

New Standards in Collagen Quantification: The Value of Second Harmonic Generation



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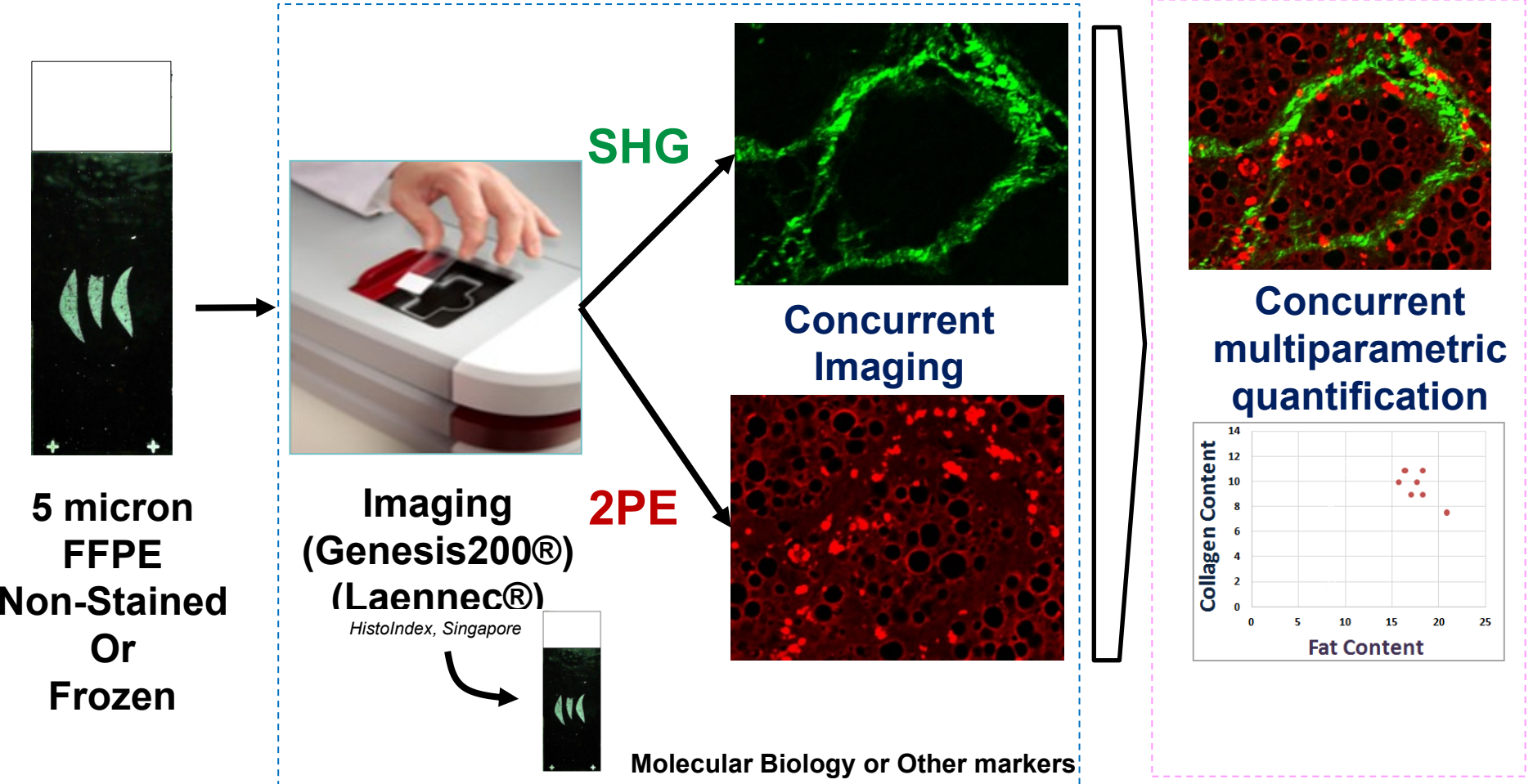
Genesis Imaging Services
PharmaNest, Princeton, NJ



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Current Capabilities

Two Optical Methods fused in one instrument



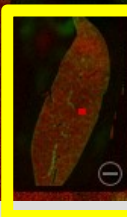
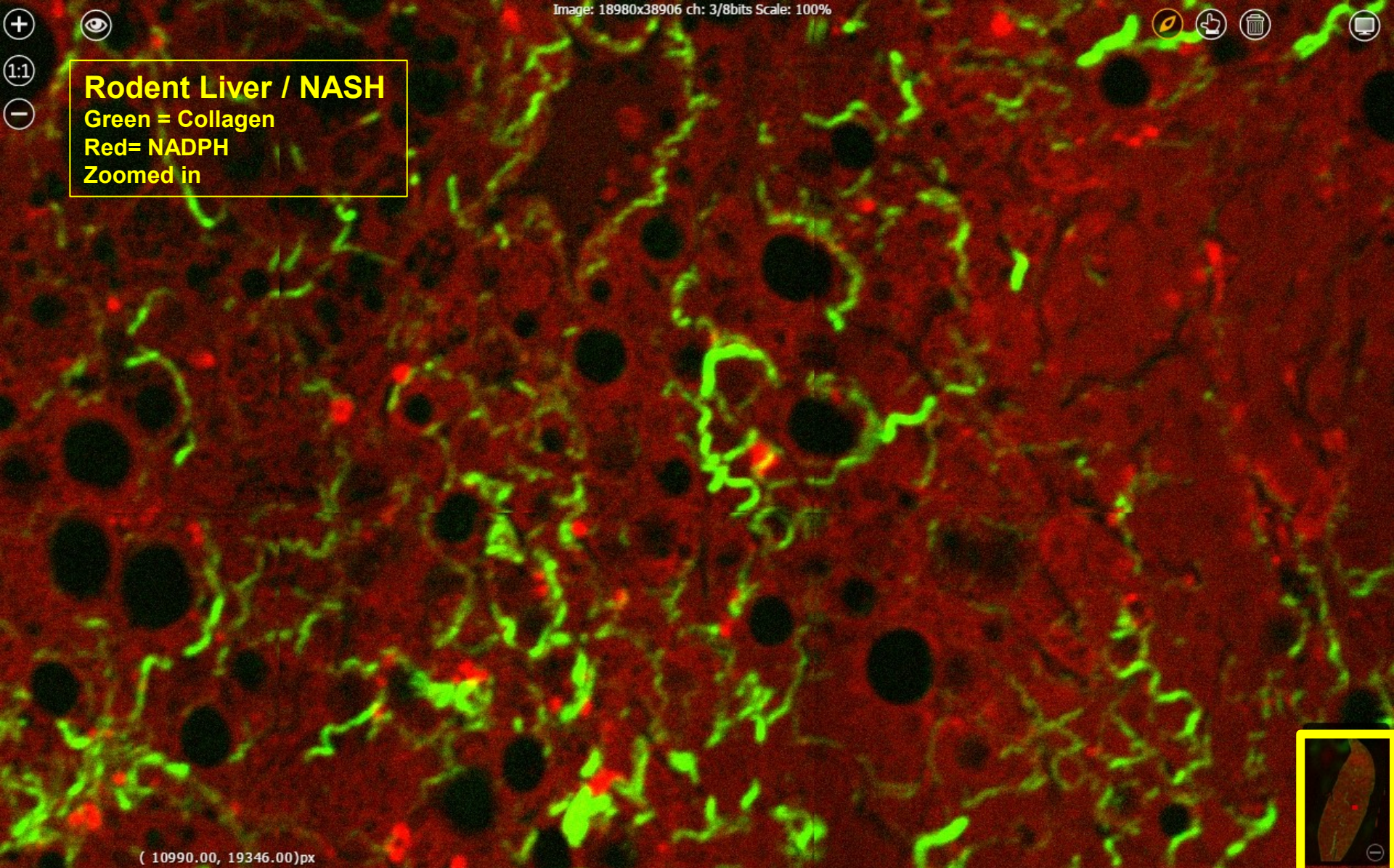


