

# TISSUEGNOSTICS

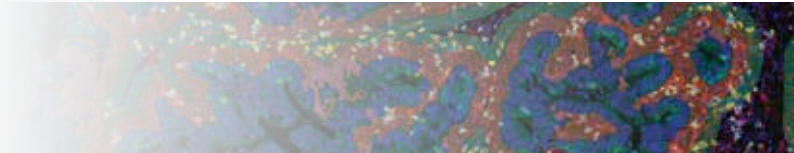
PRECISION THAT INSPIRES



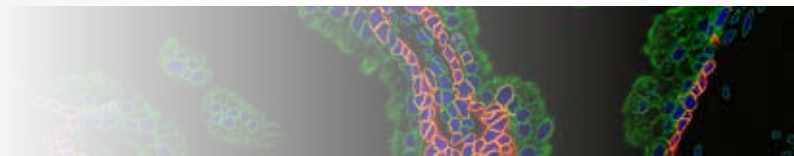
7<sup>TH</sup> GENERATION OF  
IMAGE CYTOMETRY SOLUTIONS

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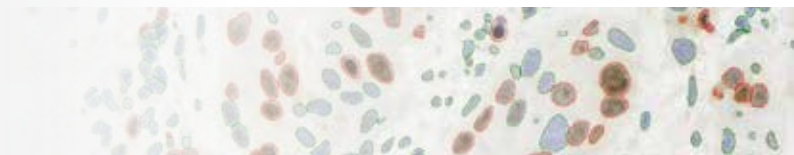
**STRATAQUEST**  
CONTEXTUAL **TISSUE CYTOMETRY**



**TISSUEQUEST**  
IF CELL **ANALYSIS SOFTWARE**



**HISTOQUEST**  
IHC/HC CELL **ANALYSIS SOFTWARE**



## 01 DIGITAL SAMPLE

import fluorescence/brightfield scans of tissue sections, TMAs or cell cultures from various sources

## 02 SPECTRAL UNMIXING AND COLOR SEPARATION

## 03 SEGMENTATION ALGORITHMS

allows automated detection of cells and stained areas based on morphological or antibody staining

## 04 STRATAQUEST: AI-POWERED TISSUE CYTOMETRY

machine learning-based classifier and deep learning-based nuclear segmentation

## 05 QUANTITATIVE ANALYSIS

automatic detection of various parameters attributed to cells and markers

## 06 DATA VERIFICATION

Explore your sample!

## 07 EXPORT RESULTS

straight-forward workflow for exporting the desired parameters, images and graphs

### TG USER EXPERIENCES

### REFERENCE PUBLICATIONS

Please check online for the constantly updated list of reference publications at

[www.tissuegnostics.com](http://www.tissuegnostics.com)

»StrataQuest, TissueQuest and HistoQuest PROVIDE QUANTITATIVE ANALYSIS OF TISSUE SECTIONS AND CONFLUENT CELL LAYERS STAINED BY IMMUNOFLUORESCENCE OR IMMUNOHISTOCHEMISTRY.«

**TISSUEGNOSTICS –  
A PRECISION MEDICINE  
COMPANY**

## 01

## NEW VERSION: TISSUE CYTOMETRY SUITE 7

TissueGnostics is proud to announce the release of StrataQuest, TissueQuest and HistoQuest version 7. In their 7<sup>th</sup> generation these highly cited image analysis applications advance FACS-like data analysis with an improved graphical user interface and added powerful machine- and deep-learning modules.



**DR. RUPERT ECKER**  
TissueGnostics, Vienna, Austria

## 02

## 03

## PRECISION AND REPRODUCIBILITY WITH EASE

## 04

StrataQuest generation 7 focuses on making high-end contextual image analysis accessible to everyone through machine- and deep-learning modules which require minimal user input.

## 05

Customized analysis pipelines can be built and packaged into simplified user interfaces called StrataQuest APPs.

## 06

StrataQuest has included streamlined image analysis engines for specific tasks such as proximity measurements, background removal, spectral unmixing, and tissue detection.

## 07

HistoQuest as well as StrataQuest APPs workflow is designed for simplicity and usability. Automated analysis starts with a few simple settings or by loading an analysis template.

Proven proprietary algorithms for nuclear segmentation and detection of nuclear, membrane and cytoplasmic markers reduce the complexity of the analytical workflow, measurement and reporting.

Data visualization using interactive flow cytometry like scattergrams (dot plots) and histograms permit analysis of subpopulations by gates.

Backward gating and Forward-connection between image and data display simplifies identification of subpopulations and unique understanding of the acquired data.

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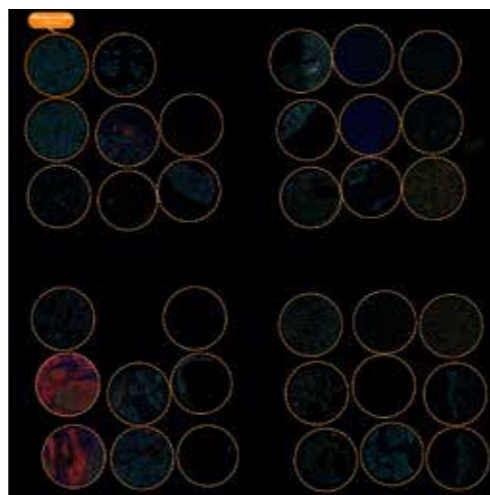
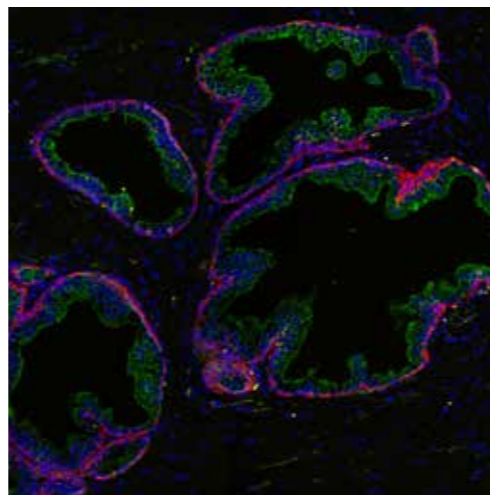
## 01 DIGITAL SAMPLE

Import fluorescence and brightfield scans of tissue sections, TMAs, and cell cultures from many popular scanning platforms.

