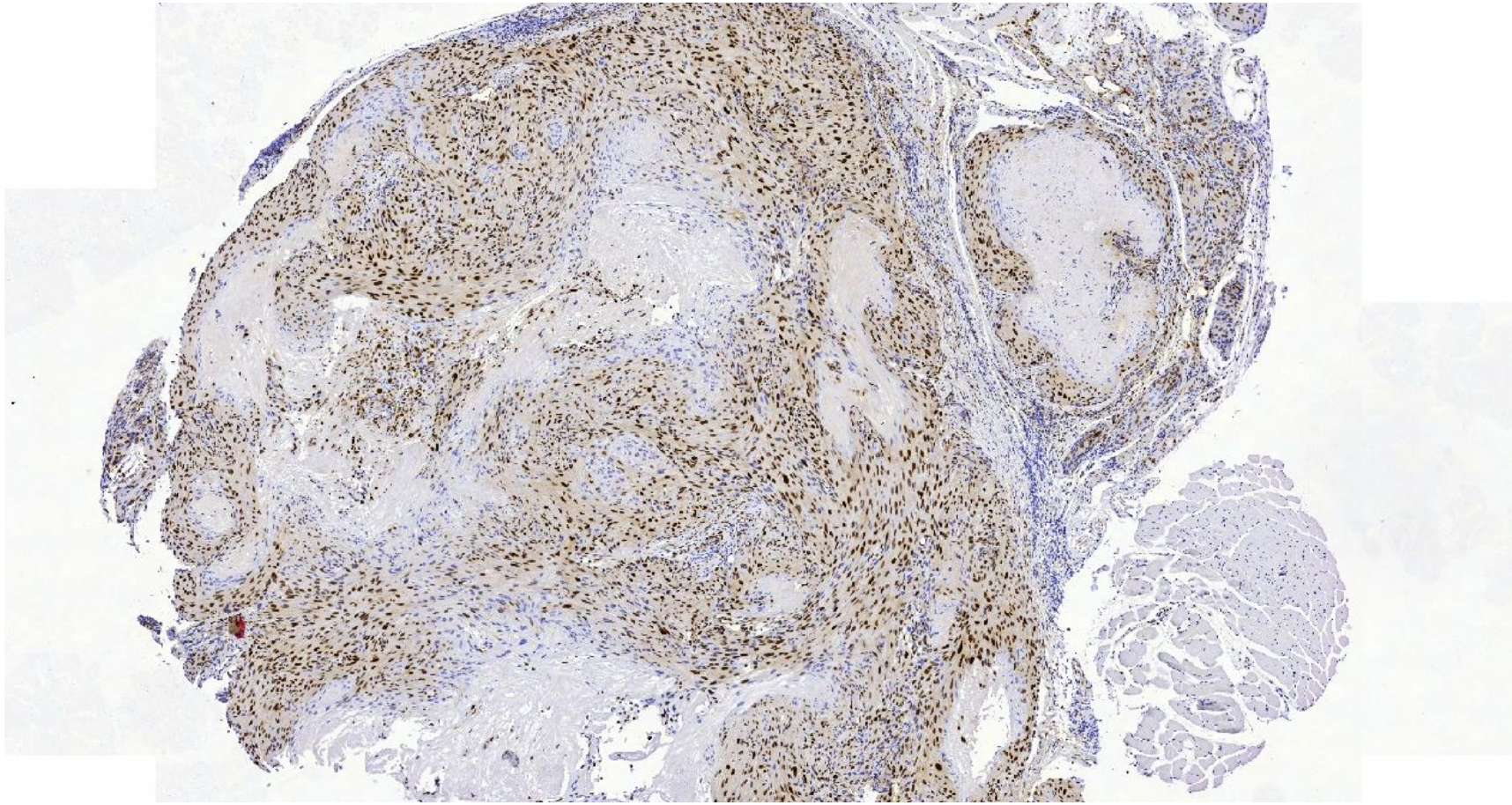
The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

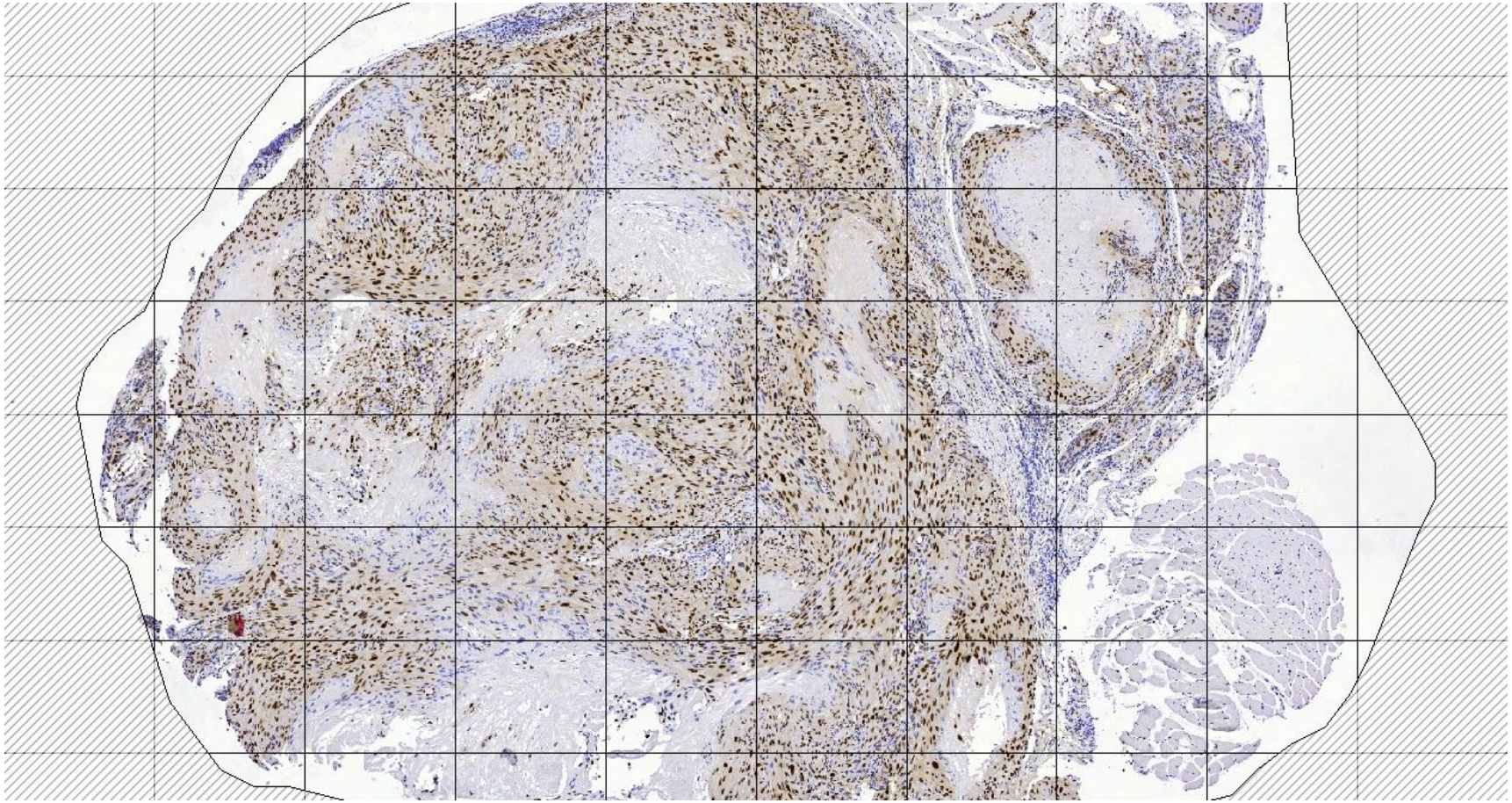
Slide overview



The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

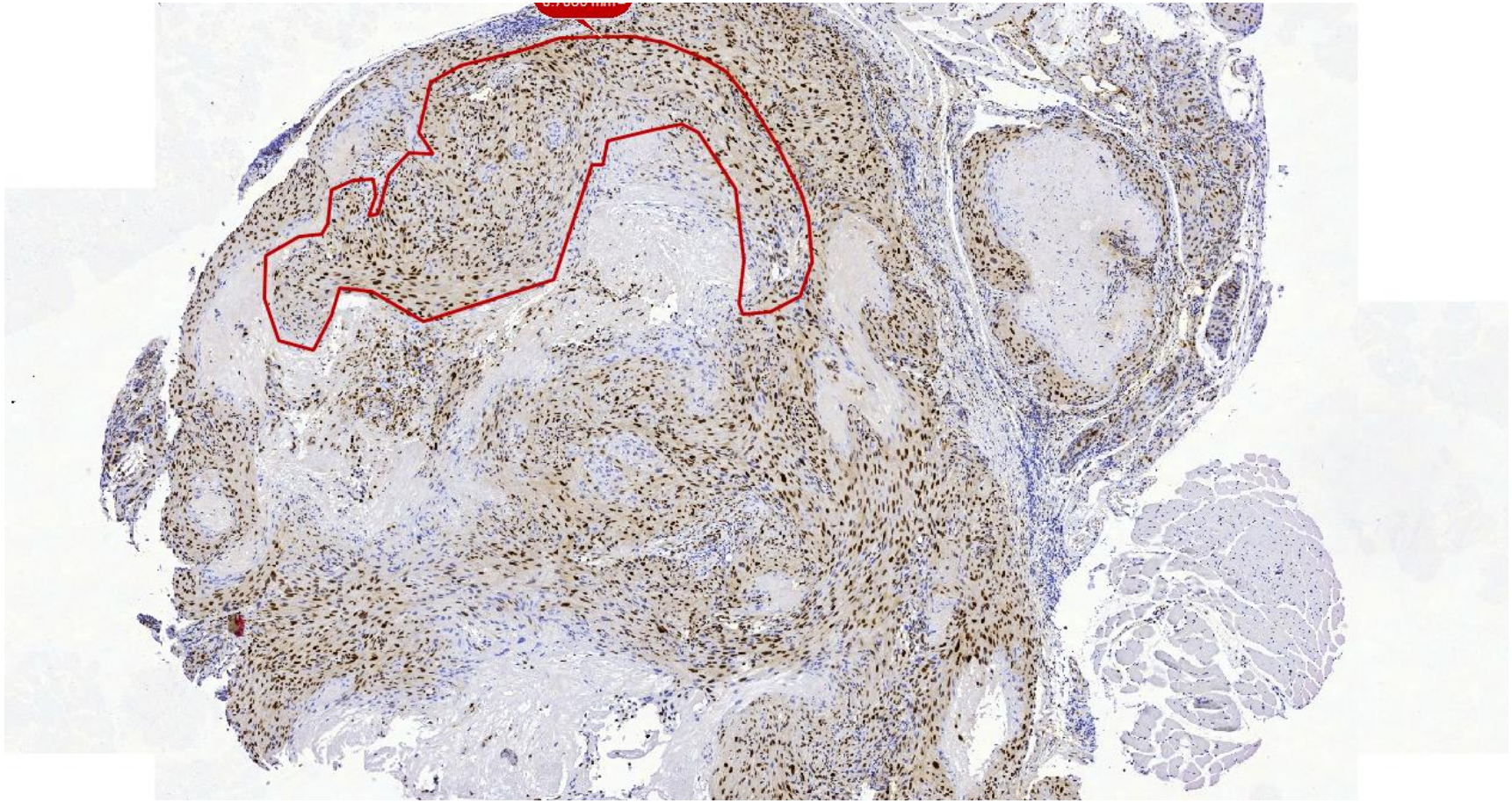
Corp and FOV line



The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

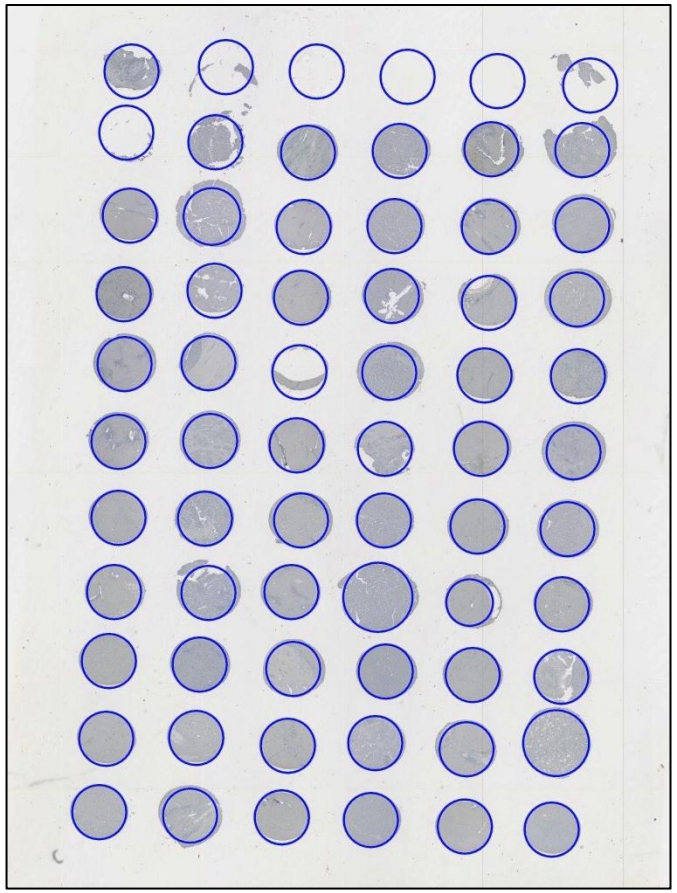
Category in virtual slide



The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

TMA acquisition and manage

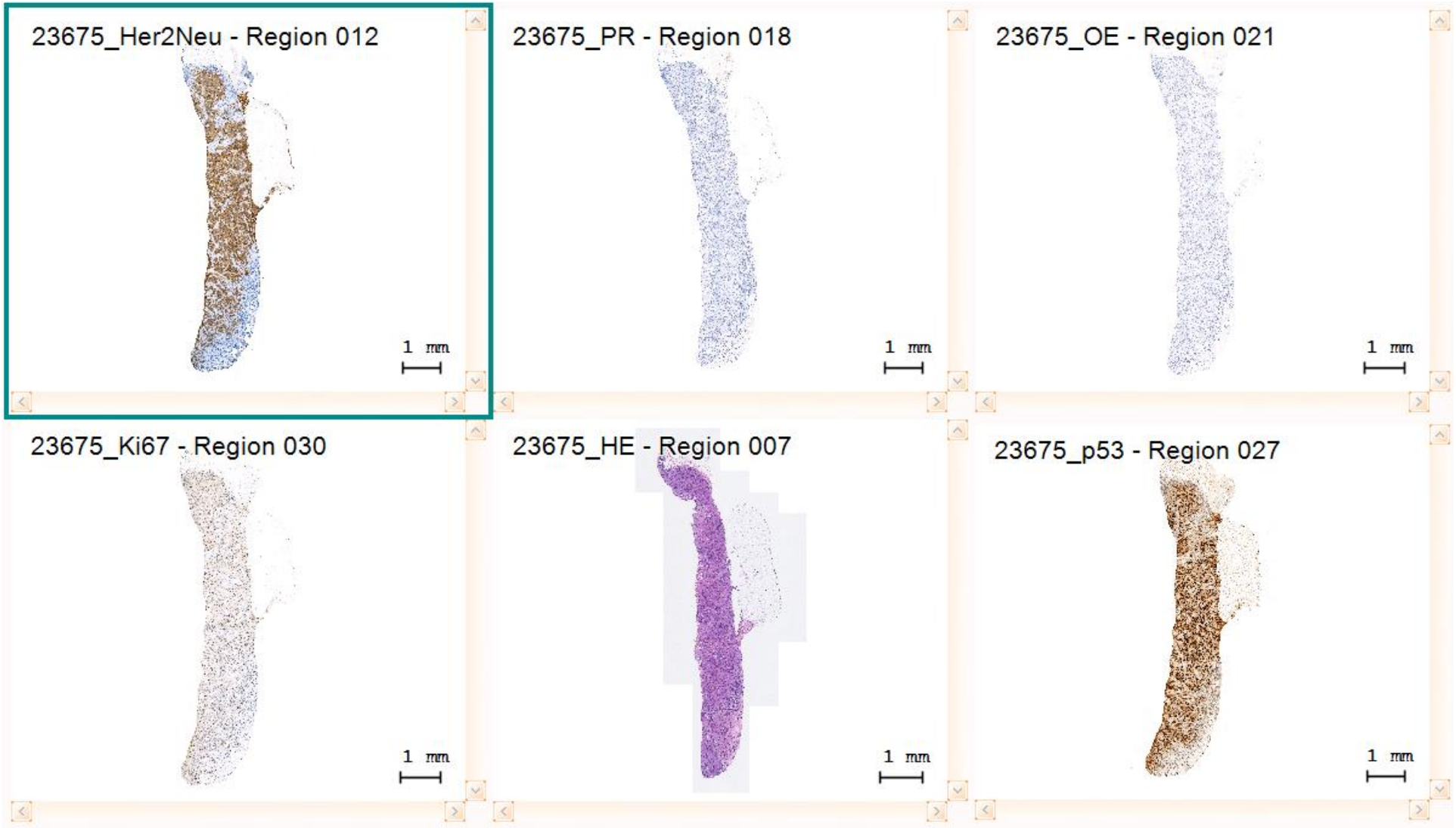


- Auto detect each core
- Missing core identify
- Block grouping
- Each core size and shape can be manually correct
- Block angle and cores distance can be manually correct
- Only scan identified core
- Focus once on each core

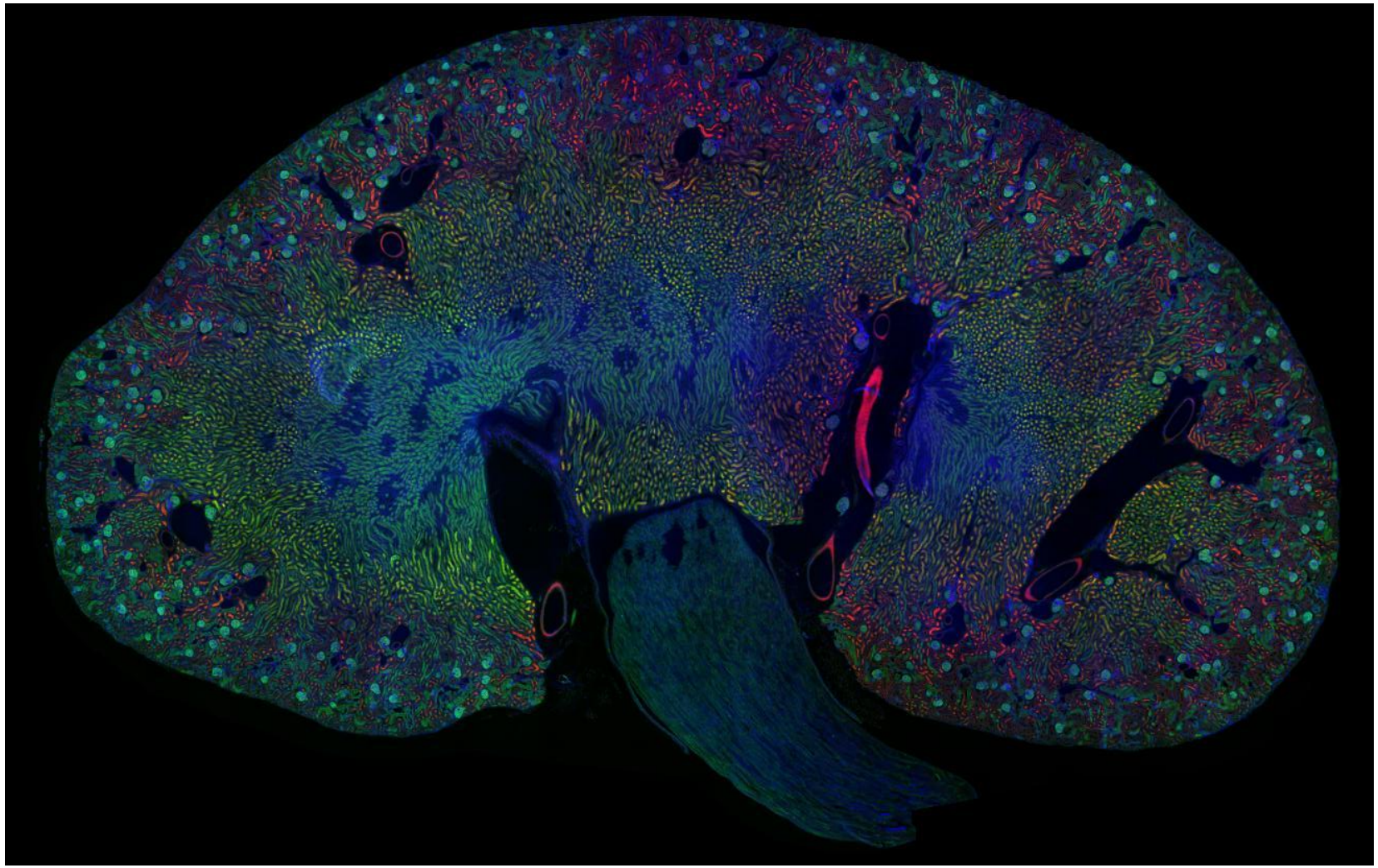
The Virtual Slide in IHC

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Consecutive sections



The Virtual Slide in IF



The *digital sample / virtual slide* might consist of thousands of individual fields of view (FOV)!

The Virtual Slide in IF

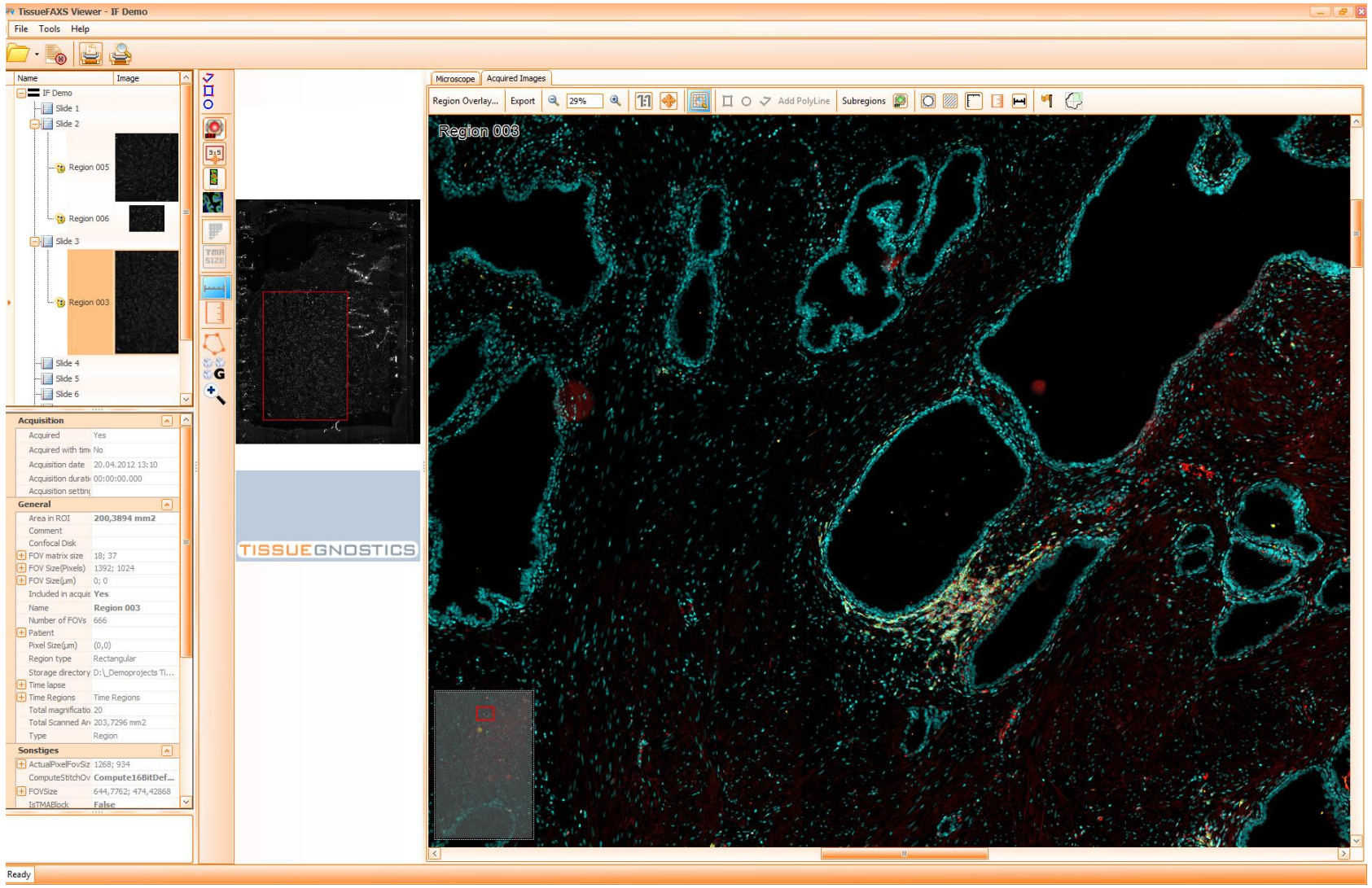
TISSUEGNOSTICS
PRECISION THAT INSPIRES

Scanning of 50 µm thick retina

TissueFAXS provide specific image stacking algorithm for thick sample without blur effect

TissueFAXS™ VIEWER – Freeware!

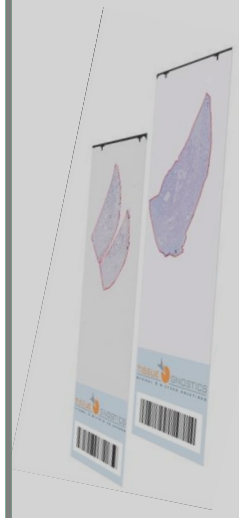
TISSUEGNOSTICS
PRECISION THAT INSPIRES



Principles of TissueFAXS

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Image



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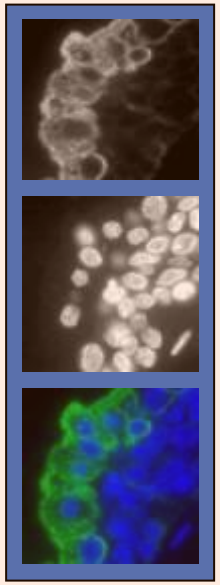
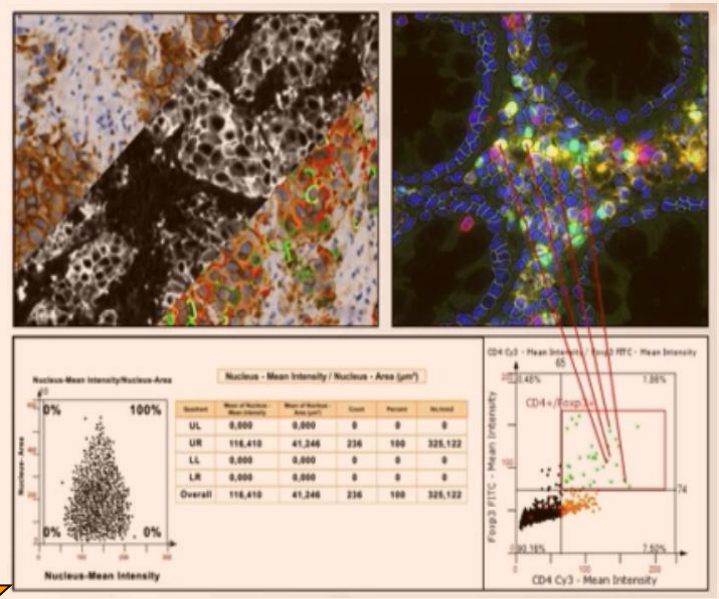


Result II



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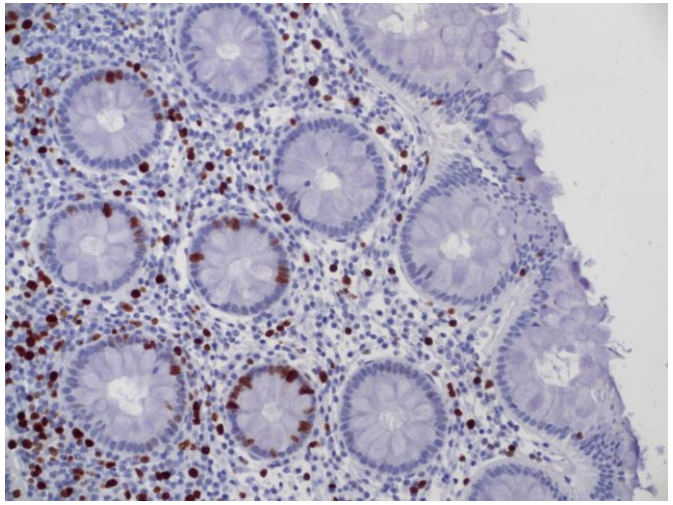
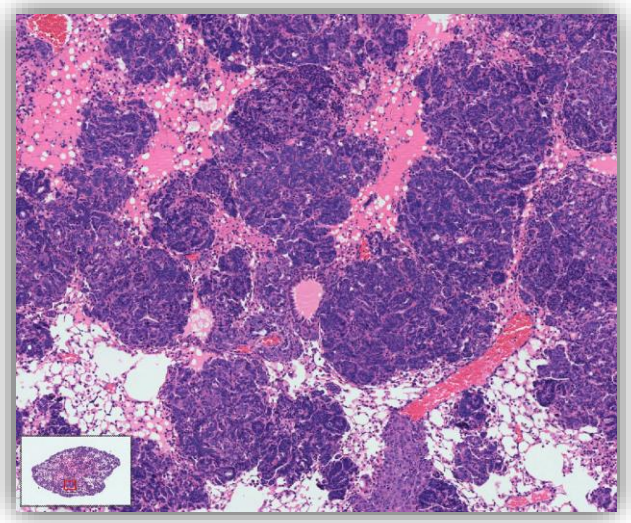
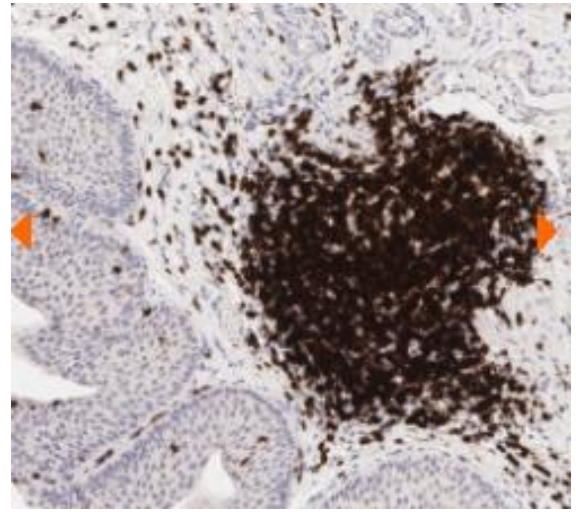
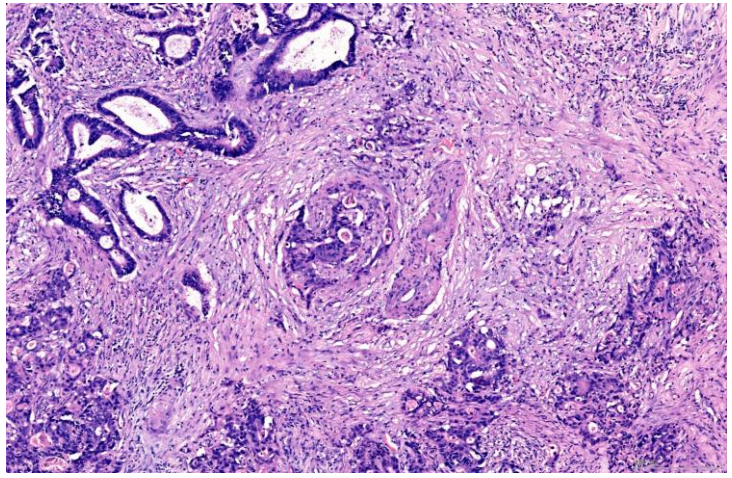
From Image...

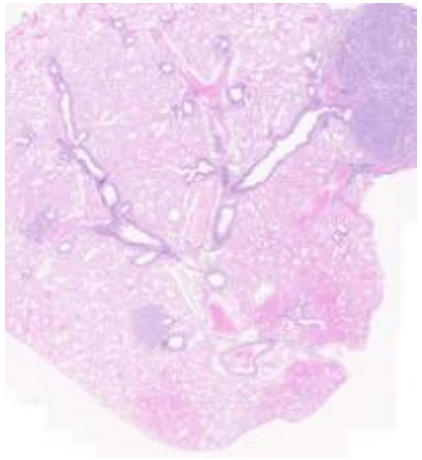
TISSUEGNOSTICS
PRECISION THAT INSPIRES

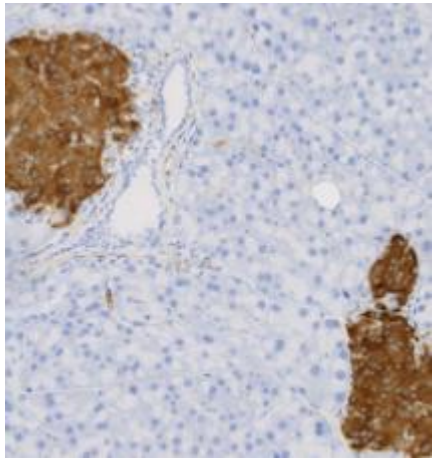


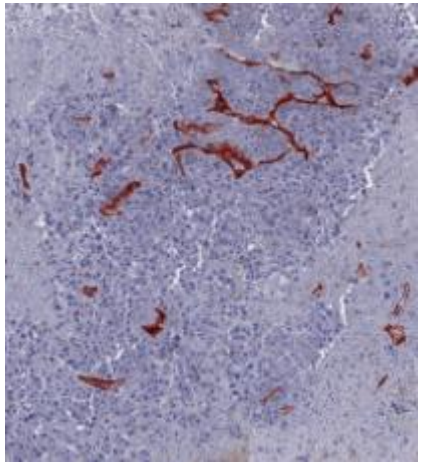




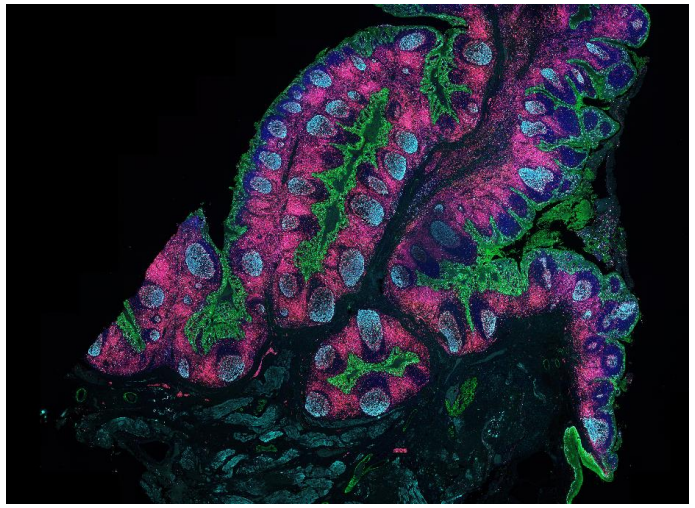


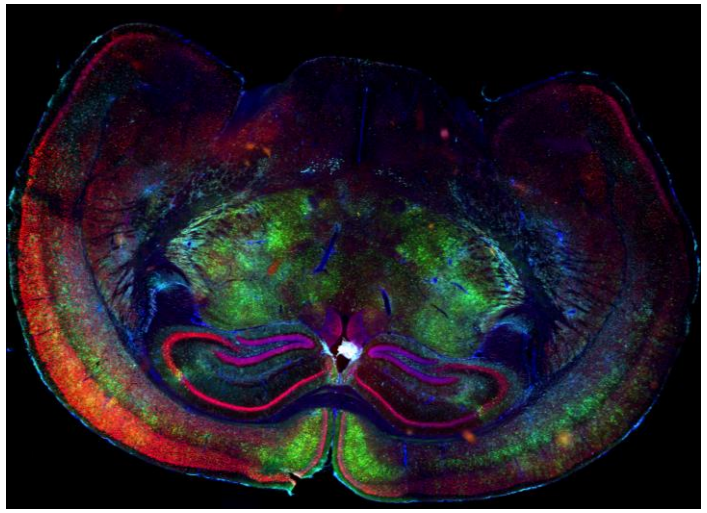


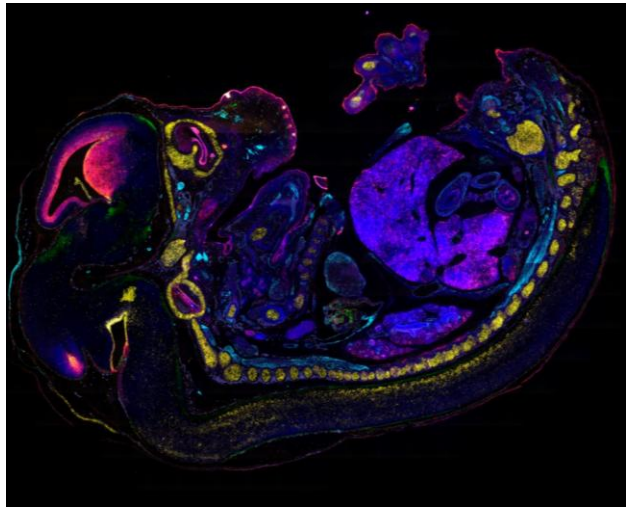


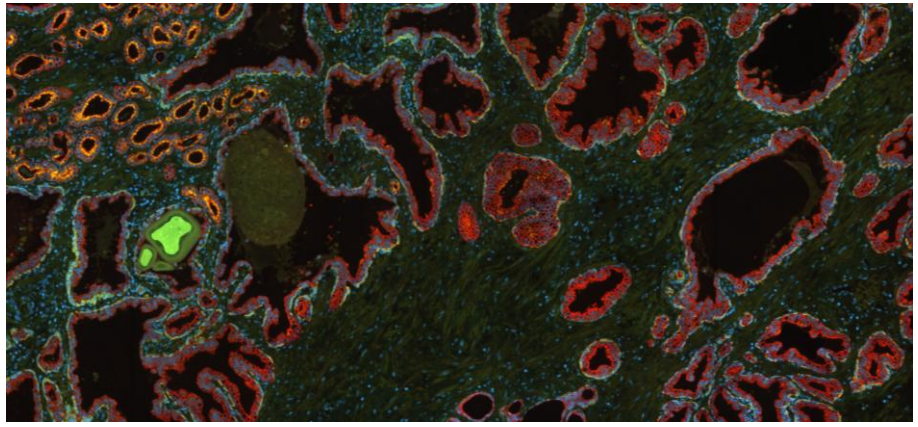


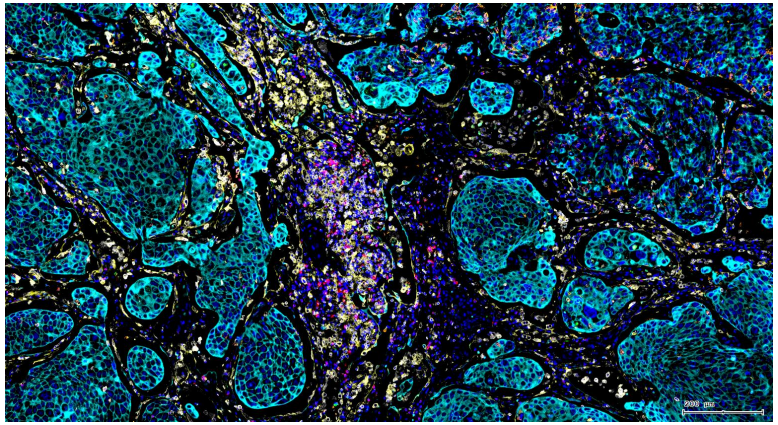
From Image...

