Cole Relaxation Frequency: A Parameter for Pancreatic Cancer Detection

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INTRODUCTION

- While there are multiple tools available to aid in Pancreatic Cancer (**PC**) diagnosis including imaging methods such as CT, MRI, ERCP and endoscopic ultrasound, real-time, on-the spot diagnosis can be challenging. [1,2]
- Lesions are generally sampled via biopsy, which presents several disadvantages; lesion heterogeneity, inter-observer variability in identifying and grading the lesions, low diagnostic yield due to insufficient integrity or size of samples, complications, and inconclusiveness of the initial biopsies. [1,2]
- There is demand for an on-the-spot, real-time assessment device that works as a **decision support tool** for the endoscopist without image interpretation.

OBJECTIVE

- The determine if Novascan technology based on Cole-Relaxation Frequency (**CRF**) calculation from impedance spectroscopy can detect cancer in pancreatic tissues.
- To demonstrate if CRF can predict the level of fibrosis in PC

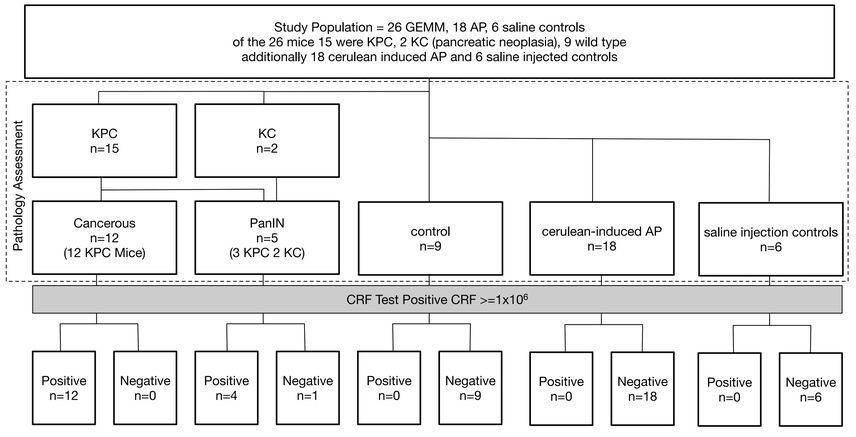
METHODS

- The genetically engineered mouse model (GEMM): *LSL-**K**ras;LSL-**p**53;Pdx1-**C**re* (**KPC**) was used as a platform for investigating CRF in PC
- CRF was measured *ex vivo* with NovaScan technology on excised pancreas samples in a cohort of n=26 genotyped mice, of which
  - ❑15 were **KPC**
  - ❑2 were **KC** (model of pancreatic neoplasia)
  - ❑9 were wild type controls

METHODS cont'd

- Cancer presence is determined if **CRF > 1 MHz**
- Outcomes were compared to histopathology results for each of these samples to determine the specificity and sensitivity of the NovaScan device
- Pancreases were scored as percent fibrosis over multiple fields of view and compared to CRF
- To determine if CRF can effectively discern fibrosis in PC from pancreatitis, n=18 cerulean-induced acute pancreatitis (AP) and n=6 saline injection controls were also tested

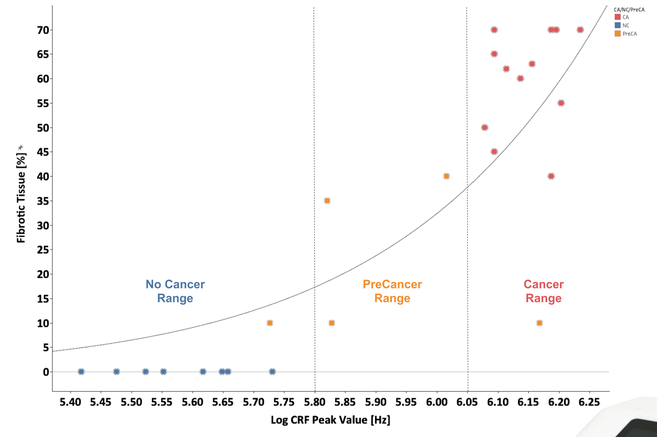
RESULTS



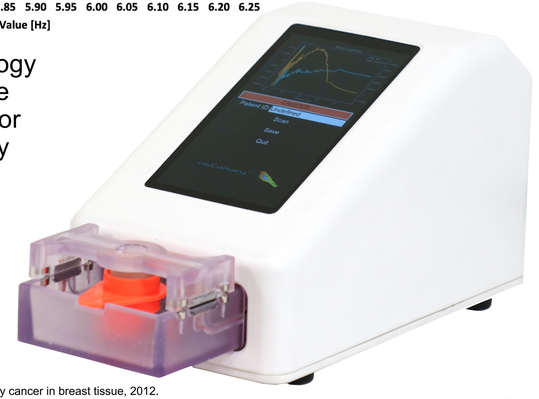
- NovaScan technology identified 4 out of 5 PanIN samples as cancerous. **Specificity** and **sensitivity** were **100%** and **94%**, respectively on the entire cohort and **100%/100%** after excluding the PanIN samples.
- Cerulean-induced AP and Saline injected controls tested negative.

CONCLUSION

- NovaScan's Impedance Spectroscopy CRF technology discerns healthy and cancerous lesions in pancreas, similarly as shown in breast skin and lung previously.[3,4,5]
- The CRF can predict the level of fibrosis in PC, results are similar to those shown in breast cancer previously.[3]
- As the CRF value increases the likelihood of cancer increases.



- Development of this technology includes a digital rapid-onsite evaluation, "**digital-ROSE**" for **quick assessment** of biopsy samples



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