### SUPPORTED FILE FORMATS

StrataQuest, TissueQuest and HistoQuest support the following file formats:

- TissueFAXS platform (aqproj)
- StrataFAXS II (vmic)
- PreciPoint (vmic, gtif)
- Generic Big TIFF Import
- OME-Tiff
- JPEG, PNG, BMP, TIFF
- Zeiss (dzi)
- Hamamatsu NanoZoomer (ndpi)
- Aperio (svs)
- Leica (scn)
- 3D HISTECH Panoramic
- Mirax (mrxs)
- Olympus (vsi)
- More slide scanners to be added



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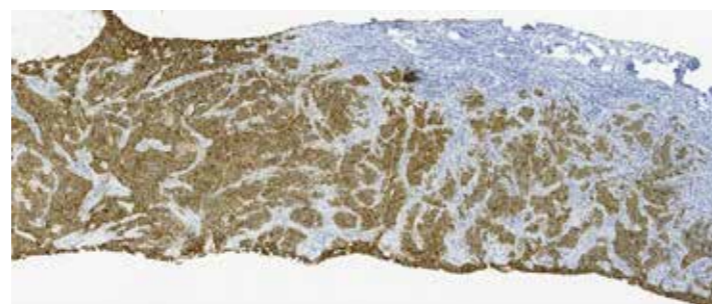
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StrataQuest, TissueQuest and HistoQuest support the ICE (Image Cytometry Experiment) file format, thereby enabling raw data export to the *FCS Express Image Cytometry Tool* (De NovoTMSoftware). *FCS Express Image Cytometry* software (<https://denovosoftware.com/image-cytometry/>) combines a flexible user interface with extensive and interactive data analysis including advanced statistics options and advanced high-dimensional analysis and machine learning algorithms such as t-SNE, UMAP, FlowSOM and many others.

USE BOTH StrataQuest and HistoQuest FOR THE ANALYSIS OF ALL KINDS OF IHC/HC STAININGS

- DAB
- AEC
- HistoGreen
- Discovery purple
- HE
- Trichrome
- ...



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## 02 SPECTRAL UNMIXING AND COLOR SEPARATION

### SPECTRAL UNMIXING

Using reference spectra from our database, the spectral unmixing engine in StrataQuest can eliminate autofluorescence and bleed-through from overlapping channels in multispectrally acquired images.

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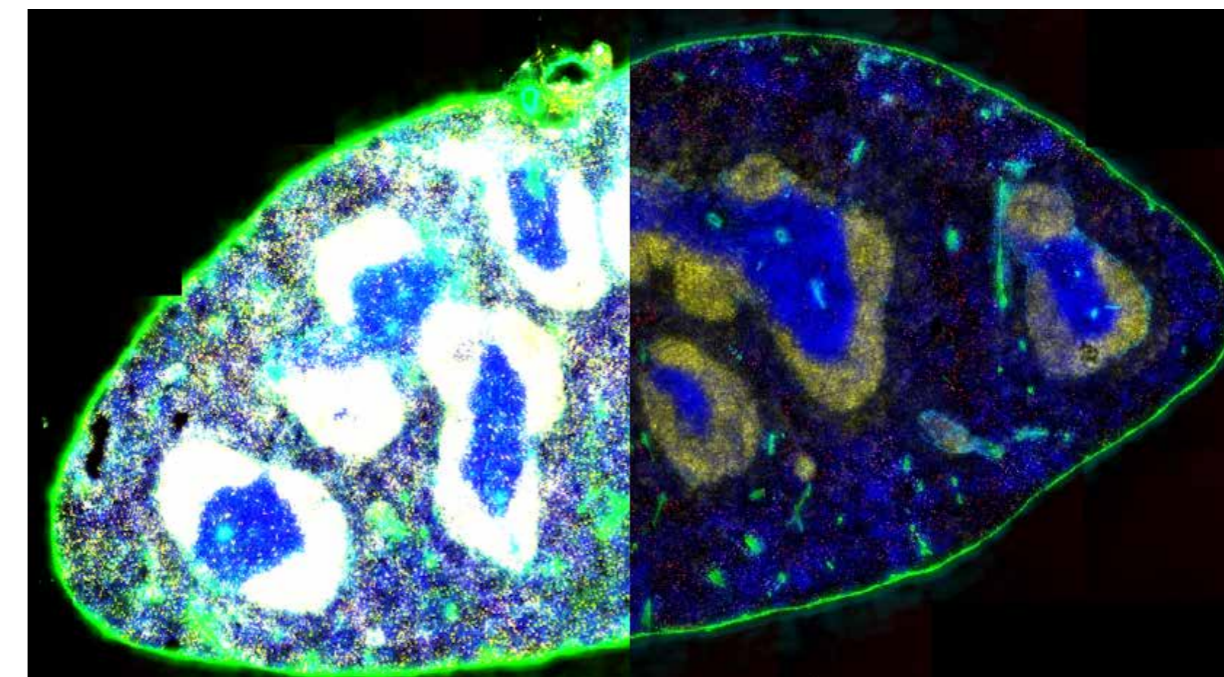
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### BEFORE SPECTRAL UNMIXING