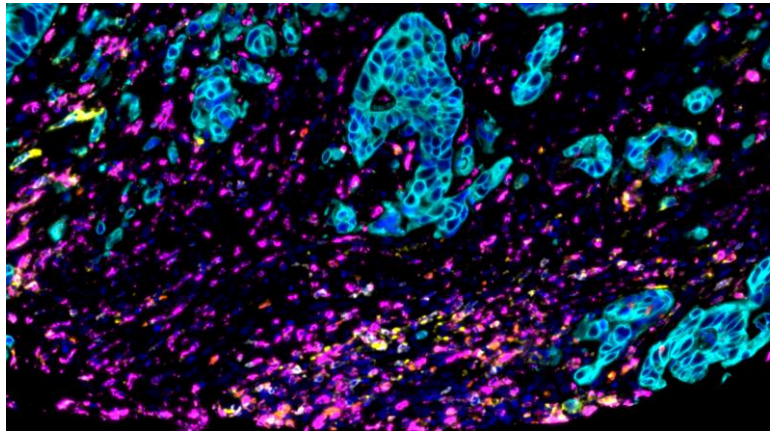






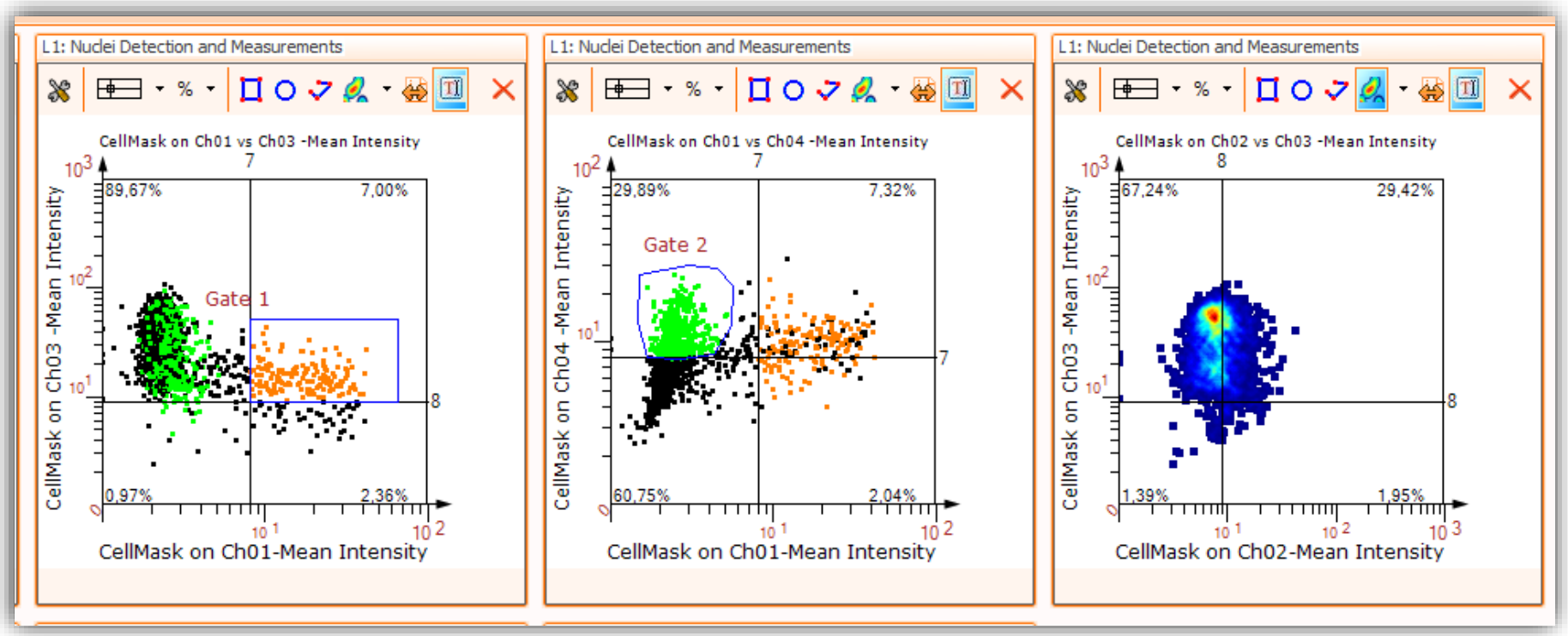


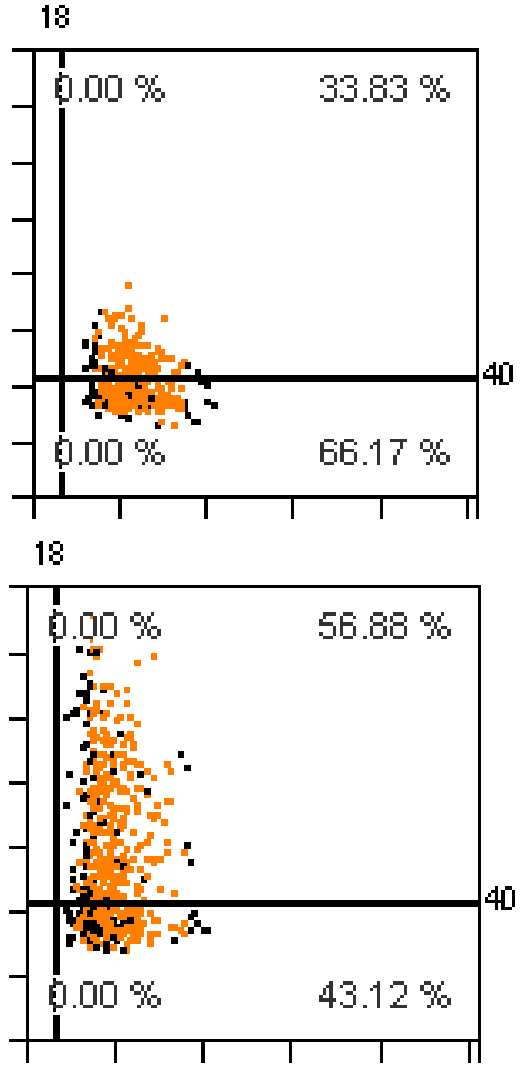




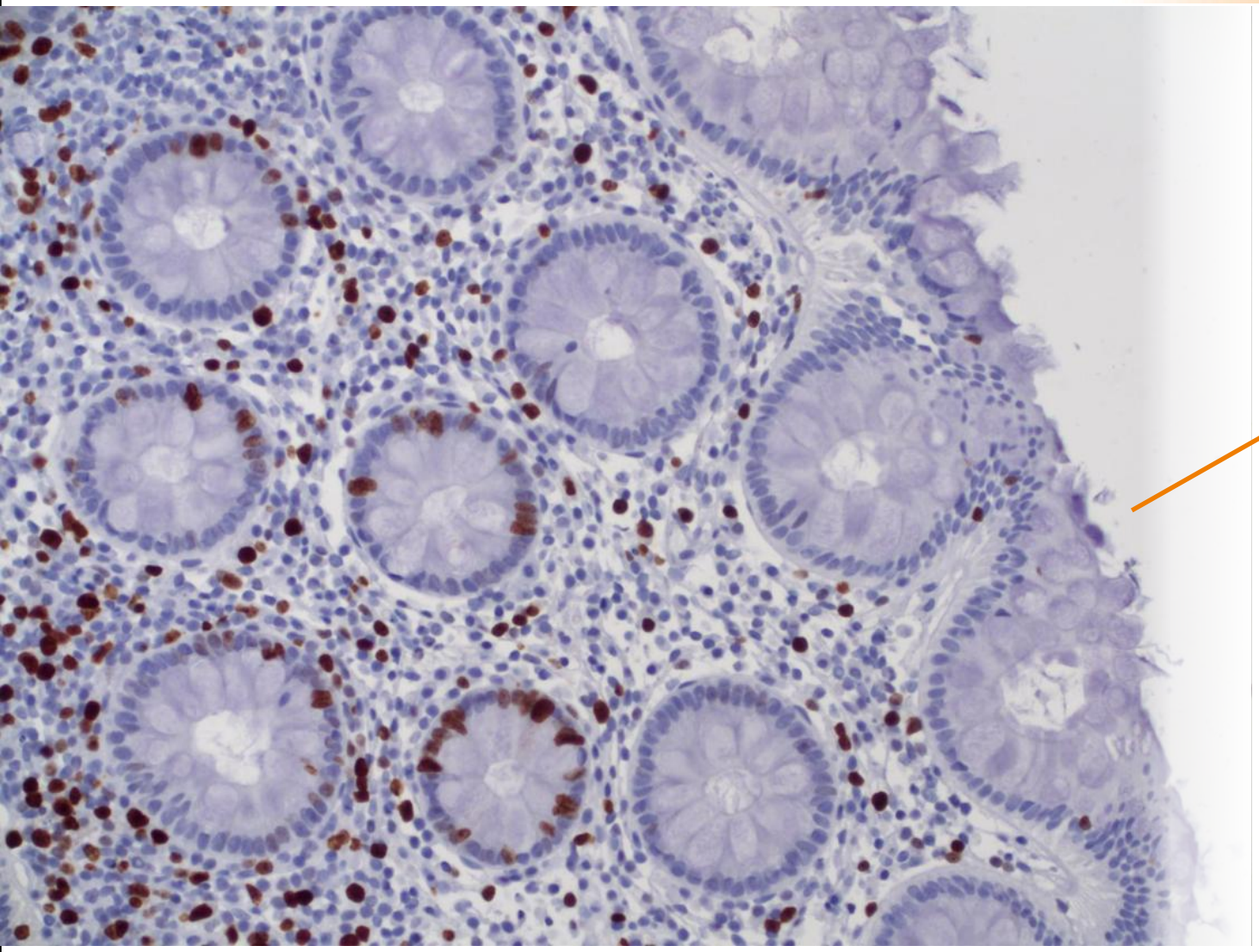
...to Analysis

Each cell is indicated as one dot
The reactivity of two channels is plotted on the x- and y-axis



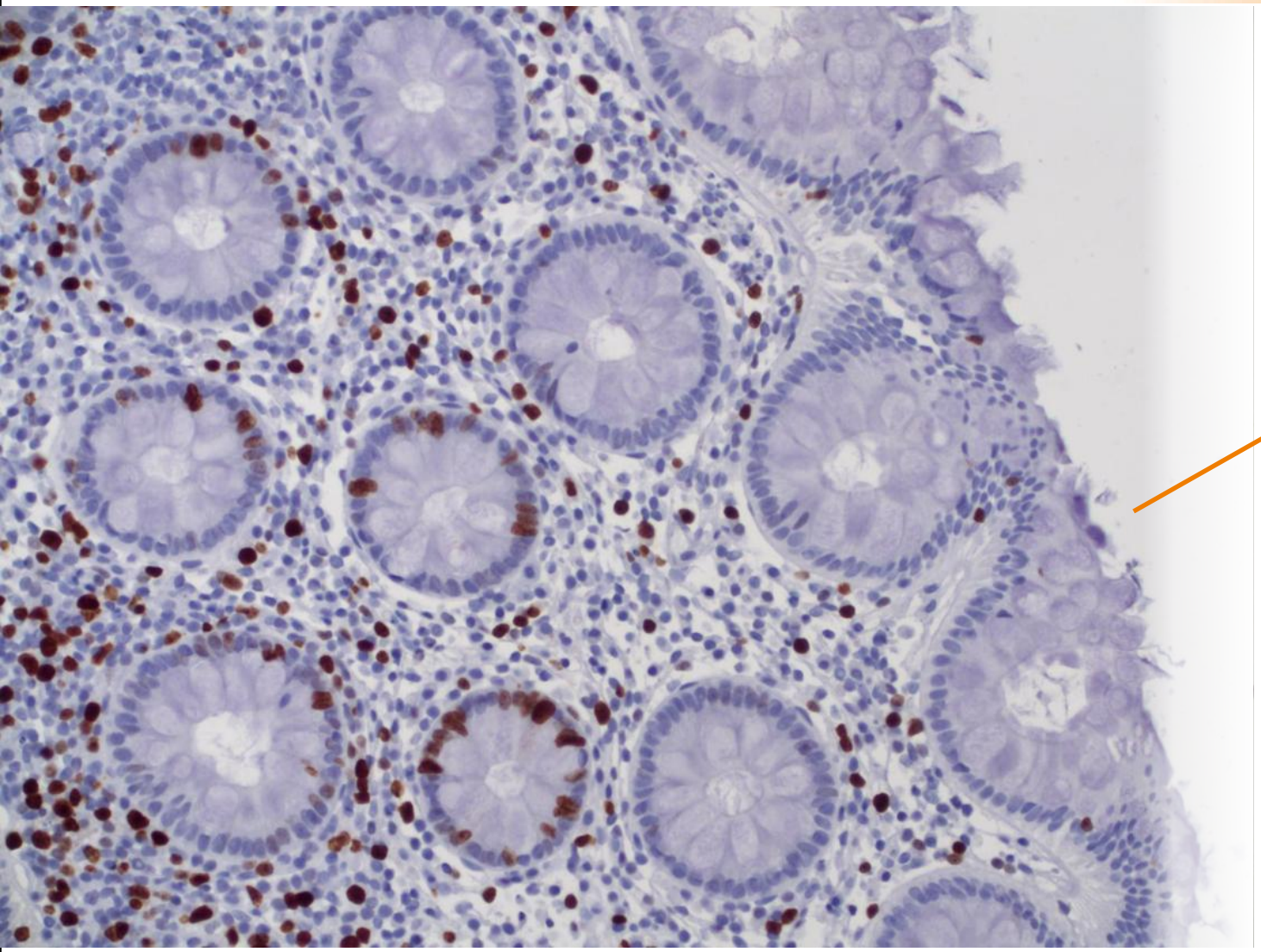


Why we need TissueFAXS™ Cytometry?



How many of the blue nuclei are also stained in brown (in %)?

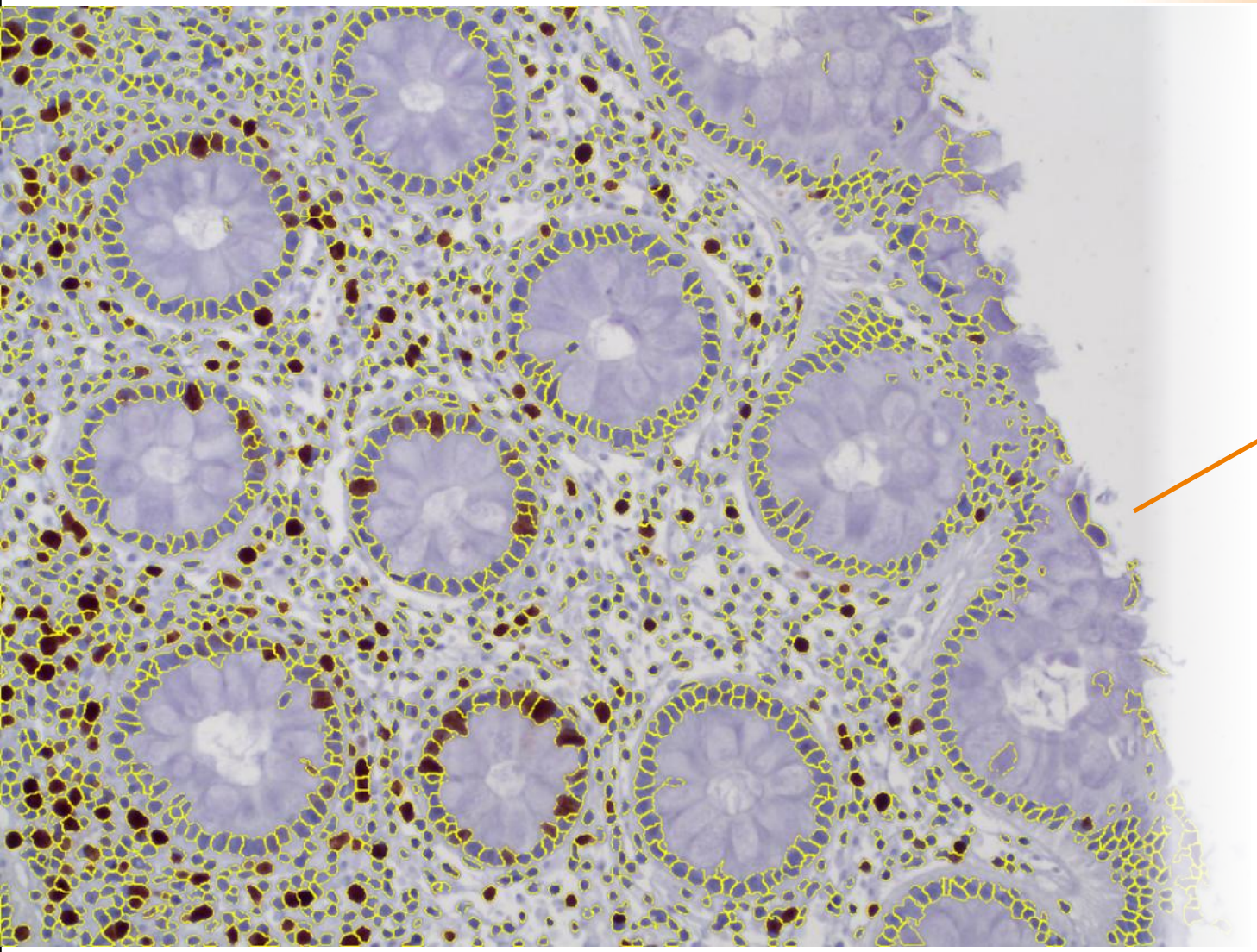
Why we need TissueFAXS™ Cytometry?



How many of the blue nuclei are also stained in brown (in %)?

Expert's estimations:
1% - 40%

HistoQuest Quantification



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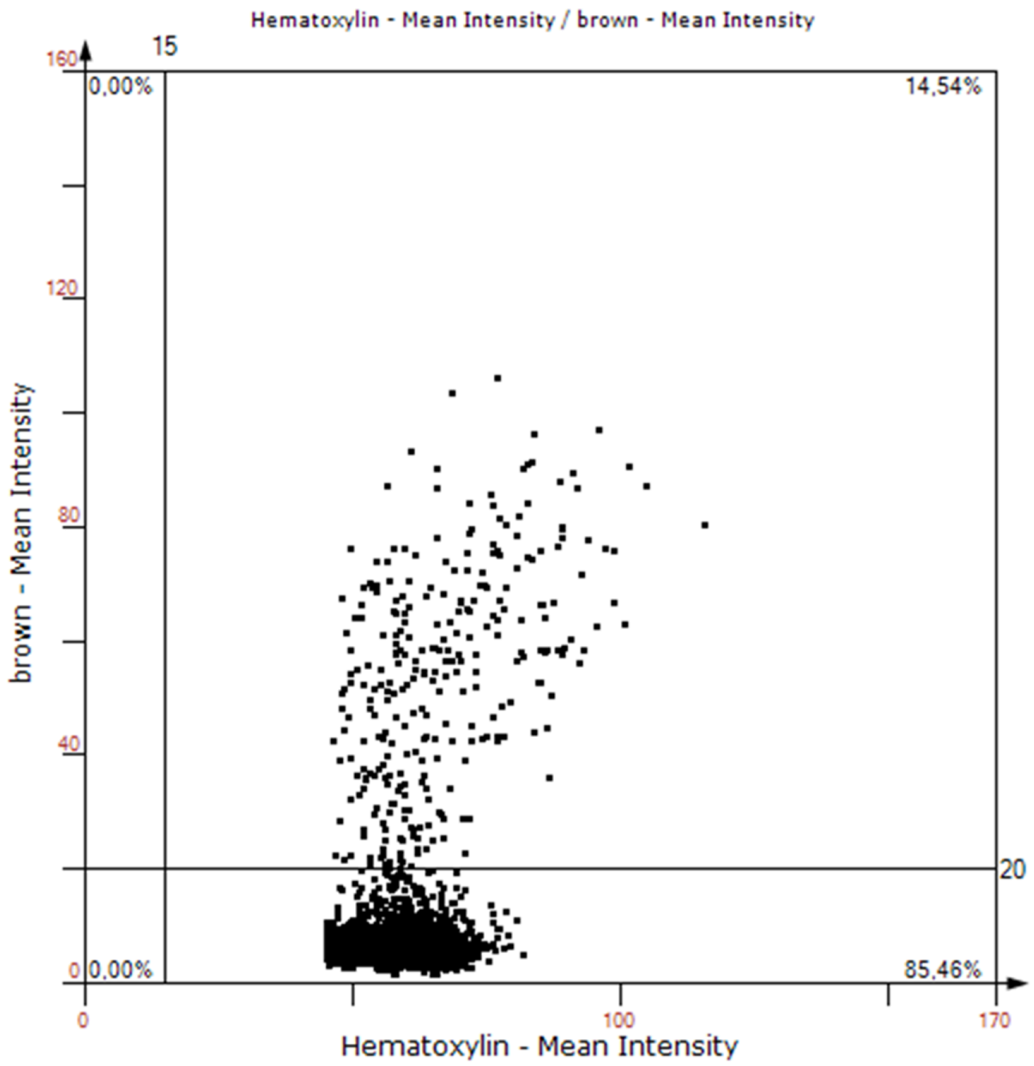
= Reliable Data



How many of the blue nuclei are also stained in brown (in %)?

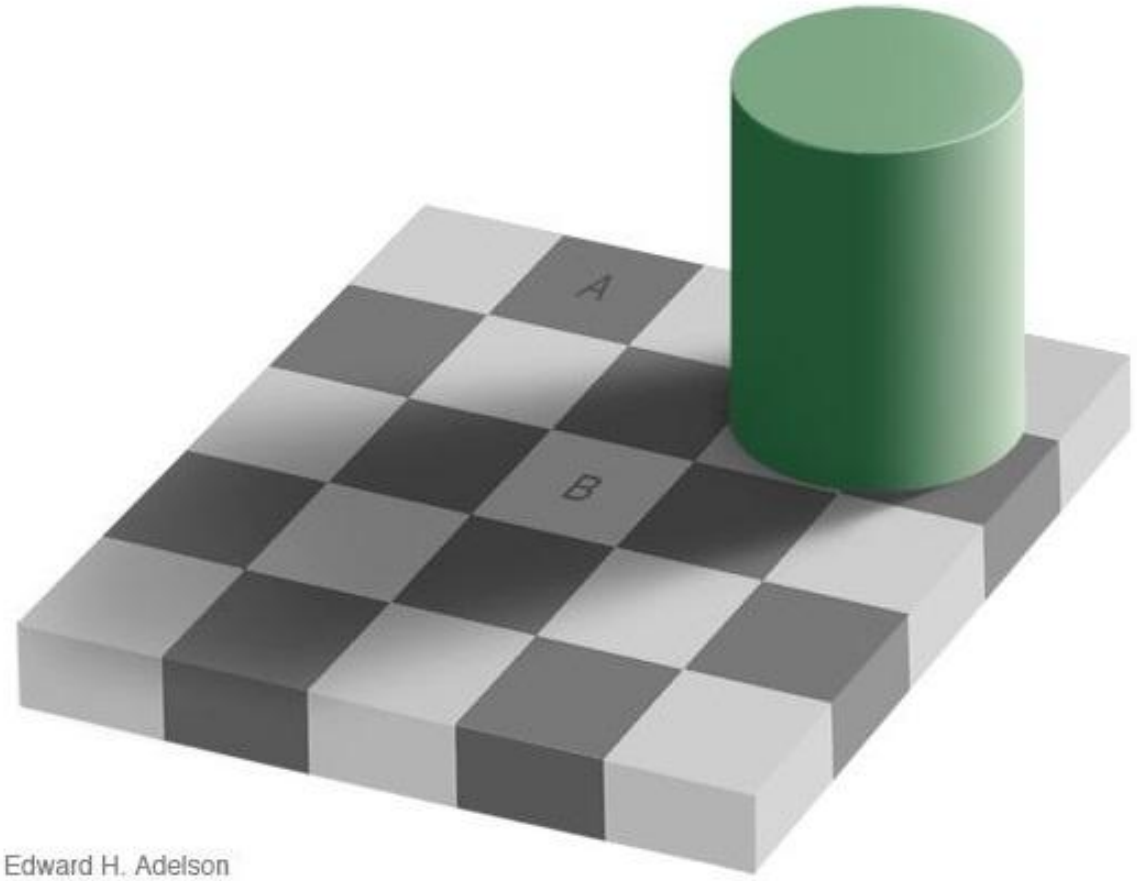
Expert‘s estimations:
1% - 40%

Observer independent measurement:
14.54%

Why we need TissueFAXS™ Cytometry?

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Relative Staining Intensity = gray value(GV)



Edward H. Adelson

GV = 0: BLACK

GV = 255: WHITE

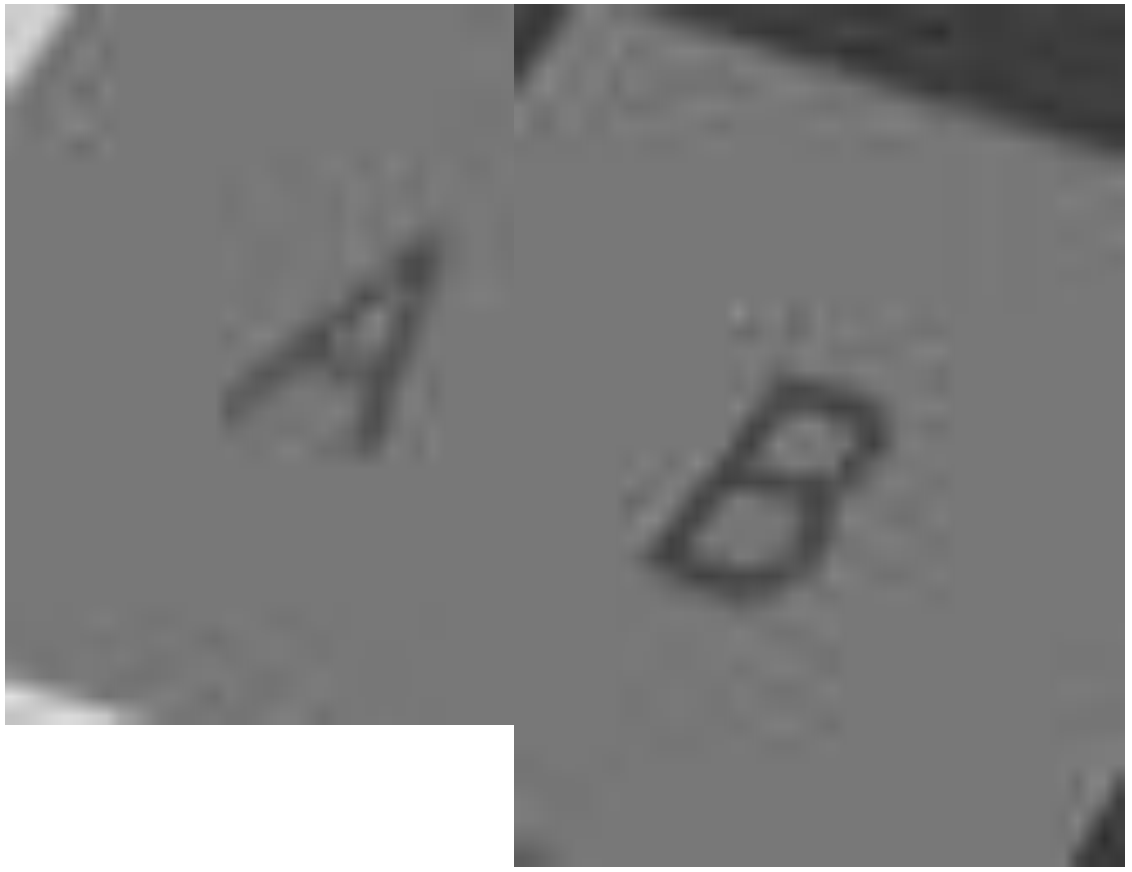
What is the difference in GV between A and B?

1. $\Delta = 0$
2. $\Delta \leq 20$
3. $\Delta \leq 50$
4. $\Delta \leq 100$
5. $\Delta > 100$

Compare frames A and B – which one is brighter and how much is it brighter (select answer to the right)?

Estimation versus Measurement

TISSUEGNOSTICS
PRECISION THAT INSPIRES

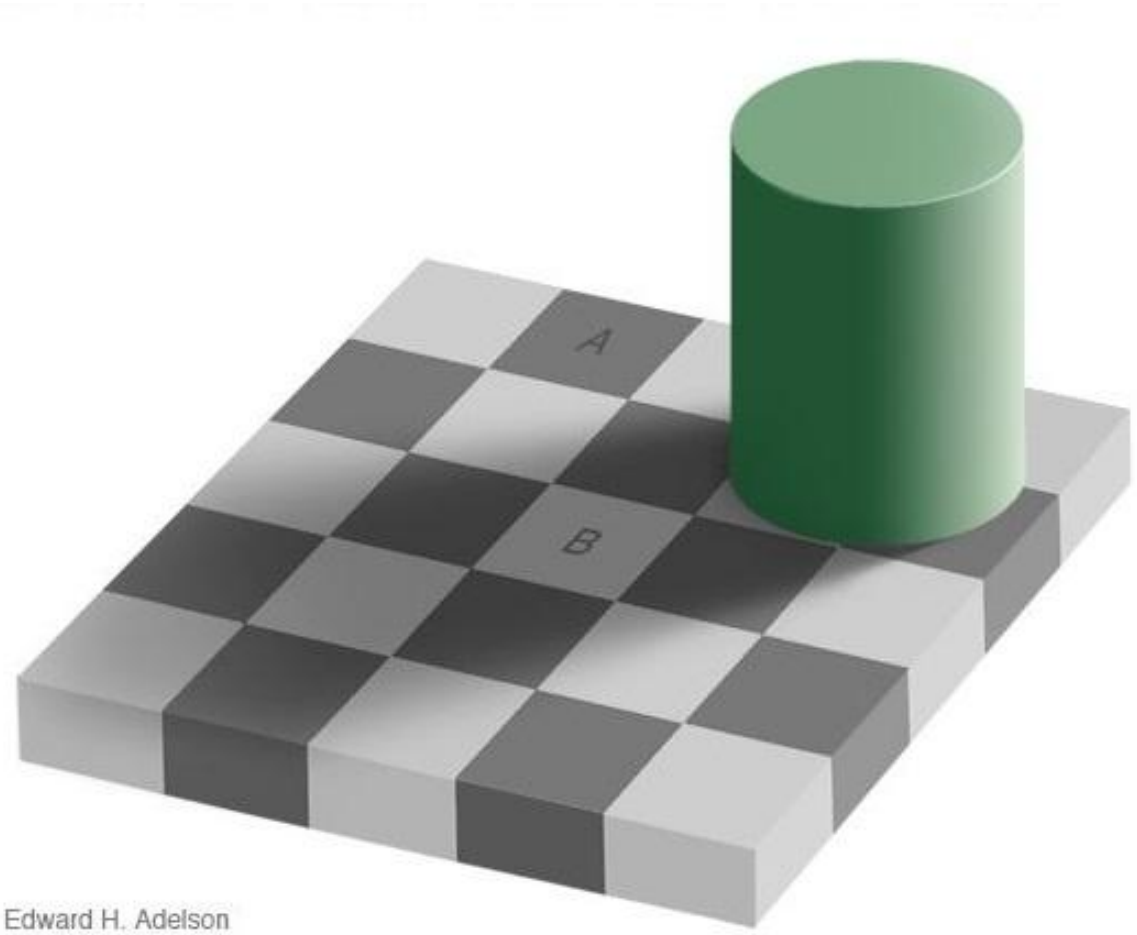


Δ = 0 !!!!

Estimation versus Measurement

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Relative Staining Intensity = gray value(GV)



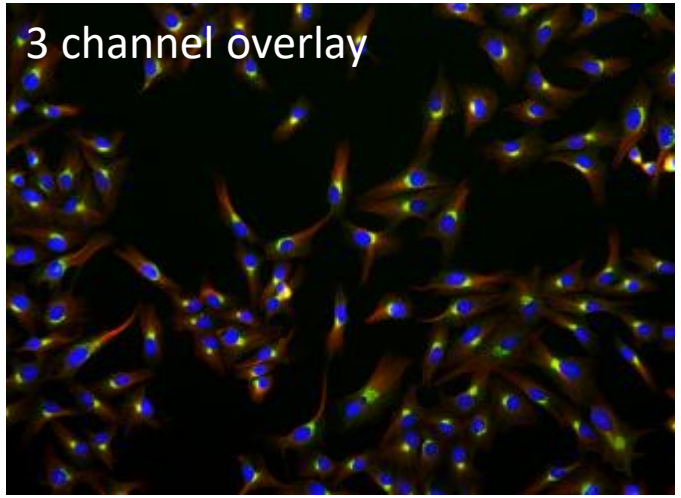
Edward H. Adelson

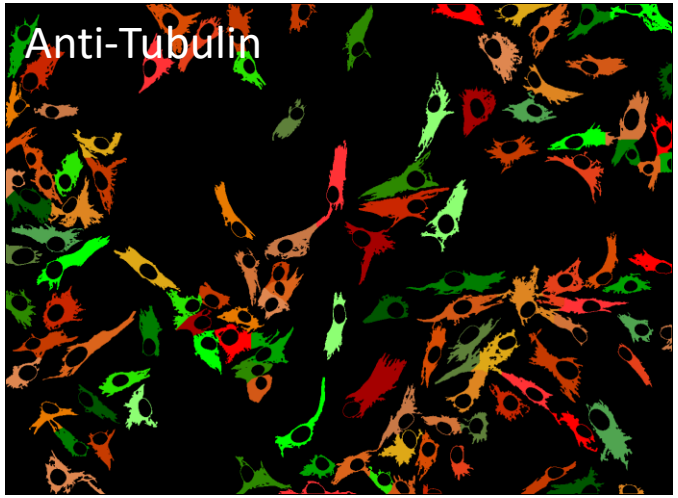
Assume A and B are 2 samples stained for:

- Tumor marker
- Cytokine expression
- Apoptosis
- Proliferation
- …..

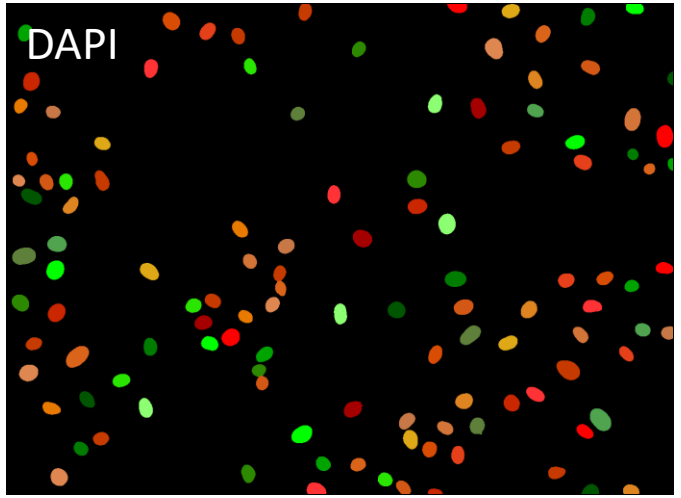
Distinguish between Nucleus and Cytoplasm!

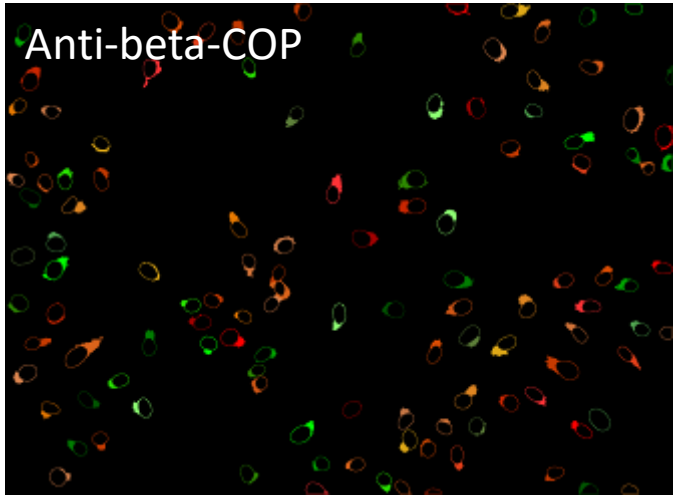
TISSUEGNOSTICS
PRECISION THAT INSPIRES





Not only analyze single cells – even analyze subcellular compartments on a single cell basis!