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Image: 18980x38906 ch: 3/8bits Scale: 100%



Rodent Liver / NASH
Green = Collagen
Red = NADPH
Zoomed in



(10990.00, 19346.00)px

Genesis Imaging Services



Image: 18980x38906 ch: 3/8bits Scale: 100%



1:1



Rodent Liver / NASH

Green = Collagen

ONLY

Zoomed in

(11081.00, 19189.00)px

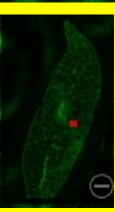
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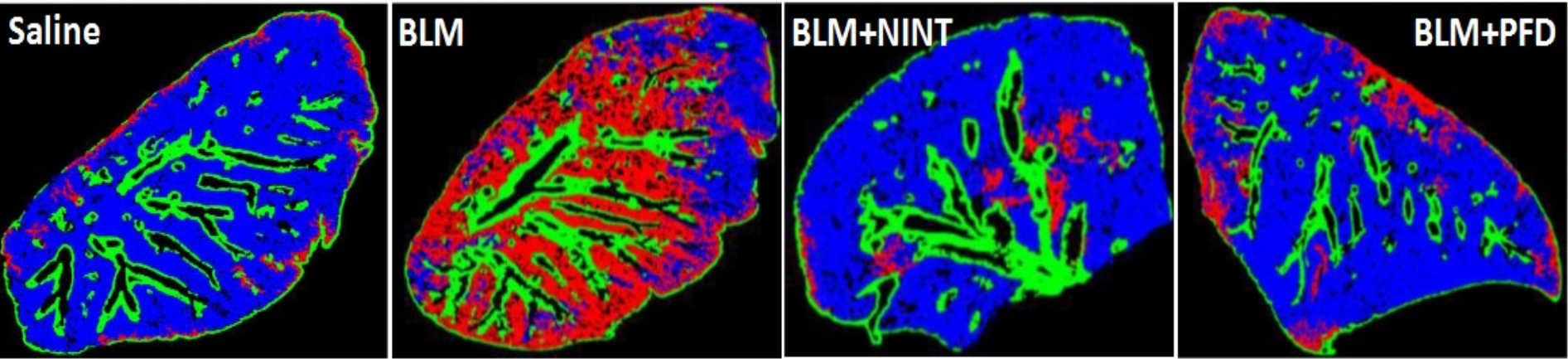
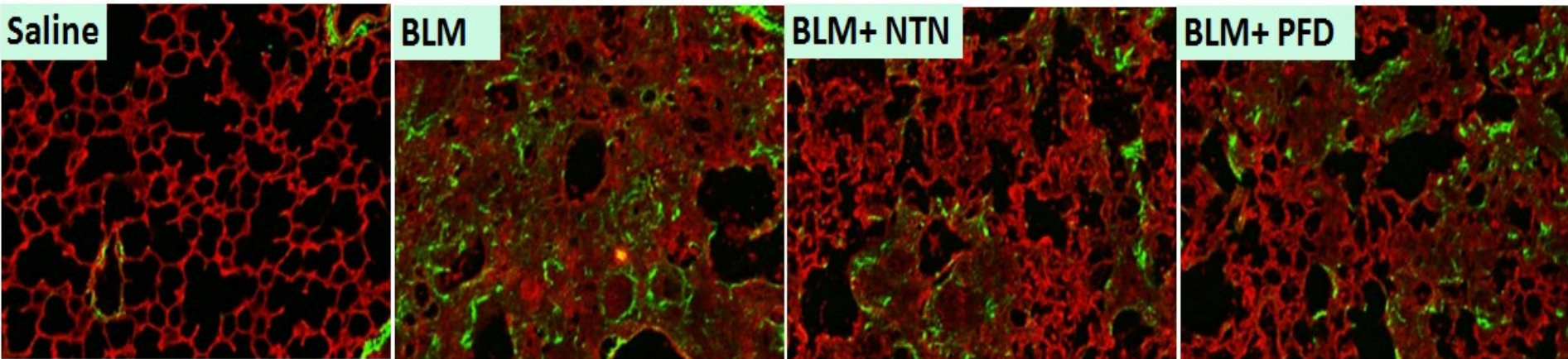
FOR PRESENTATION





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IPF : Bleomycin Induced Lung Fibrosis Treated with or without Nintedanib or Pirfenidone