### AFTER SPECTRAL UNMIXING

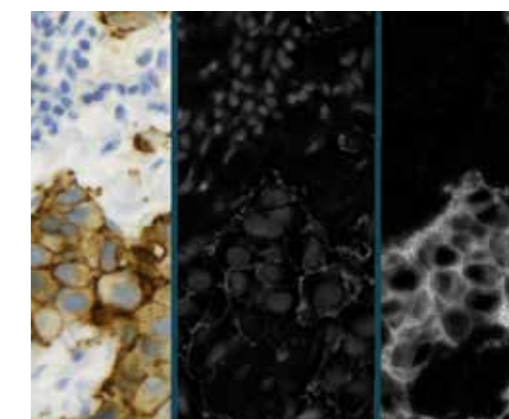


mouse spleen stained for 5 markers

### COLOR SEPARATION

StrataQuest- and HistoQuest-integrated color separation uses spectral unmixing of RGB color information in brightfield images to colorimetrically separate image components into individual channels for each identified marker. StrataQuest and HistoQuest support separation of mixtures of up to four blended chromogens or markers.

Fluorescence analysis in TissueQuest does not require colorimetric separation.



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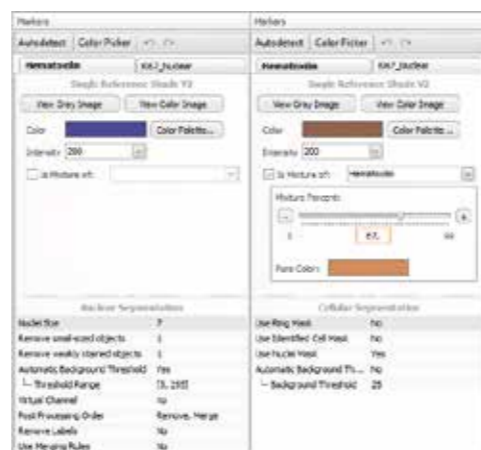
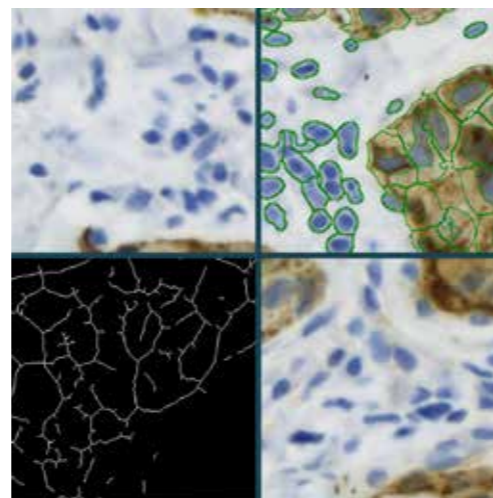
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### 03 SEGMENTATION ALGORITHMS

Choose from multiple algorithms for automated segmentation for highly flexible data analysis.

- **Nuclear Segmentation** – detect events/cells with various shapes and sizes and segment them into nucleus, cytoplasm and membrane (requires the membranes to be stained).
- **Total Area Measurement** – measure the total area stained by a marker.
- **Dot Detection** – detect dot-like features (e.g. FISH, CISH). This algorithm can be added to Nuclear Segmentation or Total Area Measurement algorithms.
- **Membrane Detection** – discriminate nuclear membrane from nucleoplasmic staining.



### IHC MARKER PROFILES

StrataQuest and Histoquest include dedicated marker management functionality. Colorimetric marker definition includes parameters for detection and measurement masks. Quickly and easily test your color segmentation parameters within your sample. Store marker profiles for future analyses.

Save TissueQuest fluorescence analysis profiles for re-use, repeatability and precision.

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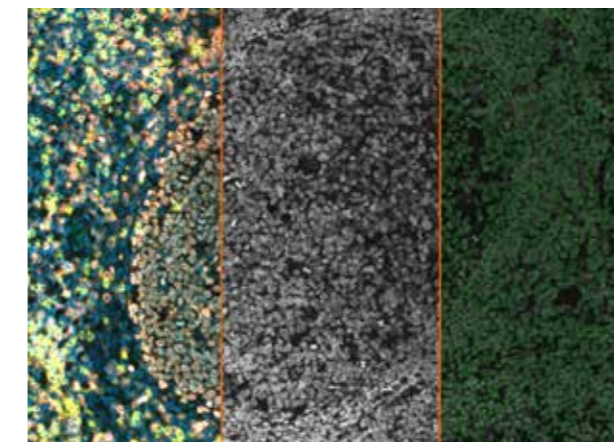
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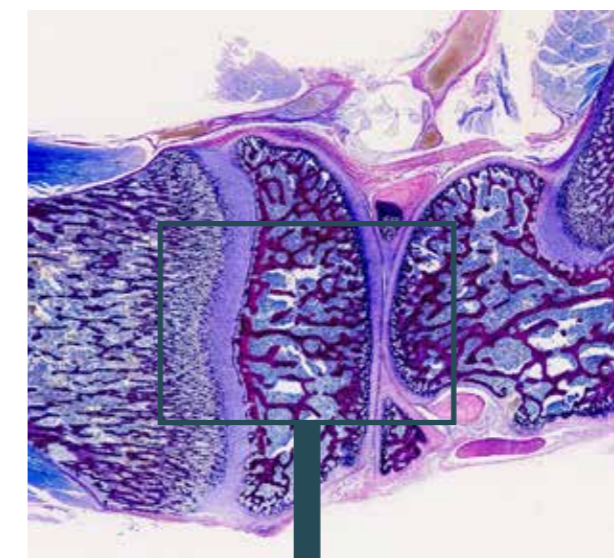
### 04 STRATAQUEST: AI-POWERED TISSUE CYTOMETRY

Use a combination of SQ's integrated AI features for a precise detection of morphological entities and increased accuracy for nuclear segmentation even in tissues comprising a high cellular density.