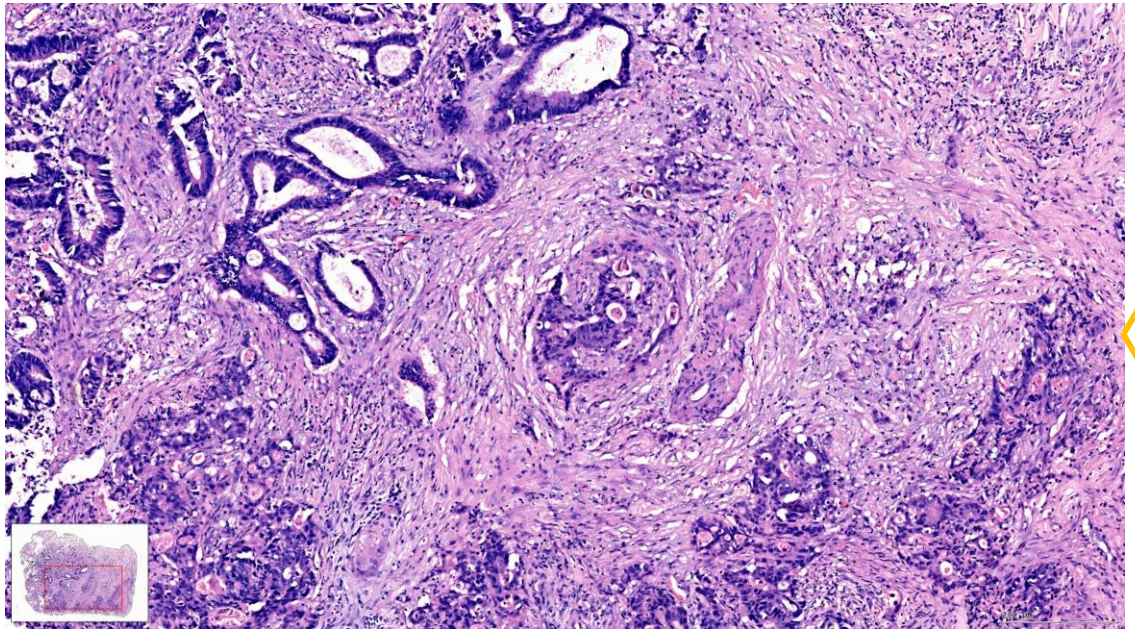
Courtesy Dr. R. Pepperkok, Advanced Light Microscopy Facility, EMBL Heidelberg

HistoQuest Workflow

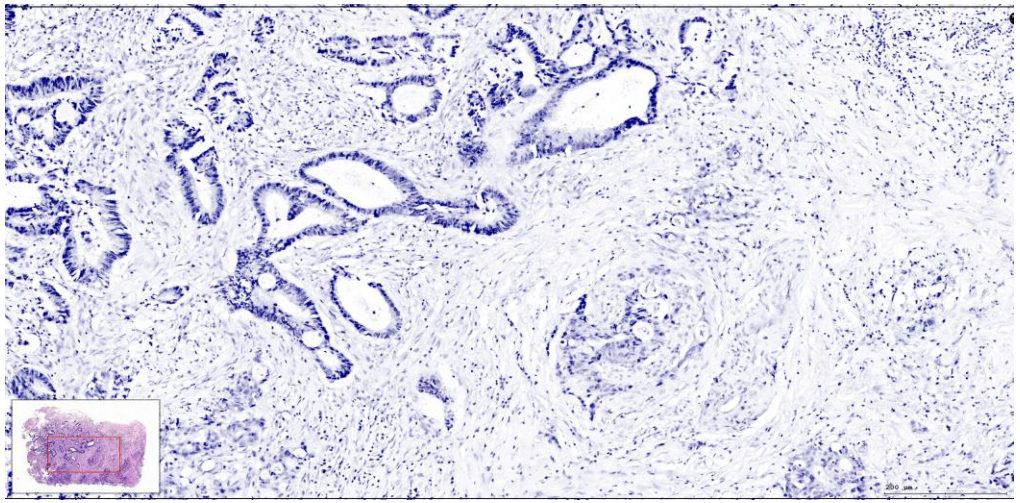
TISSUEGNOSTICS
PRECISION THAT INSPIRES

1. Click- Color Separation

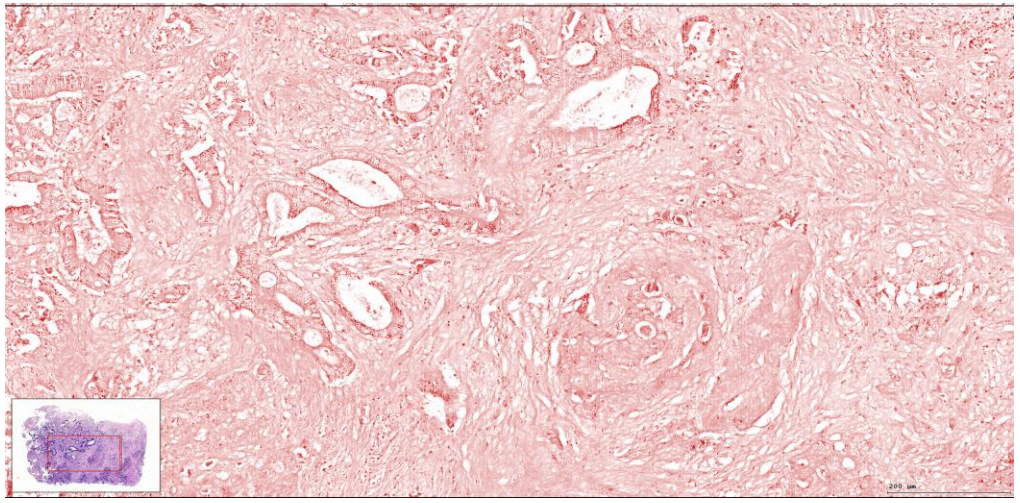
for better cell segmentation results



Hematoxylin shade



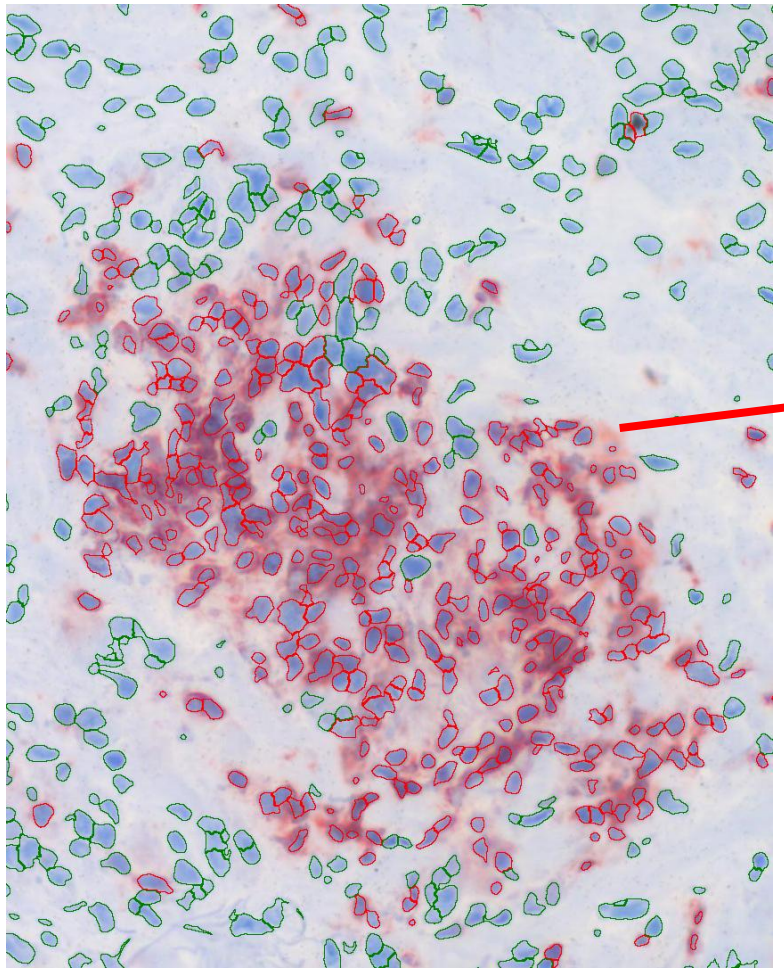
Eosin shade

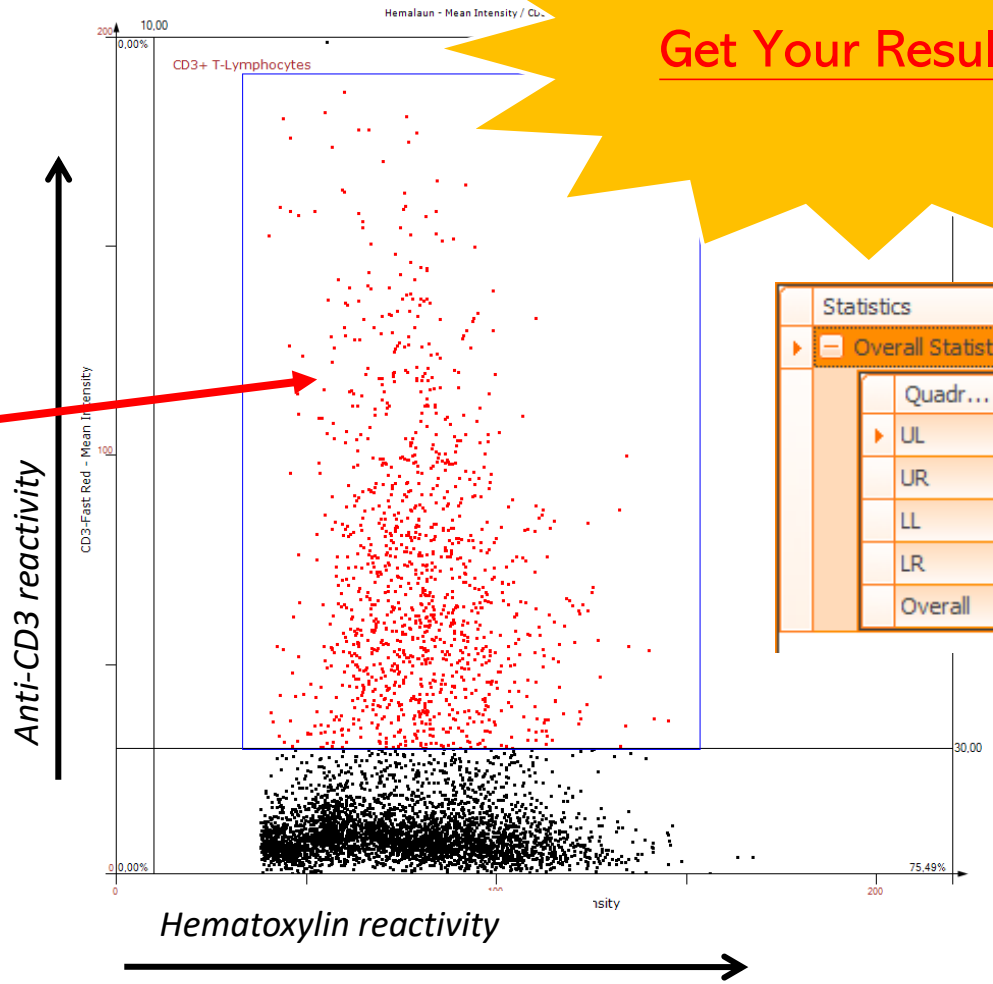


HistoQuest Workflow

TISSUEGNOSTICS
PRECISION THAT INSPIRES

2. Automatically identified cells –





Get Your Results !!

Statistics

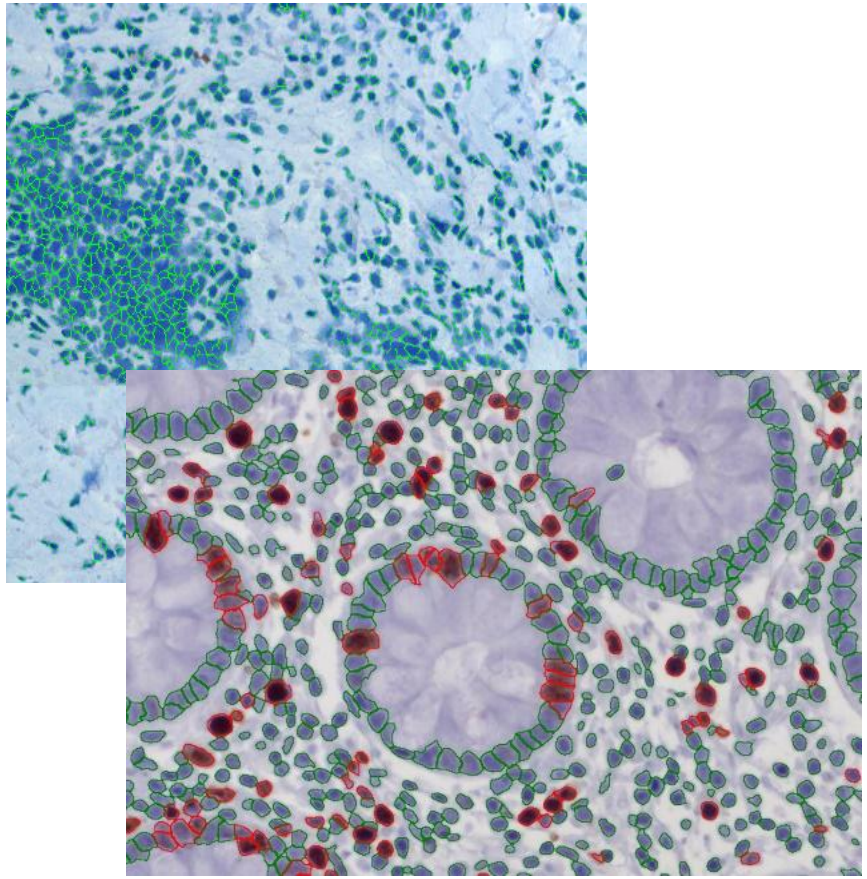
Overall Statistics

Quadr...	Hemal...	CD3-F...	Count	Percent	No./mm2
UL	0,000	0,000	0	0,00%	0,000
UR	80,094	71,675	1205	24,51%	878,820
LL	0,000	0,000	0	0,00%	0,000
LR	75,748	9,798	3712	75,49%	2707,204
Overall	76,813	24,962	4917	100,00%	3586,024

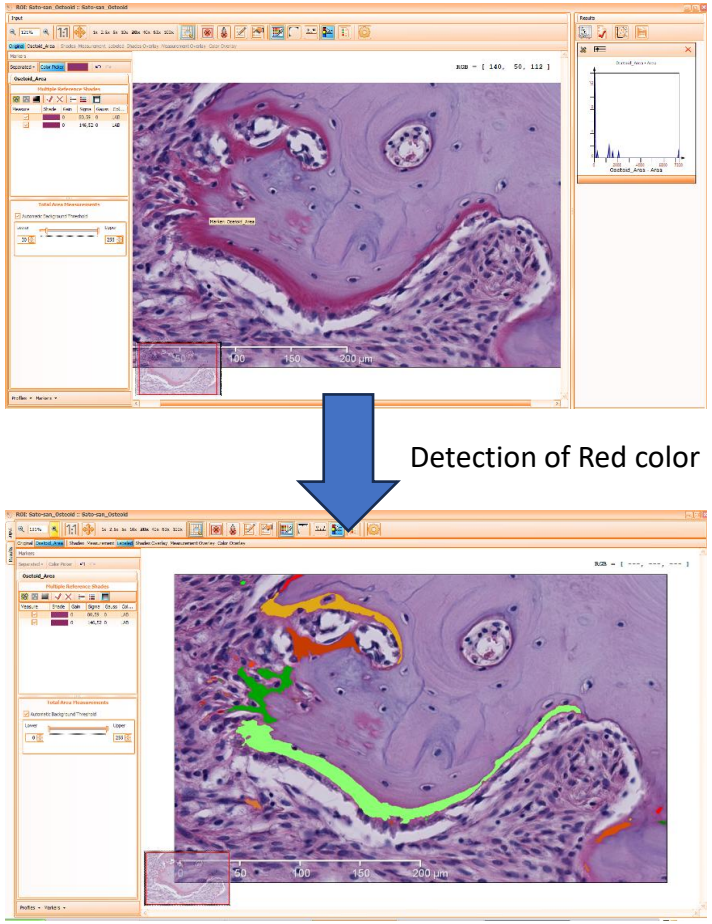
HistoQuest Analysis algorithm

TISSUEGNOSTICS
PRECISION THAT INSPIRES

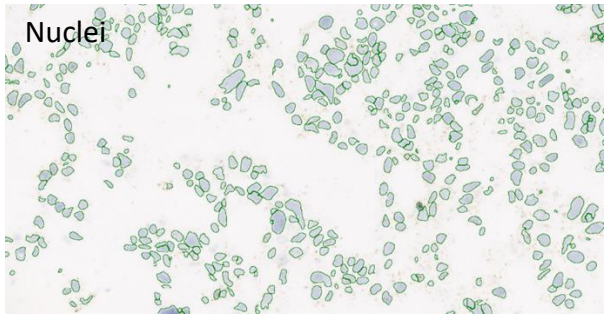
- Single Cell Segmentation

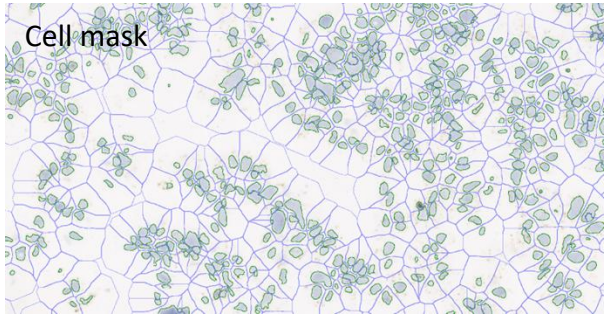


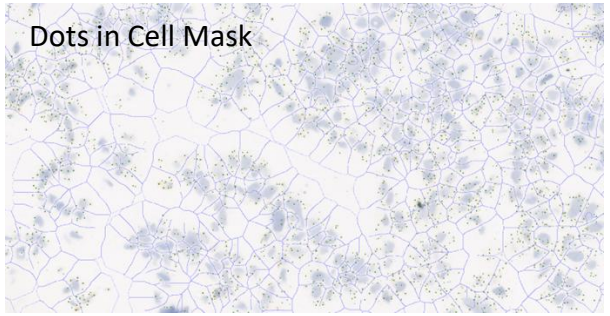
- Total Area Measurement



- Dots Detection

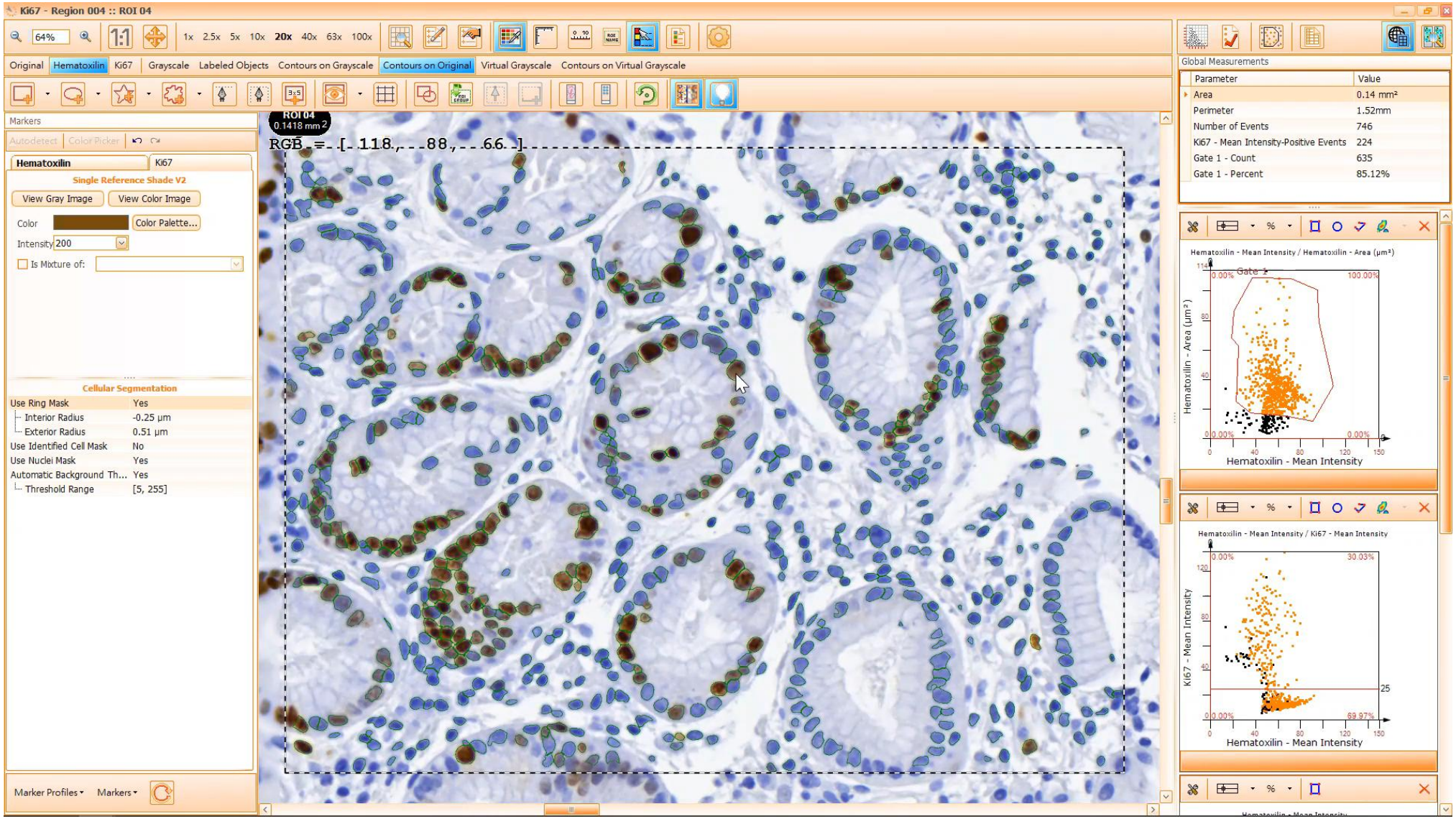






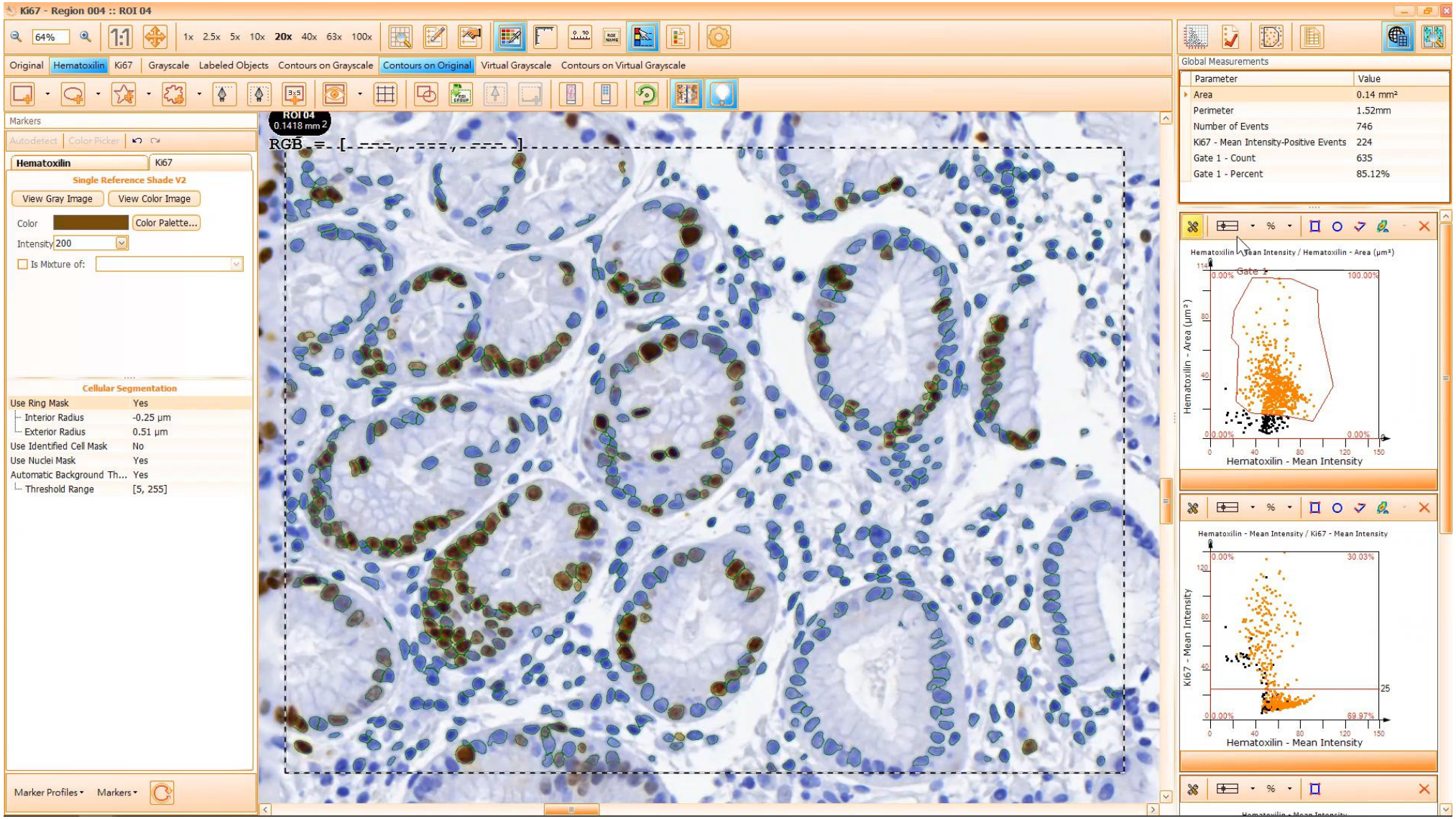
Forward Gating: Seeing is Believing

TISSUEGNOSTICS
PRECISION THAT INSPIRES



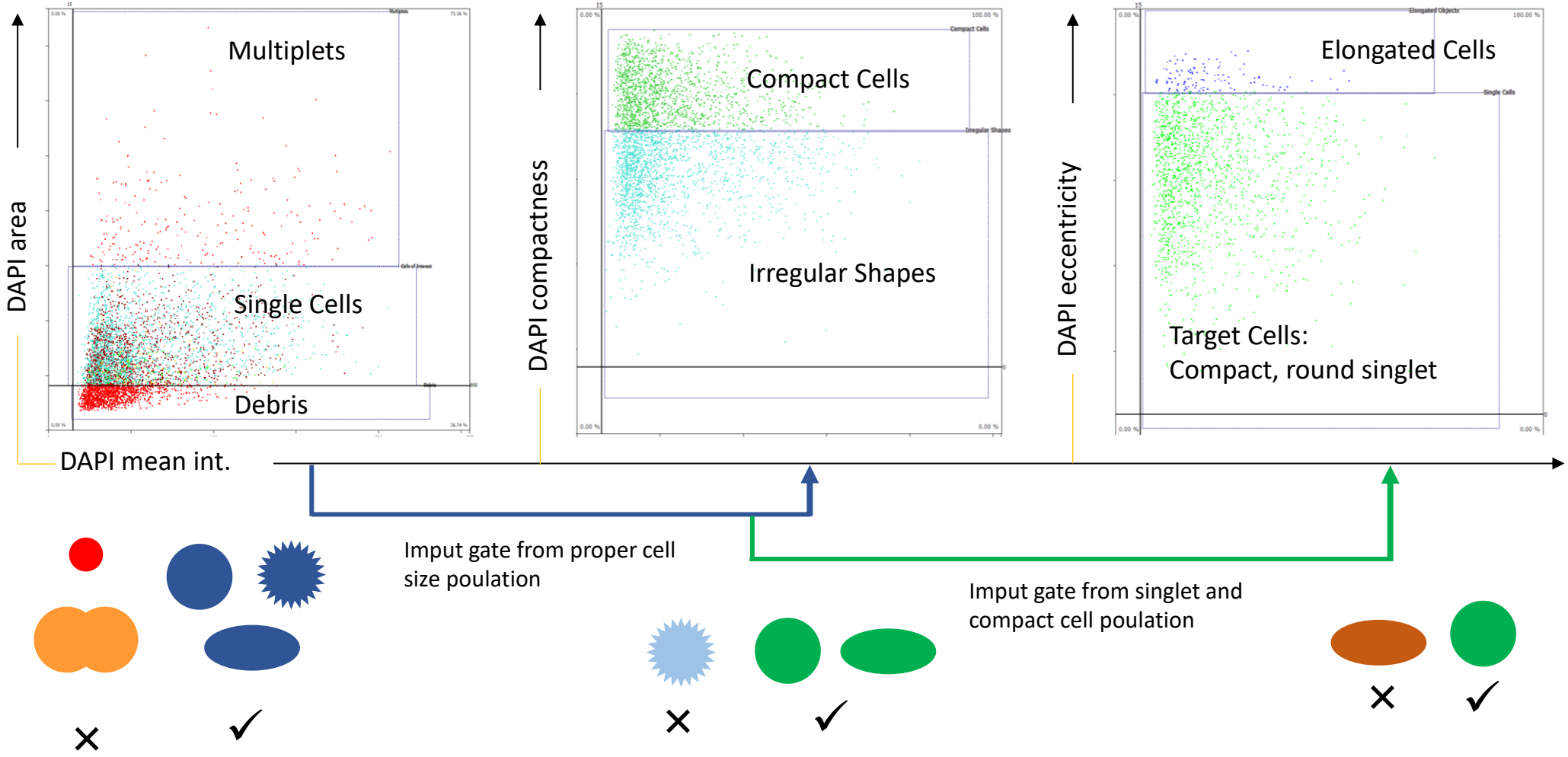
Backward Gating: In-situ analysis

TISSUEGNOSTICS
PRECISION THAT INSPIRES



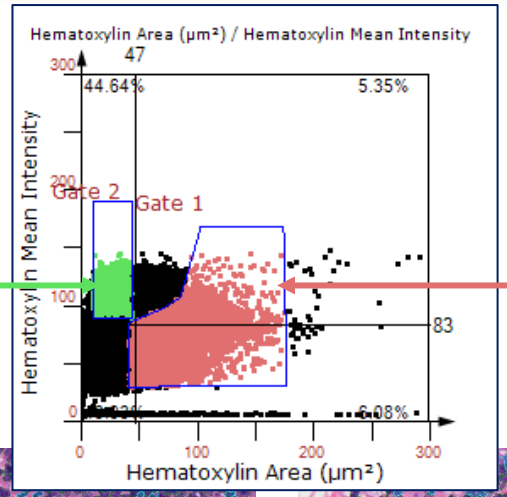
Logical Gating: Precise analysis

TISSUEGNOSTICS
PRECISION THAT INSPIRES



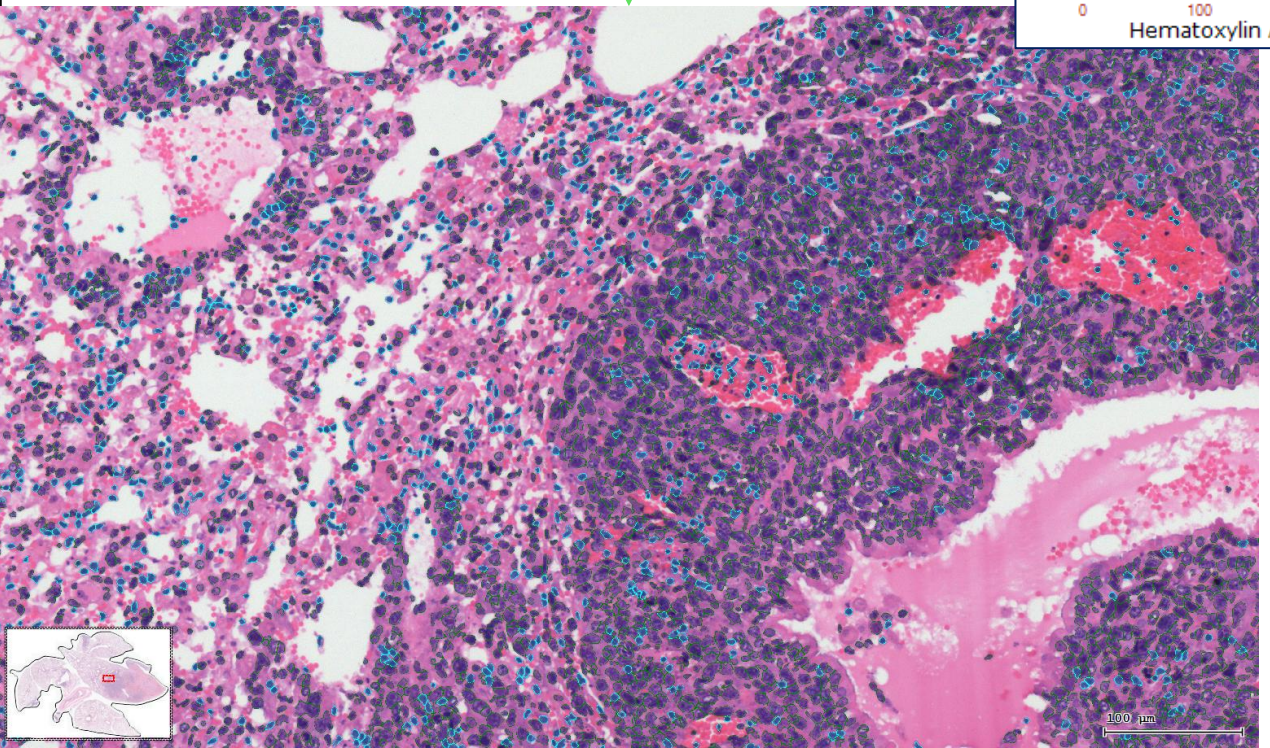
Separate Tumor/ Lymphocytes

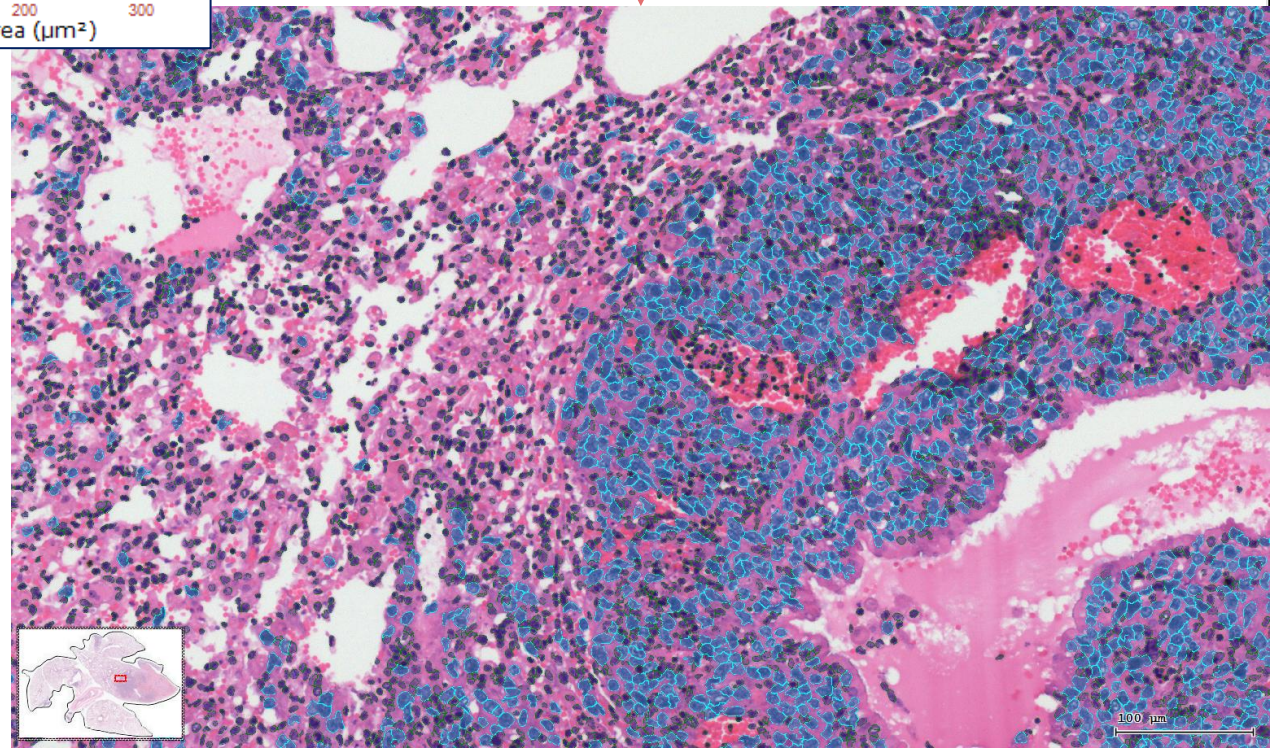
TISSUEGNOSTICS
PRECISION THAT INSPIRES



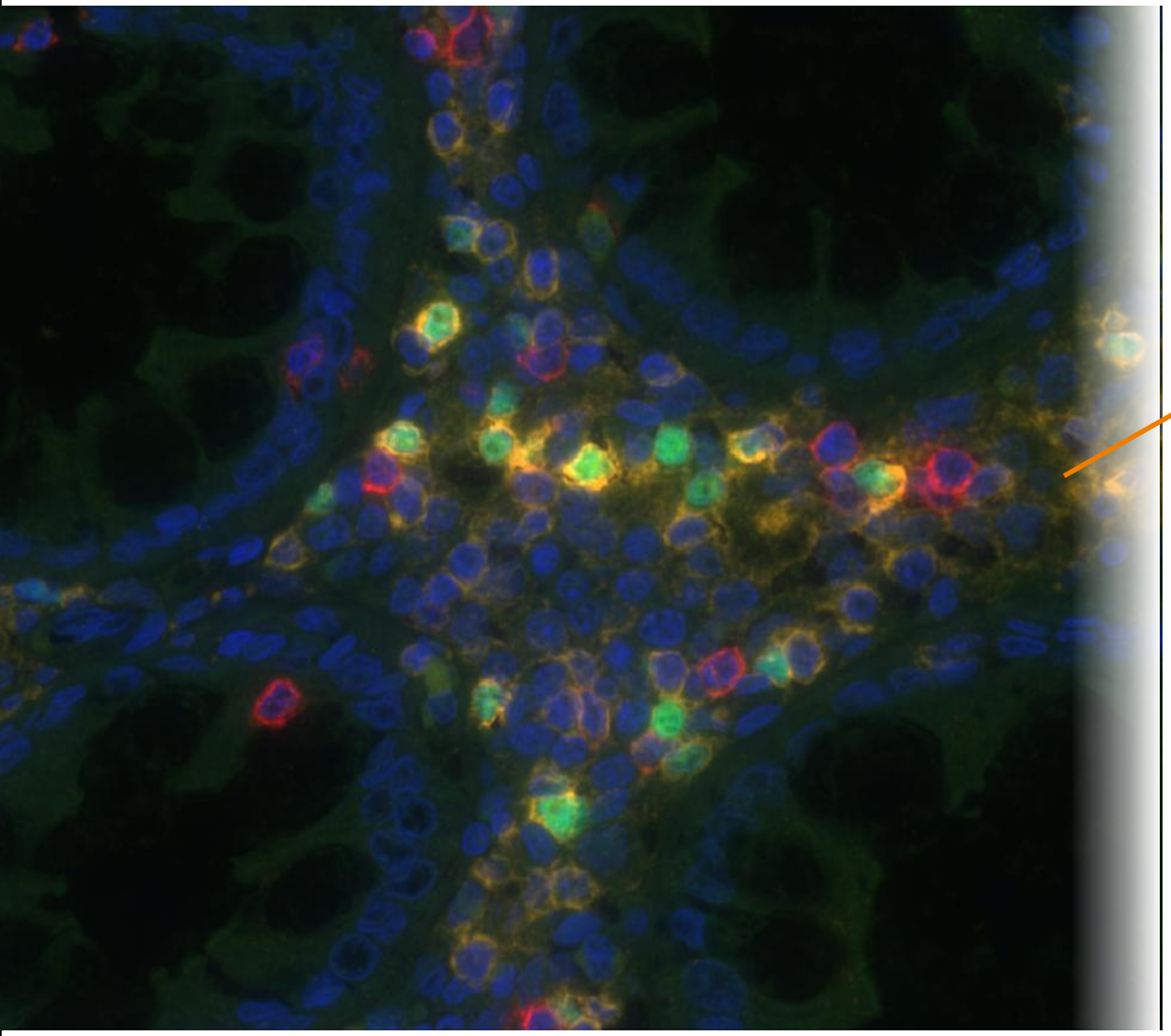
Lymphocytes

Tumor Cells





Why we need TissueQuest?



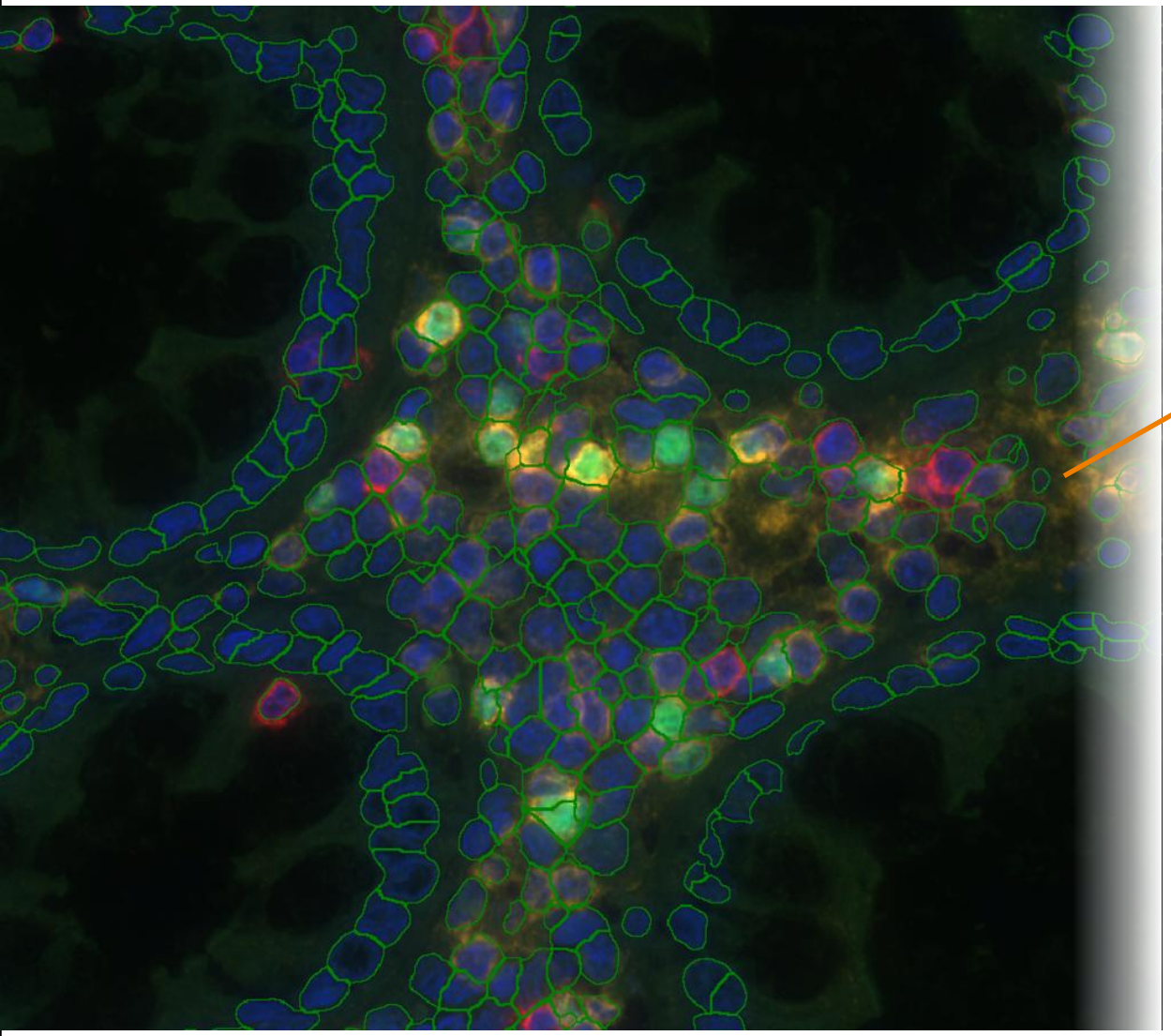
How many **CD4, CD8, Foxp3** cells are there in this image (in %)?

Colon tissue stained for

- DAPI
- CD4
- CD8
- Foxp3

Courtesy Dr. Melanie McCoy, University of Western Australia, Perth

Why we need TissueQuest?



