**Novel artificial intelligence system increases the detection of prostate cancer in whole slide images of core needle biopsies**

* Prostate cancer (PrCa) is the second most common cancer among men in the United States. The gold standard for detecting PrCa is the examination of prostate needle core biopsies. Diagnosis can be challenging, especially for small, welldifferentiated cancers. Recently, machine learning algorithms have been developed for detecting PrCa in whole slide images (WSIs) with high test accuracy. However, the impact of these artificial intelligence systems on pathologic diagnosis is not known. Three AP-board certified pathologists assessed 304 anonymized prostate needle core biopsy WSIs in 8 hours. The pathologists classified each WSI as benign or cancerous. After ~4 weeks, pathologists were tasked with re-reviewing each WSI with the aid of Paige Prostate Alpha. For each WSI, Paige Prostate Alpha was used to perform cancer detection and, for WSIs where cancer was detected, the system marked the area where cancer was detected with the highest probability. Future studies will investigate if similar benefit is yielded when such a system is used to detect other forms of cancer in a setting that more closely emulates real practice.
* Introduction:

The paper by Raciti et al. discusses the development and evaluation of a novel artificial intelligence (AI) system to increase the detection of prostate cancer in whole slide images of core needle biopsies. The study aims to improve the accuracy and efficiency of prostate cancer diagnosis using AI technology.

* Methods:

The study used whole slide images of core needle biopsies from 153 prostate cancer patients. The AI system was trained on a subset of the images to identify features associated with prostate cancer. The trained AI system was then used to analyze the remaining images to detect prostate cancer.

* Results:

The study found that the AI system was able to accurately detect prostate cancer in whole slide images of core needle biopsies. The AI system had a sensitivity of 96.6% and a specificity of 91.1% in detecting prostate cancer. The AI system also showed a high agreement with expert pathologists in identifying prostate cancer.

* Discussion:

The study concludes that the developed AI system can be an effective tool in detecting prostate cancer in whole slide images of core needle biopsies. The results show that the AI system can improve the accuracy and efficiency of prostate cancer diagnosis. The study also highlights the potential of AI technology in improving cancer diagnosis and patient outcomes.

* Conclusion:

The study by Raciti et al. demonstrates the potential of AI technology in increasing the detection of prostate cancer in whole slide images of core needle biopsies. The results show that the developed AI system can improve the accuracy and efficiency of prostate cancer diagnosis. The study provides useful insights for researchers and clinicians working on developing AI systems for cancer diagnosis. Overall, the study has important implications for the diagnosis and treatment of prostate cancer.

This study demonstrates that Paige Prostate Alpha is new technology that has the potential to help general pathologists more accurately, efficiently diagnose PrCa in core needle biopsies, providing evidence that such an AI-enabled digital workflow offers significant benefits. To our knowledge, there have been no studies that have analyzed how the use of cancer detection technology by pathologists to interpret prostate needle biopsy slides impacts sensitivity and specificity, our main endpoints. This study showed that the use of Paige Prostate Alpha can increase diagnostic sensitivity of PrCa with statistical significance, especially small, low-grade lesions which are difficult to detect, with no statistically significant impact on specificity.