5340 - Quantitative imaging and characterization of collagen patterns in high grade serous ovarian carcinoma (HGSOC)

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BACKGROUND

 HGSOC is known to demonstrate diverse molecular heterogeneity. It is unclear whether the tumor microenvironments such as the stromal components in the extracellular matrix (ECM) also exist heterogeneity.

METHODS

- As a proof-of concept study, characterization of collagen patterns was performed on 60 unstained formalin-fixed paraffin embedded (FFPE) HGSOC samples (three sections from each of the 20 patients).
- Each section with 5 micron thickness and a minimum tumour surface area of 40 mm2 were scanned by using a multiphoton imaging system (Genesis 200, HistoIndex) following deparaffinization.
- Parameters including Collagen Area Ratio (CAR), Collagen Fiber Density (CFD), Collagen Reticulation Index (CRI), Collagen Fiber Number (CFN), Collagen Fiber Thickness (CFT), and Collagen Fiber Length (CFL) were analysed (Clinnovate Health Pte Ltd). Unsupervised hierarchical clustering analysis was performed.

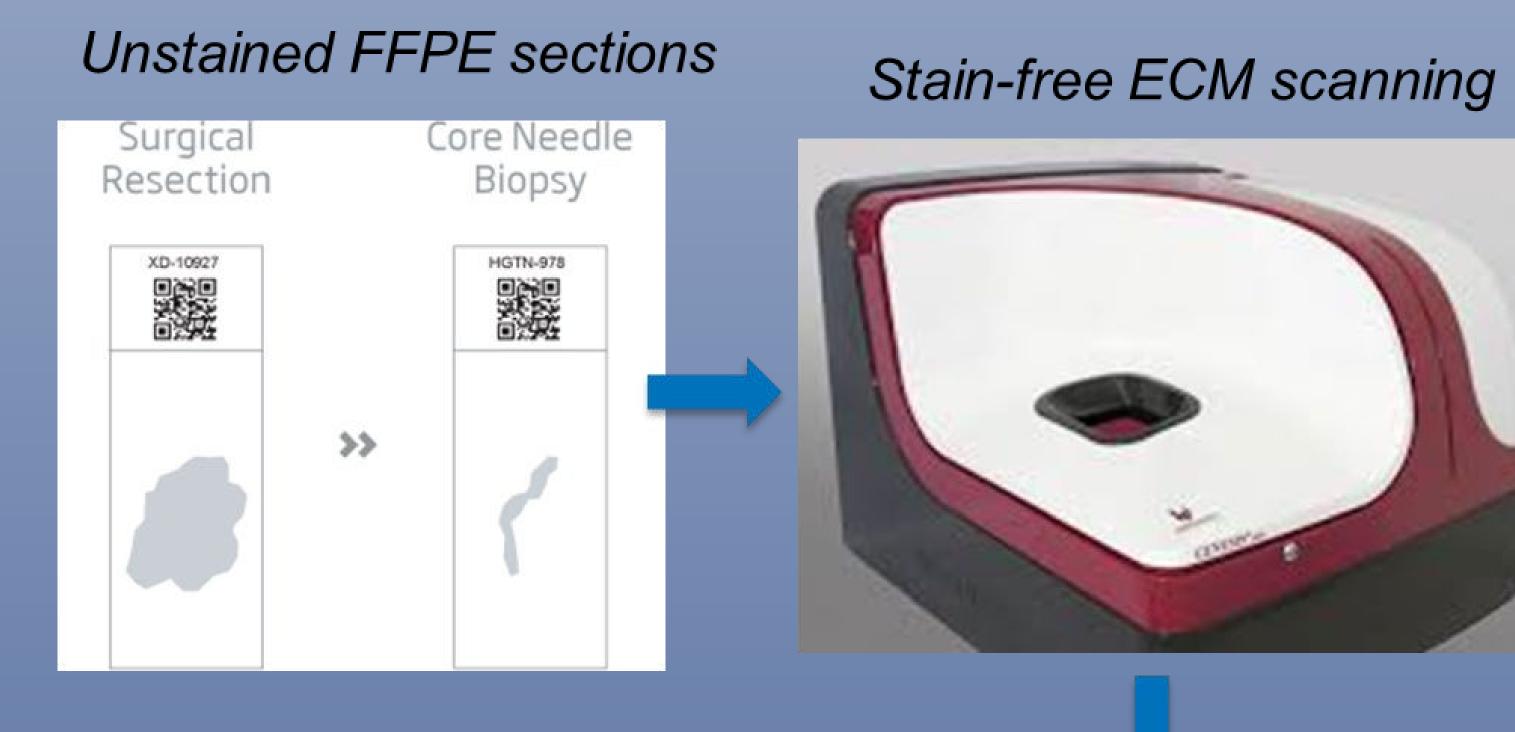
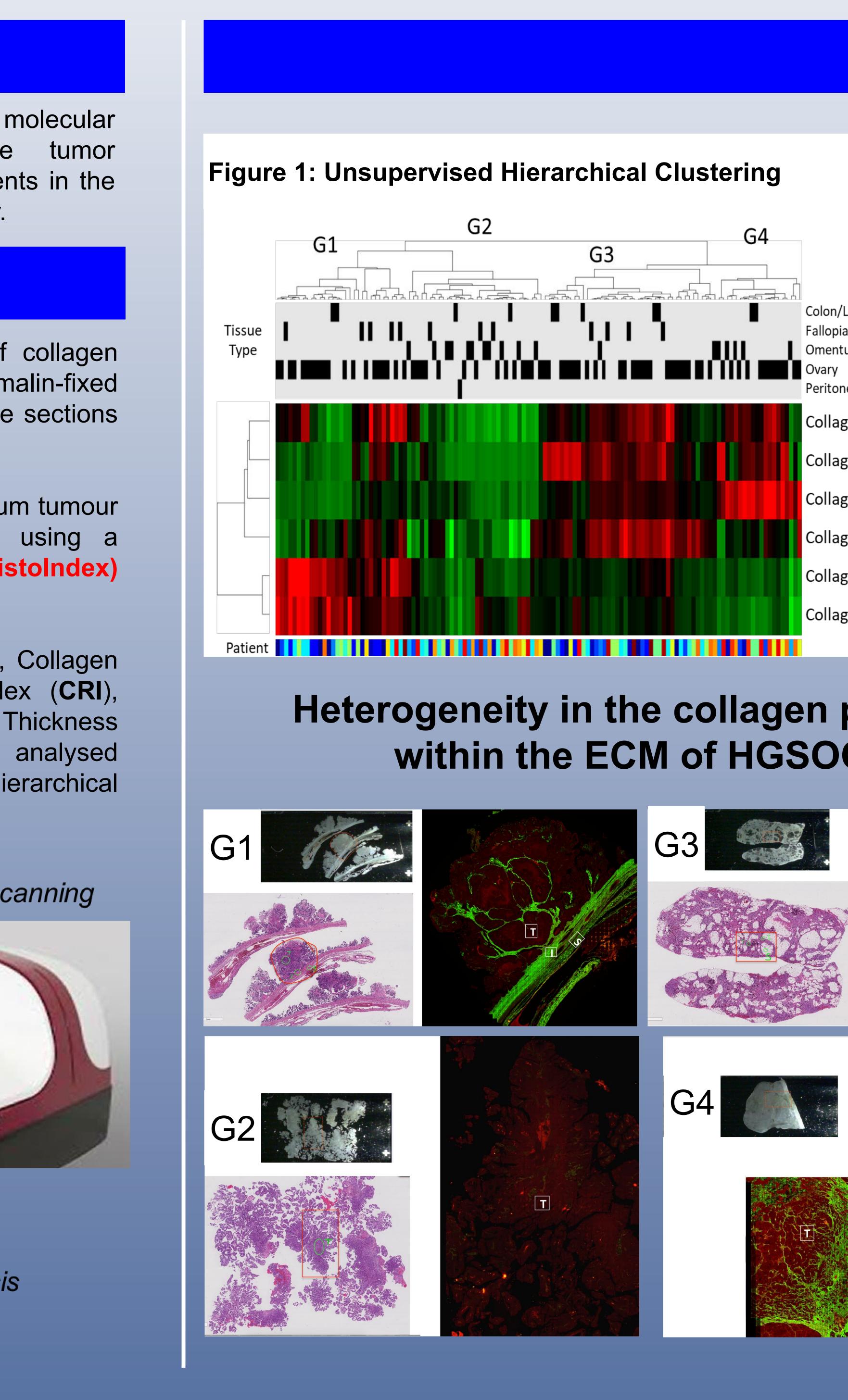