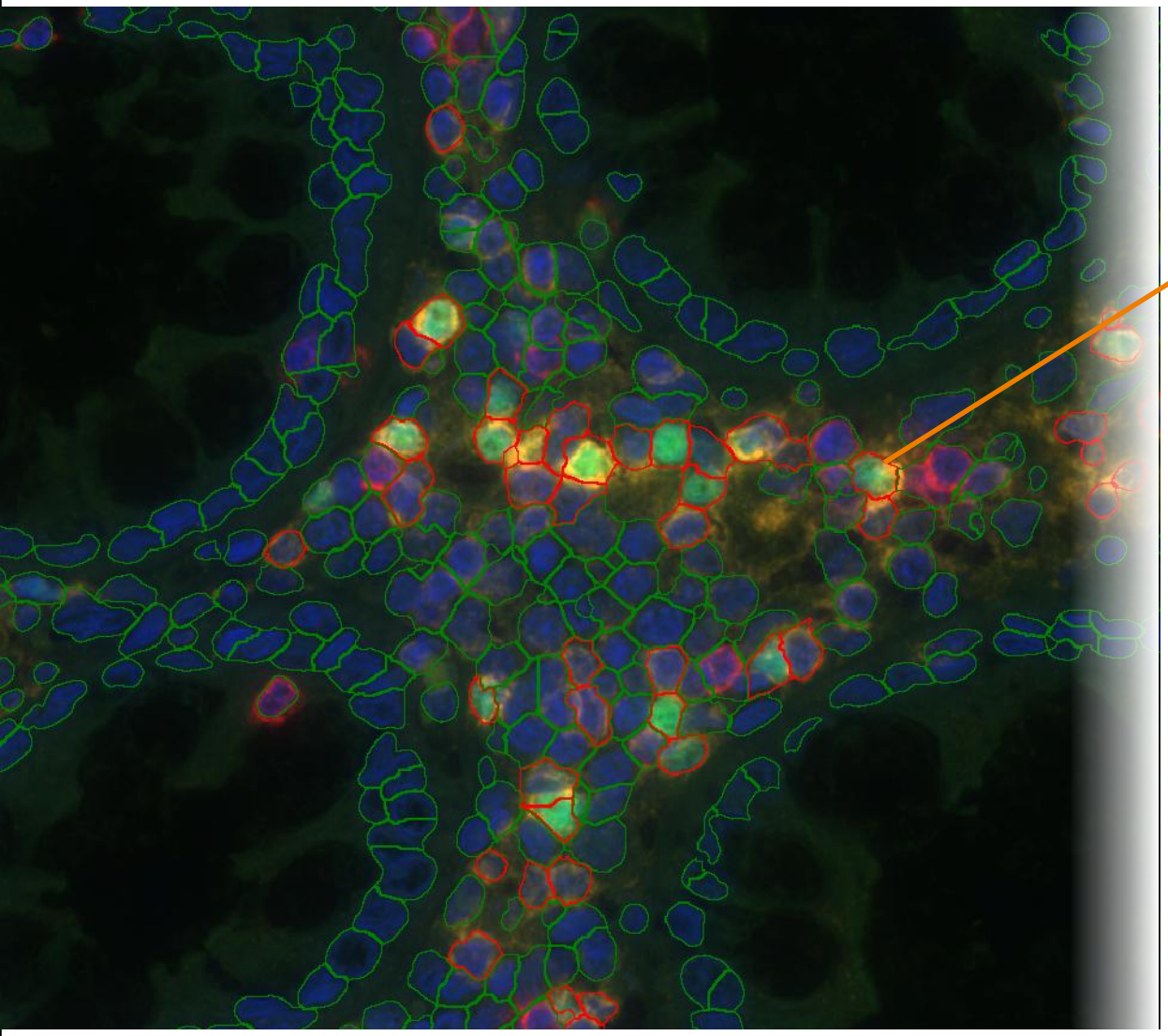
How many **CD4, CD8, Foxp3** cells are there in this image (in %)?

Nuclei detection

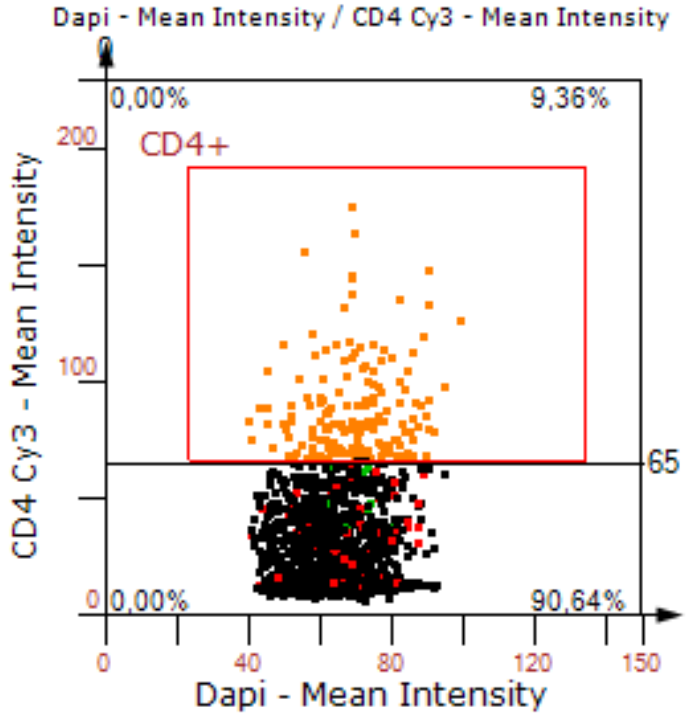
- DAPI
- CD4
- CD8
- Foxp3

Courtesy Dr. Melanie McCoy, University of Western Australia, Perth

Why we need TissueQuest?



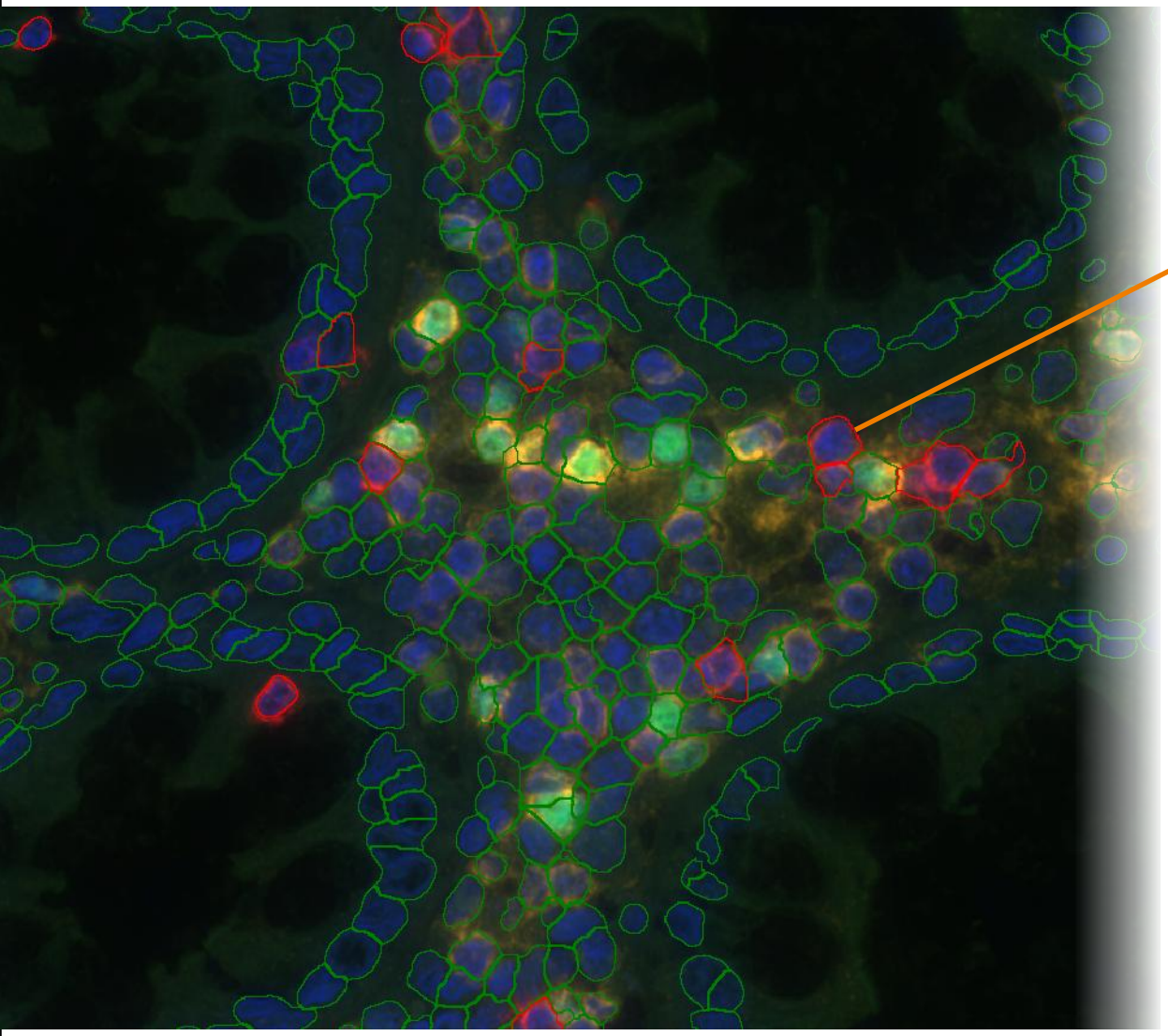
Detection of CD4 positive cells



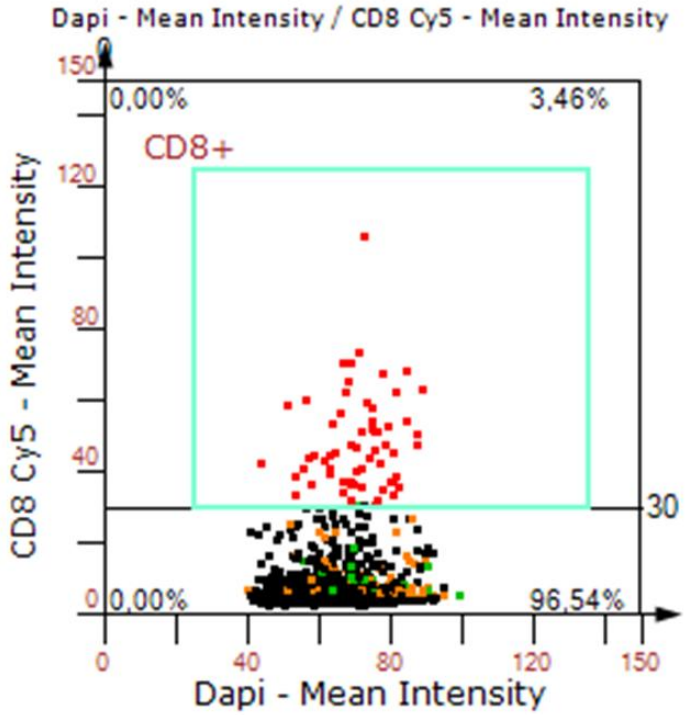
- DAPI
- CD4
- CD8
- Foxp3

Courtesy Dr. Melanie McCoy, University of Western Australia, Perth

Why we need TissueQuest?



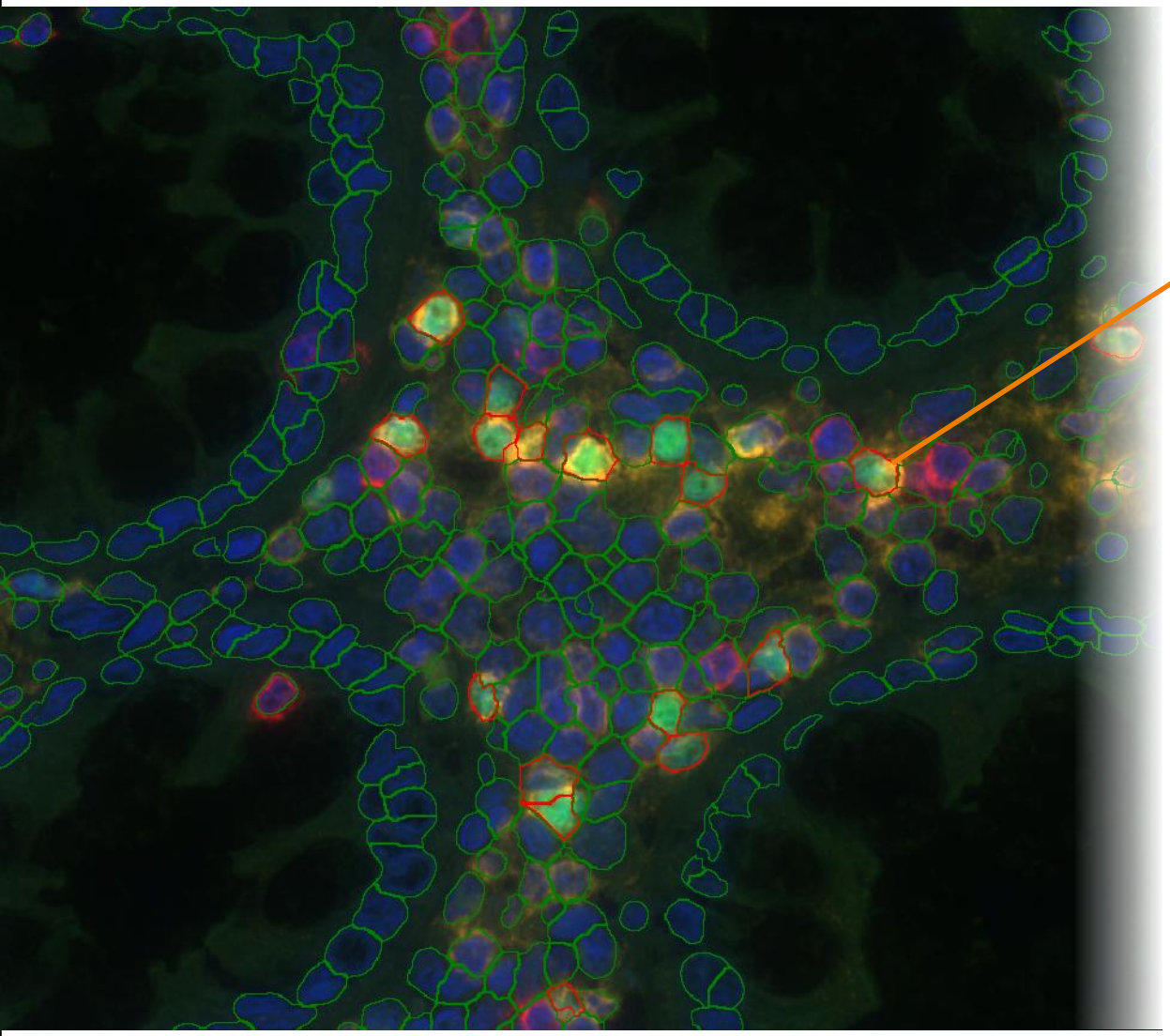
Detection of CD8 positive cells



- DAPI
- CD4
- CD8
- Foxp3

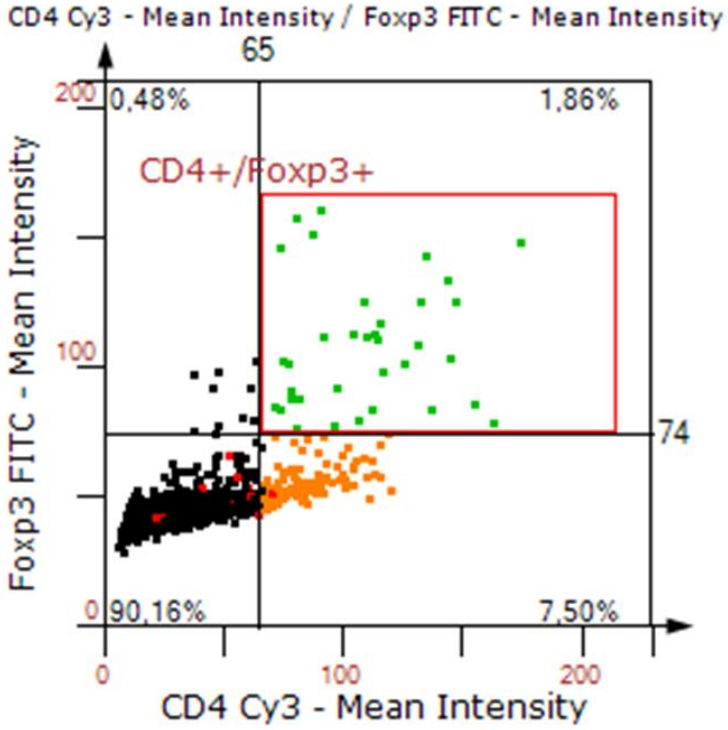
Courtesy Dr. Melanie McCoy, University of Western Australia, Perth

Why we need TissueQuest?



Courtesy Dr. Melanie McCoy, University of Western Australia, Perth

Detection of CD4+/Foxp3+ cells



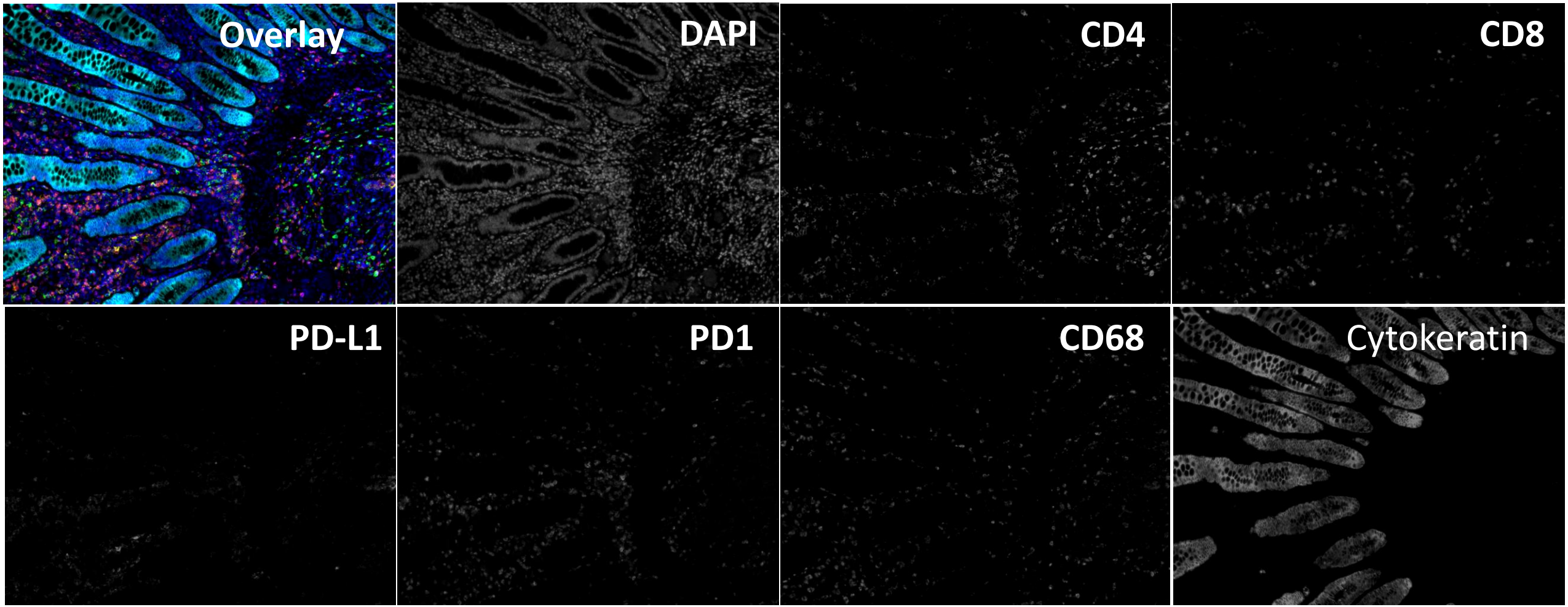
- DAPI
- CD4
- CD8
- Foxp3

TissueQuest Workflow

TISSUEGNOSTICS
PRECISION THAT INSPIRES

1. Import Single channel images

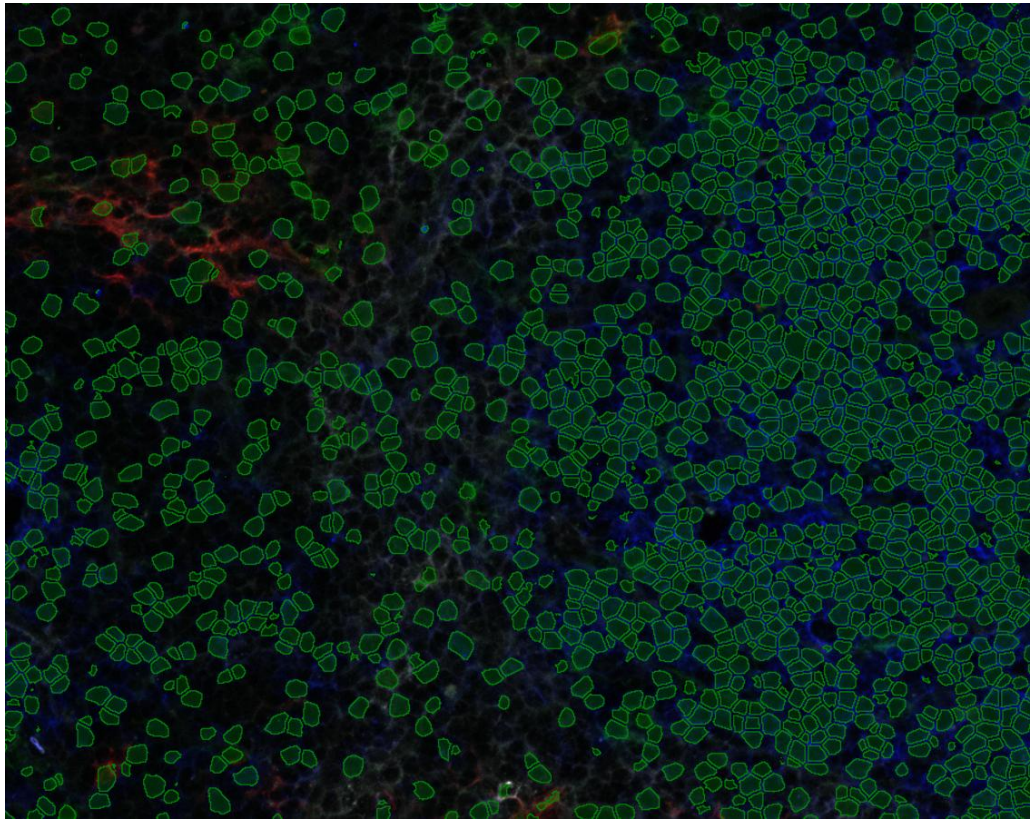
NO upper limits of marker imported !



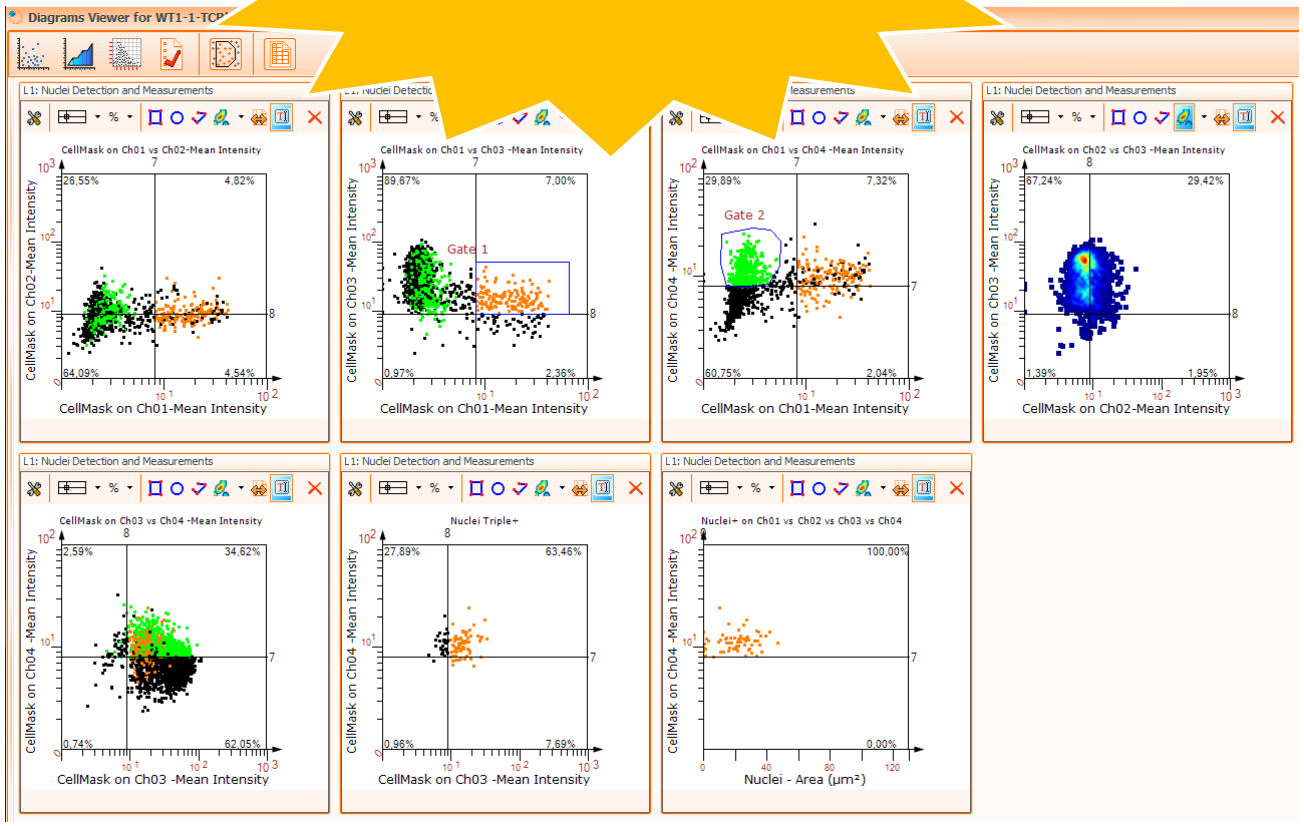
TissueQuest Workflow

TISSUEGNOSTICS
PRECISION THAT INSPIRES

2. Automatically identified cells –



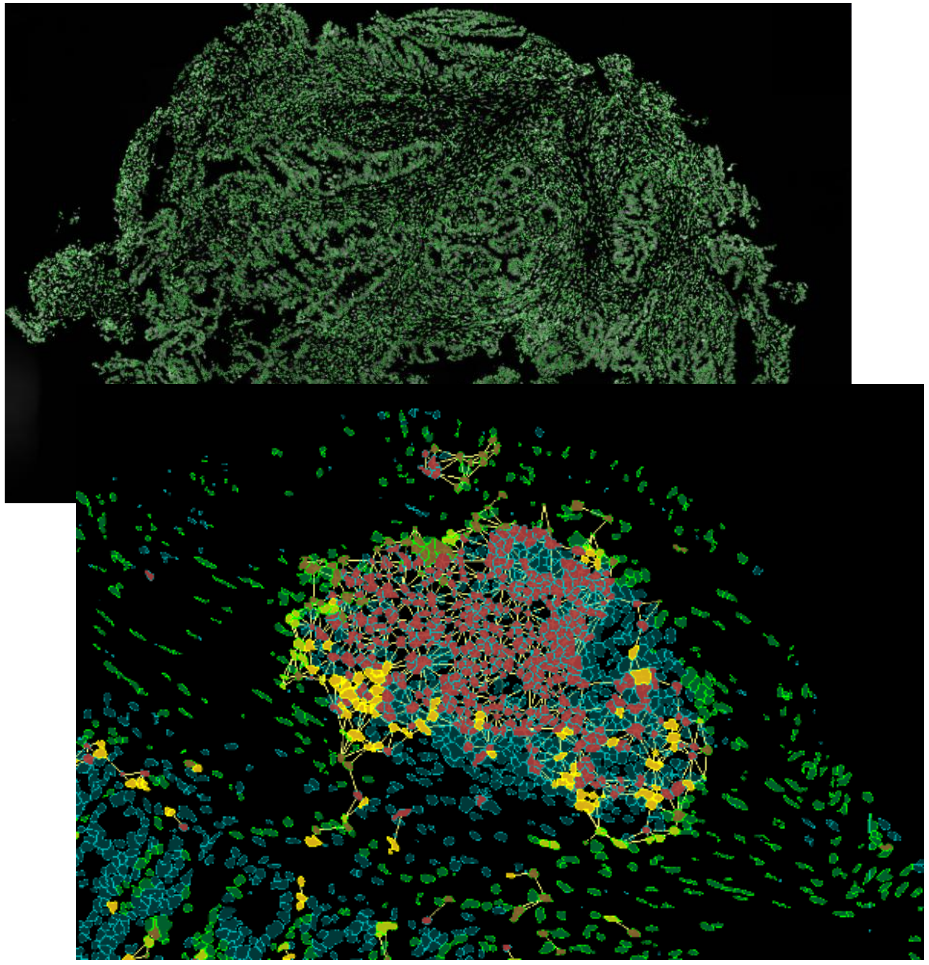
Get Your Results !!



