AI-assisted NASH histopathology using GHOST

Unbiased Objective and Quantitative Histopathology

At Gubra, we have developed the deep learning-based app GHOST (Gubra Histopathological Objective Scoring Technology) to automatically perform complete NAFLD Activity Score (NAS) and Fibrosis Staging in liver biopsies with additional quantitative metrics.

THE NAFLD Activity Score with Fibrosis Stage

The histopathological NAFLD Activity Score (NAS) with fibrosis staging is the preferred and most validated system for assessment of NASH progression/regression in liver biopsies.

GHOST – Fibrosis Staging strategy

The Fibrosis Stage AI app is based on several fibrotic features, incl. detection of portal triads and central veins, linear Bayesian image analysis in the periportal and sinusoidal zones, fiber fragment size and shape to predict bridging. Cohen´s Kappa >0.84 confirms high agreement to manual scores.

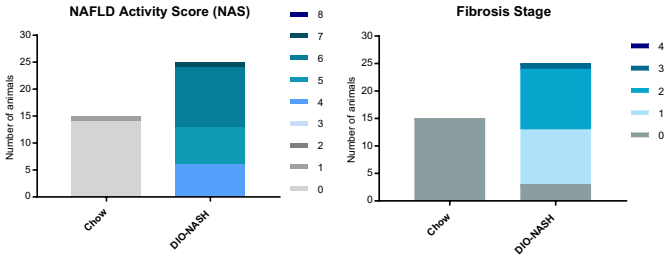
GHOST – NAFLD Activity Score Strategy

NAS is assessed using AI-assisted detection of multiple features separated into hepatocyte, inflammatory and ballooning sub APPs. Cohen´s Kappa >0.72 confirms high agreement to manual scores.

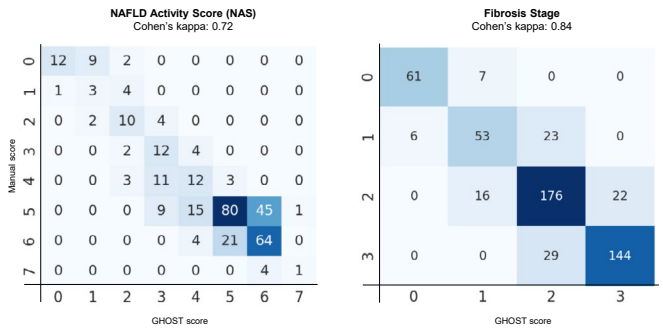
GHOST – Supportive Quantitative Metrics

The GHOST output variables are supported by exact numbers of key features behind the scores, including:

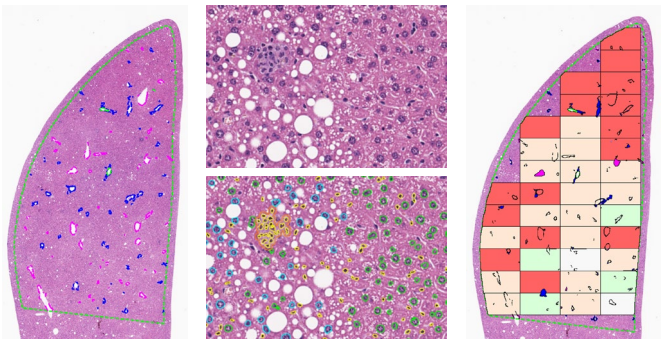
- Actual percent of hepatocytes with lipid droplets
- Actual number of inflammatory cells and foci
- Actual percent of fibrosis in different sinusoidal and periportal areas



GHOST assessment of NAS and Fibrosis Stage based on HE and PSR stains



NAS and Fibrosis Stage compared by GHOST assesment and manual scoring



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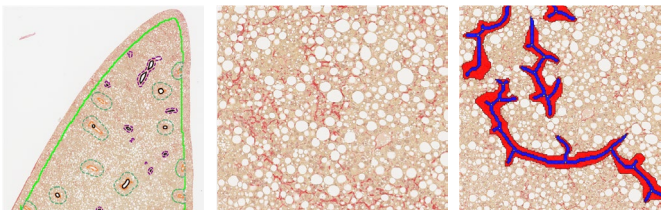

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