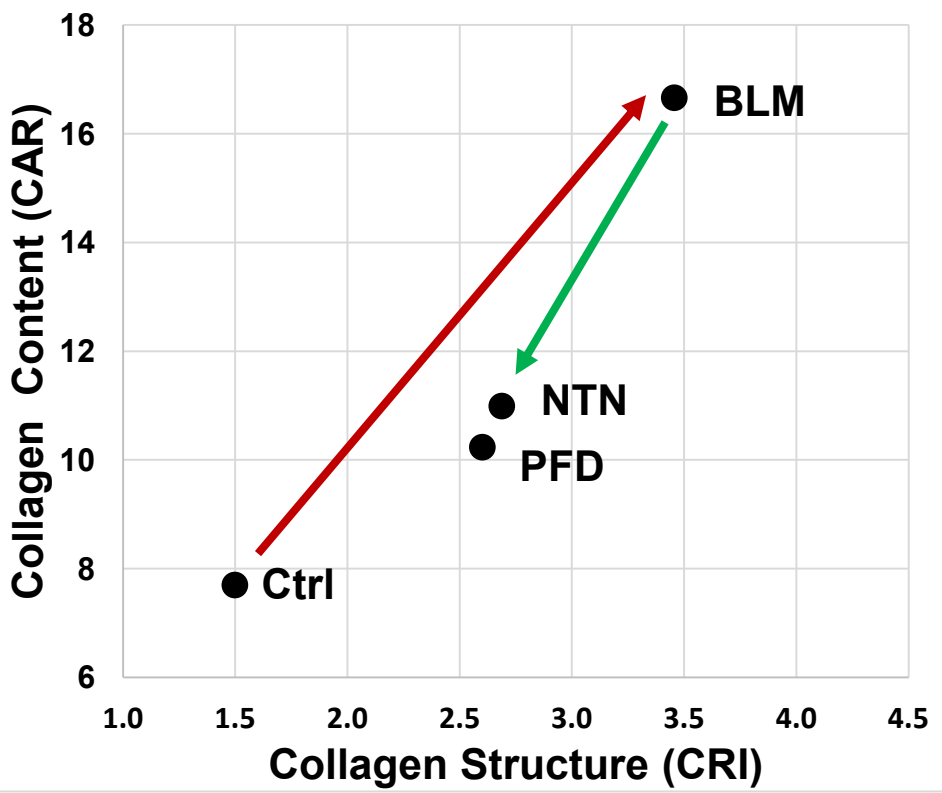




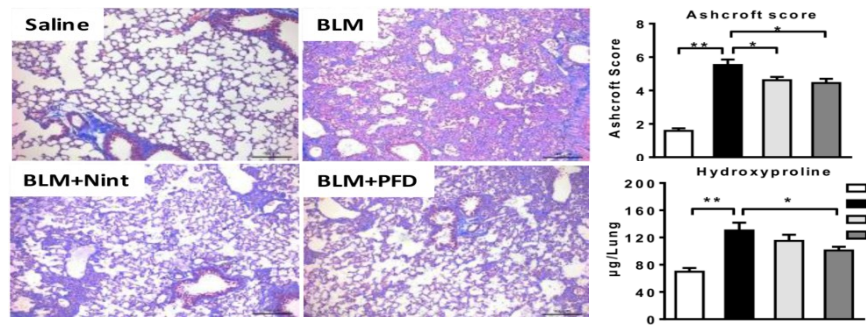
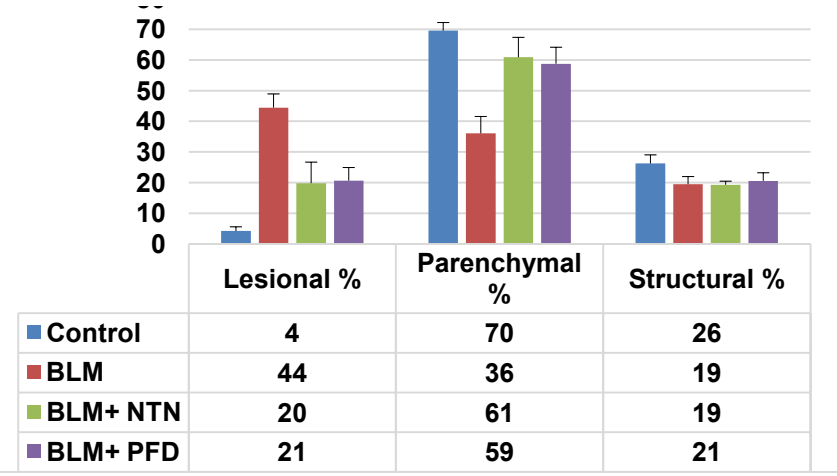
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IPF : Bleomycin Induced Lung Fibrosis Treated with or without Nintedanib or Pirfenidone

Fibrosis Content and Structure



Fibrosis Regional Quantification





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Kidney: UUO Fibrosis in Rat

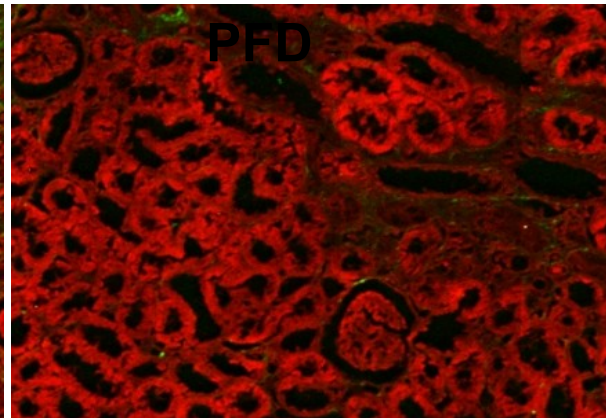
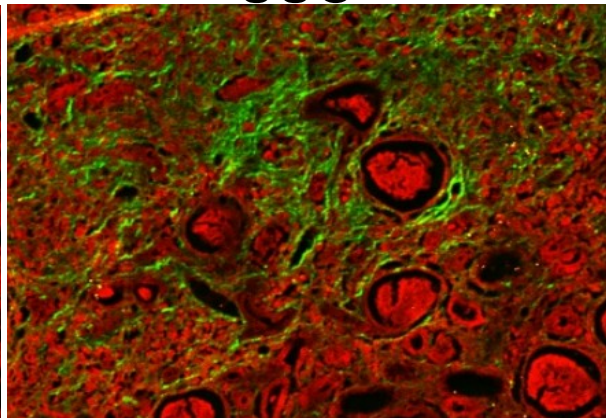
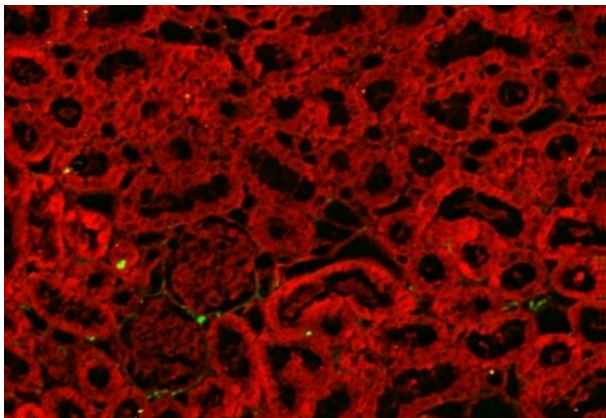
Treated with or without Pirfenidone

Control

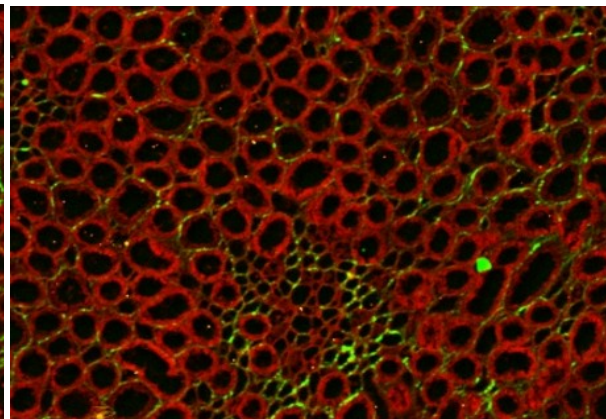
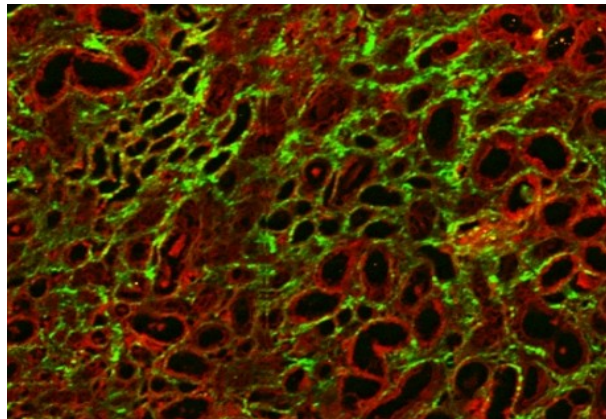
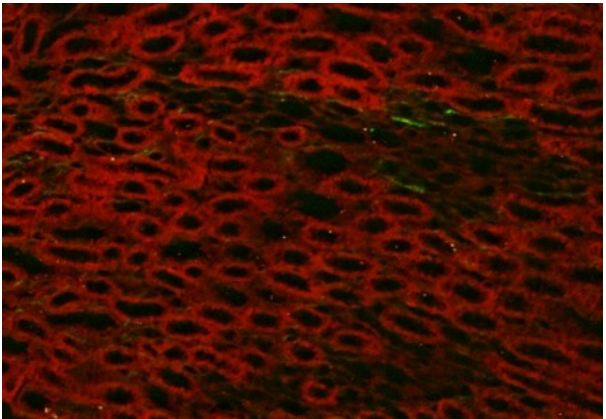
UUO