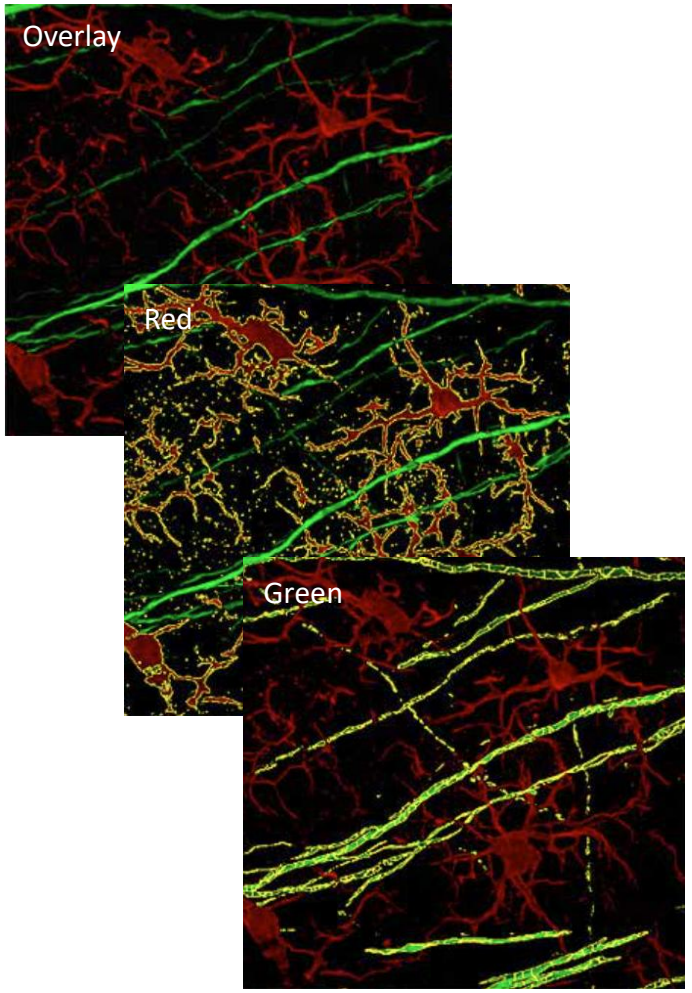
TissueQuest Analysis algorithm

TISSUEGNOSTICS
PRECISION THAT INSPIRES

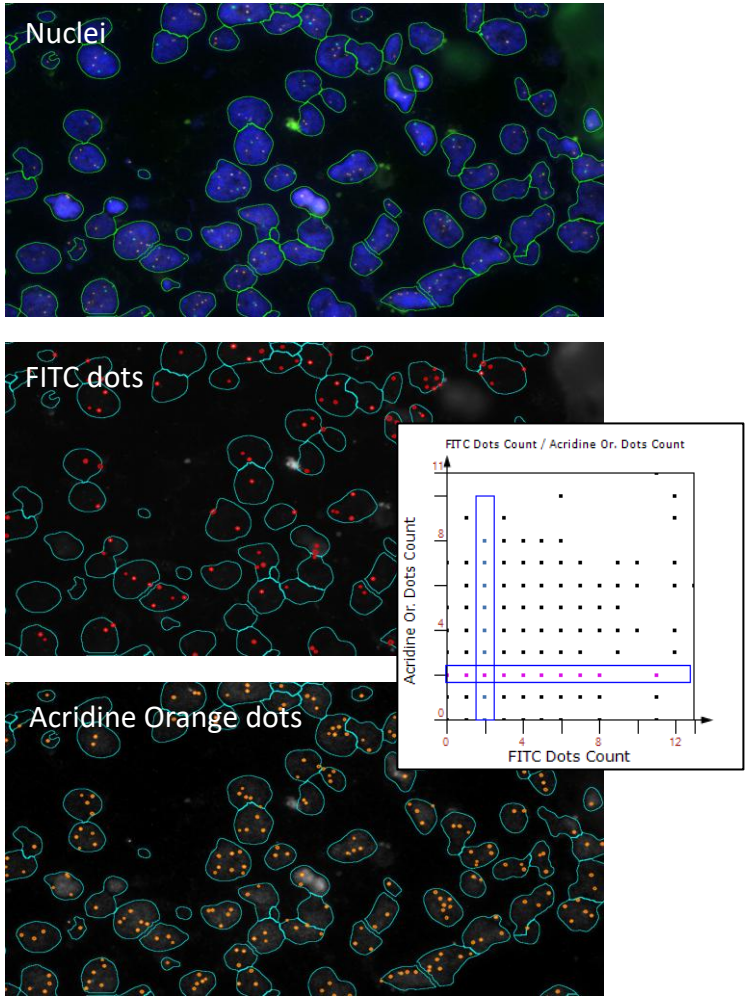
- Single Cell Segmentation



- Total Area Measurement

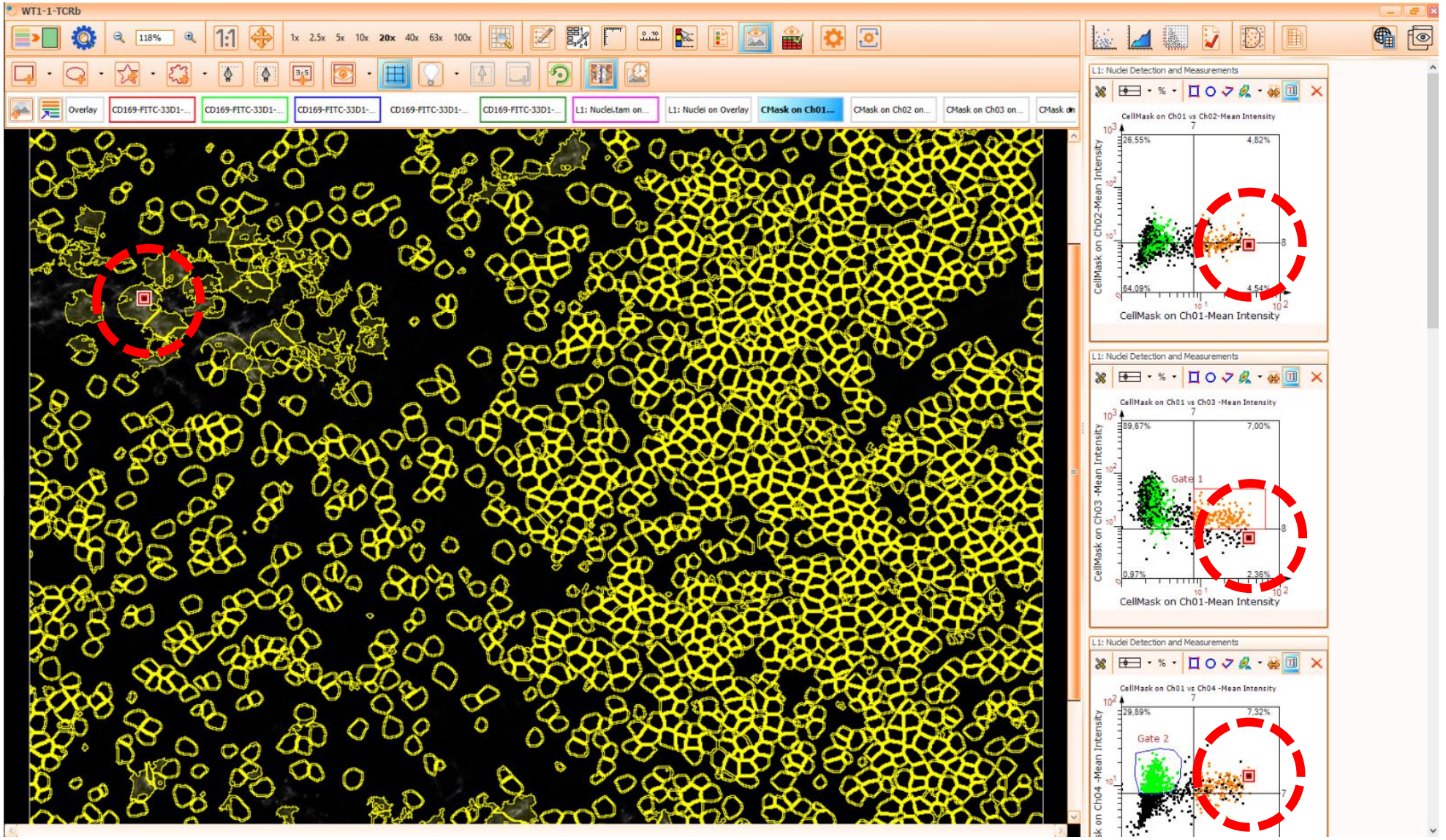


- Dots Detection



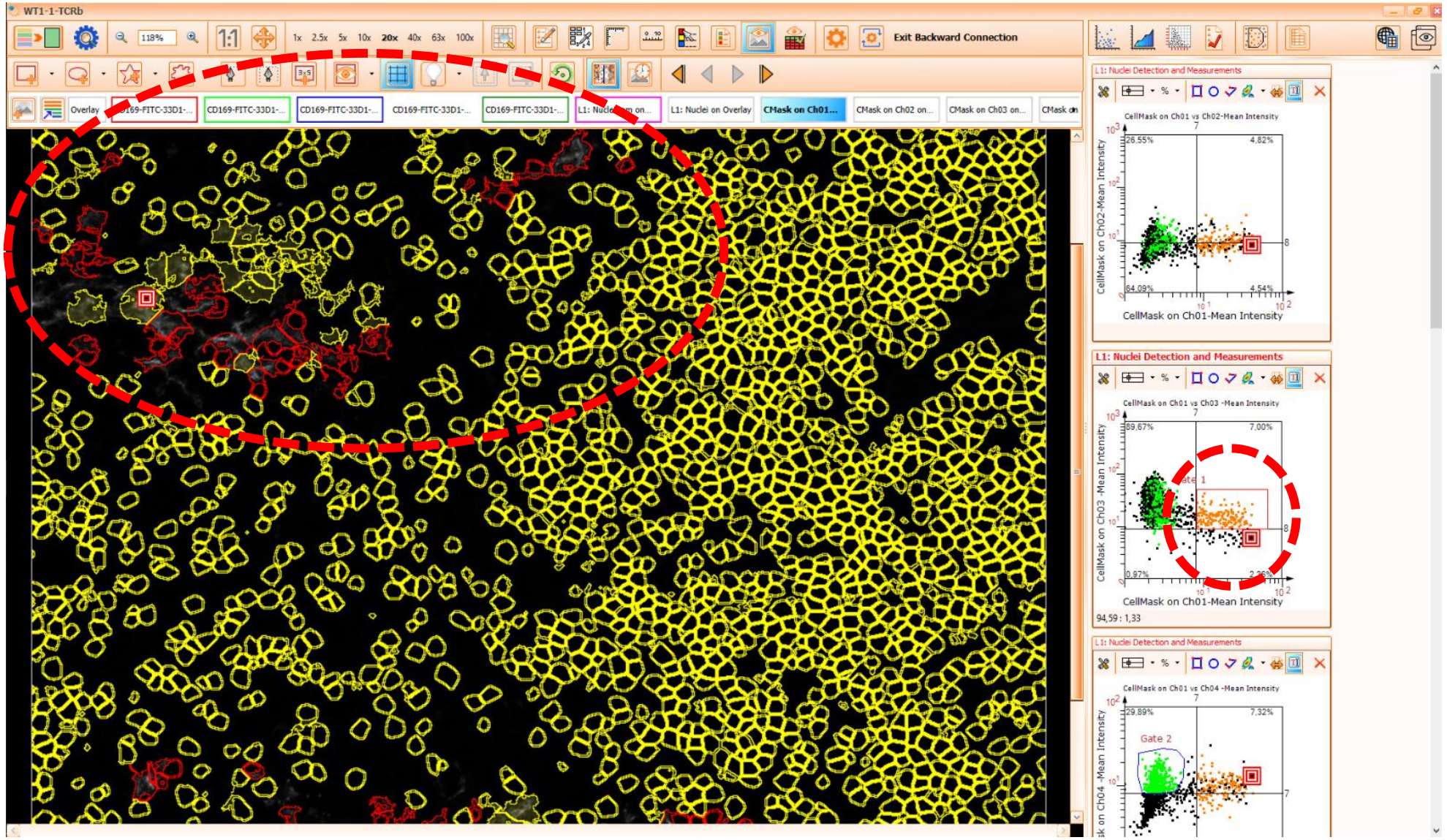
Forward Gating: Seeing is Believing

TISSUEGNOSTICS
PRECISION THAT INSPIRES



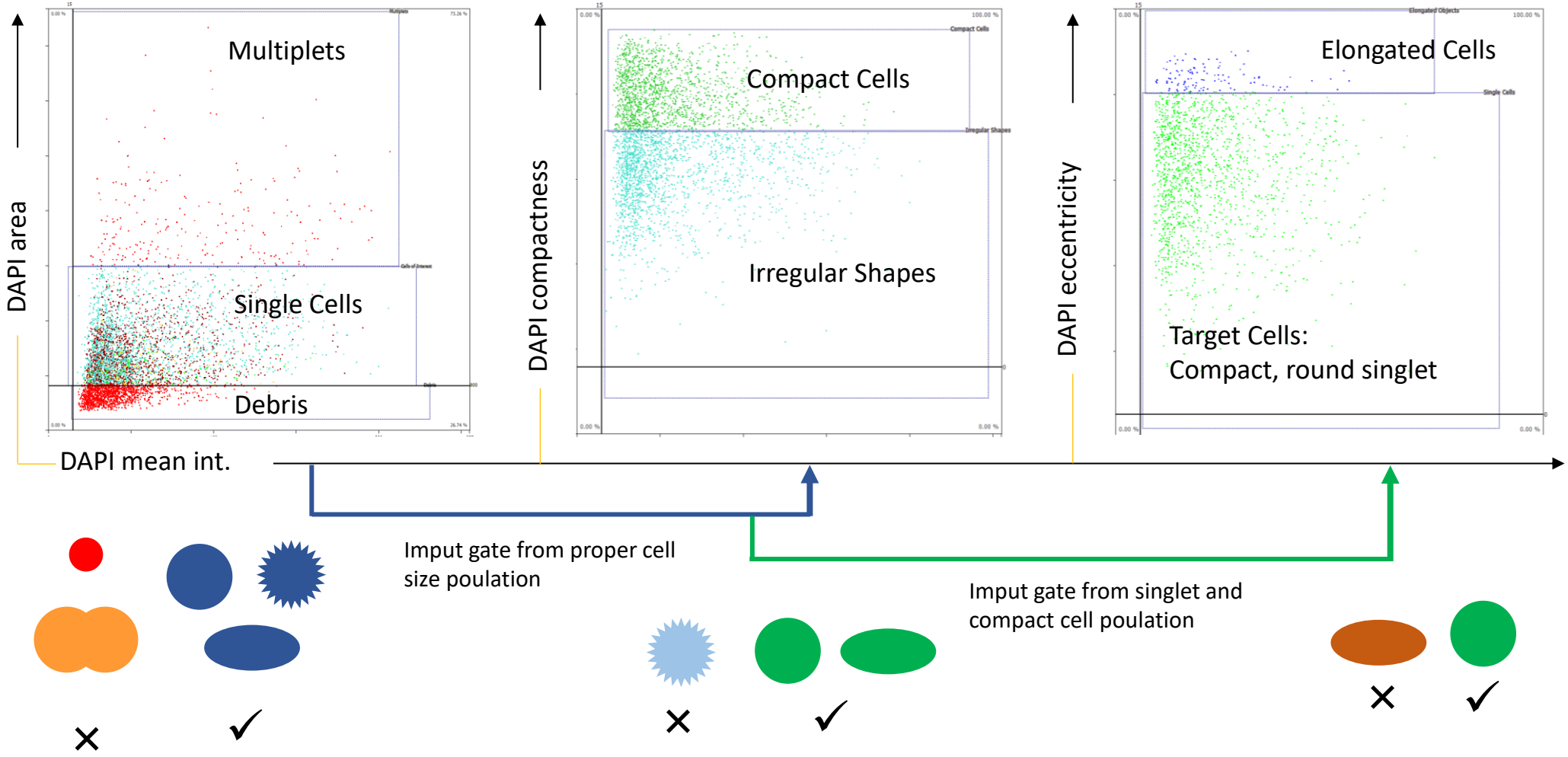
Backward Gating: In-situ analysis

TISSUEGNOSTICS
PRECISION THAT INSPIRES



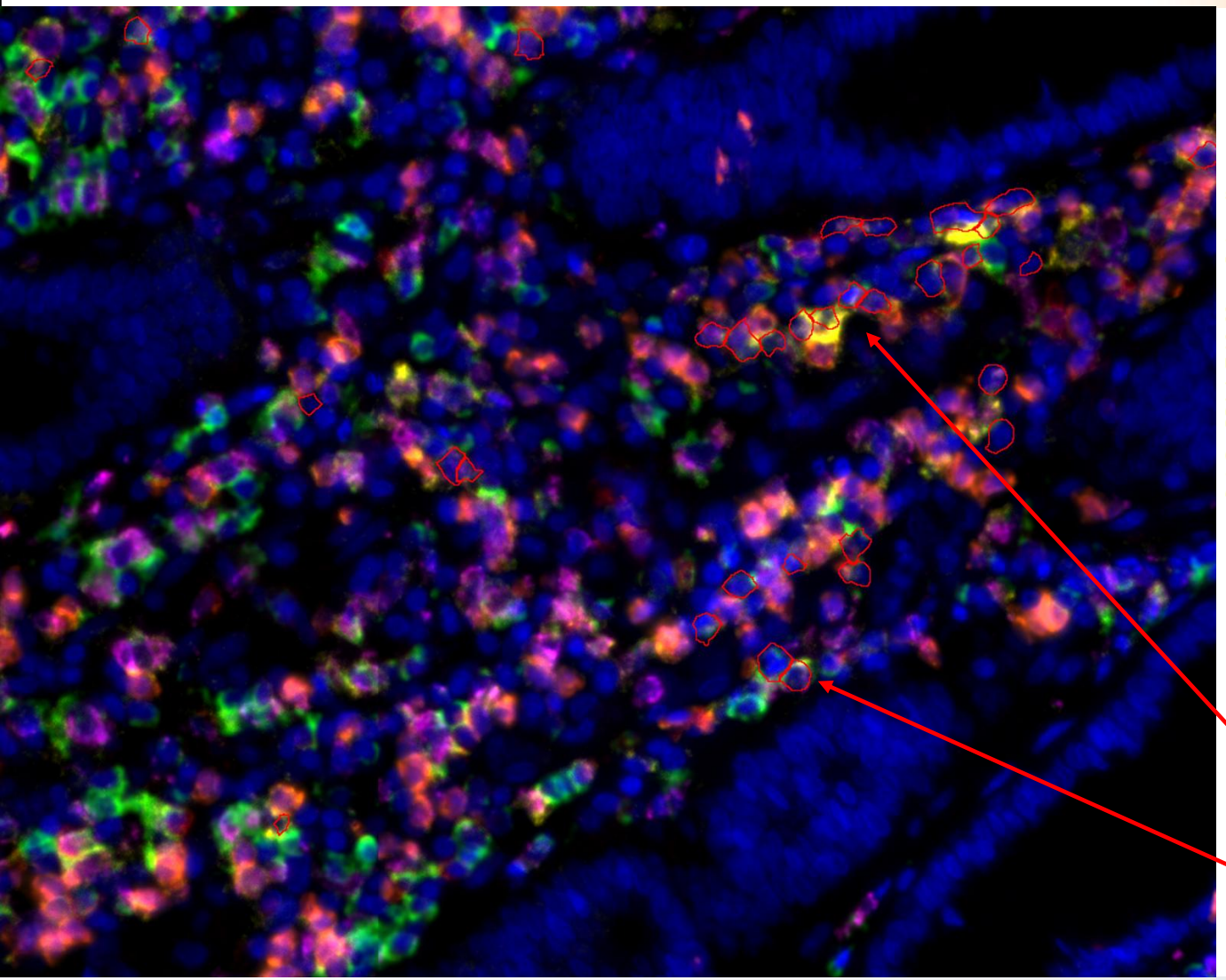
Logical Gating: Precise analysis

TISSUEGNOSTICS
PRECISION THAT INSPIRES

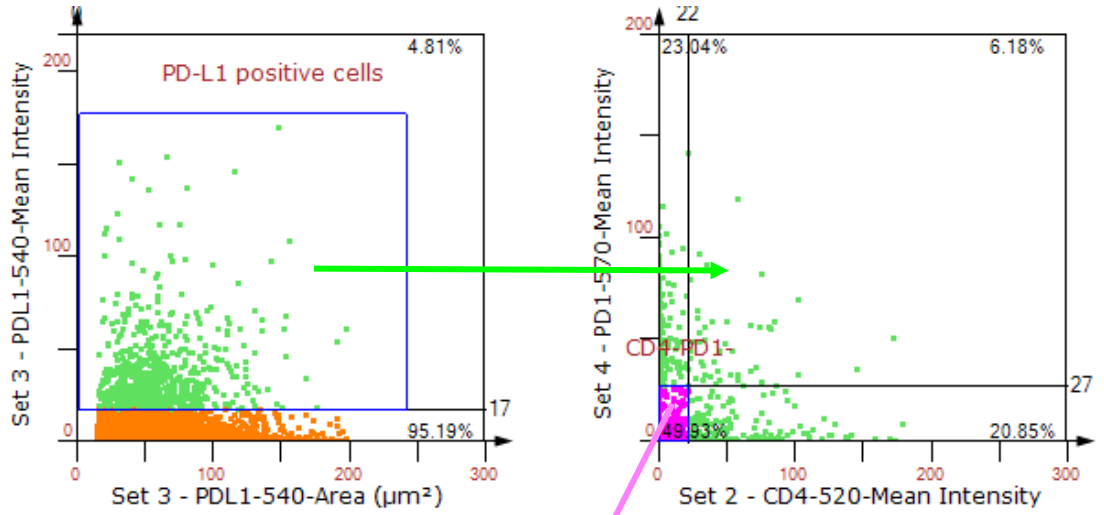


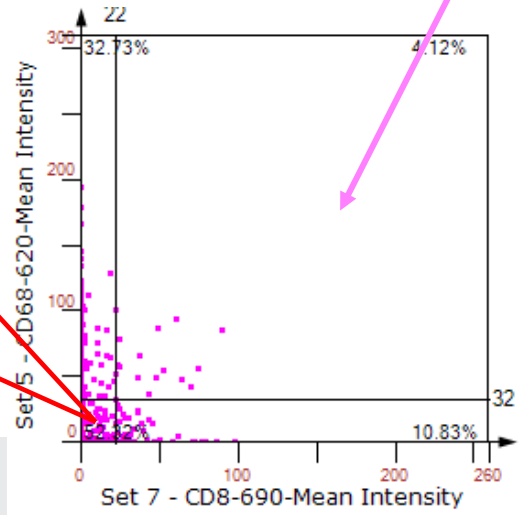
7-channel Spatial phenotyping in colon cancer

TISSUEGNOSTICS
PRECISION THAT INSPIRES



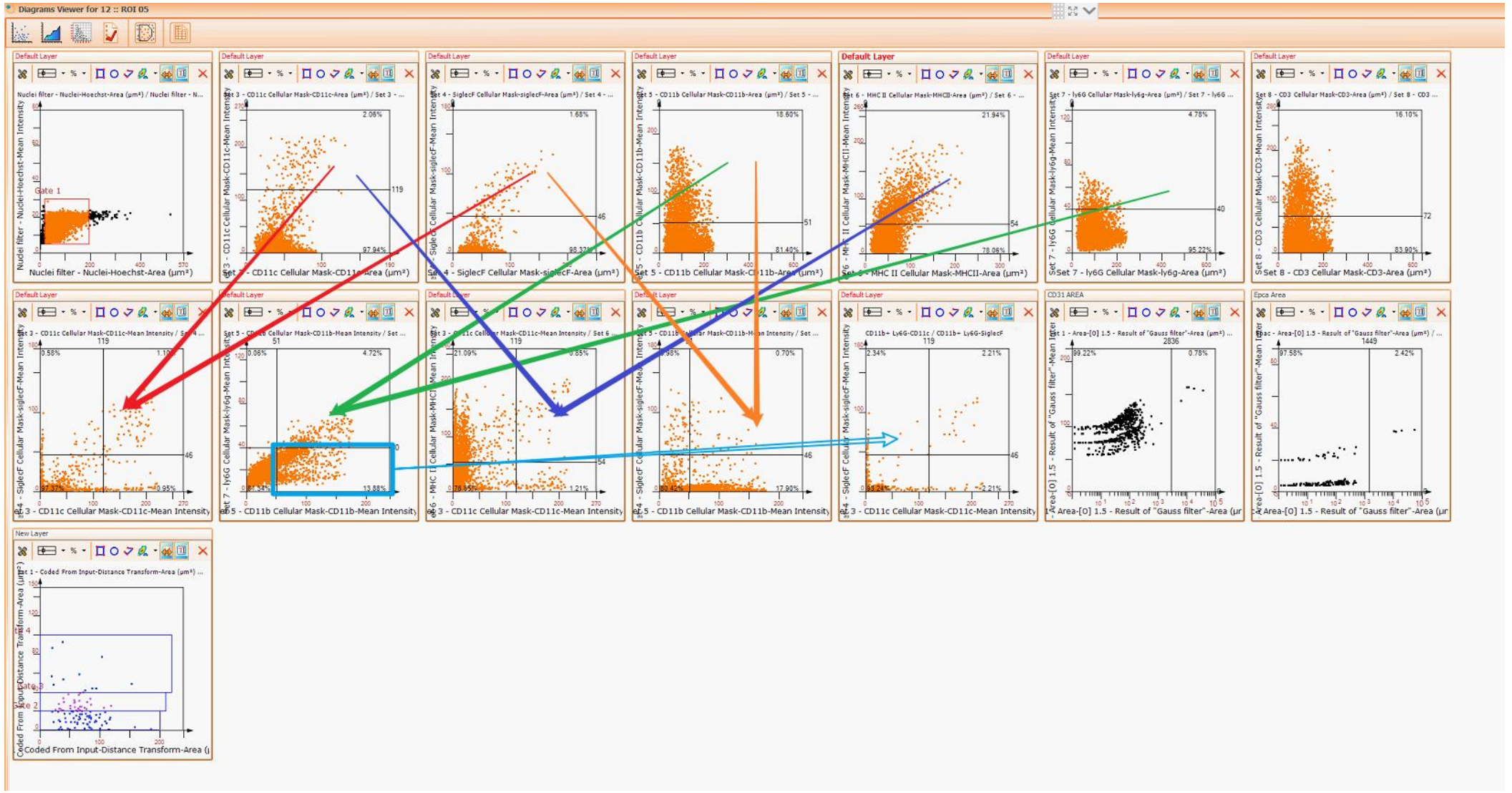
PD-L1+/CD4-/PD1-/CD8-/CD68-cells





7-channel Spatial phenotyping in colon cancer

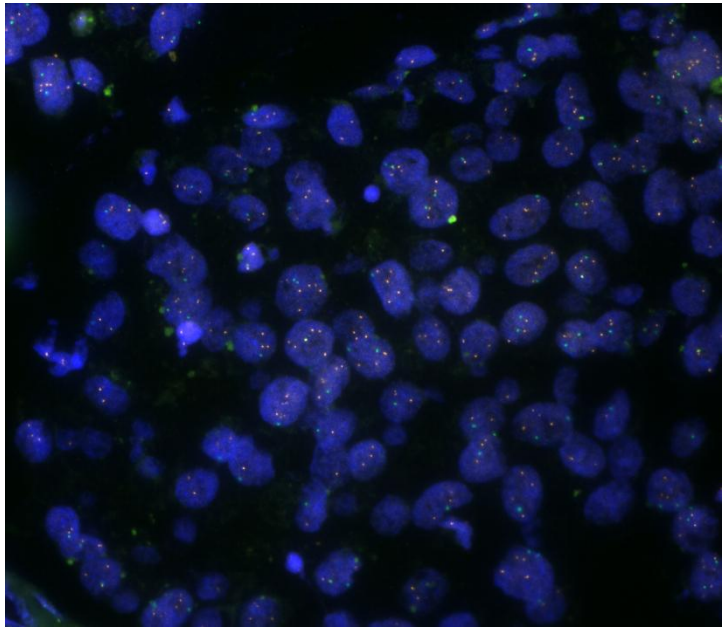
TISSUEGNOSTICS
PRECISION THAT INSPIRES

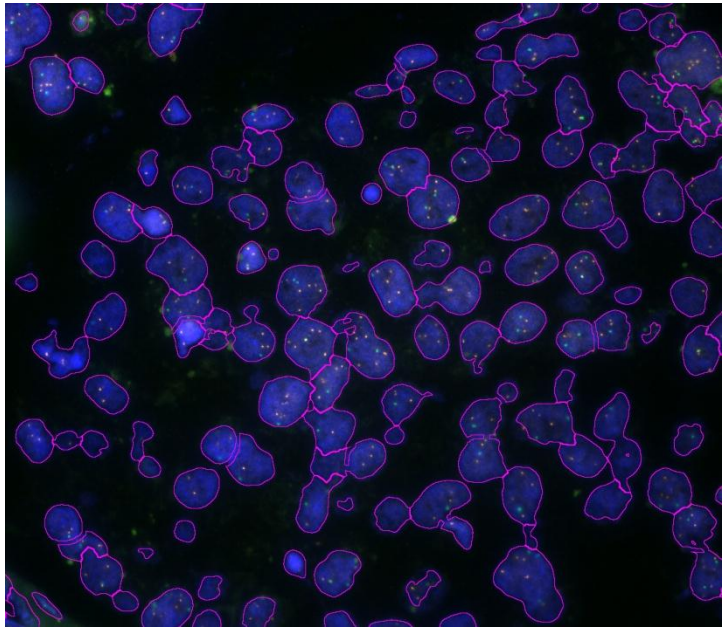


TissueFAXS – „DotFinder“ Algorithm

TISSUEGNOSTICS
PRECISION THAT INSPIRES

- Nuclear Identification by DAPI



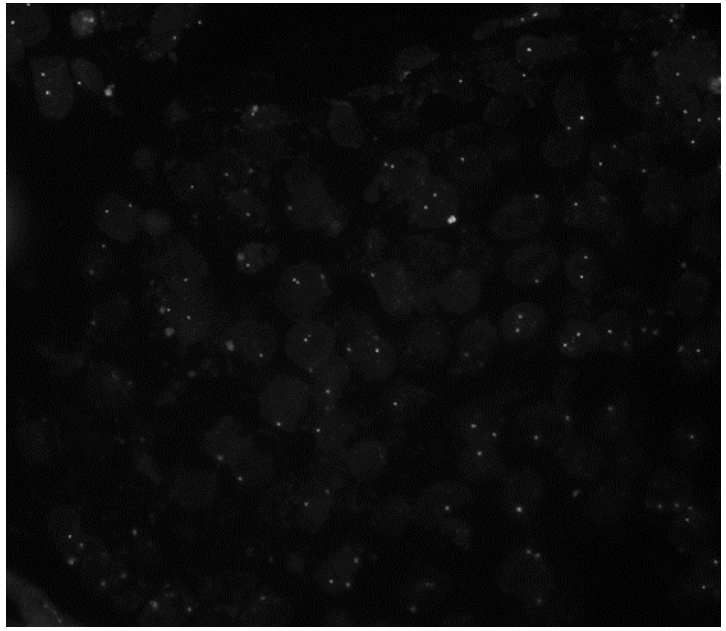


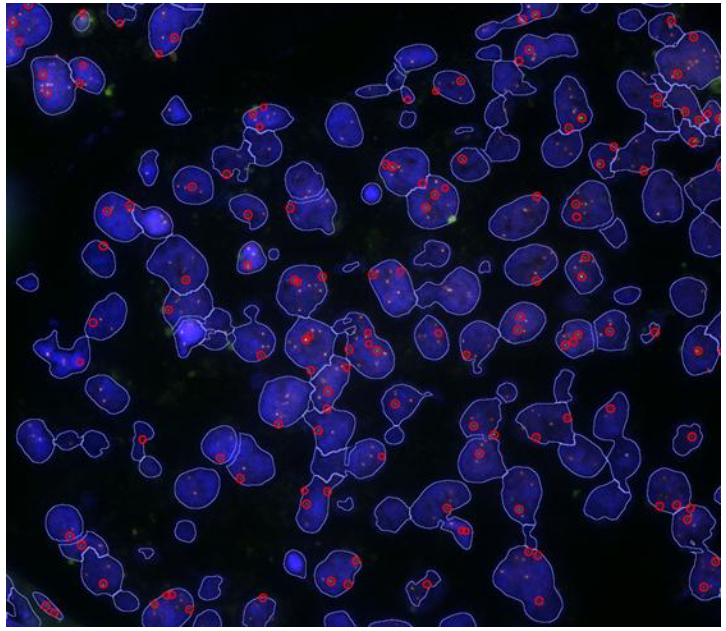
Identifies and quantifies dots optionally in the nucleus or in the cytoplasm

TissueFAXS – „DotFinder“ Algorithm

TISSUEGNOSTICS
PRECISION THAT INSPIRES

- Green Dots Count



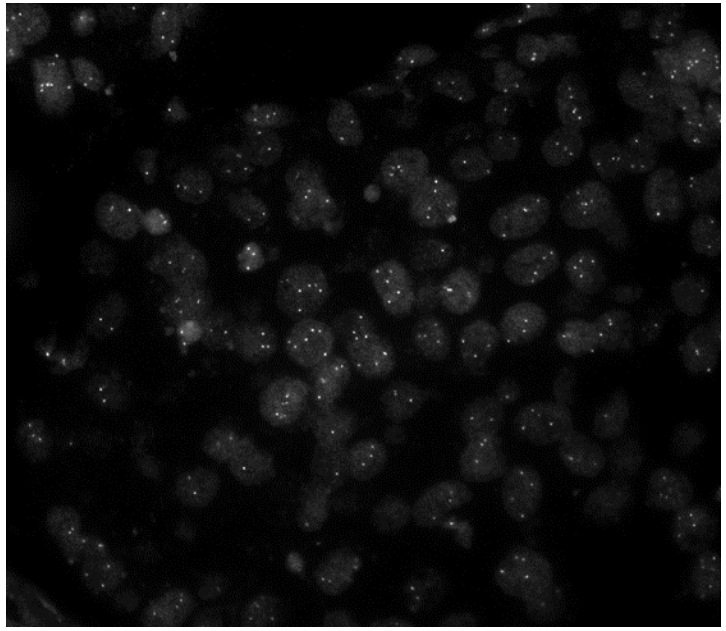


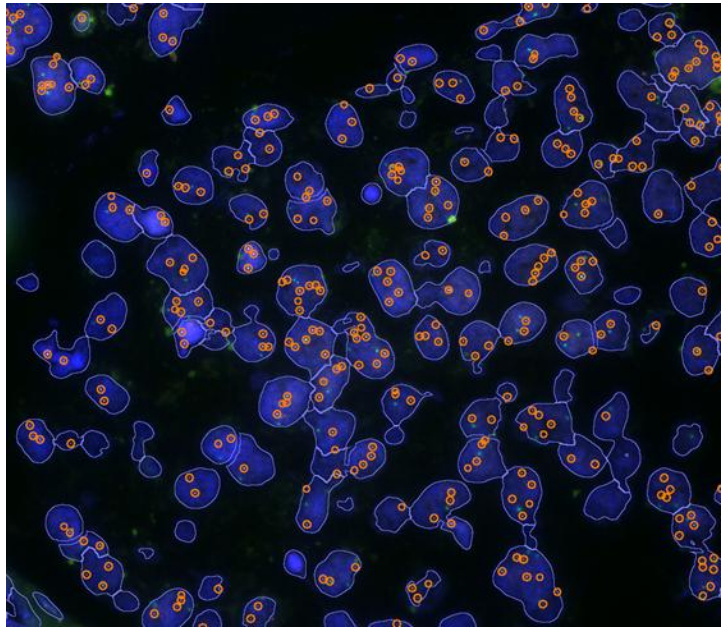
Identifies and quantifies dots optionally in the nucleus or in the cytoplasm

TissueFAXS – „DotFinder“ Algorithm

TISSUEGNOSTICS
PRECISION THAT INSPIRES

- Orange Dots Count



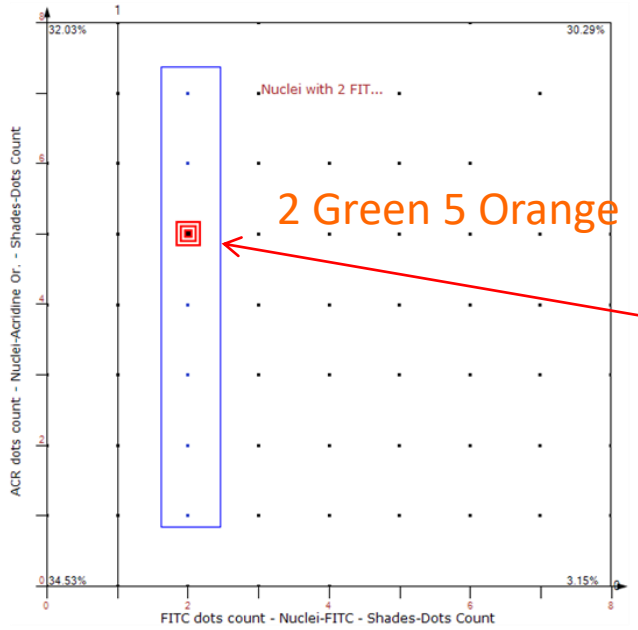


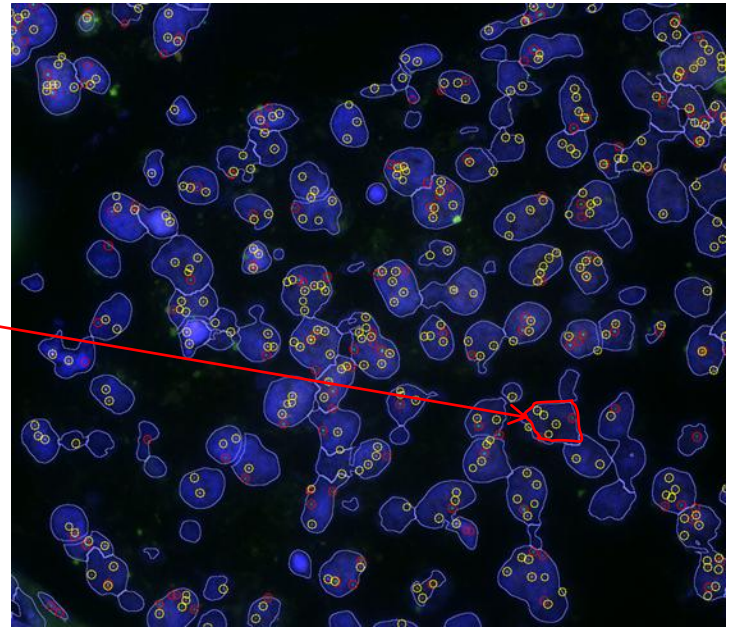
Identifies and quantifies dots optionally in the nucleus or in the cytoplasm

TissueFAXS – „DotFinder“ Algorithm

TISSUEGNOSTICS
PRECISION THAT INSPIRES

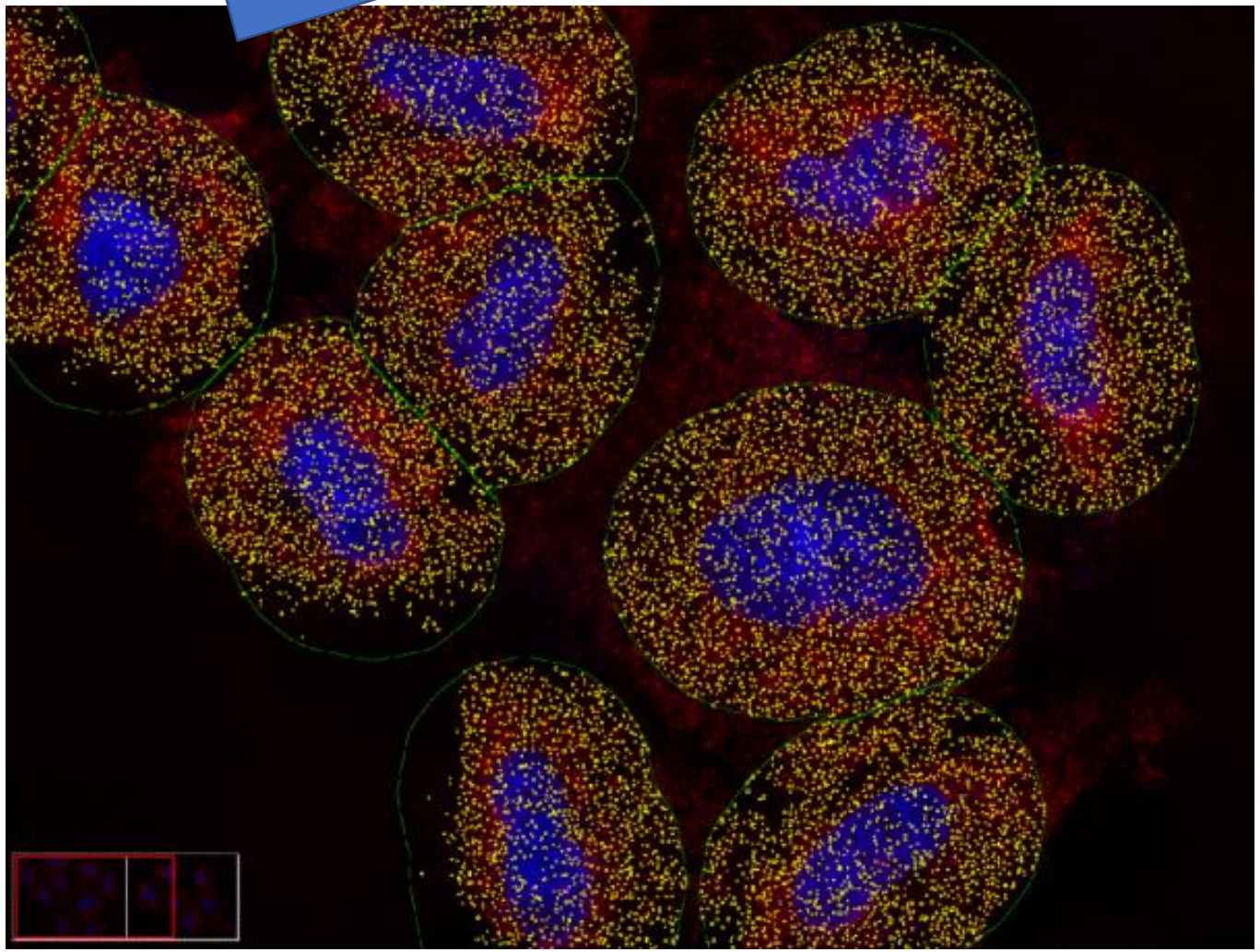
- Green dots and Orange dots finding results





Identifies and quantifies dots optionally in the nucleus or in the cytoplasm

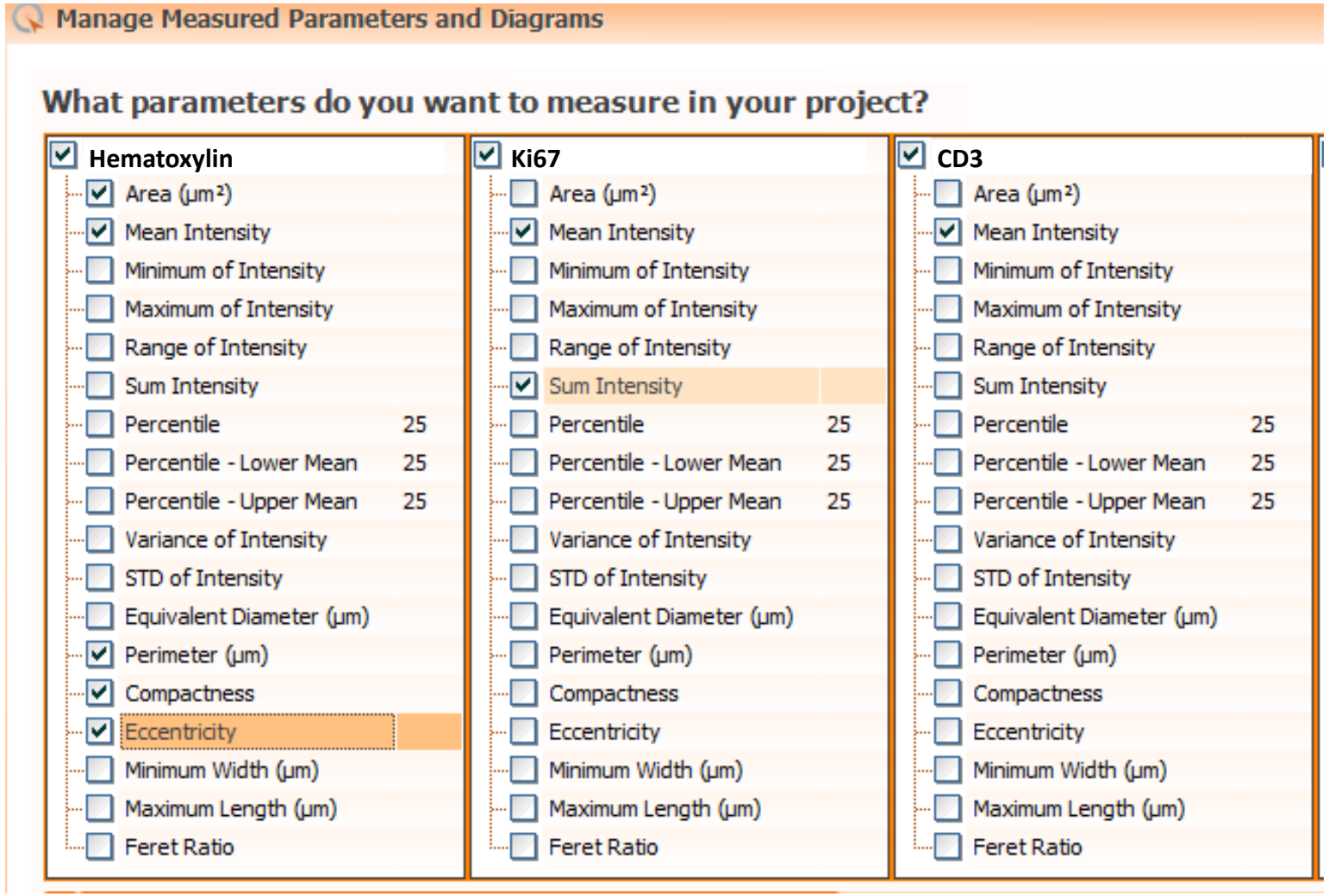
Example of detection of all dots from the image with all z-levels merged, within a given range (“ring mask”) from the automatically detected nuclear border



Identifies and quantifies dots optionally in the nucleus or in the cytoplasm

18 Parameters in Each Channel

TISSUEGNOSTICS
PRECISION THAT INSPIRES



One Click Report Generator

TISSUEGNOSTICS
PRECISION THAT INSPIRES

CYCLIN D1 analysis

Date of analysis 2021/12/1 上午 10:20:32

TISSUEGN
PRECISION THAT IN

HistoQuest Report

Experiment name	CYCLIN D1 analysis
Experiment description	mouse 76day, treattment A drug
Product version	7.1.1.117
Location	D:\TissueGnostics\Demo projects\Advanced project\CYCLIN D1
Segmentation method	Nuclear Segmentation
Color Separation method	Single Reference Shade
Institution name	
Department	
Laboratory	

Experiment Markers

Marker name: Cyclin D	Original

Segmentation Method Parameters

Parameter	Value
Use Ring Mask	Yes
Interior Radius	-0.24µm
Exterior Radius	0.48µm
Use Identified Cell Mask	Outside
Max Growing Steps	10.63µm
Skip Steps	0µm
Use Nuclei Mask	Yes
Automatic Background Threshold	No
Background Threshold	25

CYCLIN D1 analysis

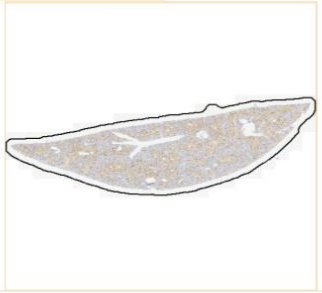
Date of analysis 2021/12/1 上午 10:20:32

TISS

Project Items

Cyclin D1 - Region 003: Region 003

Objective:	20x
Rows count:	11
Columns count:	23
FOV's count:	169
FOV Size:	0.494561821 mm/ 0.371493489 mm
Area:	23.309628 mm²
Status:	Processed (169 out of 169 FOVs)
Comment:	



1. Global Measurements

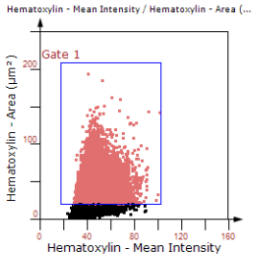
Area	23.31 m
Perimeter	25.36m

CYCLIN D1 analysis

Date of analysis 2021/12/1 上午 10:20:32

TISS

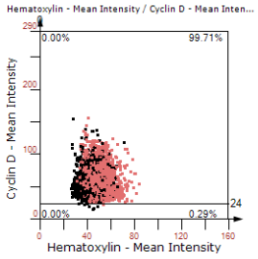
Hematoxylin - Mean Intensity / Hematoxylin - Area (µm²)



Overall Statistics

Quadrant	Mean of Hematoxylin - Mean Intensity	Mean of Hematoxylin - Area (µm²)	Count
Overall	46.834	29.442	63016
Gate 1	49.308	39.384	40406

Hematoxylin - Mean Intensity / Cyclin D - Mean Intensity



Overall Statistics

CYCLIN D1 analysis

Date of analysis 2021/12/1 上午 10:20:32

TISSUEGNOSTICS
PRECISION THAT INSPIRES

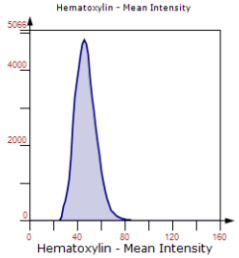
Quadrant	Mean of Hematoxylin - Mean Intensity	Mean of Cyclin D - Mean Intensity	Count	Percent	No./mm2
UL	0.000	0.000	0	0.00%	0.000
UR	46.837	59.758	62832	99.71%	2695.538
LL	0.000	0.000	0	0.00%	0.000
LR	45.886	20.351	184	0.29%	7.894
Overall	46.834	59.643	63016	100.00%	2703.432
Gate 1	49.308	60.598	40406	64.12%	1733.447

Gate 1

Quadrant	Mean of Hematoxylin - Mean Intensity	Mean of Cyclin D - Mean Intensity	Count	Percent	No./mm2
UL	0.000	0.000	0	0.00%	0.000
UR	49.305	60.657	40346	99.85%	1730.873
LL	0.000	0.000	0	0.00%	0.000
LR	51.291	21.313	60	0.15%	2.574
Overall	49.308	60.598	40406	100.00%	1733.447

3. Histograms

Hematoxylin - Mean Intensity



Overall Statistics

Quadrant	Mean of Hematoxylin - Mean Intensity	Count	Percent	No./mm2
Overall	46.834	63016	100.00%	2703.432