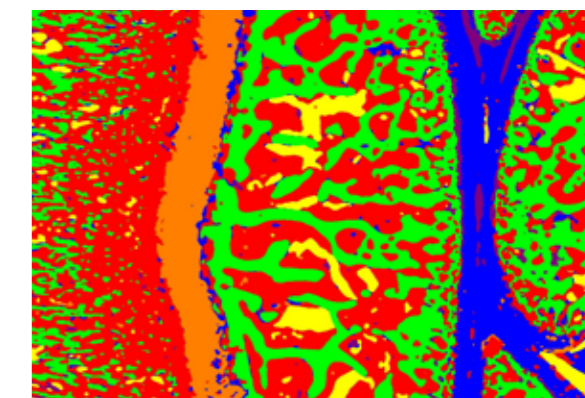
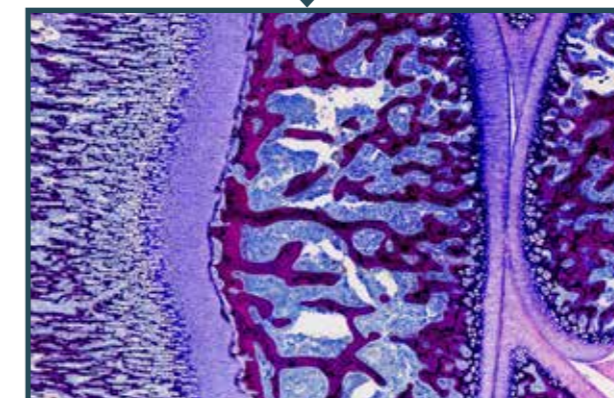
**Deep learning based nuclear segmentation** – the Deep Neural Network (DNN) can segment nuclei especially in challenging tissue samples displaying extremely dense tissue microenvironments, non-homogeneous chromatin distribution patterns, and weak DAPI signal intensity.

DNN applied on a lymphatic tissue



**Machine learning based classifier** – dissect your tissue into multiple tissue classes/morphological entities with minimal user input. The machine learning-based classifier works by marking just a few areas representative for the specific morphological entities of interest and the background.

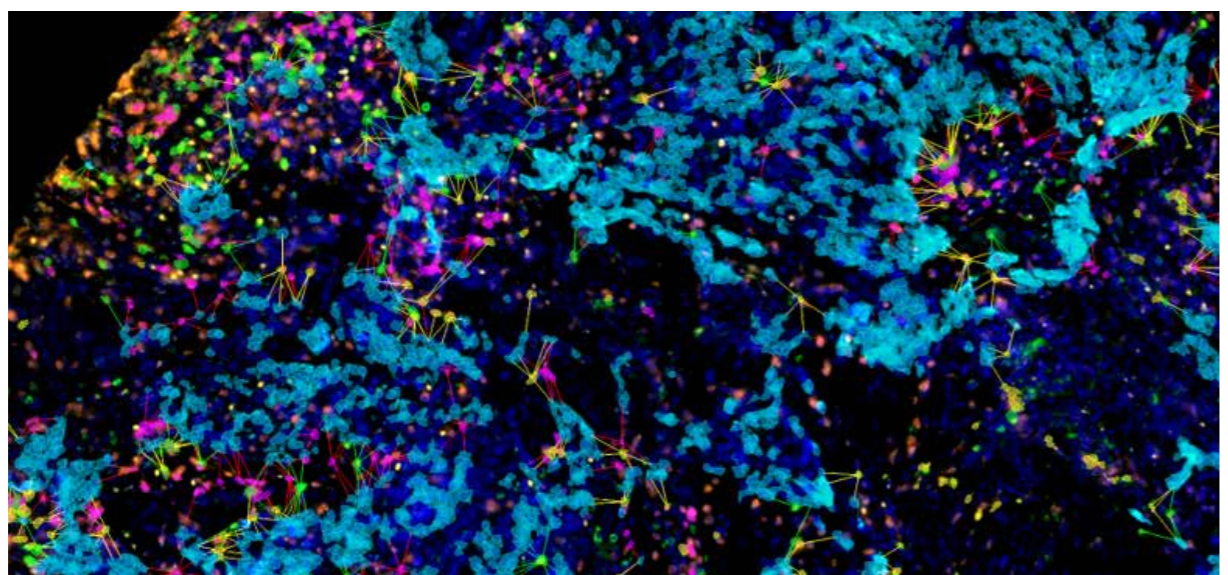
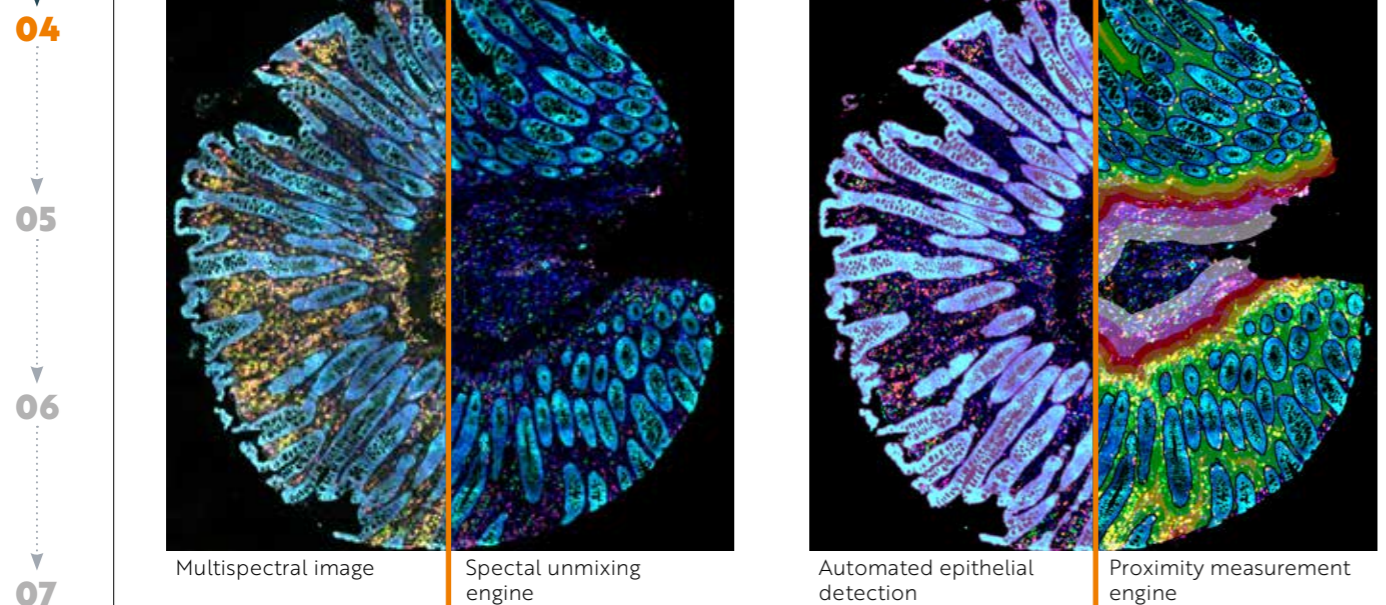
Based on these defined areas the classifier is able to separate the tissue into specific tissue classes, including the background, and will automatically generate specific measurement masks for the detected areas.