UUO +
PFD

Cortex



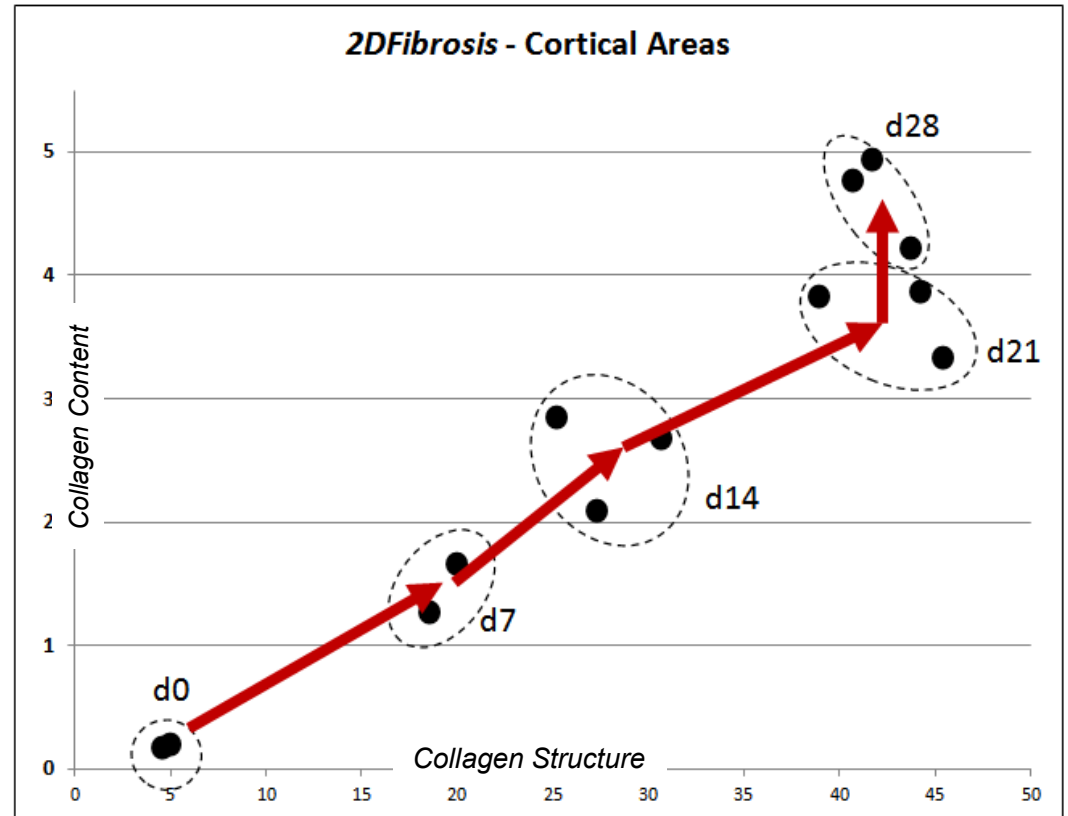
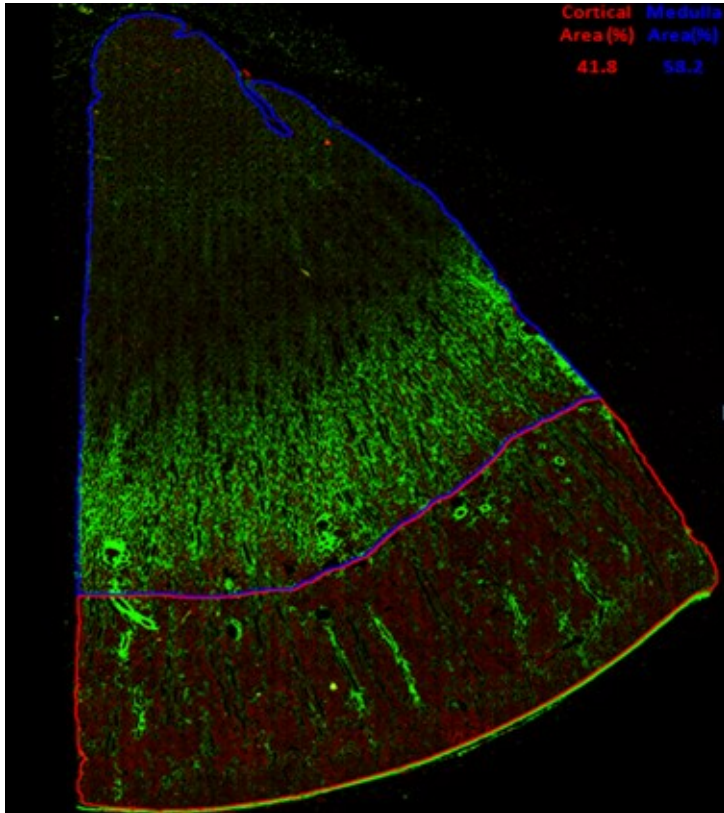
Medulla