List Mode data

TISSUEGNOSTICS
PRECISION THAT INSPIRES

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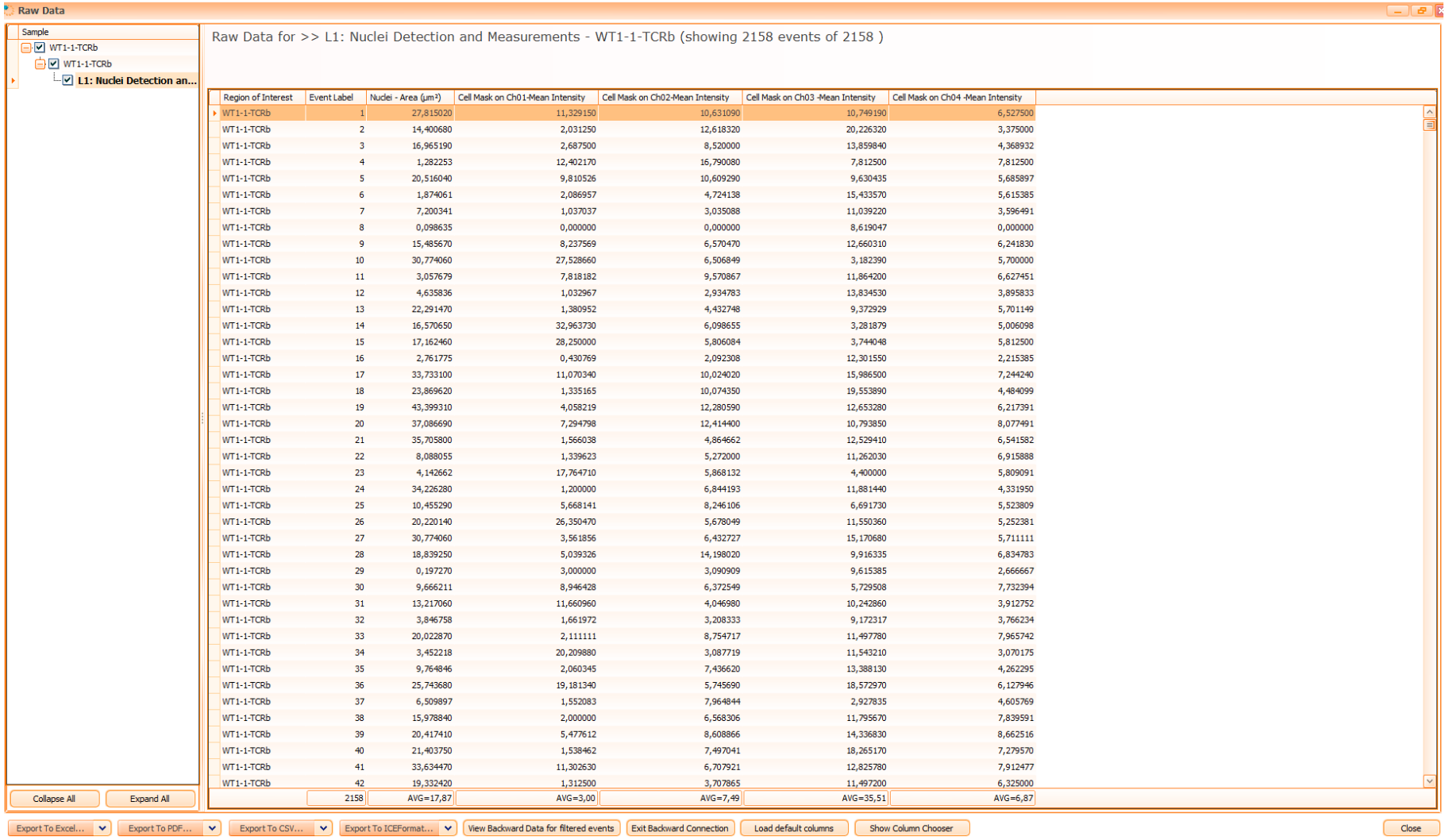
.csv



Region of Interest	Event Label	Nuclei - Area (µm²)	Cell Mask on Ch01-Mean Intensity	Cell Mask on Ch02-Mean Intensity	Cell Mask on Ch03 -Mean Intensity	Cell Mask on Ch04 -Mean Intensity
WT1-1-TCRb	1	27,815020	11,329150	10,631090	10,749190	6,527500
WT1-1-TCRb	2	14,400680	2,031250	12,618320	20,226320	3,375000
WT1-1-TCRb	3	16,965190	2,687500	8,520000	13,859840	4,368932
WT1-1-TCRb	4	1,282253	12,402170	16,790080	7,812500	7,812500
WT1-1-TCRb	5	20,516040	9,810526	10,609290	9,630435	5,685897
WT1-1-TCRb	6	1,874061	2,086957	4,724138	15,433570	5,615385
WT1-1-TCRb	7	7,200341	1,037037	3,035088	11,039220	3,596491
WT1-1-TCRb	8	0,098635	0,000000	0,000000	8,619047	0,000000
WT1-1-TCRb	9	15,485670	8,237569	6,570470	12,660310	6,241830
WT1-1-TCRb	10	30,774060	27,528660	6,506849	3,182390	5,700000
WT1-1-TCRb	11	3,057679	7,818182	9,570867	11,864200	6,627451
WT1-1-TCRb	12	4,635836	1,032967	2,934783	13,834530	3,895833
WT1-1-TCRb	13	22,291470	1,380952	4,432748	9,372929	5,701149
WT1-1-TCRb	14	16,570650	32,963730	6,098655	3,281879	5,006098
WT1-1-TCRb	15	17,162460	28,250000	5,806084	3,744048	5,812500
WT1-1-TCRb	16	2,761775	0,430769	2,092308	12,301550	2,215385
WT1-1-TCRb	17	33,733100	11,070340	10,024020	15,986500	7,244240
WT1-1-TCRb	18	23,869620	1,335165	10,074350	19,553890	4,484099
WT1-1-TCRb	19	43,399310	4,058219	12,280590	12,653280	6,217391
WT1-1-TCRb	20	37,086690	7,294798	12,414400	10,793850	8,077491
WT1-1-TCRb	21	35,705800	1,566038	4,864662	12,529410	6,541582
WT1-1-TCRb	22	8,088055	1,339623	5,272000	11,262030	6,915888
WT1-1-TCRb	23	4,142662	17,764710	5,868132	4,400000	5,809091
WT1-1-TCRb	24	34,226280	1,200000	6,844193	11,881440	4,331950
WT1-1-TCRb	25	10,455290	5,668141	8,246106	6,691730	5,523809
WT1-1-TCRb	26	20,220140	26,350470	5,678049	11,550360	5,252381
WT1-1-TCRb	27	30,774060	3,561856	6,432727	15,170680	5,711111
WT1-1-TCRb	28	18,839250	5,039326	14,198020	9,916335	6,834783
WT1-1-TCRb	29	0,197270	3,000000	3,090909	9,615385	2,666667
WT1-1-TCRb	30	9,666211	8,946428	6,372549	5,729508	7,732394
WT1-1-TCRb	31	13,217060	11,660960	4,046980	10,242860	3,912752
WT1-1-TCRb	32	3,846758	1,661972	3,208333	9,172317	3,766234
WT1-1-TCRb	33	20,022870	2,111111	8,754717	11,497780	7,965742
WT1-1-TCRb	34	3,452218	20,209880	3,087719	11,543210	3,070175
WT1-1-TCRb	35	9,764846	2,060345	7,436620	13,388130	4,262295
WT1-1-TCRb	36	25,743680	19,181340	5,745690	18,572970	6,127946
WT1-1-TCRb	37	6,509897	1,552083	7,964844	2,927835	4,605769
WT1-1-TCRb	38	15,978840	2,000000	6,568306	11,795670	7,839591
WT1-1-TCRb	39	20,417410	5,477612	8,608866	14,336830	8,662516
WT1-1-TCRb	40	21,403750	1,538462	7,497041	18,265170	7,279570
WT1-1-TCRb	41	33,634470	11,302630	6,707921	12,825780	7,912477
WT1-1-TCRb	42	19,332420	1,312500	3,707865	11,497200	6,325000
	2158	AVG=17,87	AVG=3,00	AVG=7,49	AVG=35,51	AVG=6,87

Statistics Report

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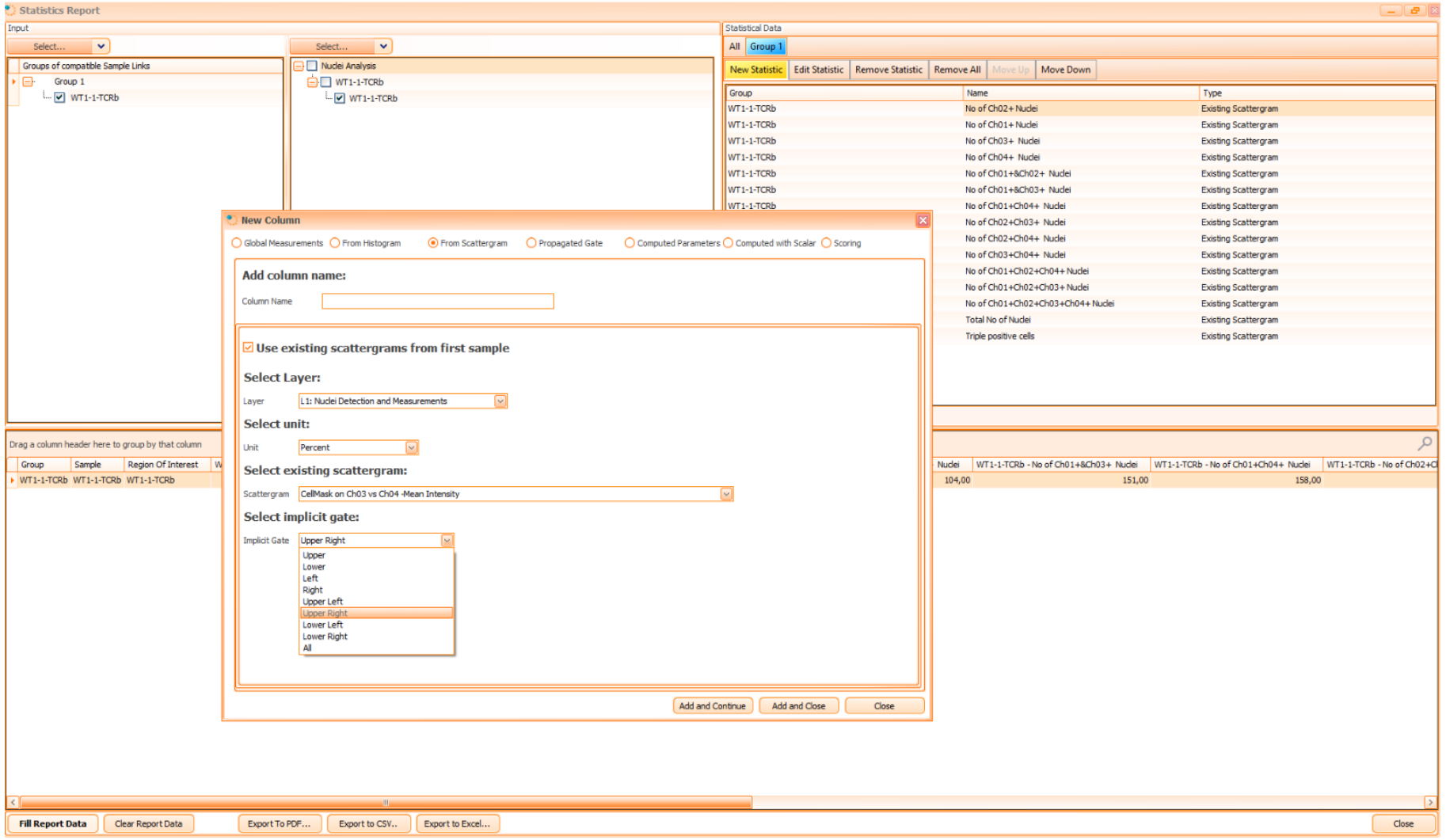

Is TG Accurate?

TISSUEGNOSTICS
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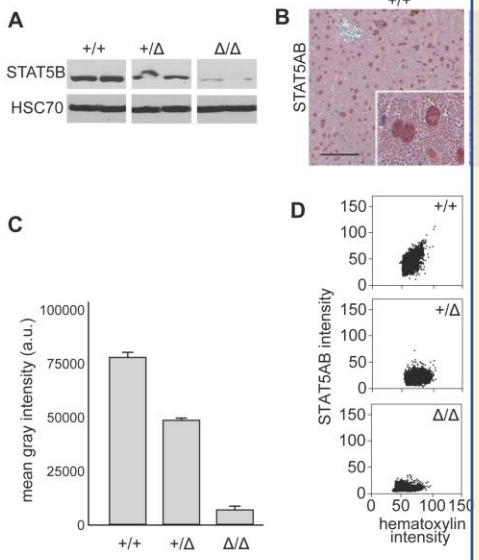
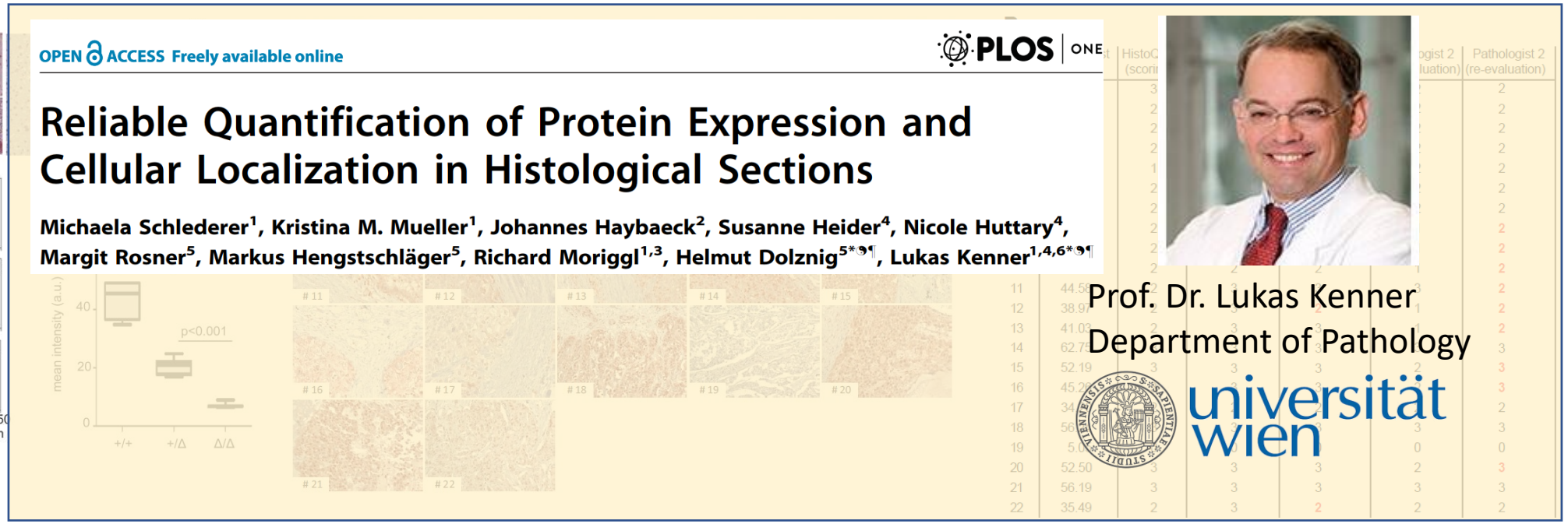
Compared with western blotting & pathologists quantification

- High correlation with WB results
- Align with pathologists
- Reproducibility & Standarization





OPEN ACCESS Freely available online

PLOS ONE

Reliable Quantification of Protein Expression and Cellular Localization in Histological Sections

Michaela Schlederer[1], Kristina M. Mueller[1], Johannes Haybaeck[2], Susanne Heider[4], Nicole Huttary[4], Margit Rosner[5], Markus Hengstschläger[5], Richard Moriggl[1,3], Helmut Dolznig[5*¶], Lukas Kenner[1,4,6*¶]

Prof. Dr. Lukas Kenner
Department of Pathology
universität wien

Lukas Kenner et.,al. Plos One, 2014

Import Images from 3rd parties

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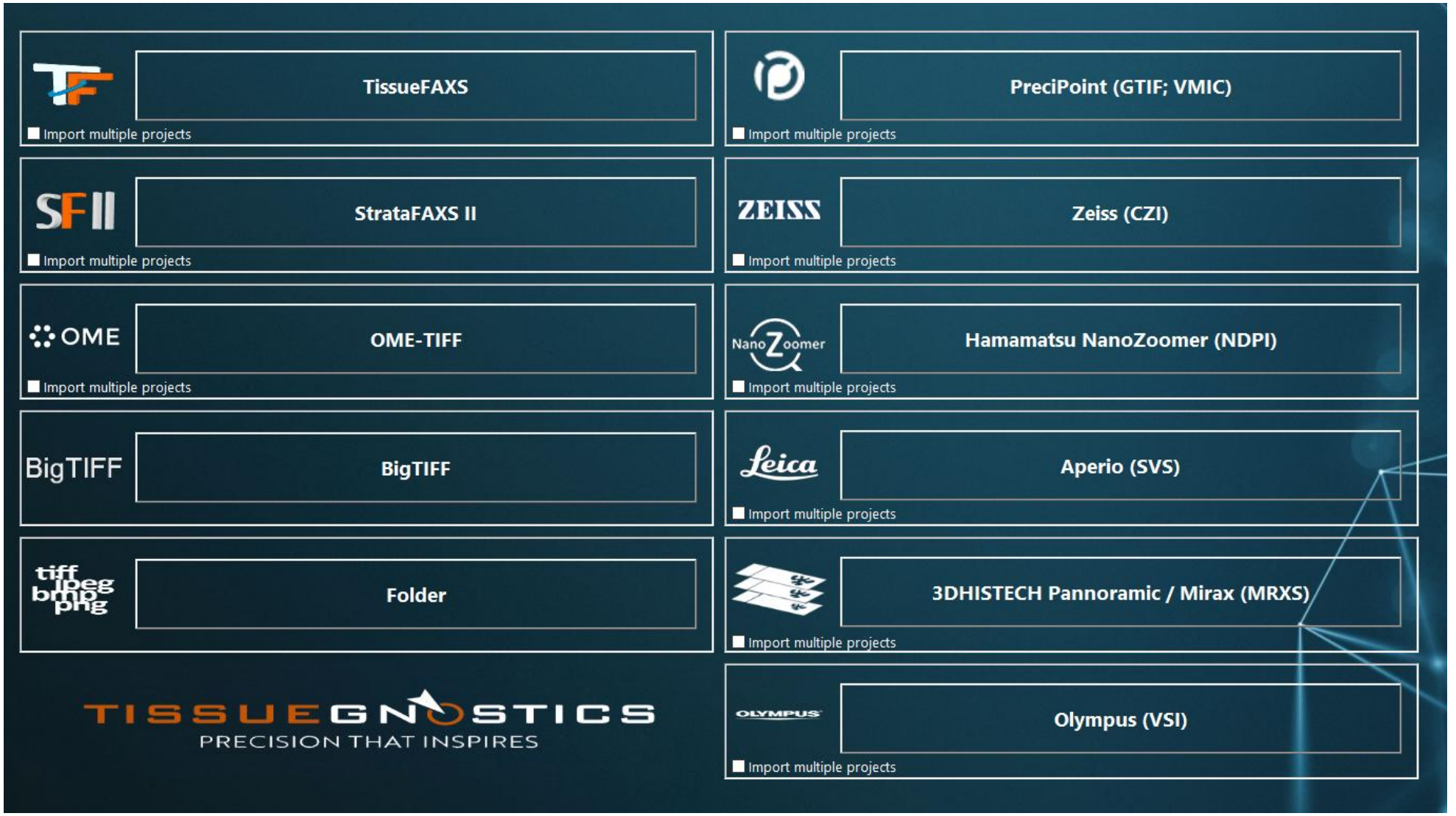

Publications

Signalling Molecules in Apoptosis

TISSUEGNOSTICS
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PNAS PNAS

Death receptor 5 mediated-apoptosis contributes to cholestatic liver disease

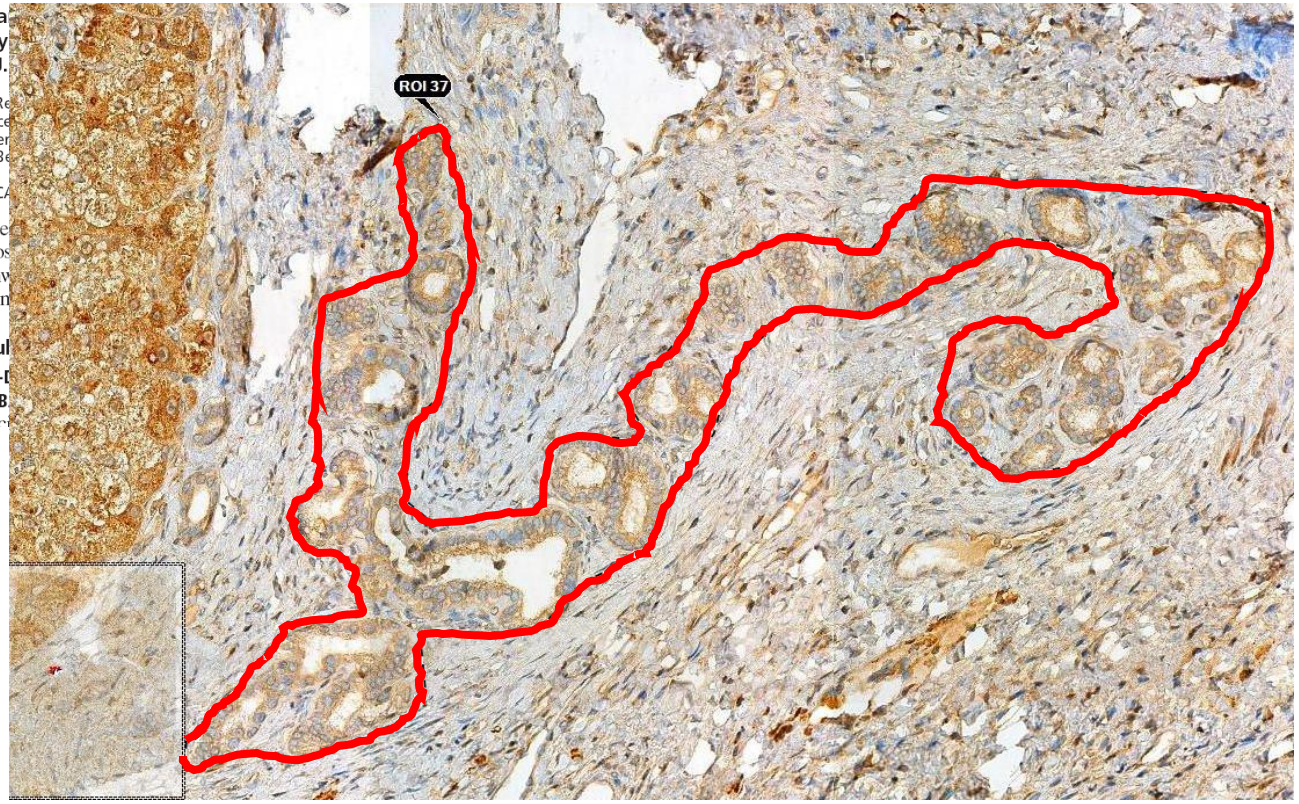
Kazuyoshi Takeda*†‡§, Yuko Kojima§¶, Kenichi Ikejima‖, Kenichi Ha
Tomonori Aoyama‖, Steffen Frese††, Hiroko Ikeda**, Nicole M. Hay
Noriyoshi Sueyoshi¶, Nobuhiro Sato‖, Yasuni Nakanuma**, Mark J.

*Department of Immunology, ¶Division of Biomedical Imaging Research, Biomedical Re
University School of Medicine, Hongo 2-1-1, Bunkyo-ku, Tokyo 113-8421, Japan; †Cance
Place, East Melbourne, Victoria 3002, Australia; **Human Pathology, Kanazawa Univer
and ††Department of Clinical Research, Laboratory of Thoracic Surgery, University of Be

Edited by Leonard A. Herzenberg, Stanford University School of Medicine, Stanford, CA

Chronic cholestasis often results in premature death from liver failure with fibrosis; however, the molecular mechanisms contributing to biliary cirrhosis are not demonstrated. In this article, we show that the death signal mediated by TNF-related apoptosis-inducing ligand (TRAIL) receptor 2/death receptor 5 (DR5) may be a key regulator of cholestatic liver injury. Agonistic anti-DR5 monoclonal antibody treatment triggered cholangiocyte apoptosis, and subsequently induced cholangitis and cholestatic liver injury in a mouse strain-specific manner. TRAIL- or DR5-deficient

Region-specific analysis of liver tissue by HistoQuest as key feature in tissue analysis



Takeda K, et al. 2008, Proc. Natl. Acad. Sci. USA 105(31):10895-900

Immune Escape of Lung Cancer

TISSUEGNOSTICS
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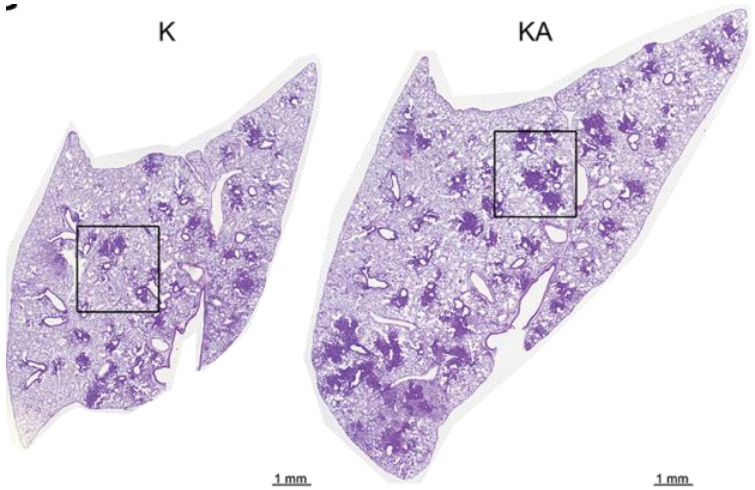
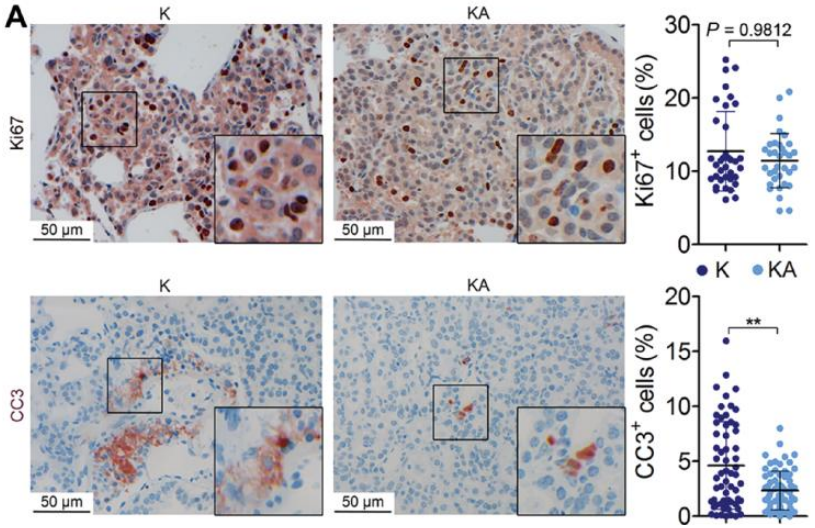
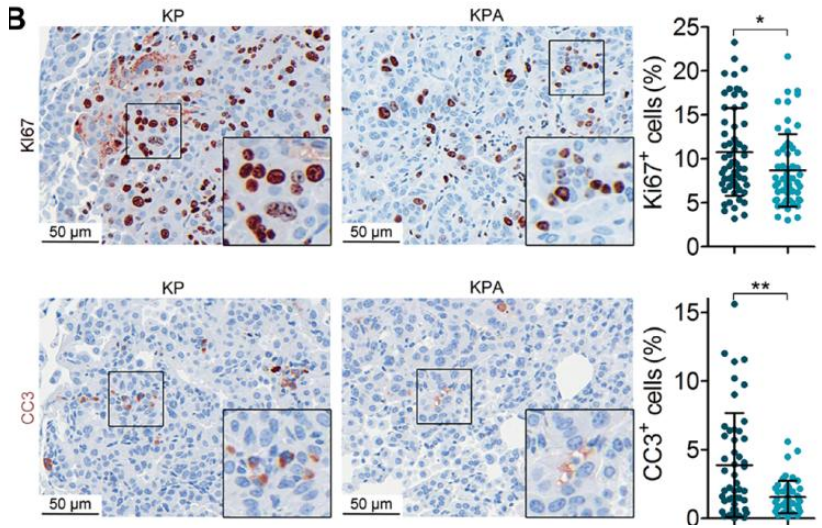
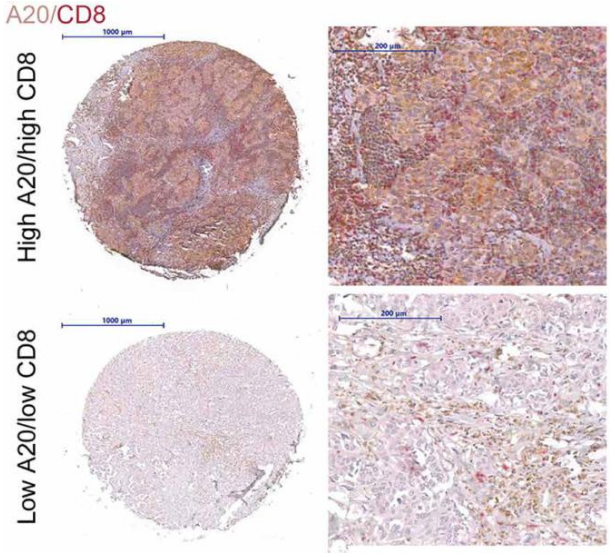
Science Translational Medicine

Down-regulation of A20 promotes immune escape of lung adenocarcinomas









DOI: 10.1126/scitranslmed.abc3911

Counting of Bacteria (Spirochaeta)

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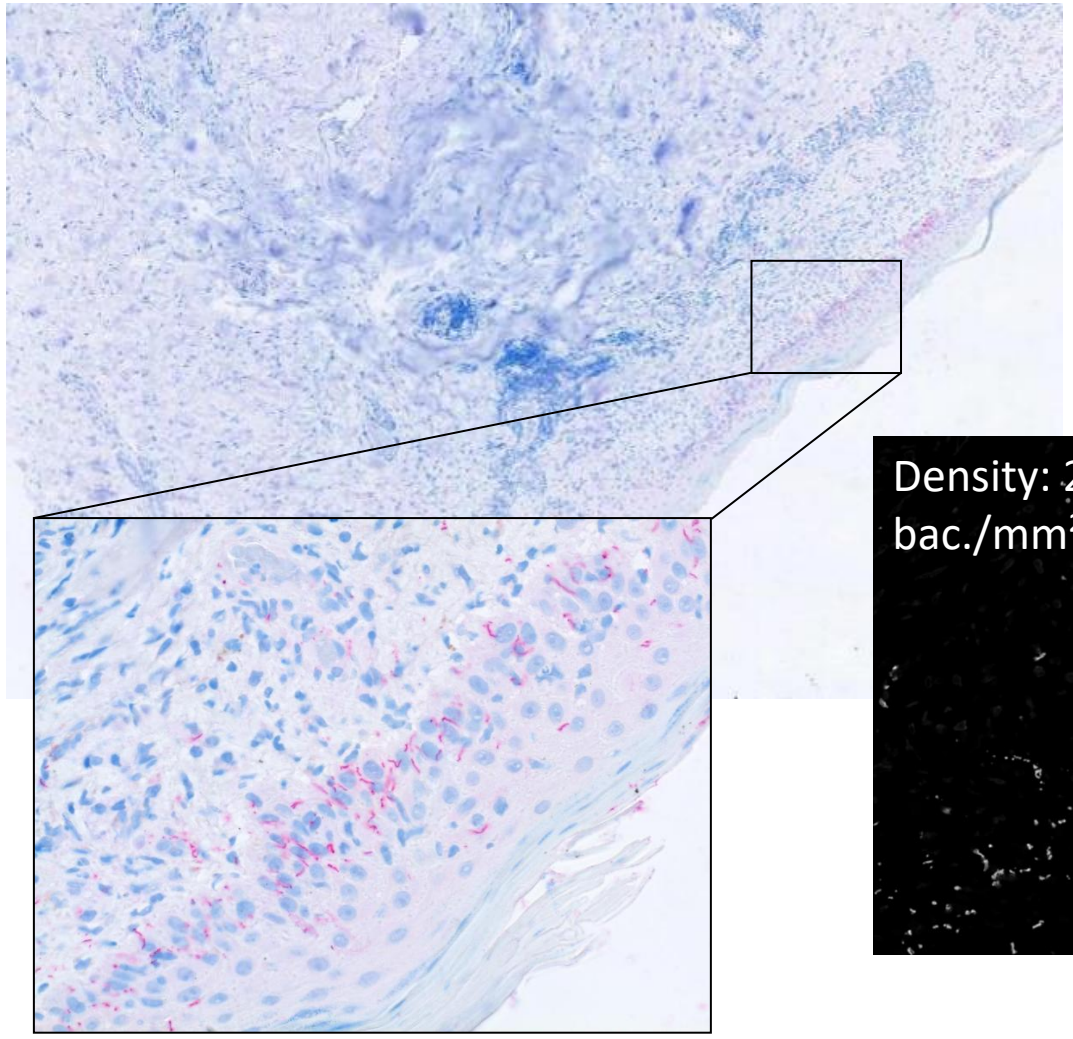
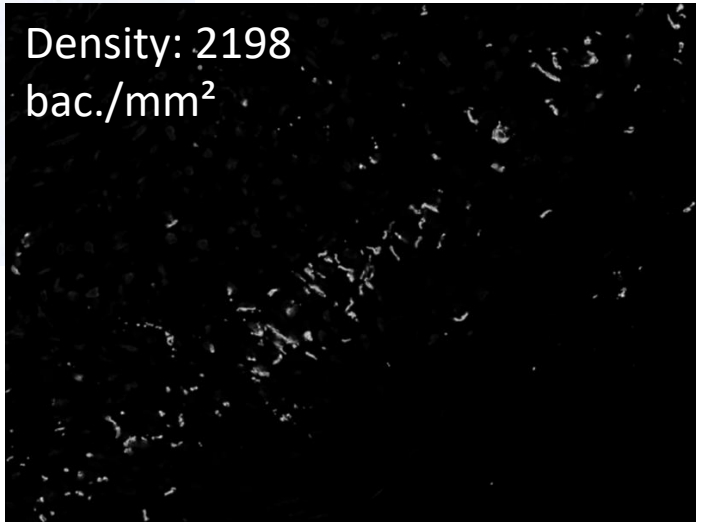


Aim:

Automatically count bacteria per mm² in infected skin.



Courtesy Dr. M.J. Flaig, Dep. of Dermatology, LMU Munich, Germany

Measurement of Neuronal Markers

TISSUEGNOSTICS
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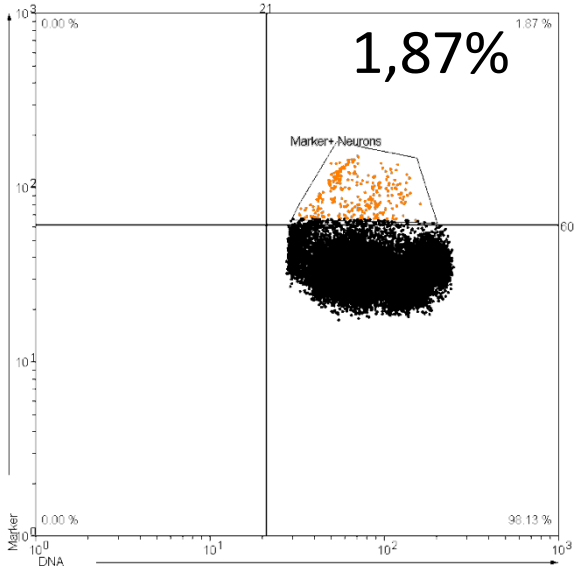
Red: nuclei (Propidium Iodide)
Green: neuronal marker



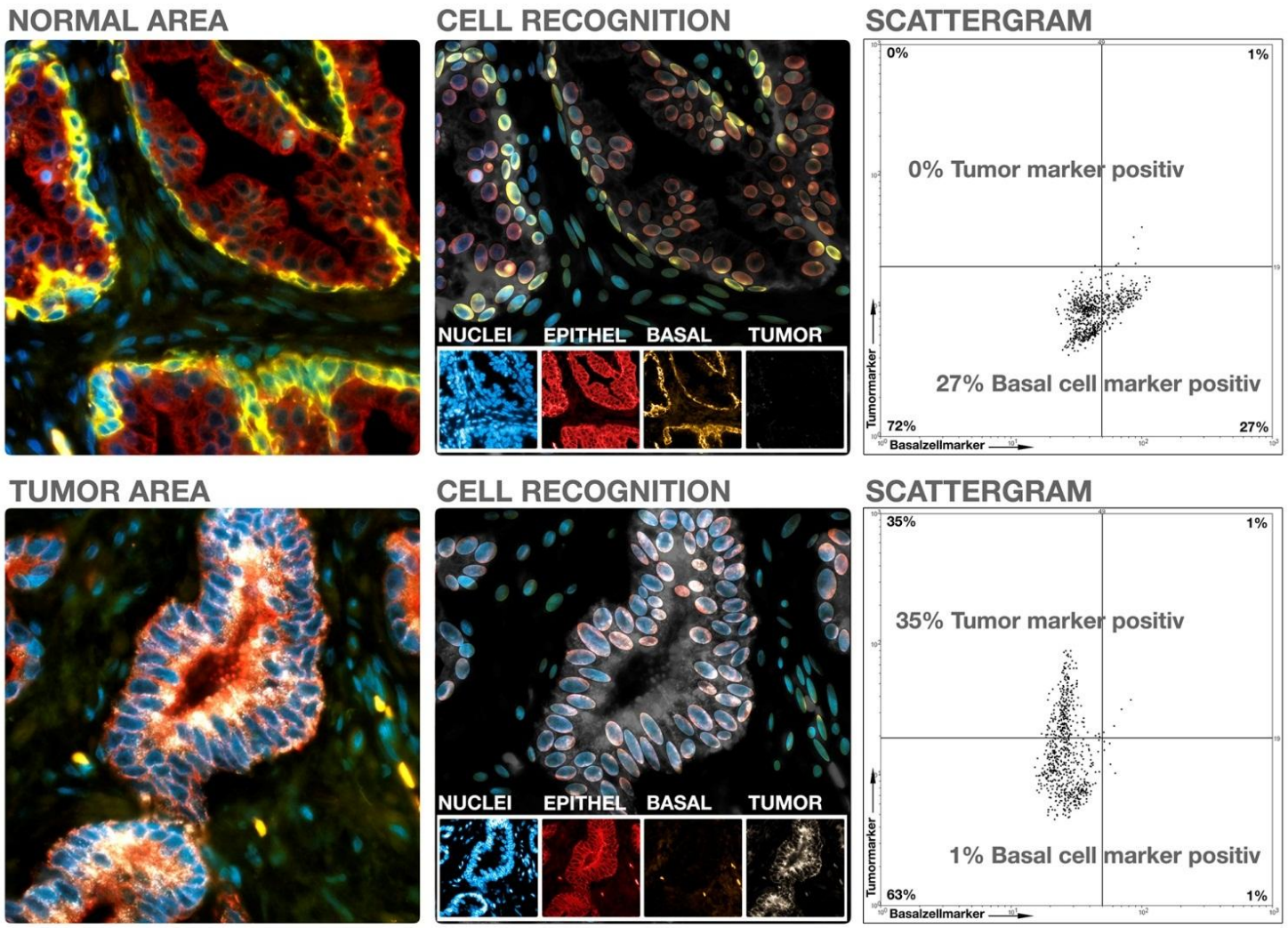
	All events in scattergram				
	X-Mean	Y-Mean	Events	#/mm²	%
UL	0.00	0.00	0	0.00	0.00
UR	70.83	84.02	374	2423.47	1.87
LL	0.00	0.00	0	0.00	0.00
LR	84.12	32.62	19660	127394.17	98.13
SUM	83.88	33.58	20034	129817.64	100.00

	Marker+ Neurons				
	X-Mean	Y-Mean	Events	#/mm²	%
UL	0.00	0.00	0	0.00	0.00
UR	72.45	90.92	285	1846.76	100.00
LL	0.00	0.00	0	0.00	0.00
LR	0.00	0.00	0	0.00	0.00
SUM	72.45	90.92	285	1846.76	100.00

Courtesy Prof. M. Maurer, Inst. f. Pathophysiologie, Univ. of Heidelberg, Germany

Early Identification of Malignant Transformation

TISSUEGNOSTICS
PRECISION THAT INSPIRES



Aim:

Provide an automated and observer independent data basis for clinical diagnosis of prostate cancer based on a specific tumor marker and changes in the composition of prostatic glands characterized by different types of cytokeratin expressed by epithelial cells.

