Assessment of collagen in human idiopathic pulmonary fibrosis using second harmonics on Genesis 200

S. Royce, C. Erdem, A. Tan, J. Jaffar, G. Westall, J. Bourke, C. Samuel, R. Widdop

Monash University - Clayton (Australia), HistoIndex Pte Ltd - JTC LaunchPad (Singapore)

ABSTRACT

Background: It is important to quantify collagen in lung disease as it is associated with severity, progression & loss of organ function. Histochemistry relies on recognition of collagen by dyes, & exhibits variability & other limitations for quantification & characterization of collagen. The HistoIndex Genesis 200™ (G200) is a 2nd harmonic imaging instrument designed for tissue sections but hasn’t been used in fibrotic lung disease (idiopathic pulmonary fibrosis; IPF).


Methods: Formalin-fixed paraffin-embedded (FFPE) specimens of IPF & normal donors (n=10) were obtained from the Alfred Lung Fibrosis Biobank. Sections were scanned on the G200 (laser power=0.6, TPE & SHG sensitivities 0.8 & 0.7) & analysis performed using FibroIndex™ (FI) image quantification. Comparison was made with Masson trichrome (MT) analysed using ImageJ.

Results: FI analysis of G200 images & MT detected similar collagen area ratios (CAR) in controls, but, FI analysis was able to detect greater collagen area in IPF using the same setting. FI analysis was able to detect a greater CAR than MT staining (p<0.001) in IPF samples with comparable detection in normal donor controls. FI analysis was also able to detect greater collagen overlap with tissue and collagen fibre density in IPF v controls.

Discussion: Genesis 200, in conjunction with FibroIndex, can be used to quantify collagen in IPF. It may have advantages in sensitivity, reproducibility & efficiency compared to morphometric quantification of collagen from MT stains. This technology may have application in the characterization of collagen in IPF & other diseases.

Summary