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Kidney: UUO Fibrosis in Rat

Rodent Model Dynamic Range Selection

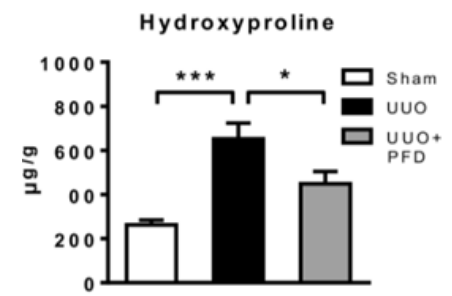
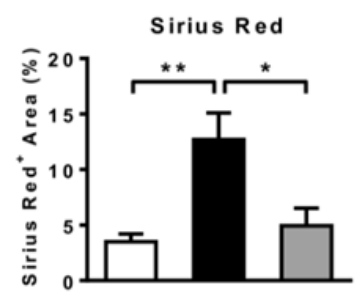
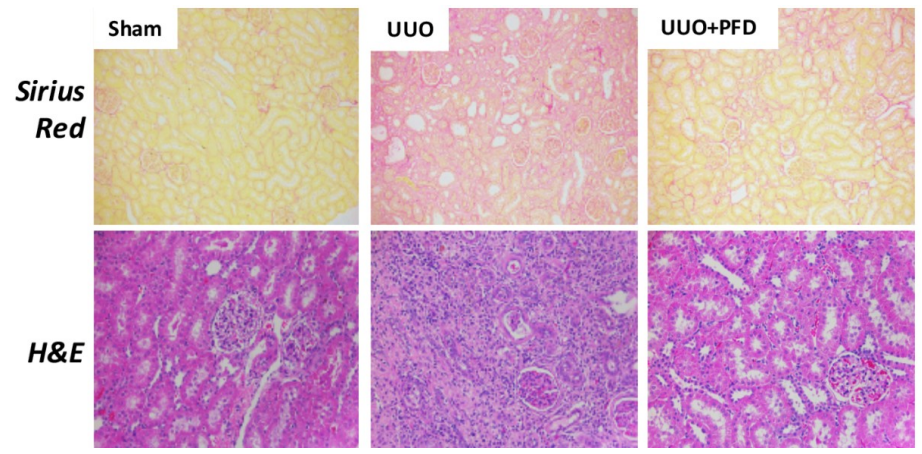
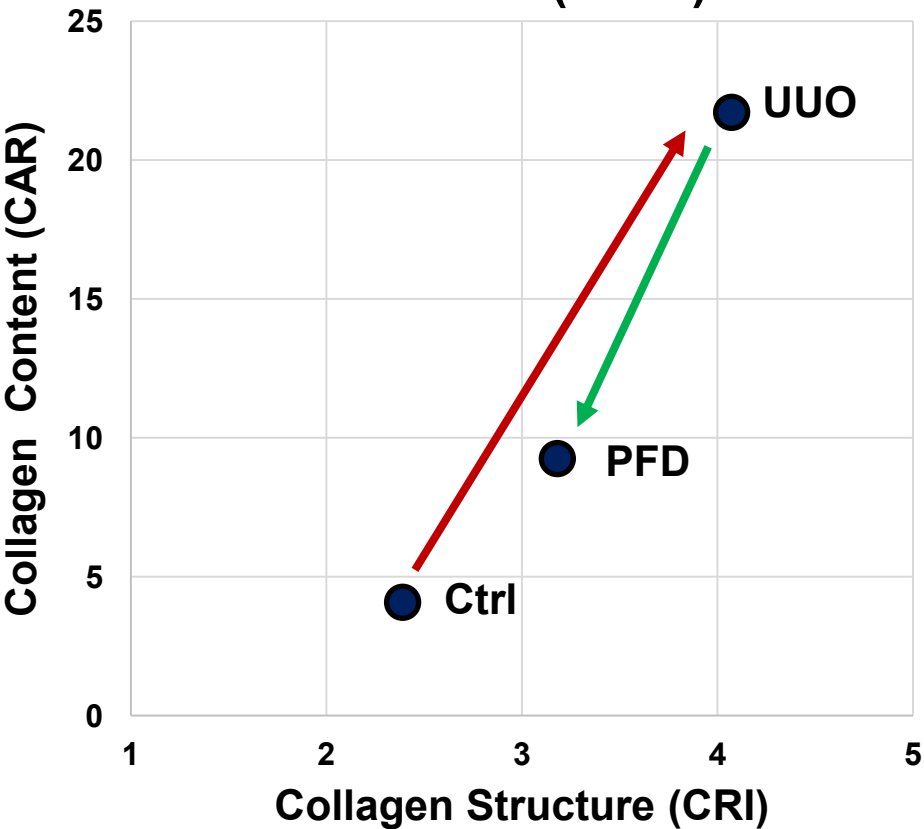


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Kidney: UUO Fibrosis in Rat

Treated with or without Pirfenidone

2D Fibrosis (Total)

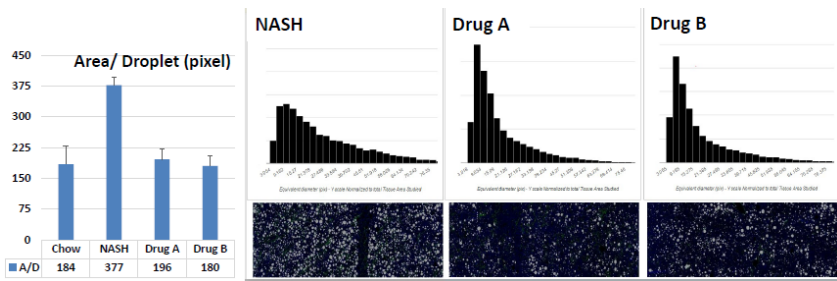
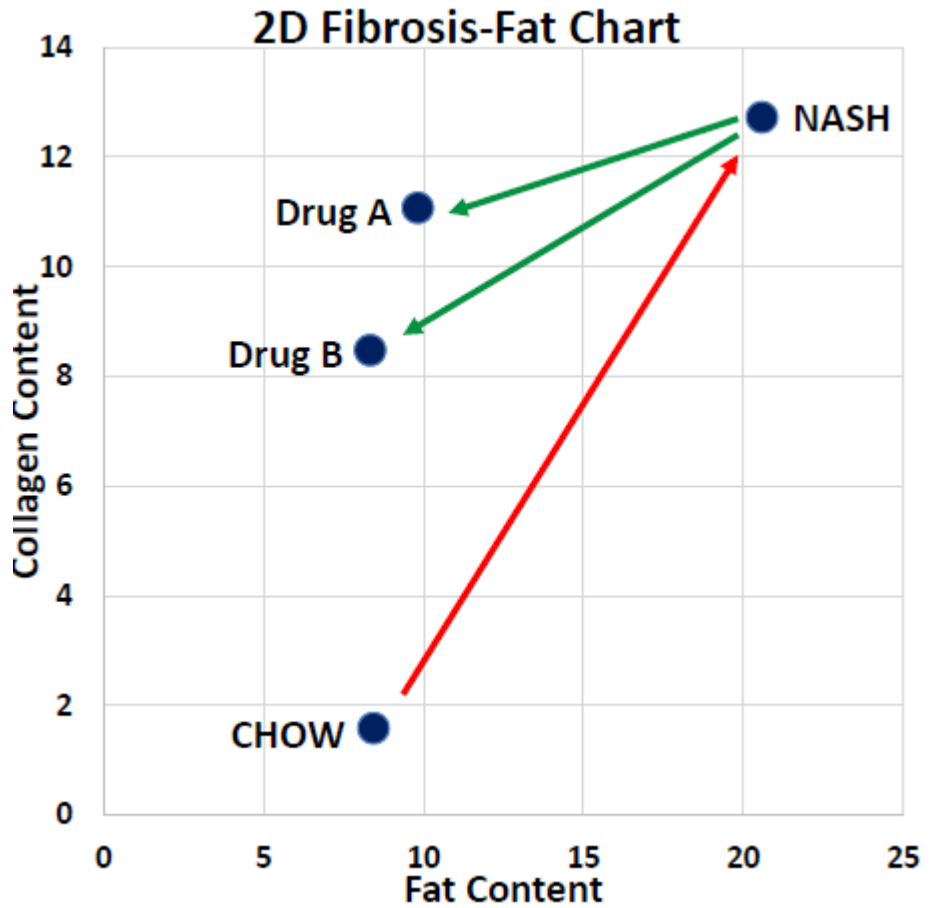
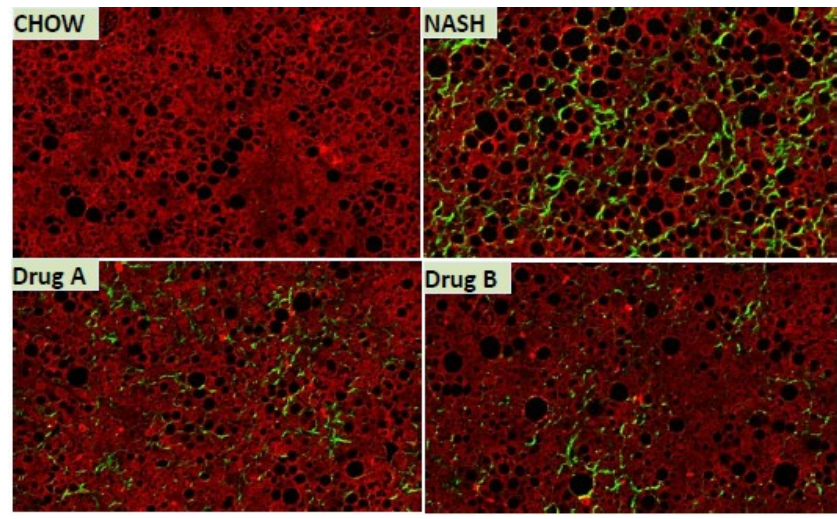