Courtesy Prof. H. Klocker, Dep. of Urology, Med. Univ. of Innsbruck, Austria

Tissues are Where Immune Cells Function

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nature

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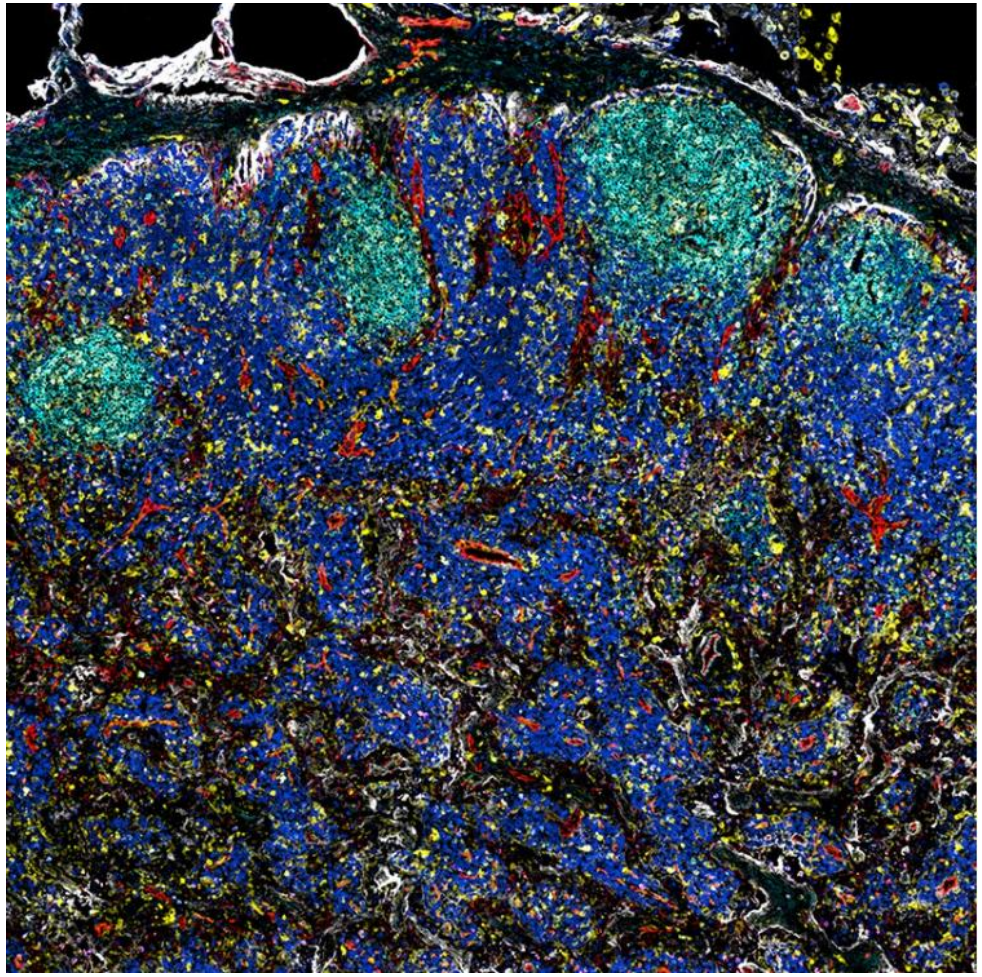
nature > comment > article

COMMENT | 25 May 2021

Tissues, not blood, are where immune cells function

COVID has shown we must study immunity in the whole body – let's sort the logistics to acquire the right samples.

Donna L. Farber



Immune cells have designated sites. In this lymph node, colours indicate cell types, such as B cells (light blue) and T cells (dark blue and green).
Credit: Andrea Radtke

Epigenetic Therapies Boost Anti-tumour Immune Responses

TISSUEGNOSTICS
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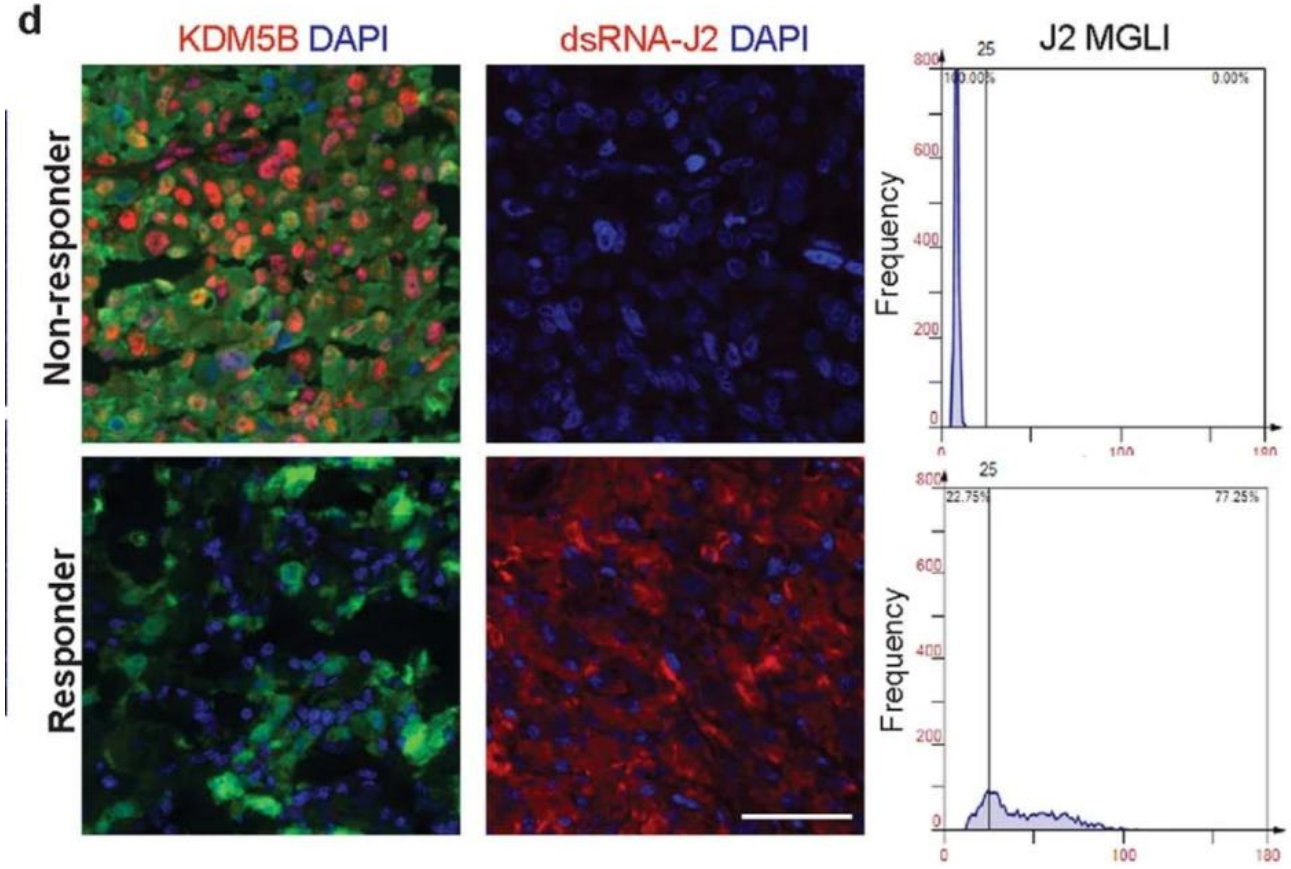
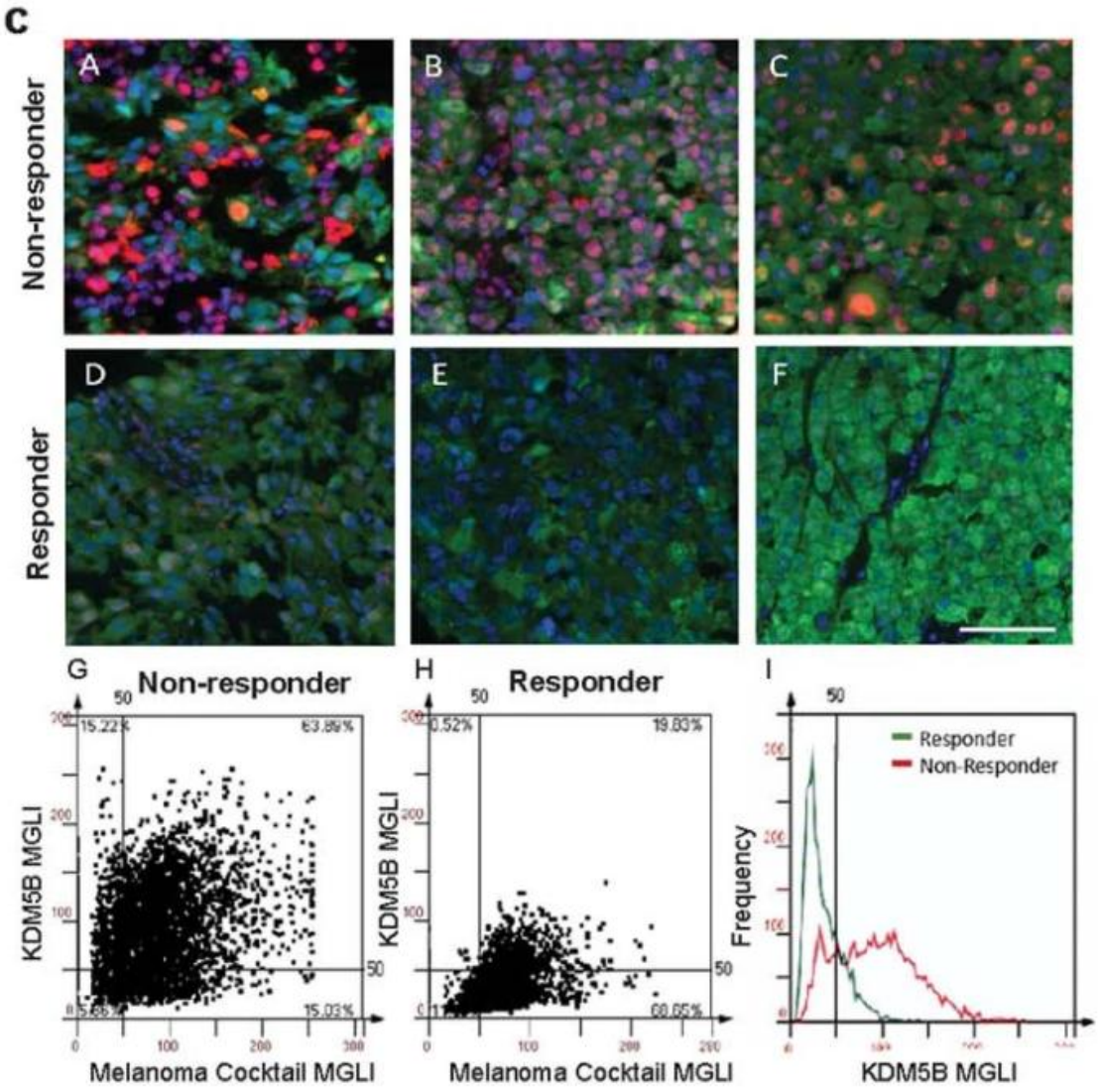
nature

Article | Published: 20 October 2021

KDM5B promotes immune evasion by recruiting SETDB1 to silence retroelements





https://doi.org/10.1038/s41586-021-03994-2

Single-cell and spatial transcriptomics reveal aberrant lymphoid developmental programs driving granuloma formation

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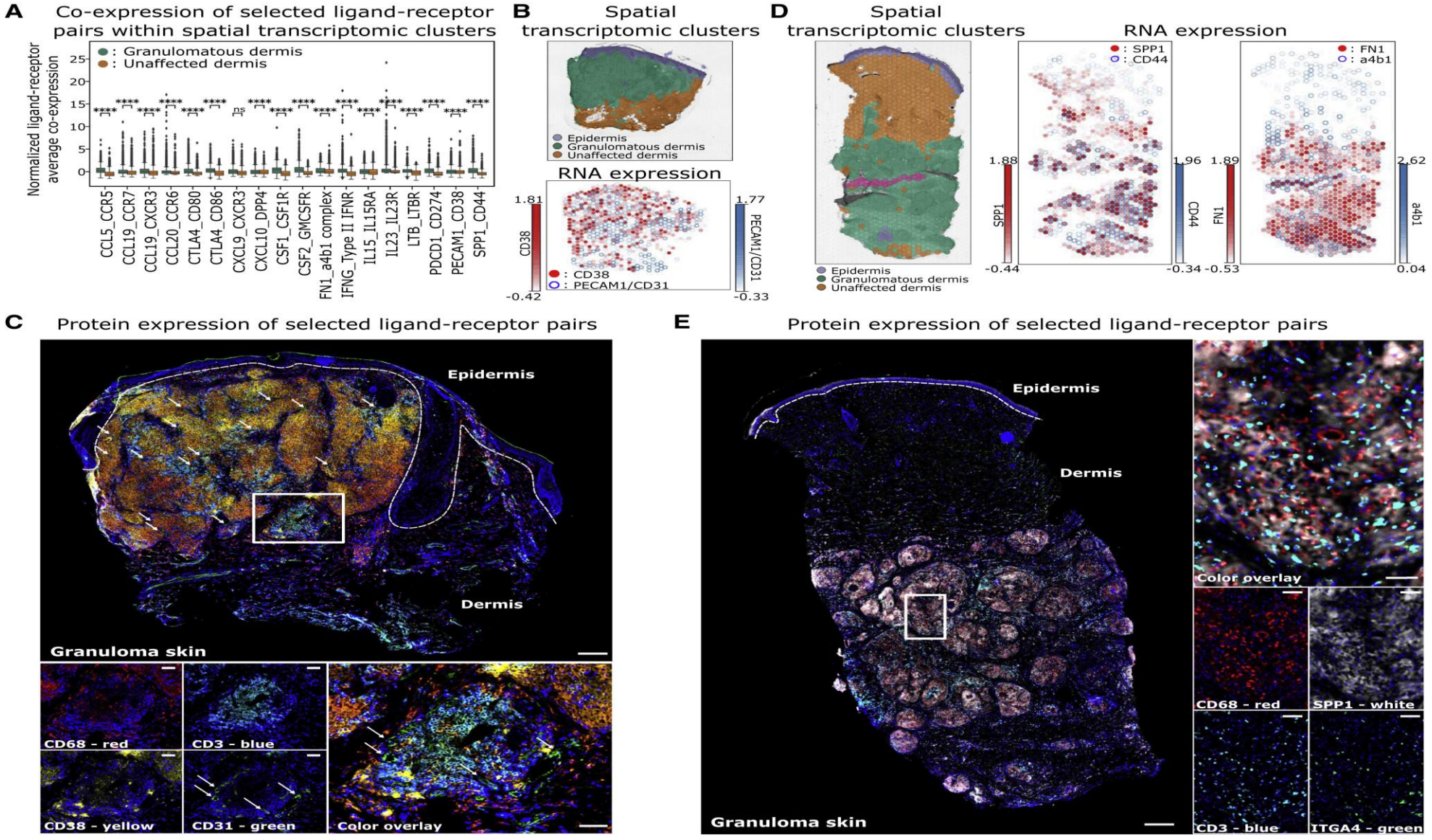
Cell PRESS

Immunity



Immune Response in COVID-19

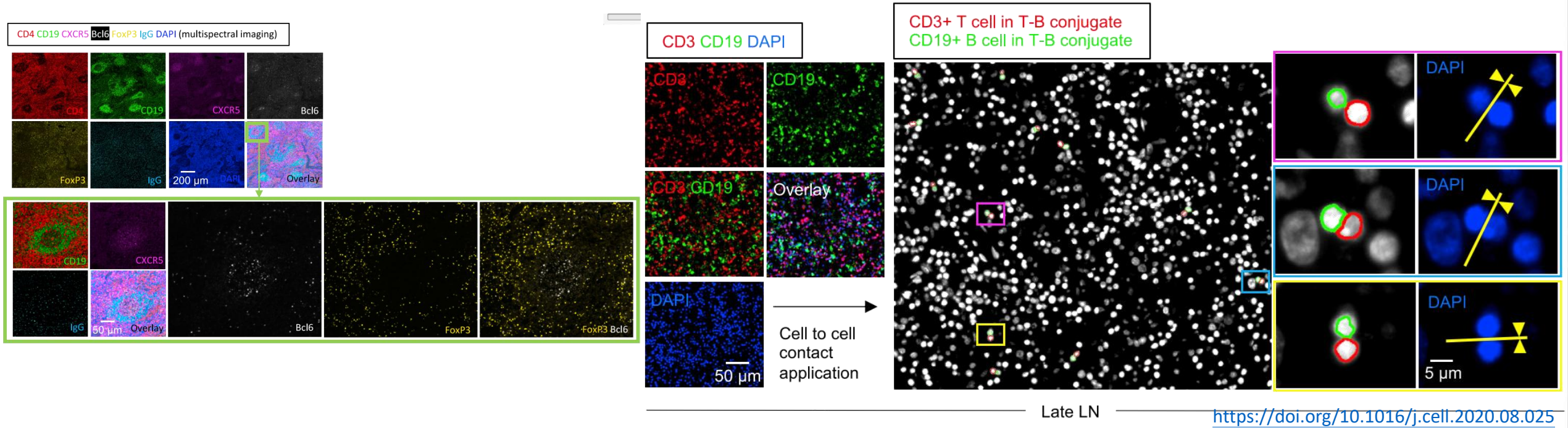
TISSUEGNOSTICS
PRECISION THAT INSPIRES

Cell

Loss of Bcl-6-Expressing T Follicular Helper Cells and Germinal Centers in COVID-19

Massachusetts Institute of Technology

Dr. Thomas Diefenbach



https://doi.org/10.1016/j.cell.2020.08.025

Phenotyping immune cells in situ

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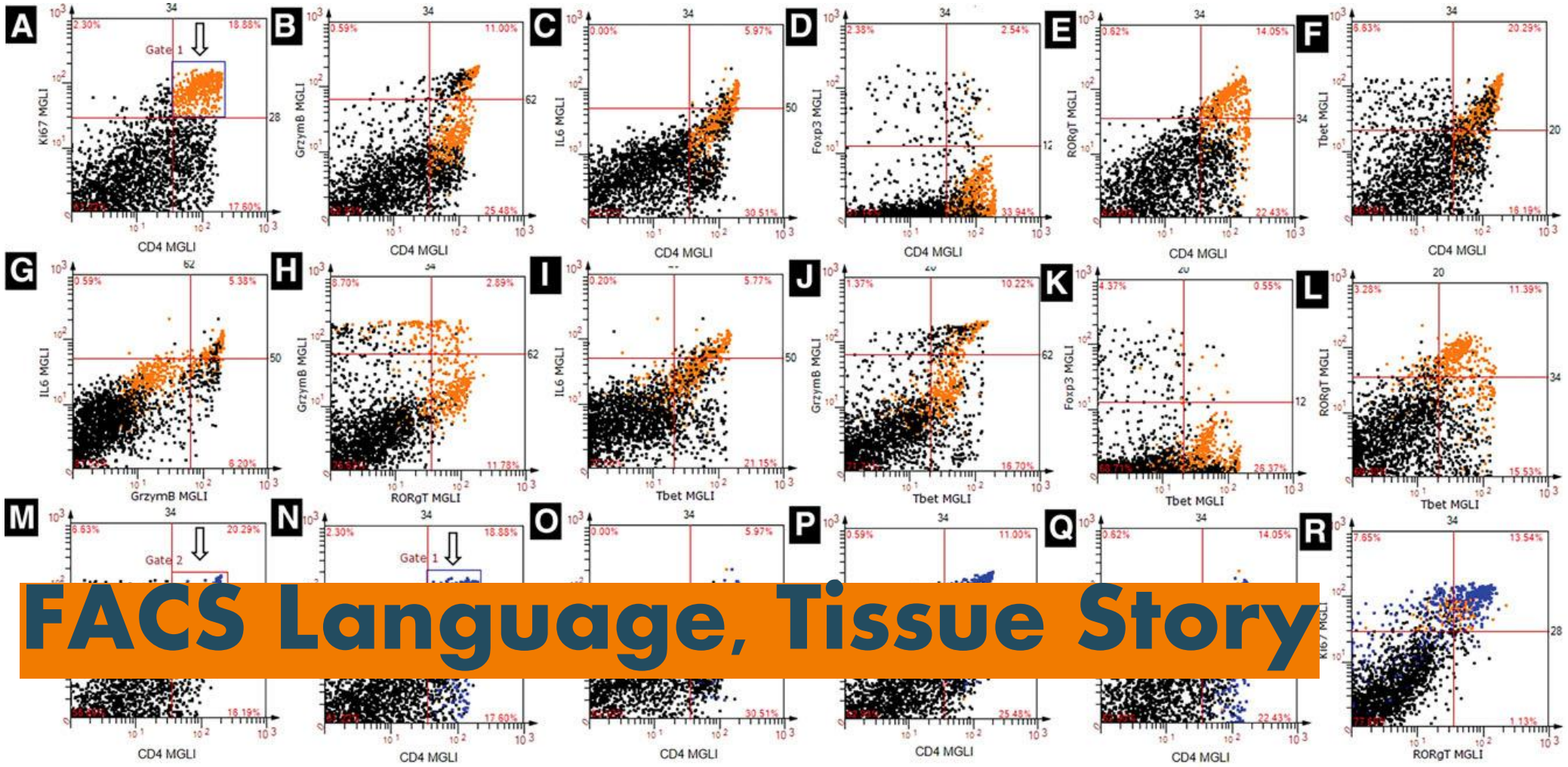
Cytometry PART A
ISAC
Journal of Quantitative Cell Science



FACS Language, Tissue Story

Blenman & Bosenberg, cytometry partA, 2018

Intracellular Parasites (Dot Analysis)

TISSUEGNOSTICS
PRECISION THAT INSPIRES

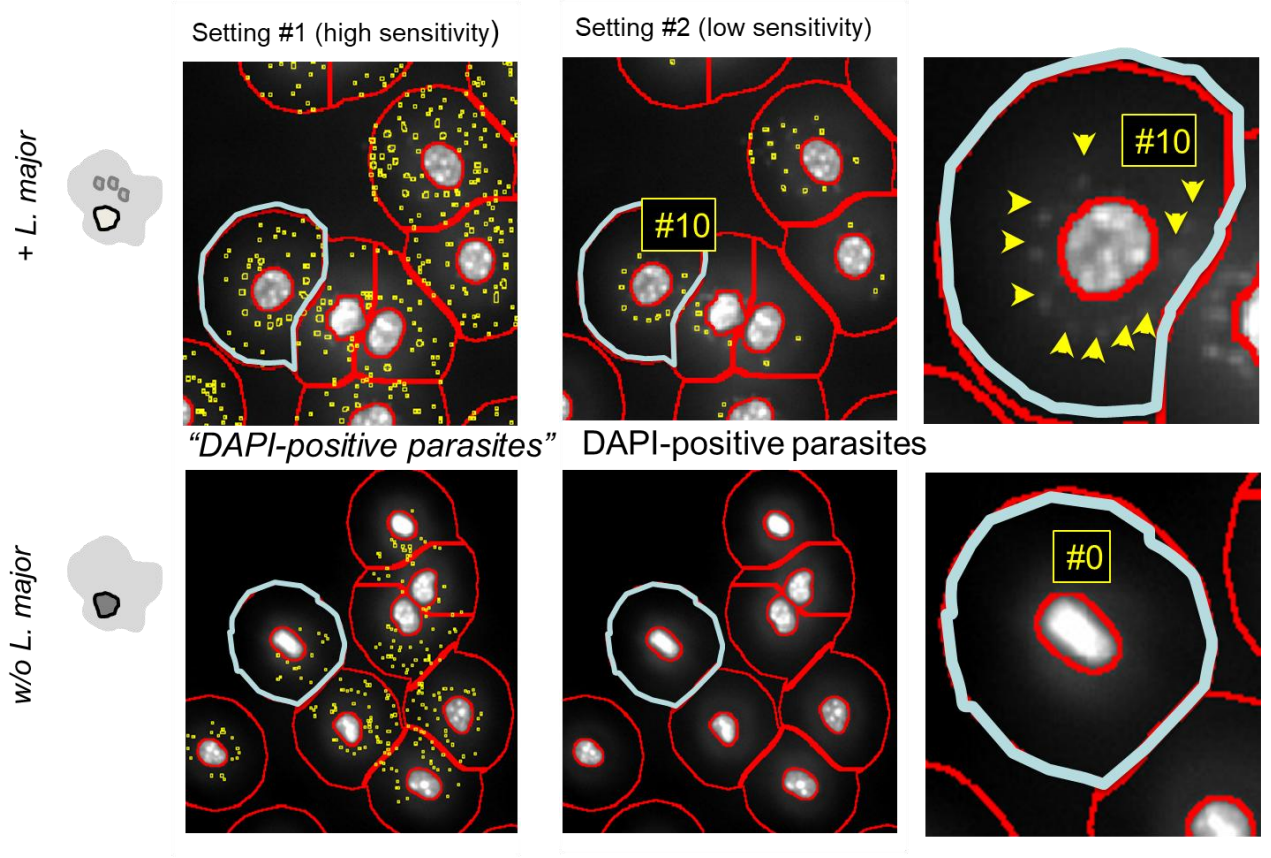
PLOS ONE

RESEARCH ARTICLE

An Emerging Approach for Parallel Quantification of Intracellular Protozoan Parasites and Host Cell Characterization Using TissueFAXS Cytometry

Maximilian Schmid[1], Bianca Dufner[1], Julius Dürk[1], Konstanze Bedal[1], Kristina Stricker[1], Lukas Ali Prokoph[1], Christoph Koch[1], Anja K. Wege[2], Henner Zirpel[3], Ger van Zandbergen[2,4], Rupert Ecker[5], Bogdan Boghiu[5], Uwe Ritter[1]*

1 Institute of Immunology, University of Regensburg, Regensburg, Germany, **2** Department of Gynecology and Obstetrics, University of Regensburg, Regensburg, Germany, **3** Division of Immunology, Paul-Ehrlich-Institute, Langen, Germany, **4** Institute of Immunology, University Medical Center of the Johannes Gutenberg University of Mainz, Mainz, Germany, **5** TissueGnostics GmbH, Vienna, Austria



Courtesy Prof. Uwe Ritter, Institute for Immunology, University of Regensburg, Germany

Human Skin Aging (Dot Analysis)

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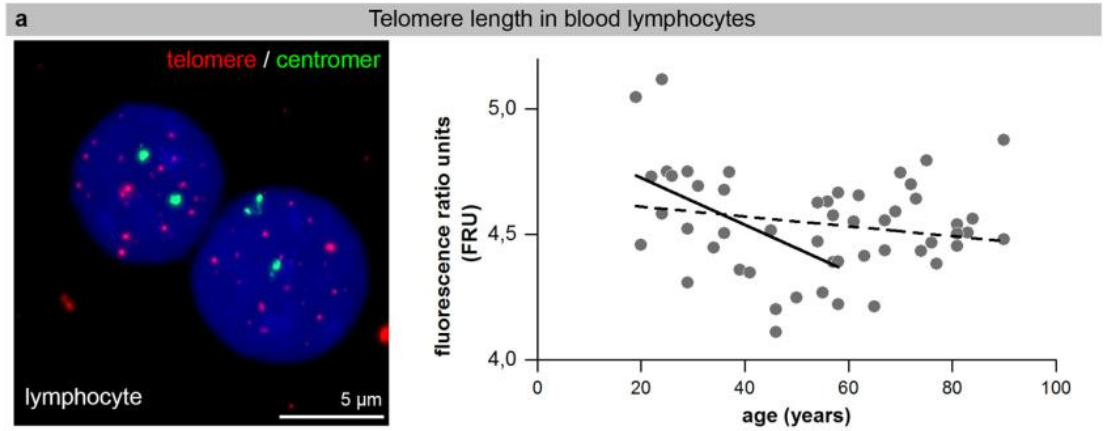
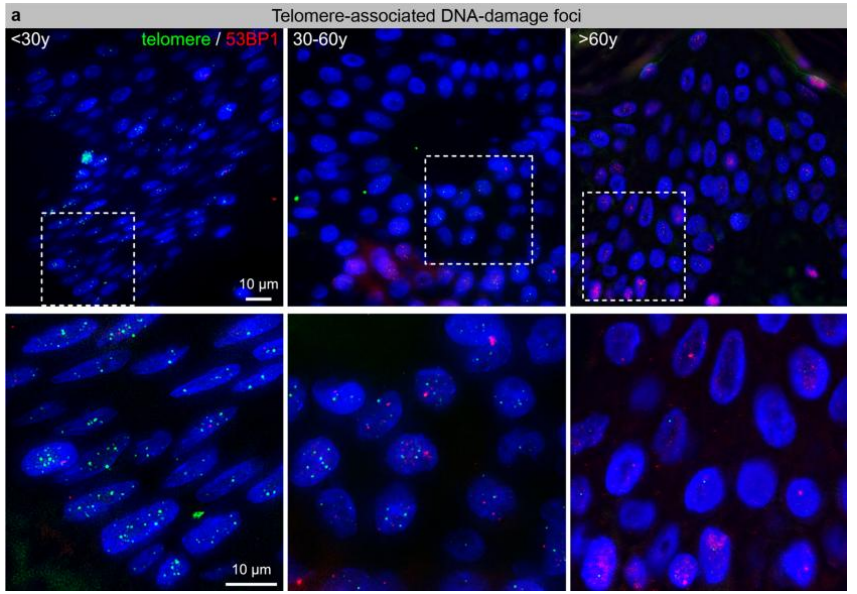
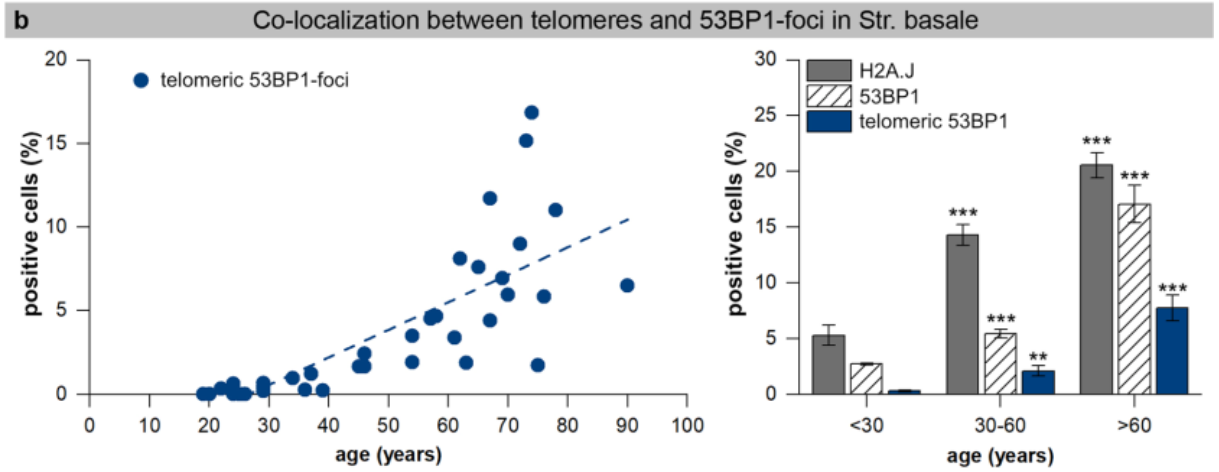
npj | aging

Human skin aging is associated with increased expression of the histone variant H2A.J in the epidermis







npj Aging and Mechanisms of Disease (2021)7:7 ; https://doi.org/10.1038/s41514-021-00060-z

Phenotyping immune cells in situ

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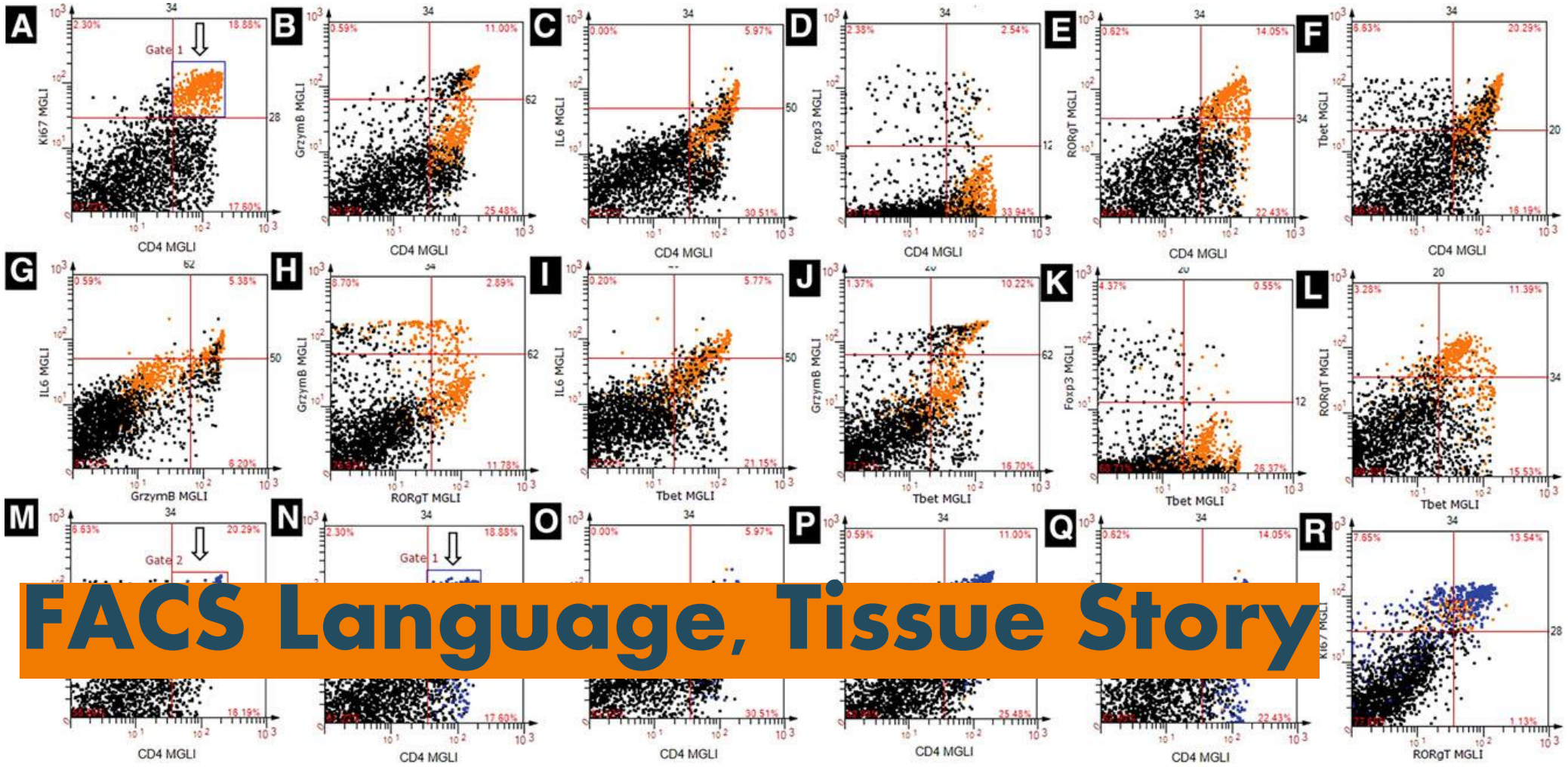
Cytometry PART A
ISAC
Journal of Quantitative Cell Science



FACS Language, Tissue Story

Blenman & Bosenberg, cytometry partA, 2018

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USA installation sites (partial)

Johns Hopkins University

Fred Hutchinson Cancer Research Center

Dana-Farber Cancer Institute

Novartis Institutes for Biomedical Research

BWH Brigham and Women's Hospital

Northwestern University

UCSF University of California San Francisco

HHMI Howard Hughes Medical Institute

Yale University School of Medicine

University of Pittsburgh

Memorial Sloan Kettering Cancer Center

University of California Santa Barbara

Massachusetts Institute of Technology

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Asia Pacific installation sites (partial)

NUS National University of Singapore

National Cancer Center
国立研究開発法人国立がん研究センター

國立臺灣大學
National Taiwan University

Singapore Institute for Clinical Sciences
A*STAR

Juntendo University
順天堂大学

National Cheng Kung University
成功大學

中國醫藥大學附設醫院
China Medical University Hospital

KOBE UNIVERSITY

KBSI KOREA BASIC SCIENCE INSTITUTE

KYOTO UNIVERSITY FOUNDED 1897

KANAZAWA UNIVERSITY 1862–1949 金沢大学

昭和大学

TAIPEI MEDICAL UNIVERSITY
臺北醫學大學

長庚醫療財團法人
Chang Gung Medical Foundation

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

東京大学
THE UNIVERSITY OF TOKYO

Sullivan Nicolaides PATHOLOGY

高雄醫學大學
Kaohsiung Medical University

SUNG KYUN KWAN UNIVERSITY (SKKU)

ST JOHN OF GOD
Subiaco Hospital

中山醫學大學
Chung Shan Medical University

TISSUEGNOSTICS
PRECISION THAT INSPIRES

Industrial Installation sites (partial)

Roche

Biogen

BAYER x vividion THERAPEUTICS

上海芯超生物科技有限公司
SHANGHAI OUTDO BIOTECH CO.,LTD.

NOVARTIS
INSTITUTES FOR BIOMEDICAL RESEARCH

Genentech
A Member of the Roche Group

Otsuka

Wiener Gesundheitsverbund
Klinik Floridsdorf
Für die Stadt Wien

Infinity™ PHARMACEUTICALS

Santen

上海瑞雨生物科技有限公司

Genecast 臻和

Nestlé Good Food, Good Life
Nestlé Research Center

PPMX
PERSEUS PROTEOMICS

Increase Your Impact Factor!

TISSUEGNOSTICS
PRECISION THAT INSPIRES

3000+ papers,

400+ from Taiwan!!

Country	Total	%
USA	612	16.9%
China	596	16.5%
Austria	422	11.7%
Taiwan	402	11.1%
Germany	303	8.4%
The Netherlands	166	4.6%
UK	148	4.1%
Japan	127	3.5%
South Korea	106	2.9%
Italy	70	1.9%

until September, 2023

Cell
nature
Science
nature
nature medicine
Clinical Cancer Research
Experimental Dermatology
PNAS
nature methods
blood
Cell Stem Cell
Science Translational Medicine
Cancer Research
Clinical Cancer Research
Gastroenterology
The American Journal of PATHOLOGY
Cellular and Molecular Biology of Disease
The Journal of Immunology
The Prostate
JID
JOURNAL OF INVESTIGATIVE DERMATOLOGY
HEPATOLOGY

TISSUEGNOSTICS
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Cell-Bio 尚博生物科技
Cell-Bio Biotechnology Co., Ltd.

Highly Efficient TSA Multiplex IHC Assay Kits
多色免疫組織染色分析套組

What is TSA?