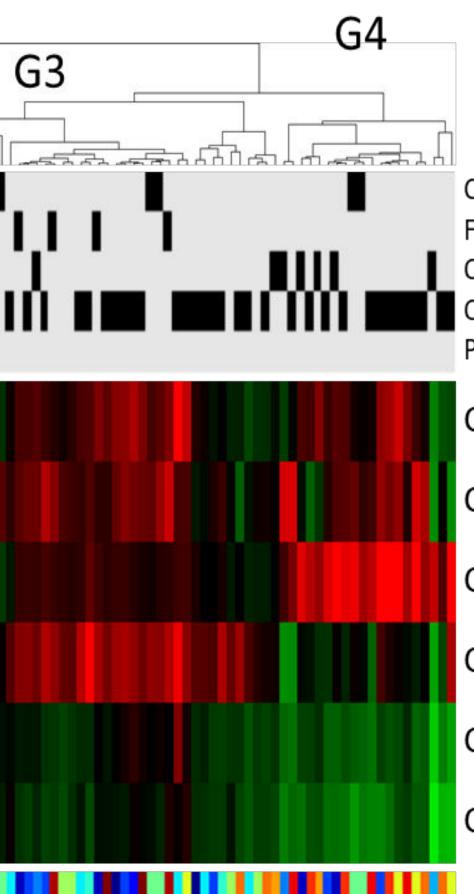
Image analysis

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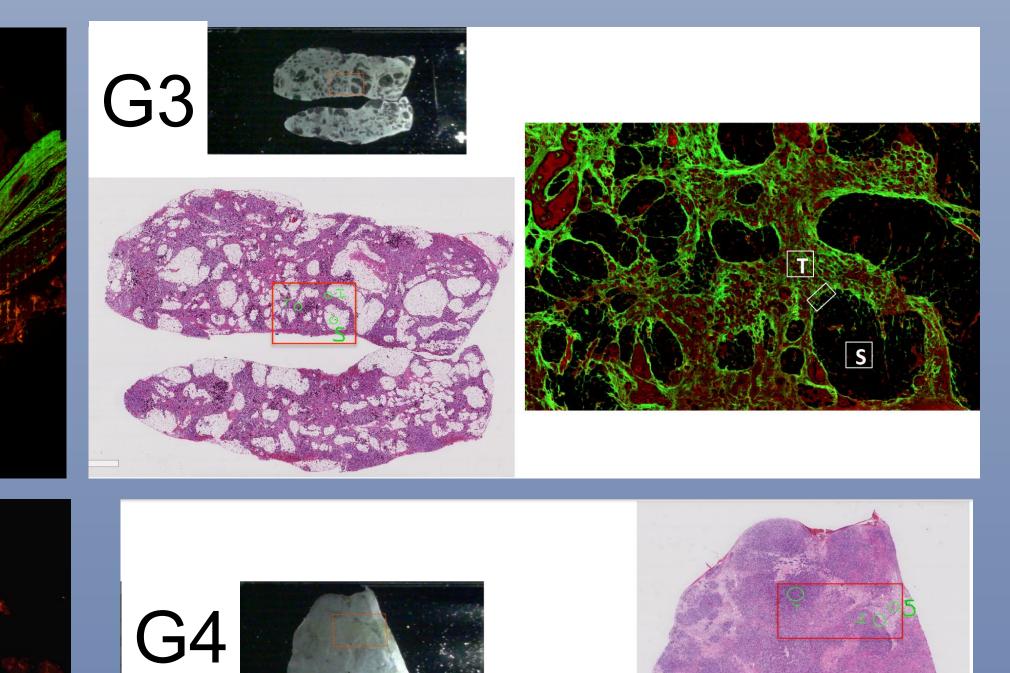


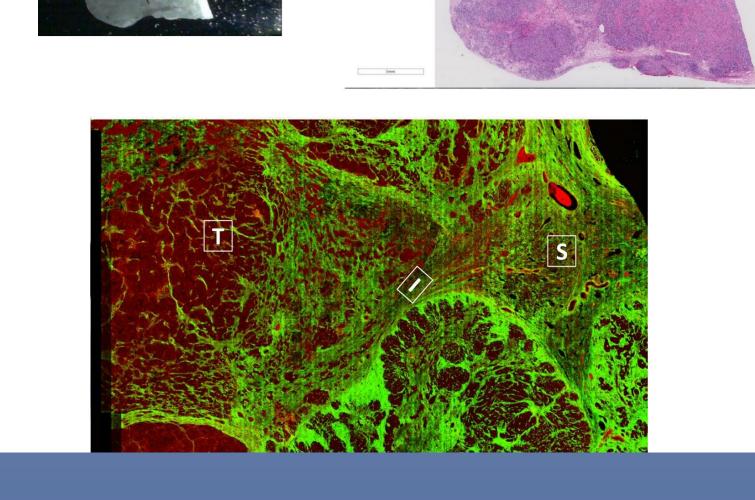
RESULTS



Colon/Liver Mets Fallopian Tube Omentum Peritoneum Collagen_Area_Ratio Collagen_Fiber_Density Collagen_Fibers_N_per_sq_mm Collagen_Reticulation_Index Collagen_Fibers_Mean_Thickness Collagen_Fibers_Mean_Length

Heterogeneity in the collagen pattern within the ECM of HGSOC





- samples.
- high CFT and CFL.
- deposition.



Conflicts of Interest a potential conflict of interest.

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 Unsupervised hierarchical clustering of the collagen parameters revealed four distinct patterns in HGSOC

• G1 tumors consisted of long and thick collagen fibers with

• G2 tumors were low in all the collagen parameters, suggesting a relatively "clean" stromal without collagen

• G3 tumors consisted of dense collagen fibers with high CRI suggestive of extensive cross alignment among the fibers.

• G4 tumors were high in CFN and low in CRI, CFT and CFL, suggesting a stroma loaded with high amount of thin and short collagen fibers without high cross alignment.

• The collagen patterns were not exclusive for specific organ sites (ovary, fallopian tube, other metastatic sites) except that the collagen pattern from the omental metastases were mainly G2 (10/18; 55.6%) and G4 (6/18; 33.3%).

CONCLUSION

• The stromal component in the ECM of HGSOC can be successfully quantitated by the multi-photon imaging technology on unstained FFPE sections. The collagen component exhibited significant heterogeneity in terms of the number, thickness, length, and reticulation patterns. The contribution of different collagen patterns to clinical outcomes and the correlation with known molecular subtypes in HGSOC warrants further investigation in larger cohorts.

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