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Liver: NASH (Modified ALIOS diet-feed mice)

Label Free, Automated, Concurrent Fibrosis and Steatosis Quantification

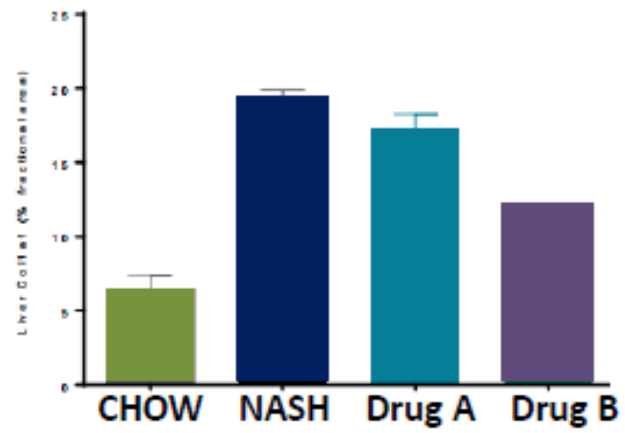
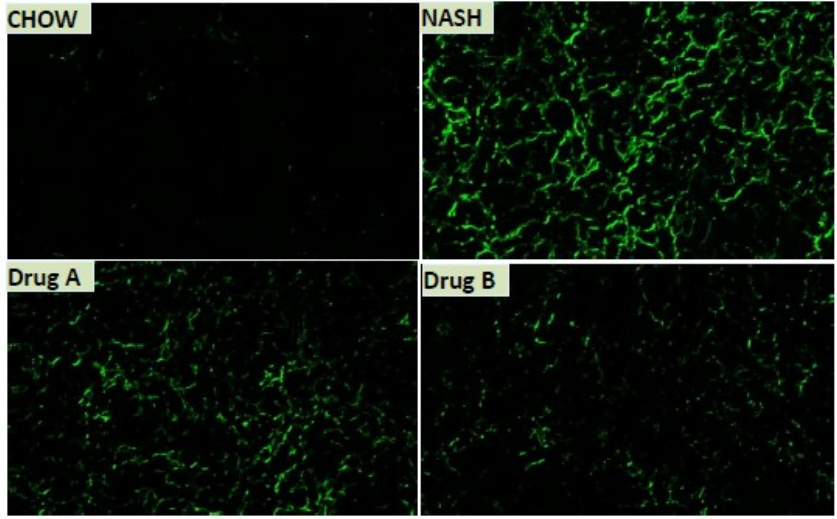
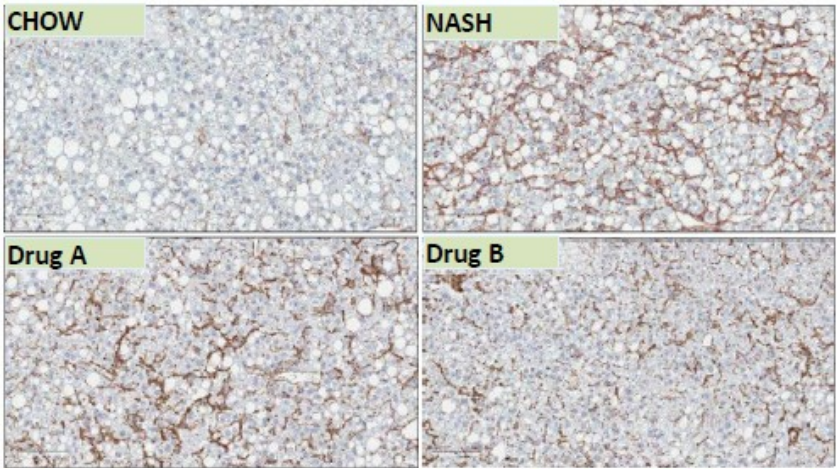




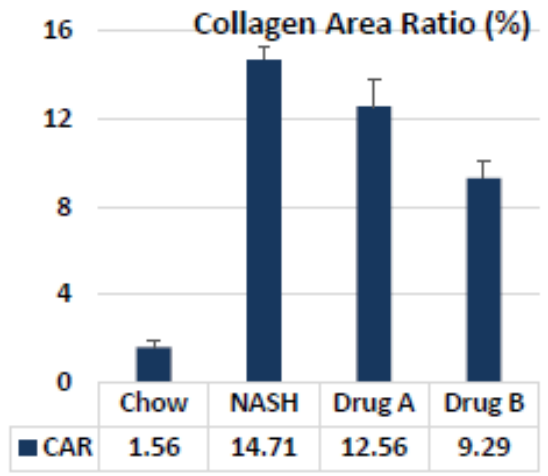
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Liver: NASH (Modified ALIOS diet-feed mice)

Concordance with Standard Methods (50% less N)



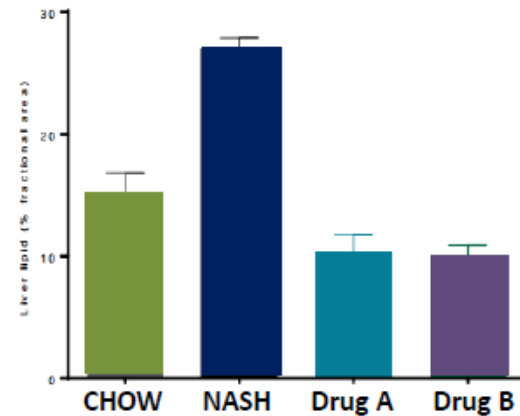
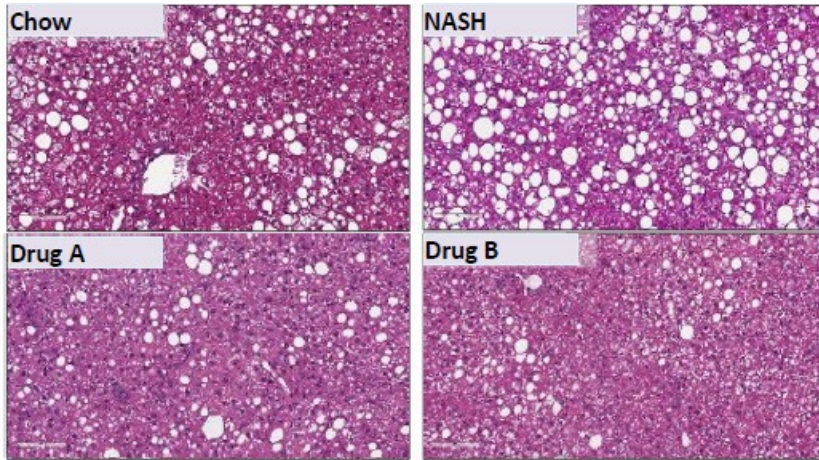
@ Data from conventional method is provided by Intercept