TISSUEGNOSTICS
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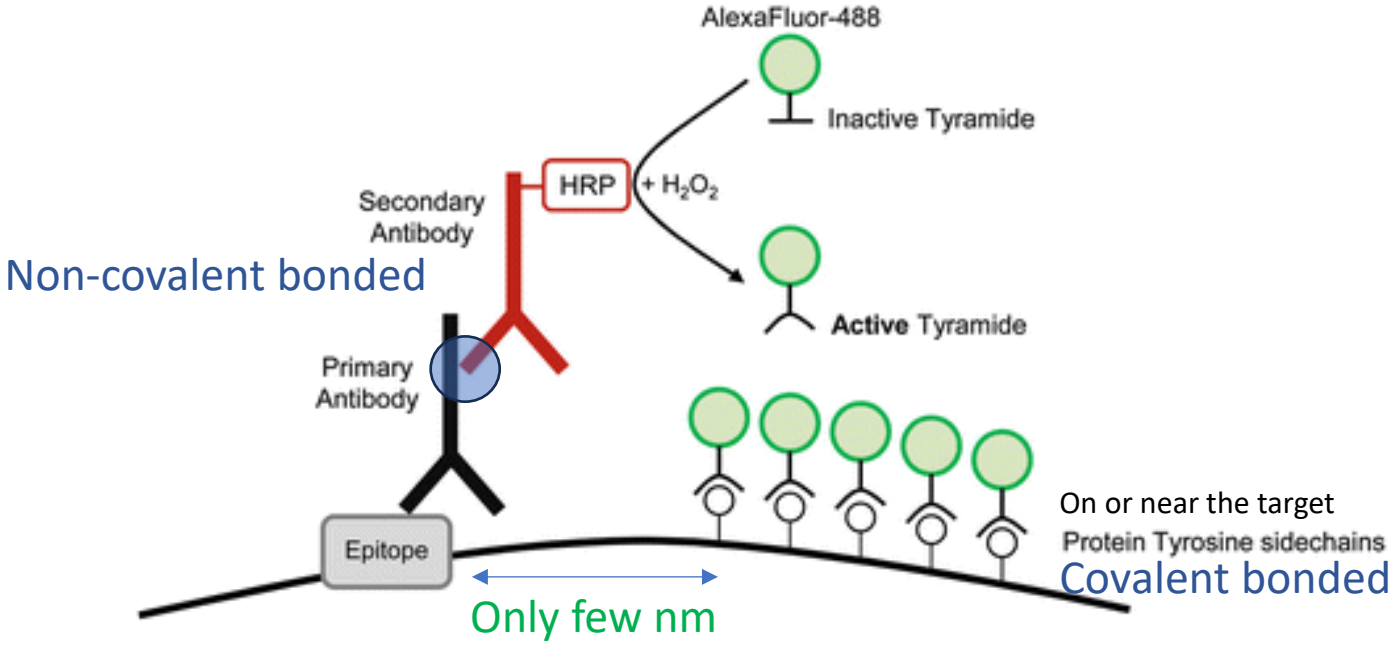
TSA (Tyramide Signal Amplification) 染色技術是一種基於酵素催化反應的信號放大技術，可以大幅增強免疫螢光或免疫組織化學染色的訊號。它利用辣根過氧化物酶 (HRP) 對酪胺酸 (tyramide) 進行催化反應。

TSA相較於傳統螢光染色的優勢

TSA技術的主要優勢在於其極高的靈敏度和多重染色的能力。它特別適合用於檢測組織切片中低豐度的生物標誌物，或在有限的樣本上需要標記多個目標時。



TSA versus IF

TISSUEGNOSTICS
PRECISION THAT INSPIRES

優勢	TSA染色技術	傳統螢光染色
信號強度	信號放大效果顯著，能檢測到低豐度的目標蛋白，靈敏度極高。	無信號放大機制，檢測低豐度蛋白的能力較差。
多重染色	由於酵素催化反應後，標記的螢光分子會與蛋白共價結合，因此可以透過移除抗體來進行多次循環染色 (Sequential Staining)，實現多達七個或更多的標記。	螢光抗體直接結合，無法移除。因此能同時標記的目標數量受限於光譜串擾（spectral crosstalk），通常只能標記3-4個。
抗體用量	由於信號放大，可以大幅減少一級抗體和二級抗體的使用量。	需要較高濃度的抗體才能產生足夠的信號。
背景雜訊	雜訊較低，因為標記只發生在目標蛋白附近，非特異性結合的螢光信號較少。	非特異性結合的抗體可能會產生較高的背景螢光。
樣本保存	染色後的樣本穩定性高，信號持久，不易褪色。	螢光分子容易光漂白，保存困難，信號會隨著時間減弱。

Increase Signal to 500-folds by Next Gen. TSA

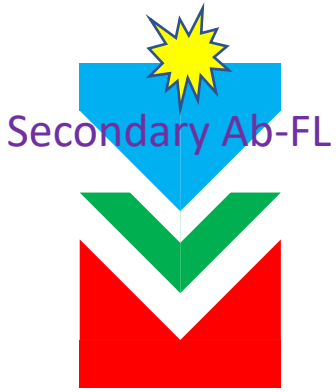
TISSUEGNOSTICS
PRECISION THAT INSPIRES

500-folds

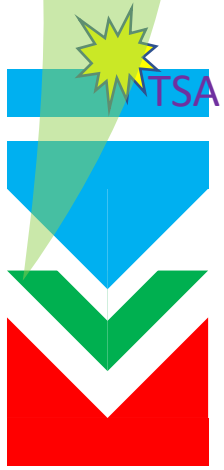
100-folds

Direct Labeling

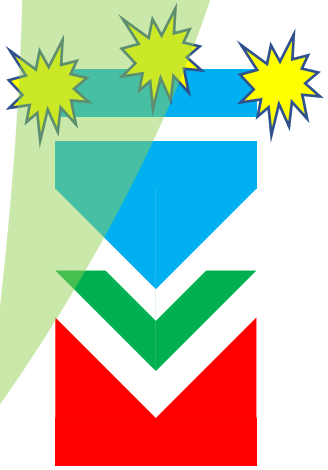
Indirect IHC/IF



TSA
(Tyramide Signal Amplifier)

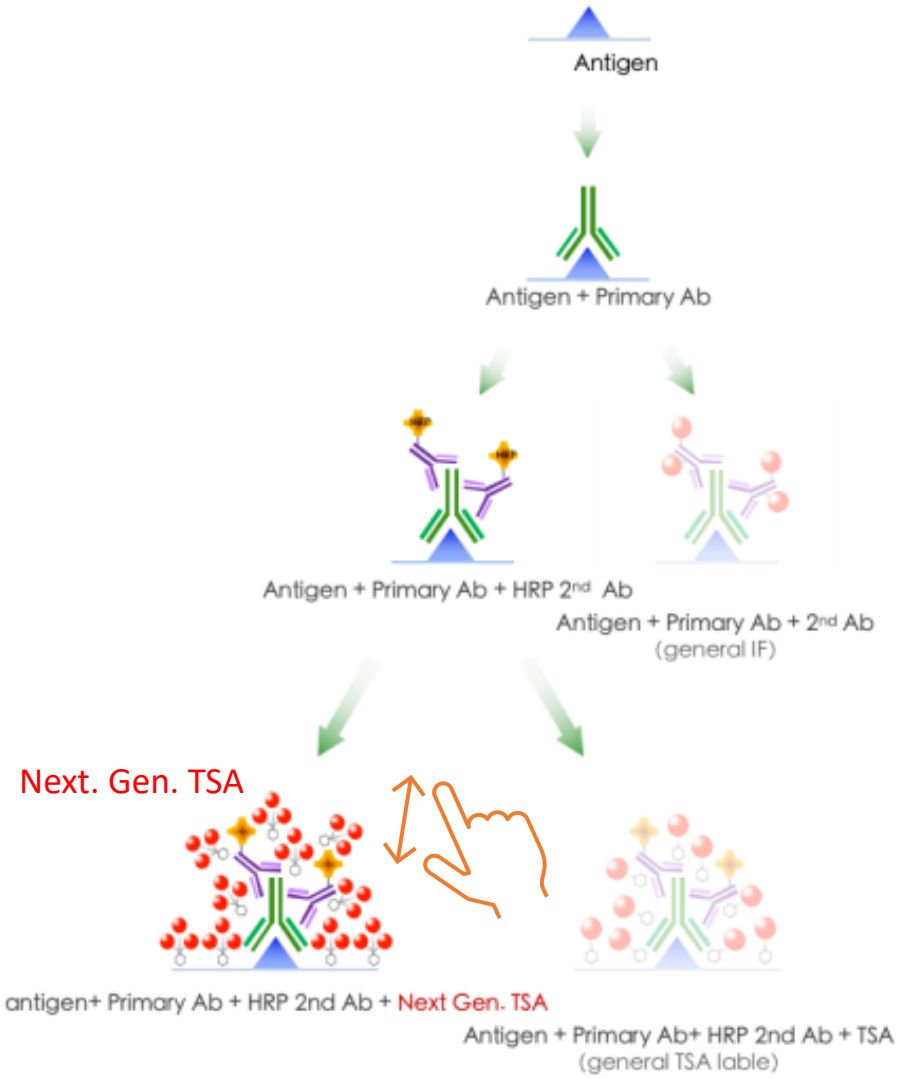


TG Next Generation TSA

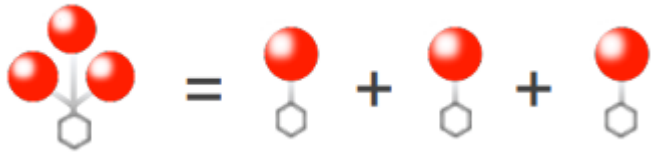


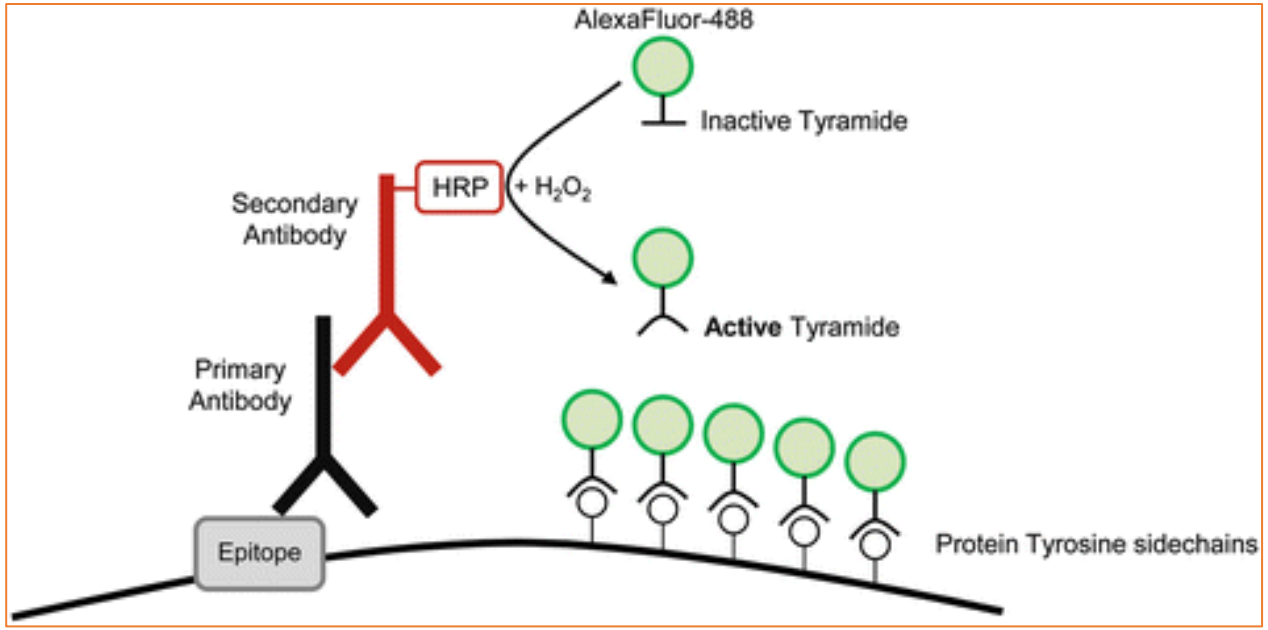
Next Gen. Tyramide Signal Amplification (TSA)

TISSUEGNOSTICS
PRECISION THAT INSPIRES



Next Gen. TSA
- binds more Fluor via Dendrimier molecule





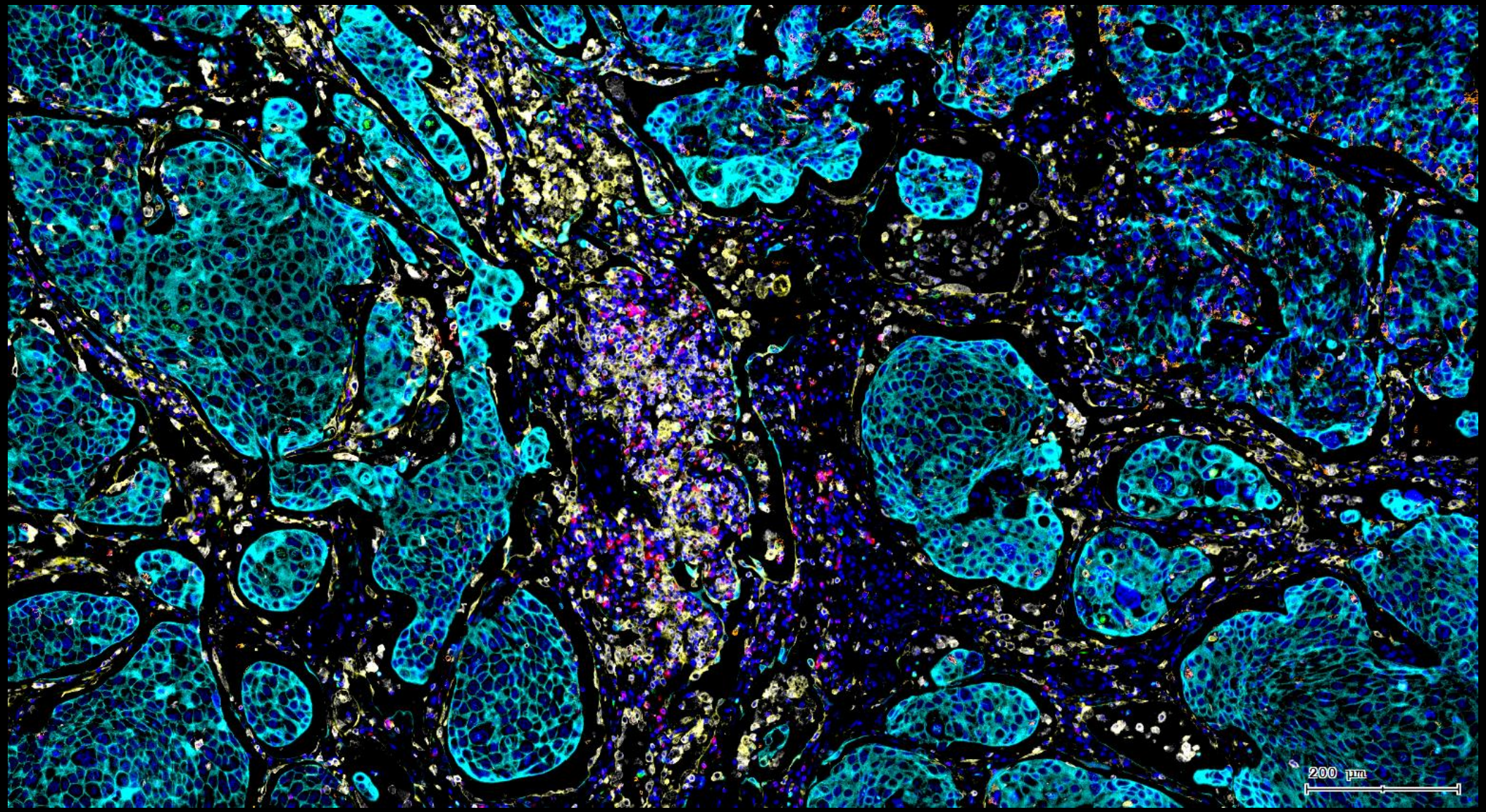
Features & Benefits of TSA IHC Assay Kits

TISSUEGNOSTICS
PRECISION THAT INSPIRES

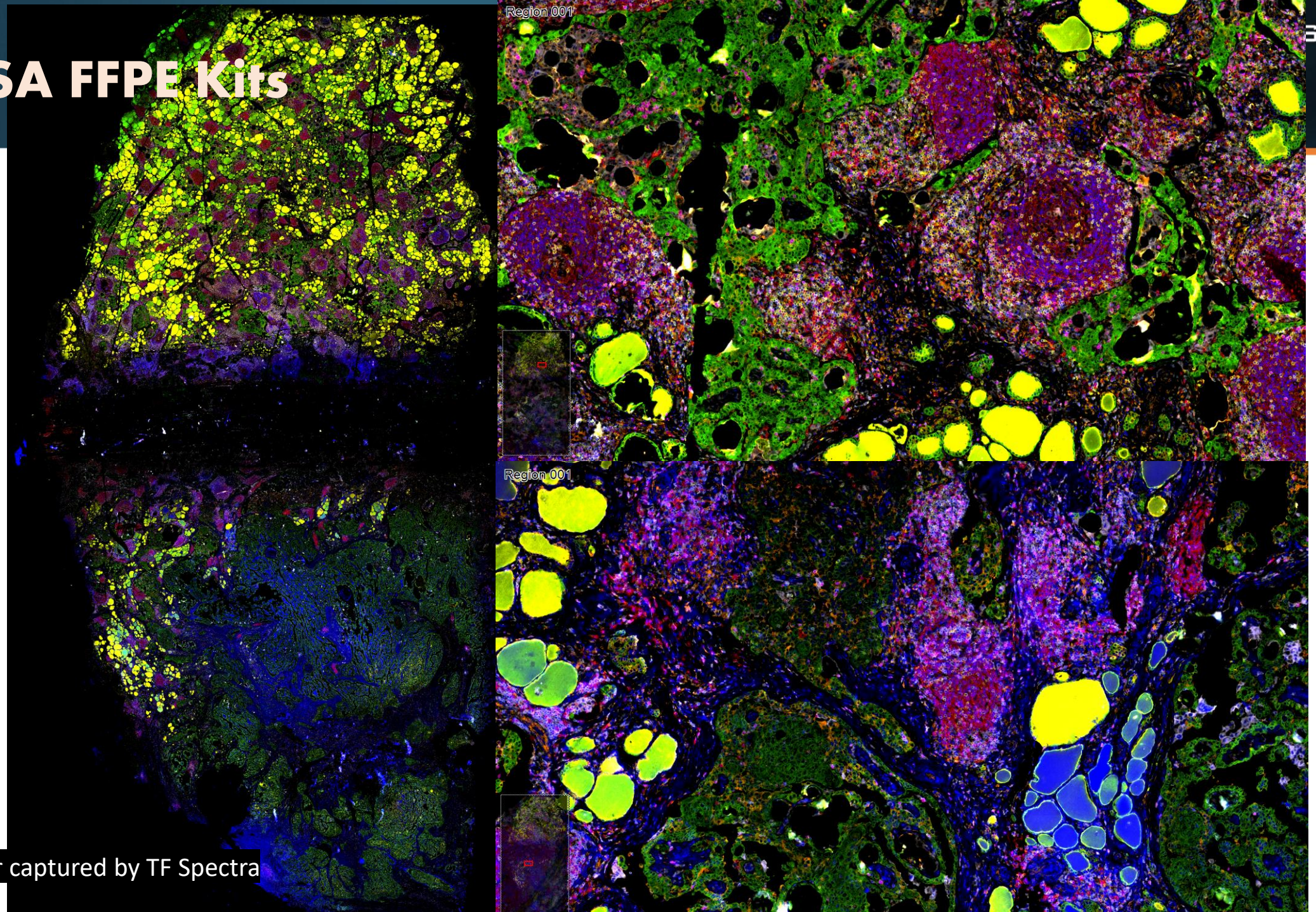
- **Flexible panel design:**
  - ✓ Select antibodies from any commercial products
  - ✓ No overlap between primary and secondary
- **Higher Sensitivity**
  - ✓ 5-folds than other TSA
  - ✓ 500-folds than conventional
- **High Signal-to-noise ratio**
- **Cost effective**
  - ✓ Reduce the consumption of Primary Antibody
- **Up to 10 colors**

10-color TSA FFPE Kits

TISSUEGNOSTICS
PRECISION THAT INSPIRES

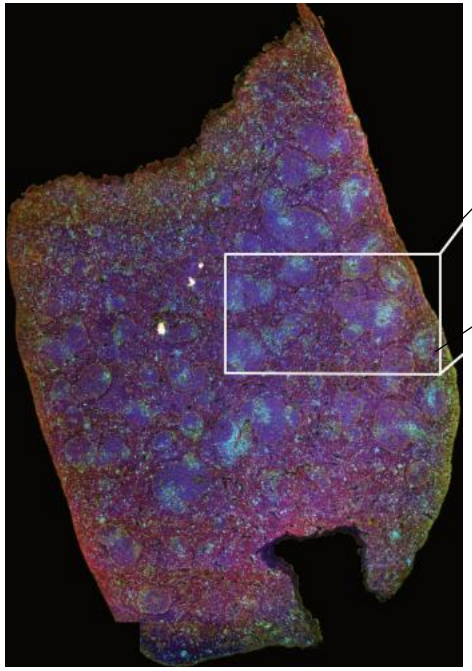


7-color TSA FFPE Kits



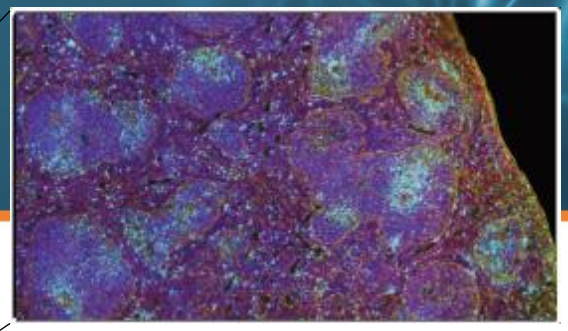
Human Thyroid Tumor captured by TF Spectra

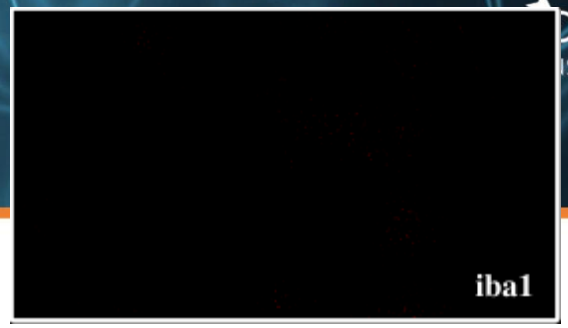
6-color TSA FFPE Kits

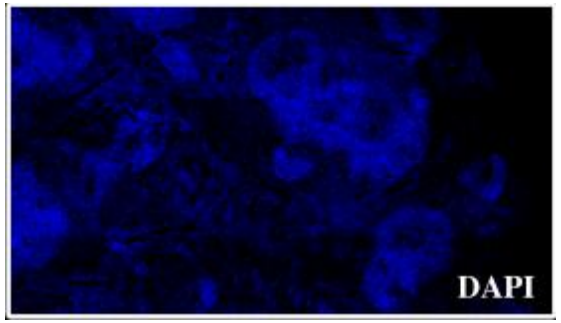


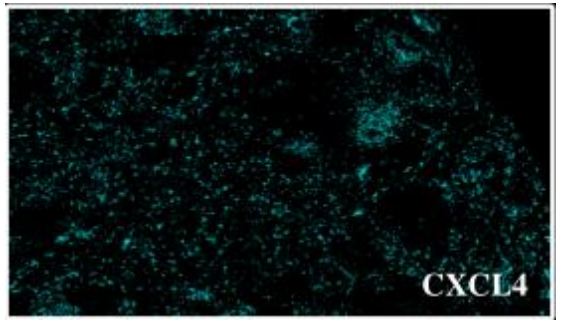
Mouse Spleen Tissue
Captured by TF Spectra

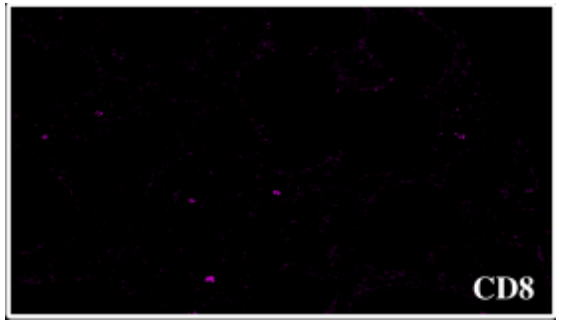
CD4 TG520N
CD31 TG620N
CXCL4 TG650N
SMA TG660S
CD8 TG570N
Ibal TG700N
DAPI

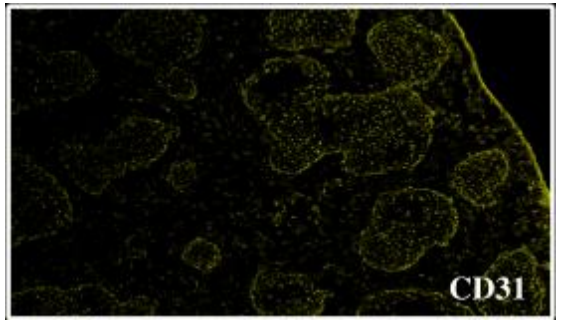


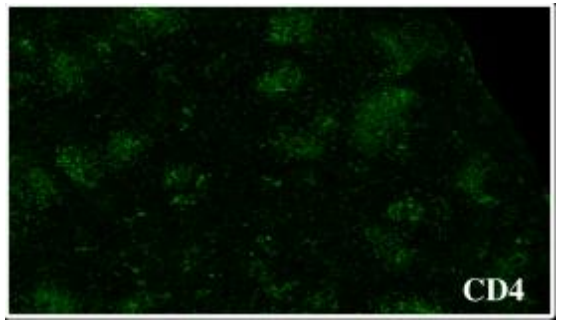




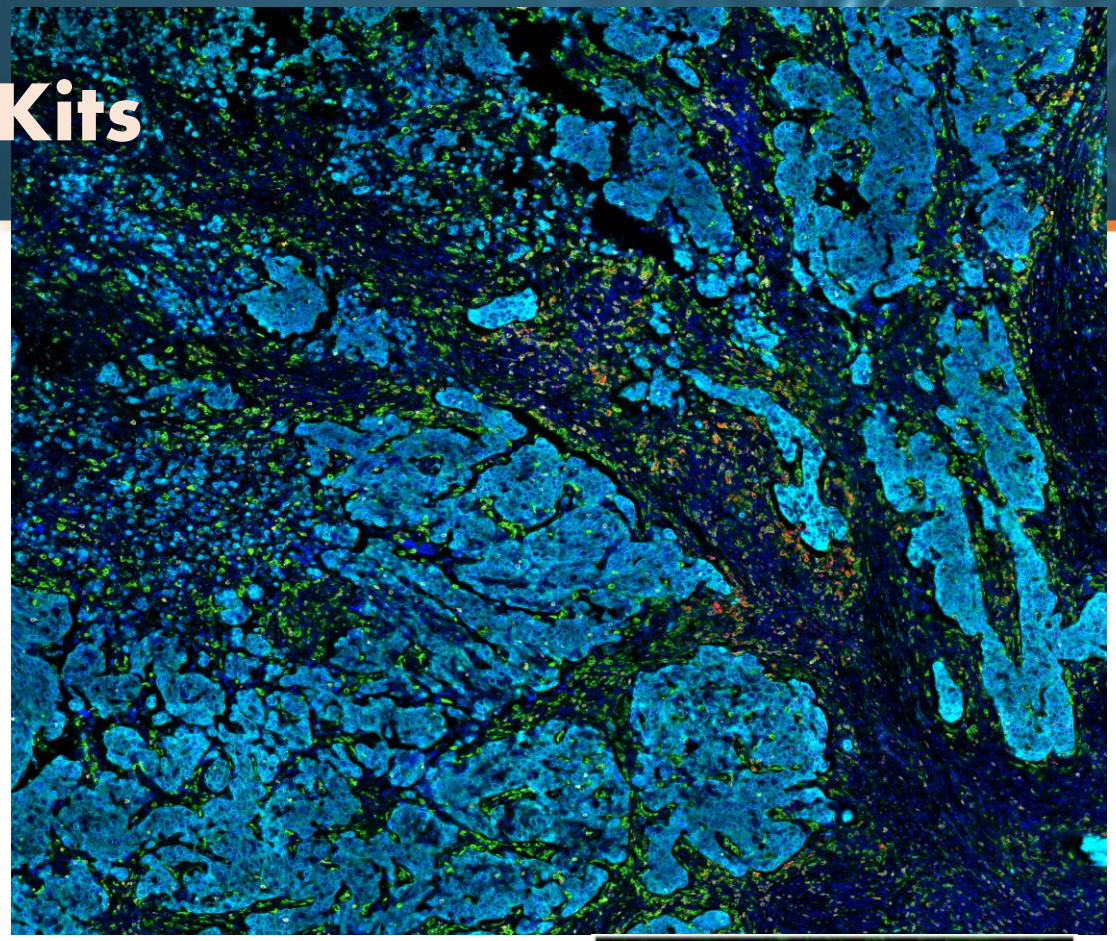


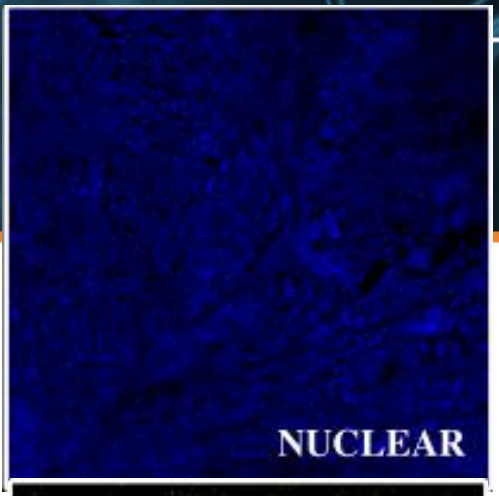


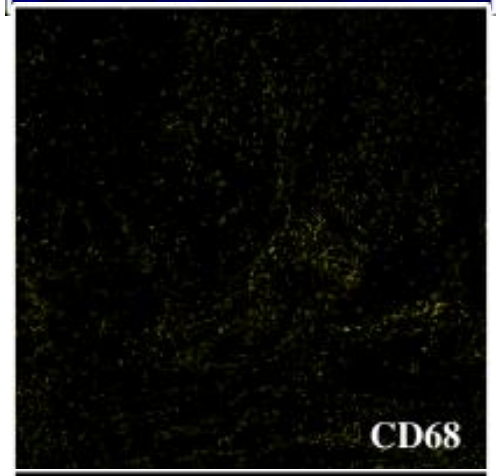




5-color TSA FFPE Kits

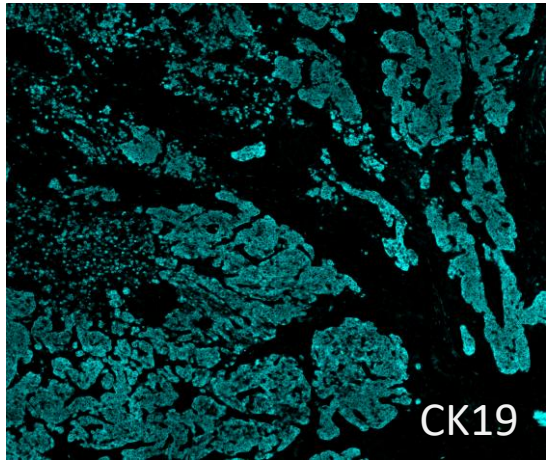


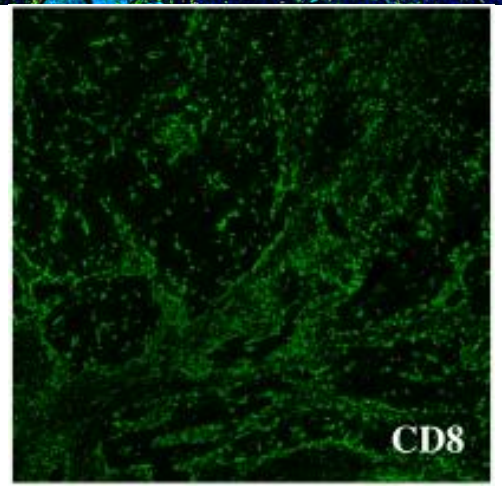


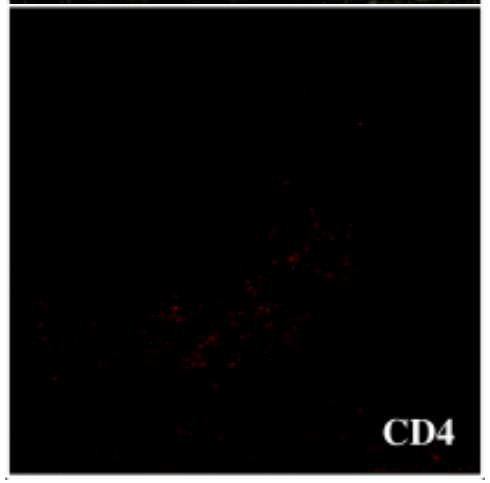


Human Lung Tumor
Captured by TF Spectra

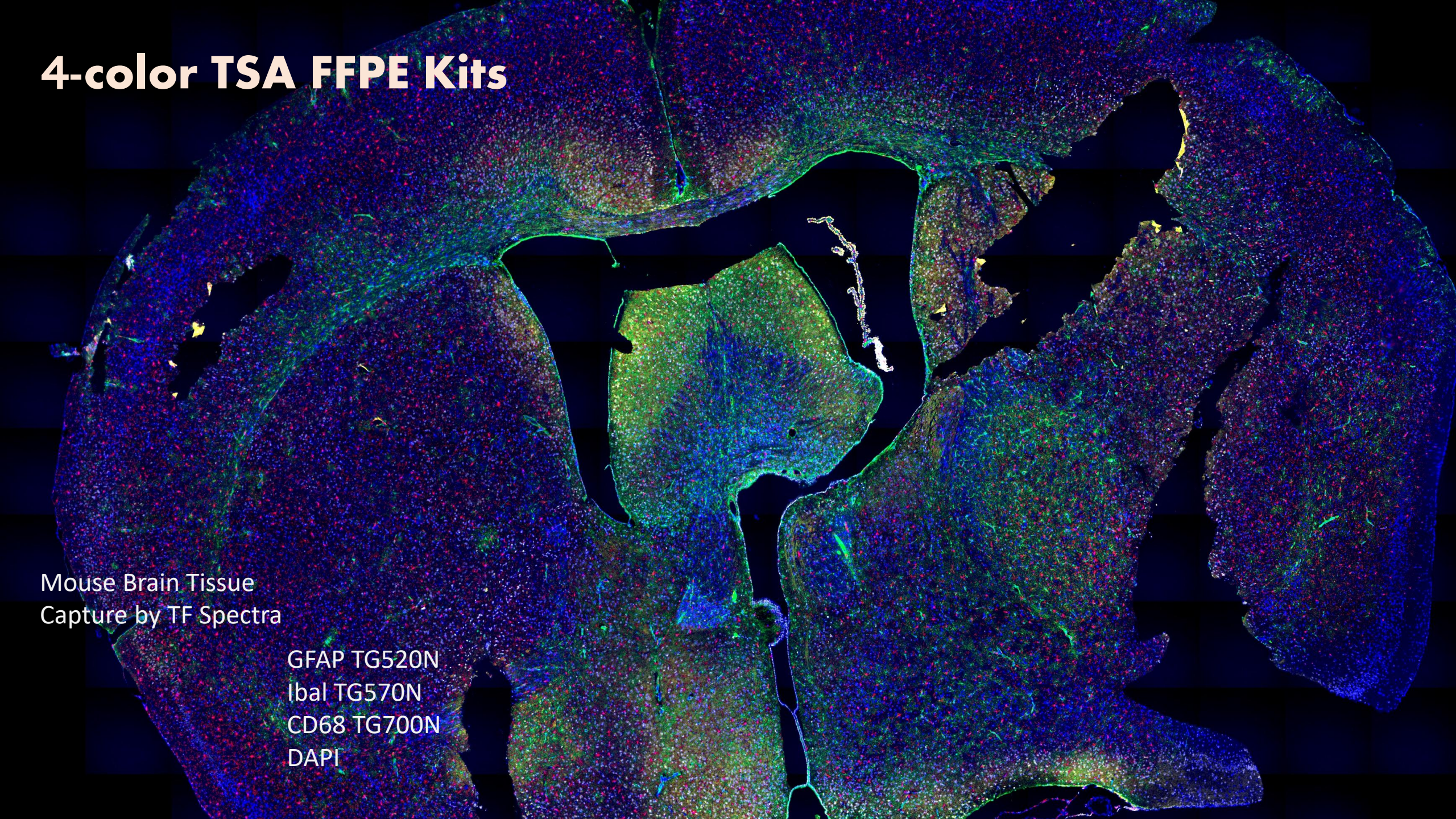
CK19 TG440N
CD8 TG5209N
CD4 TG570N
CD68 TG650N
Nuclei TG470SN







4-color TSA FFPE Kits



TSA Dyes List

TISSUEGNOSTICS
PRECISION THAT INSPIRES

TSA Dyes	Brightness	Photo sensitivity	Heat Stability	pH Stability	Ex. (nm) Em.(nm)
TG420N	★★	★★	★★★	★★★	405/420
TG440N	★★★	★★★	★★★★	★★★★	362/436
TG520N	★★★★	★★★	★★★	★★★	488/519
TG540N	★★★★	★★★★	★★★★	★★★★	517/539
TG570N	★★★★	★★★★	★★★★	★★★★	555/570
TG620N	★★★★	★★★★	★★★★	★★★★	594/615
TG650N	★★★★	★★★★★	★★★★	★★★★	633/655
TG670N	★★★★	★★★★★	★★★★	★★★★	650/670
TG700N	★★★★	★★★★★	★★★★	★★★★	682/702
TG540S	★★	★★★★	★★★★	★★★★	405/540
TG660S	★★	★★★★	★★★★	★★★	500/660
Nuclear dyes					
DAPI	★★★★	★★★★★	★	★★★★	360/460
TG 470 SN	★★★	★★★★	★	★★★★	450/470

Product List

TISSUEGNOSTICS
PRECISION THAT INSPIRES

	Product Name	Contents	Size	Catalog no.
Standalone Dye	4-color dyes combination	TSA Amplification reagent: TG520N, TG570N, TG670N, DAPI, Amplification diluent buffer	50μL	TGT4C50
			100μL	TGT4C100
	5-color dyes combination	TSA Amplification reagent: TG520N、TG570N、TG620N、TG670N、DAPI Amplification diluent buffer	50 μL	TGT5C50
			100 μL	TGT4C100
	6-color dyes combination	TSA Amplification reagent: TG520N、TG570N、TG620N、TG650N、TG700N、DAPI Amplification diluent buffer	50μL	TGT6C50
			100μL	TGT6C100
	7-color dyes combination	TSA Amplification reagent: TG440N、TG520N、TG570N、TG650N、TG700N、TG660S、TG470SN Amplification diluent buffer	50μL	TGT7C50
			100μL	TGT7C100
	8-color dyes combination	TSA Amplification reagent: TG440N、TG520N、TG540N、TG570N、TG620N、TG650N、TG700N、TG470S, NAmplification diluent buffer	50μL	TGT8C50
			100μL	TGT8C100
	9-color dyes combination	TSA Amplification reagent: TG440N、TG520N、TG540N、TG570N、TG620N、TG650N、TG700N、TG540S、TG470SN, Amplification diluent buffer	50μL	TGT9C50
			100μL	TGT9C100
	10-color dyes combination	TSA Amplification reagent: TG440N、TG520N、TG540N、TG570N、TG620N、TG650N、TG700N、TG540S、TG660S、TG470SN, Amplification diluent buffer	50μL	TGT10C50
			100μL	TGT10C100

FFPE slide (or frozen/ cell slide)	FFPE 4-color TSA mIHC Kits	TSA Amplification reagent: TG520N, TG570N, TG670N, DAPI, Amplification diluent buffer, Antigen retrieval buffer (or Stripping Buffer for frozen/ cell slide), Mounting medium, Peroxidase blocking solution, Primary Antibody Dilutions, Blocking Buffer	50 μL	TGFP450
			100 μL	TGFP4100
	FFPE 5-color TSA mIHC Kits	TSA Amplification reagent: TG520N、TG570N、TG620N、TG670N、DAPI , Amplification diluent buffer, Antigen retrieval buffer (or Stripping Buffer for fr ozen/ cell slide), Mounting medium, Peroxidase blocking solution, Primary Antibody Dilutions, Blocking Buffer	50μL	TGFP550
			100μL	TGFP5100
	FFPE 6-color TSA mIHC Kits	TSA Amplification reagent: TG520N、TG570N、TG620N、TG650N、TG700N、DAPI , Amplification diluent buffer, Antiger ozen/ cell slide), Mounting medium, Peroxid Dilutions, Blocking Buffer	50μL	TGFP650
	FFPE 7-color TSA mIHC Kits	TSA Amplification reagentTG440N、TG52 TG660S、TG470SN , Amplification diluent (or Stripping Buffer for frozen/ cell slide), N lution, Primary Antibody Dilutions, Blocking		
	FFPE 8-color TSA mIHC Kits	TSA Amplification reagentTG440N、TG52 TG650N、TG700N、TG470SN, Amplificat buffer (or Stripping Buffer for frozen/ cell slide), Mounting medium, Peroxidase bloc king solution, Primary Antibody Dilutions, Blocking Buffer	100μL	TGFP8100
	FFPE 9-color TSA mIHC Kits	TSA Amplification reagent: TG440N、TG520N、TG540N、TG570N、TG620N、TG650N、TG700N、TG540S、TG470SN, , Amplification diluent buffer, Antigen retrieval buffer (or Stripping Buffer for frozen/ cell slide), Mounting medium, Peroxid ase blocking solution, Primary Antibody Dilutions, Blocking Buffer	50μL	TGFP950
			100μL	TGFP9100
	FFPE 10-color TSA mIHC Kits	TSA Amplification reagentTG440N、TG520N、TG540N、TG570N、TG620N、TG650N、TG700N、TG540S、TG660S、TG470SN, Amplification diluent buffer, Antigen retrieval buffer (or Stripping Buffer for frozen/ cell slide), Mounting medium, Peroxidase blocking solution, Primary Antibody Dilutions, Blocking Buffer	50μL	TGFP1050
			100μL	TGFP10100

Antigen retrieval buffer
Mounting medium
Peroxidase blocking solution
Primary antibody dilution
Blocking buffer