Rat joint classified into 5 different classes

01 Add more depth to your research with StrataQuest engines in which specific tasks are simplified into automated modules providing a more insightful and comprehensive analysis

- 02 ■ **proximity measurements** – discover spatial relationships between metastructures and specific cell populations
- 02 ■ **background removal** – remove unspecific signals to increase object detection accuracy
- 02 ■ **spectral unmixing** – remove autofluorescence and channel bleed-through from multispectrally acquired virtual slides
- 03 ■ **dot measurements** – applicable to RNAscope, FISH, CISH, intracellular parasites
- 03 ■ **manual correction** – add the final touches and prune your analysis
- 03 ■ **membrane detection** – can be used for any network-like structure including neurons, blood vessels, canaliculi etc.
- 03 ■ **tissue detection** – automatically detect tissue areas



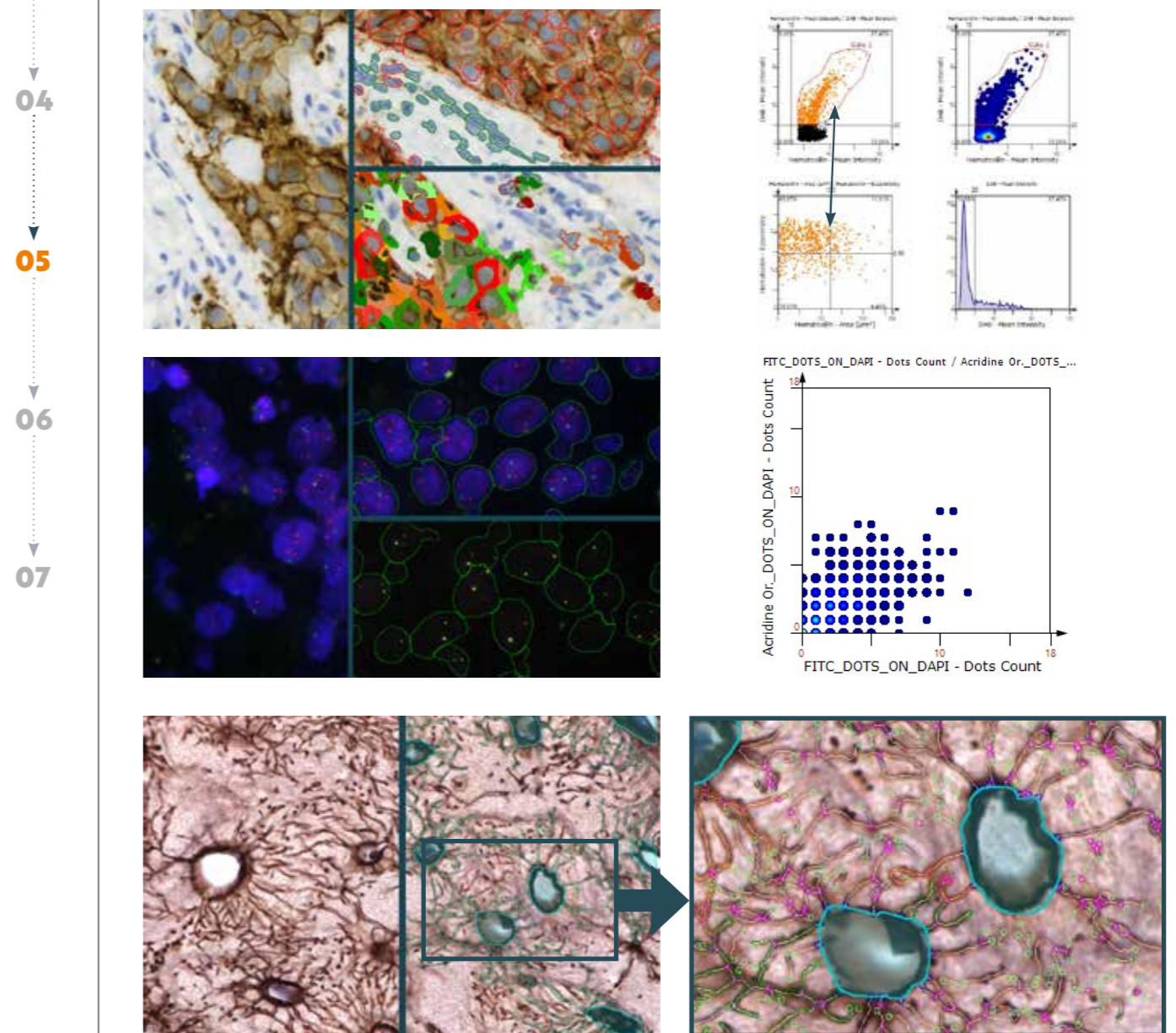
Spatial relationships

## 05 QUANTITATIVE ANALYSIS

01 StrataQuest, TissueQuest and HistoQuest automate the measurement of multiple parameters for each cell, ROI, group of ROIs, and whole samples across multiple samples/slides. Apply prepared analysis protocols for rapid analysis and straight forward reporting.

02 Both applications support up to 18 individual metrics per marker for each detected object and analysis can be easily adjusted to fit evolving requirements. TissueGnostics Image Cytometry software analyzes and reports on populations of millions of cells at a time with clarity and precision.