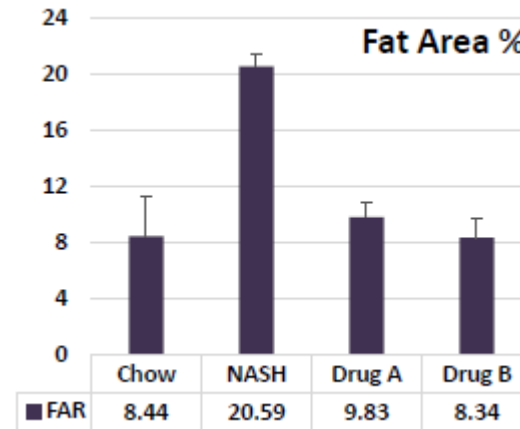
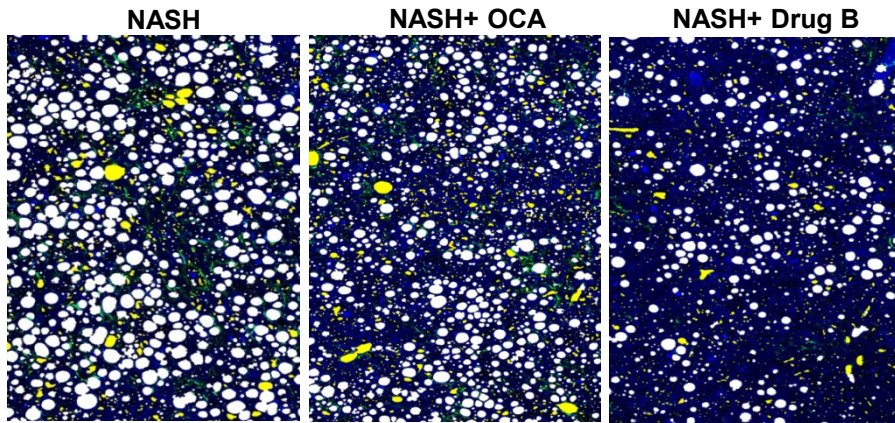
Genesis Imaging Services

Liver: NASH (Modified ALIOS diet-feed mice)

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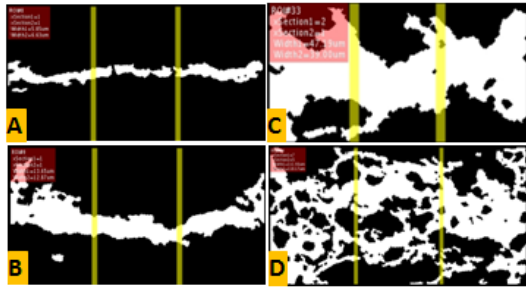
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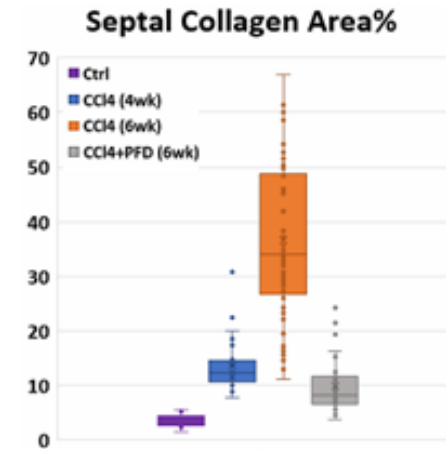
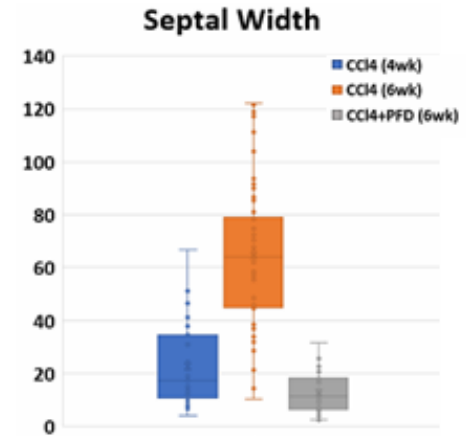
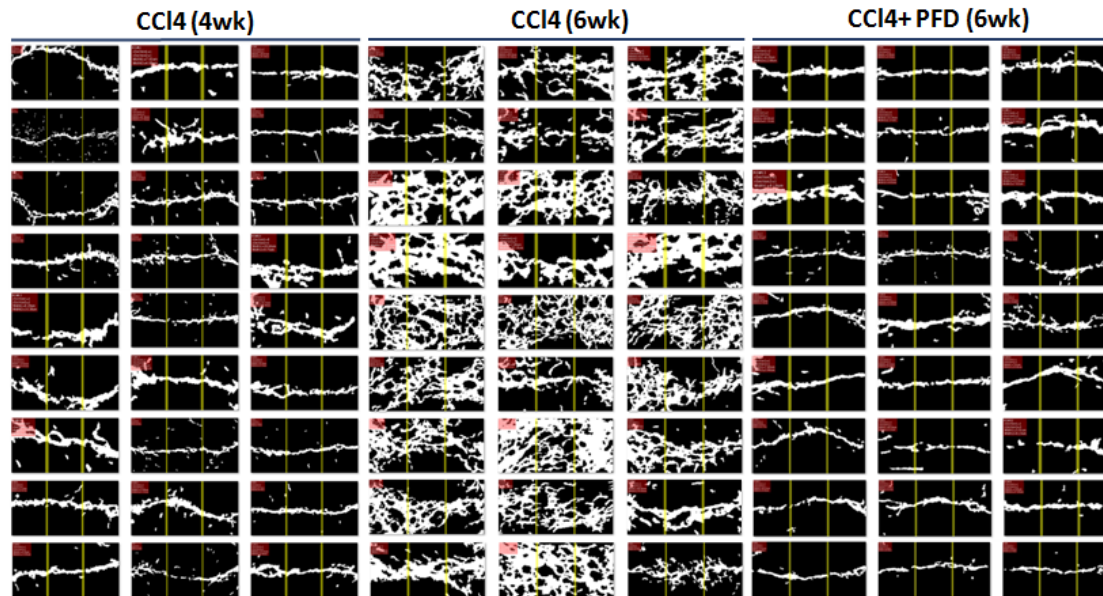
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Truly Quantitative Fibrosis Parameters(qFPs)

Septal Bridges Classification



	Septal Bridge Characteristics				
	Width	Branches	Segment Length	Collagen Reticulation Index	Collagen Area
	at 1/3 & 2/3 intersection				
A					
B					
C					
D					

