Introduction & Objectives:

PRI-MUS™ (prostate risk identification for micro-ultrasound) is an evidence-based risk identification protocol developed to identify suspicious regions of the prostate to enable improved targeting of prostate biopsies using micro-ultrasound.

Since high resolution micro-ultrasound – which operates at 29 MHz - has resolution down to 70 microns, it is reasonable to expect that the imaging findings would bear a correlation to the cellular and ductal structures identified in pathology.

Methods:

• 20 images of micro-ultrasound guided biopsies from the Exact Imaging clinical trial (NCT02079025) were selected

• These images were taken immediately preceding biopsy using the ExactVu™ micro-ultrasound system (ExactVu™, Exact Imaging)

• A detailed pathological review was performed to investigate the correlation between the detailed histological features with the identified imaging features

Results:

A strong correlation was found for all of the features investigated (Figure 2).

+ The PRI-MUS 4 Echogenic “Cauliflower” feature was correlated to densely packed cancer

+ The PRI-MUS 4 “Bright Echoes” feature was associated with comedonecrosis (Figure 1e)

+ The PRI-MUS 4 “Smudgy texture” feature contained corpora amylacea mixed with dense or intermediate grade cancer (Figure 1d)

+ The PRI-MUS 5 “Finger-like shadowing” feature samples all contained dense cribriform cancer (Figure 1c)

Conclusions:

• The strong correlation between pathology and micro-ultrasound imaging suggests a biophysical basis for the sonographic changes observed in the prostate

• This correlation will perhaps allow for the tracking of cancer progression as well as estimation of the grade of disease using micro-ultrasound

• Future work involving multiple pathology and imaging readers will be used to determine the strength of this correlation and potentially to improve the PRI-MUS risk identification system

References