- Area (µm<sup>2</sup>)
- Mean Intensity
- Minimum of Intensity
- Maximum of Intensity
- Range of Intensity
- Sum Intensity
- Percentile 75%
- Percentile - Lower Mean 75%
- Percentile - Upper Mean 75%
- Variance of Intensity
- STD of Intensity
- Equivalent Diameter (µm)
- Perimeter (µm)
- Compactness
- Eccentricity
- Minimum Width (µm)
- Maximum Length (µm)
- Feret Ratio



Bone sample acquired at 100x magnification. Automated detection of lacunar-canalicular networks (LCN) and detection of interconnected lacunae

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**06 DATA VERIFICATION** EXPLORE YOUR SAMPLE!

Gain insight through contextual analysis that juxtaposes and connects data and sample. Use visual exploration, comparison, display, verification to better make qualified conclusions.

02

**BACKWARD AND FORWARD CONNECTION**

Evaluate your results by selecting any event or group of events (gate) in the scattergram to immediately highlight the corresponding cell(s) in the image and vice versa. Users gain control of the accurately analysed data and can verify outliers with ease. Real-time backward gating from scattergram quadrants and gates is used to interactively set cut-offs in the absence of an isotype-matched negative control.

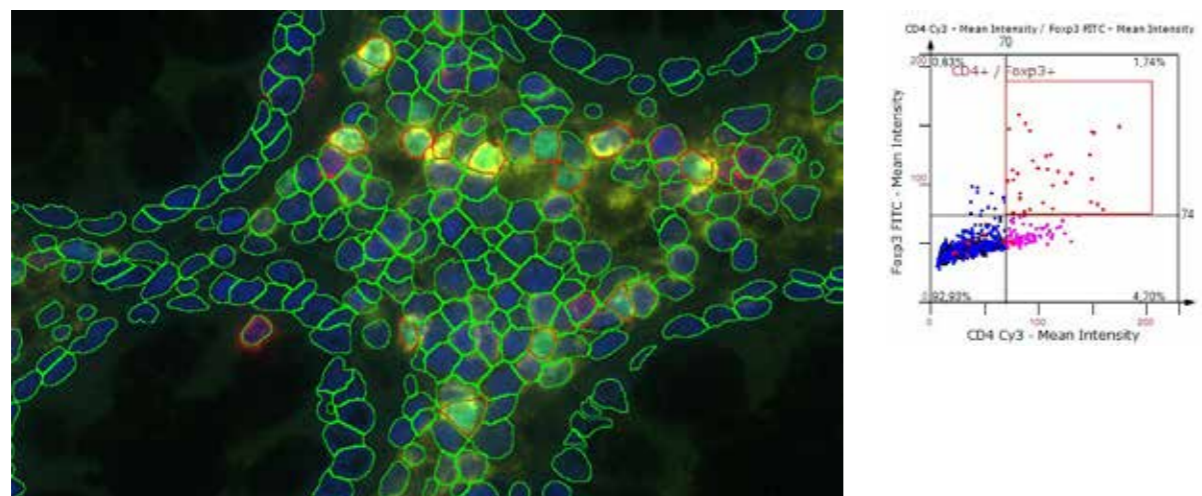
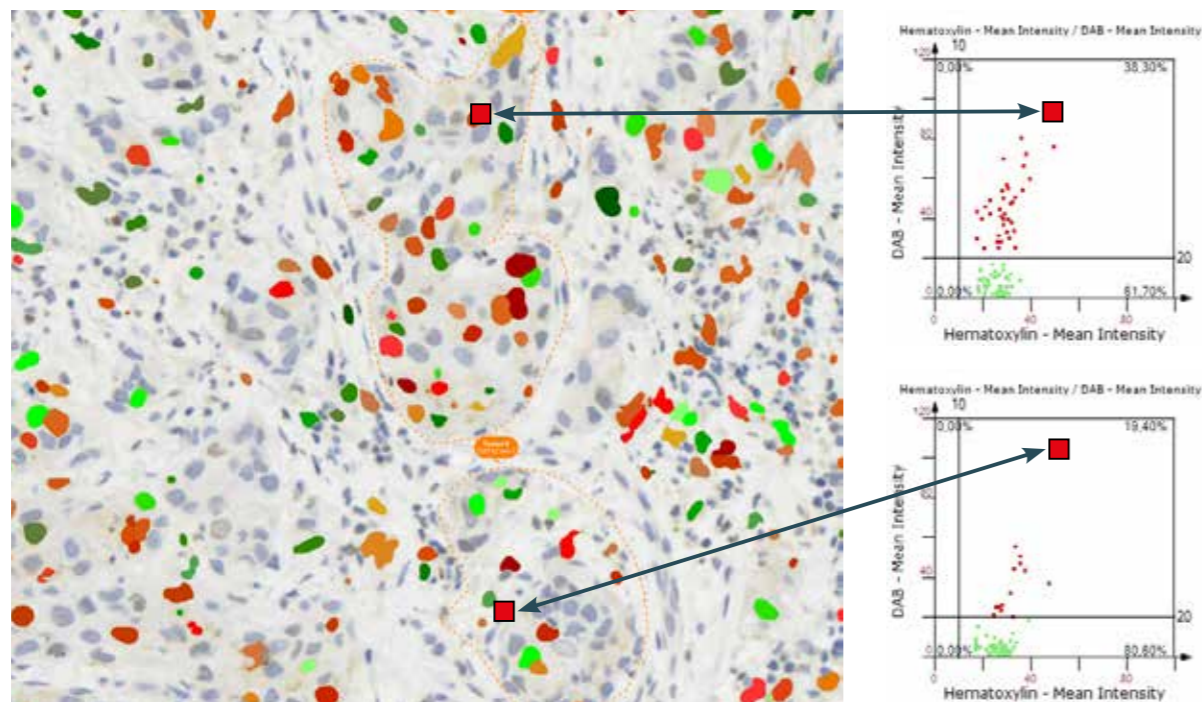
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**IMAGE COMPARE SETS**