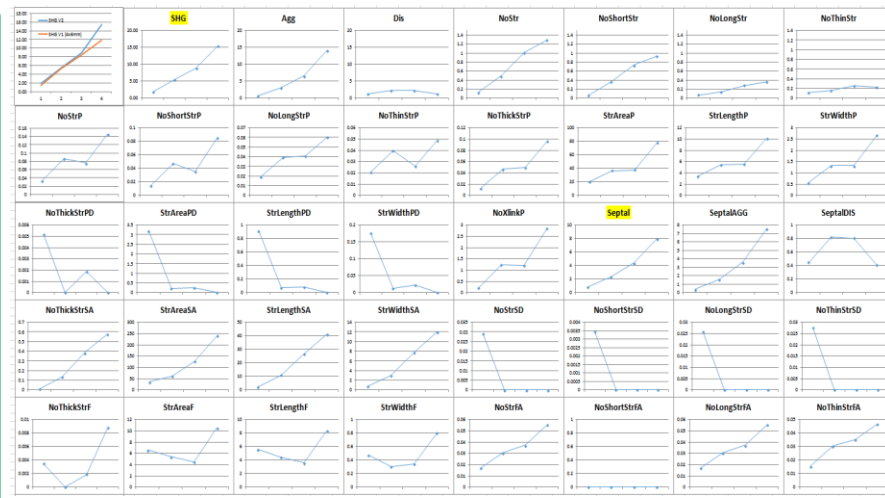
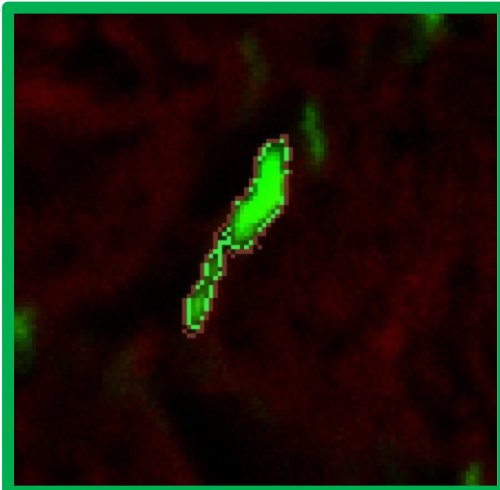
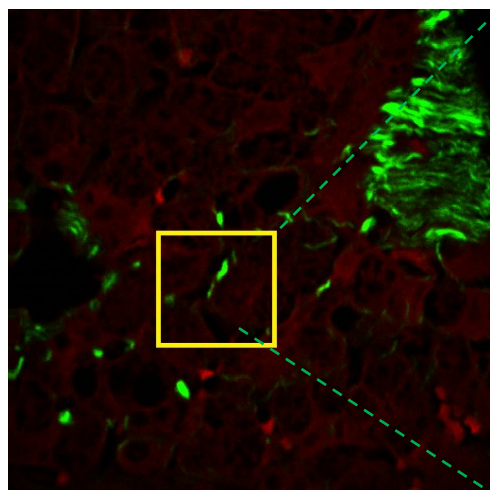




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Truly Quantitative Fibrosis Parameters(qFPs)

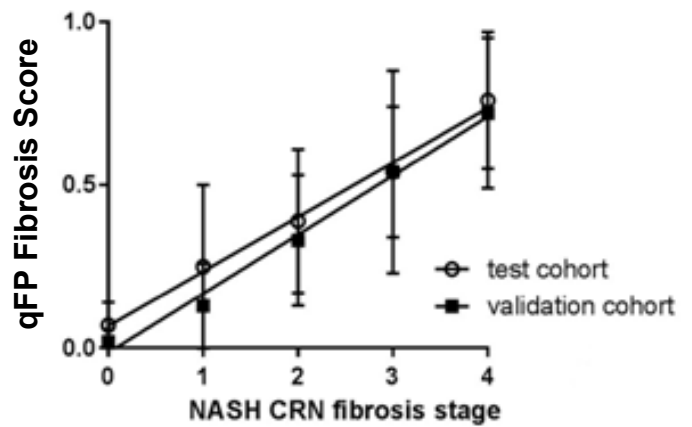
Fibrosis Morphometric Phenotypic <Models



+16 different qFPs

- a. Area
- b. Perimeter
- c. Compactness -
- d. Length
- e. Breadth
- f. Convex Hull Perimeter
- g. Convex Hull Area
- h. Elongation
- i. Roughness
- j. Major Axis Length
- k. Minor Axis Length
- l. Orientation
- m. Axis Ratio
- n. Tortuosity

the qFP fibrosis Score provides a continuous metric for the assessment of Fibrosis, that is independent of staining artifacts and reader variability



DUAL PHOTON MICROSCOPY BASED QUANTITATION OF FIBROSIS-RELATED PARAMETERS (Q-FP) TO MODEL DISEASE PROGRESSION IN STEATOHEPATITIS Yan Wang MD PhD, Hepatology doi: 10.1002/hep.29090

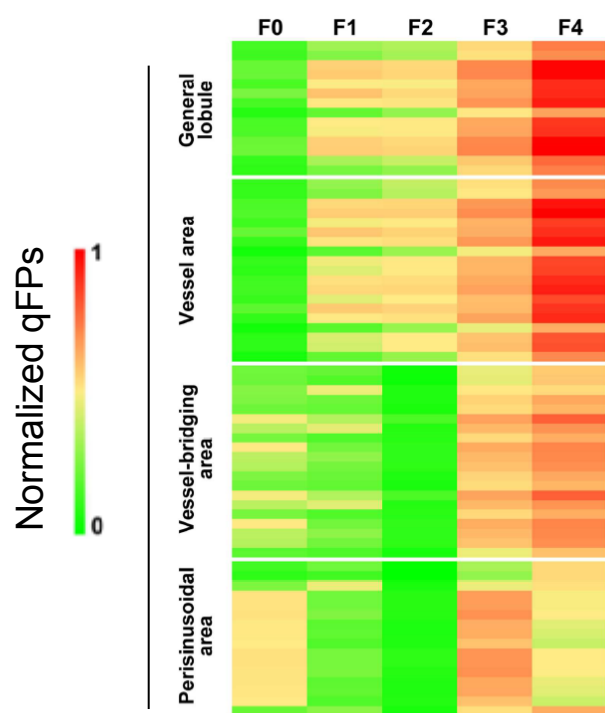


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Fibrosis Phenotypic Morphometric Modeling

Based on Collagen Morphometrics features

Morphometric Phenotype Chart



← Each Column represents and quantifies a stage:

F progression

Time course

Drug A vs Drug B vs Chow

Animal Model 1 vs Animal Model 2

Animal vs human

AHS vs NASH

Obese vs Diabetes vs Normal

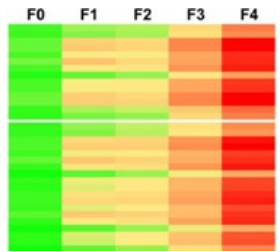
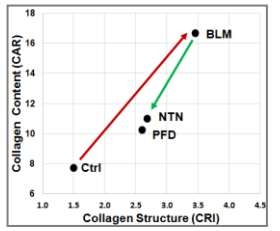
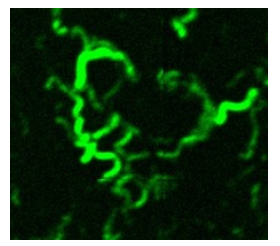


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New standards in Fibrosis Quantification

The Value of Second Harmonic Generation

- Requires Biopsy, compatible with existing pathology workflows, eliminates staining and reader variability. Collagen I and III optical biomarker.
- Generates a 100% specific BigTIFF image for Collagen I and III (SHG) allowing fully quantitative and morphometric fibrosis quantification (content and structure)
- Validated for most pre-clinical models (Liver, NASH, Kidney, IPF)
- Correlate with standard methods (with at 50% N)
- Basic Quantification at “*Pathology +20% - 30%*” price premium
- 2 weeks turnaround (N=40)
- Growing panels of robust and validated Drug Discovery Tools
- Fully Translational





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March 9, 2016

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