Easily display multiple virtual slides for comparison and review. Use TissueGnostics registration algorithm to align consecutive tissue sections stained with different markers. Compare the analysis of the same histological structure across multiple samples.



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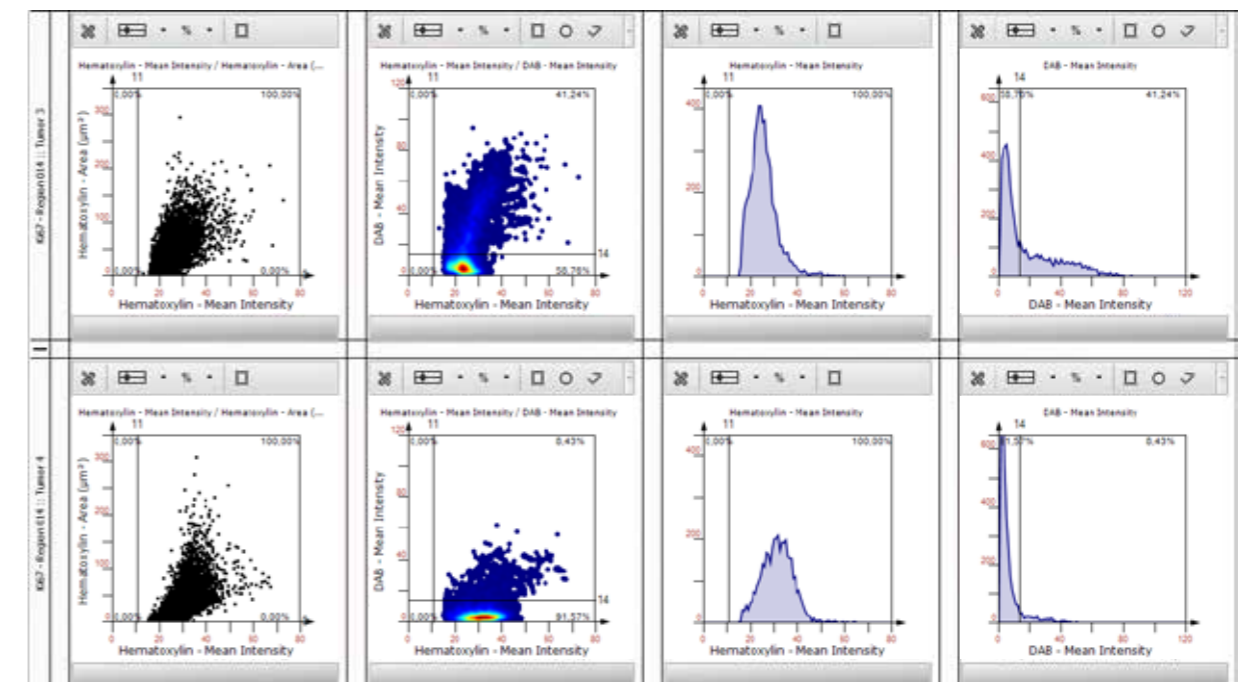
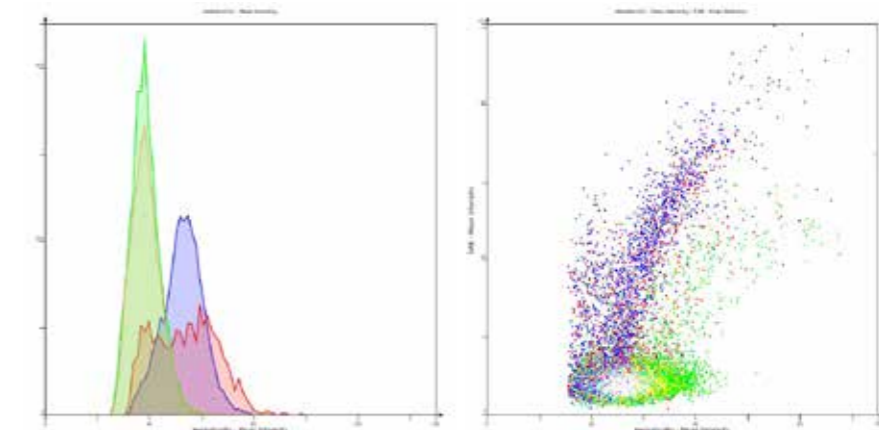
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**DATA COMPARE SETS/OVERLAY DIAGRAMS**

Perform side-by-side or overlaid comparison of diagrams within a project.



Analyzed parameters of cellular characteristics and marker expression can be compared among different regions and/or samples.

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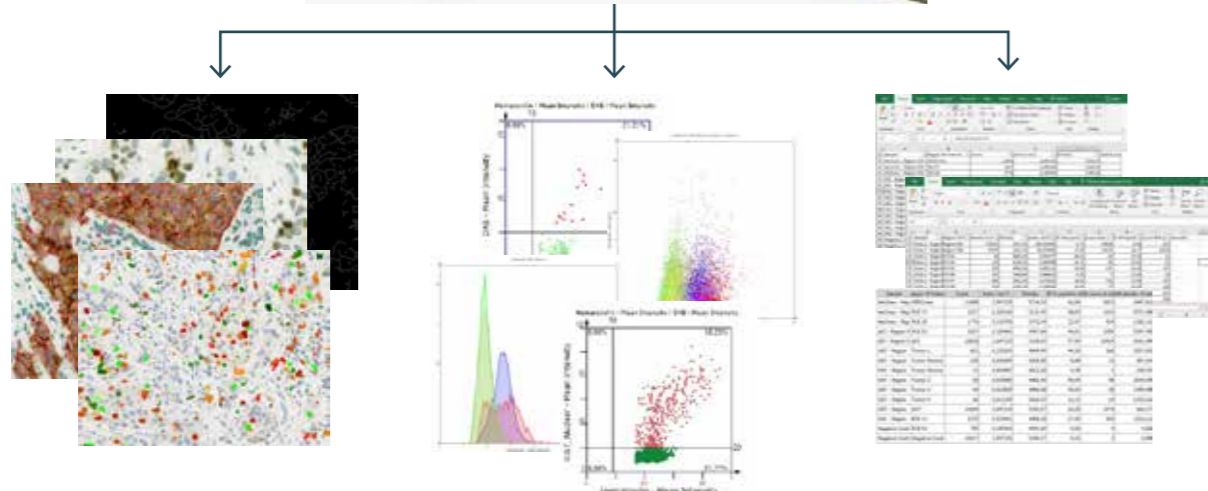
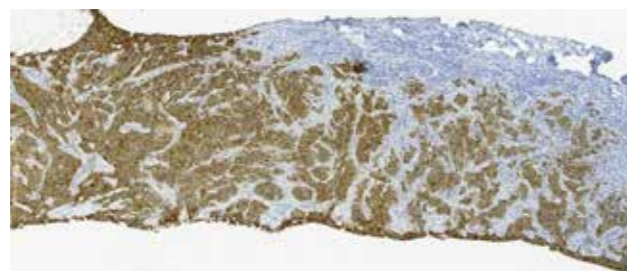
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**07 EXPORT RESULTS**

Report upon measured ROIs and full samples using the Statistics Report. Export data in .xlsx, .pdf or .csv file formats. Export images and diagrams in a range of file formats (TIFF, BMP, PNG, JPG). Every measured value of each cell is available for list review and backward connection or export as raw data.



StrataQuest, TissueQuest AND HistoQuest offer you the possibility to get the maximum of information from your stained tissue sections, cell cultures and TMAs.



**TG USER EXPERIENCES**



**DISSECTING THE COMPLEXITY**

»I am working with the TissueFAXS system for almost 13 years. Then and now, pioneering in Austria and worldwide, the unique digital image technology with the analysis software packages from TissueGnostics enabled my research group to dissect the multilayer complexity of immune cells in cancer.«

*(Associate Professor, Dr., Dipl.-Ing. Diana Mechtcheriakova, Medical University of Vienna)*



**THE BEST STATE OF ART**

»I have been working with the TissueFAXS Cytometer and the analysis software from TissueGnostics for more than 10 years. My focus was to determine markers in the tissue, not only to determine the protein expression profile of the marker but also the subcellular location within the tissue. Looking into other systems, the TissueGnostics systems still provide in my opinion the best state of art and a unique analysis platform. I'm a strong TissueGnostics supporter and will continue the investigation of protein expression with the TissueFAXS analysis system in cancer tissue.«

*(Dr. Franco Fortunato, University of Heidelberg)*



**ULTIMATE TMA MODULE**

»HistoQuest is the ideal tool for TMA-Analysis. Superior data management and intuitive user interface, for exact and quantitative analysis of every single core.«

*(Professor Dr. Lukas Kenner, Ludwig Boltzmann Institute for Cancer Research, Vienna, Austria)*



**REFERENCE PUBLICATIONS**

TissueGnostics systems produce valuable research imaging on six continents around the world and the list of publications grows daily. Check TG's searchable online database of publications to see how TissueGnostics can support you!

[www.tissuegnostics.com](http://www.tissuegnostics.com)

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