New genetic assay to help prostate cancer patients avoid radiation toxicity

PROSTOX™

PROSTATE CANCER OVERVIEW

Prostate cancer (PC) affects nearly 270,000 patients each year,[1] and is the third leading cause of cancer mortality in men[2] in the U.S. PC mainly affects those over 65 years of age. If the cancer is localized, there is an excellent five-year survival rate of > 99%.[1]

TREATMENT OPTIONS AND SIDE EFFECTS

Physicians often face difficult choices when deciding on a course of treatment for prostate cancer patients. Radiation therapy (RT) can be an effective treatment option and is performed on approximately half of men diagnosed with localized prostate cancer. However, about 12-15% of these men experience late grade >2 genitourinary (GU) toxicity, that can result in urinary retention, pain, increased urinary frequency, and bleeding.[3,4] This 5-year late GU toxicity appears to be similar whether treated by conventionally fractionated radiotherapy (CFRT; 1.8-2.0 Gy per fraction over 39-45 sessions) or stereotactic body radiotherapy (SBRT; >7 Gy per fraction over 5 or fewer sessions).[5,6]

MIRSNP DNA SIGNATURES AND RADIATION TOXICITY

Genomic factors appear to play an important role in determining clinical radiosensitivity. MicroRNAs (miRNAs) are small, non-coding regulatory RNAs that are key directors of stress response pathways, including the DNA damage and immune response. MiRNAs have also been found to be critical in the response to radiation, both locally and systemically.[7]

PROSTOX

MiraDX's **PROS**TOX assay analyzes a patient's germline DNA and determines if they are genetically at higher risk of late grade ≥2 genitourinary toxicity following SBRT radiation therapy.

The **PROS**TOX test provides a low or high risk score to help identify the safest course of treatment to avoid toxicity in the management of the patients' prostate cancer.

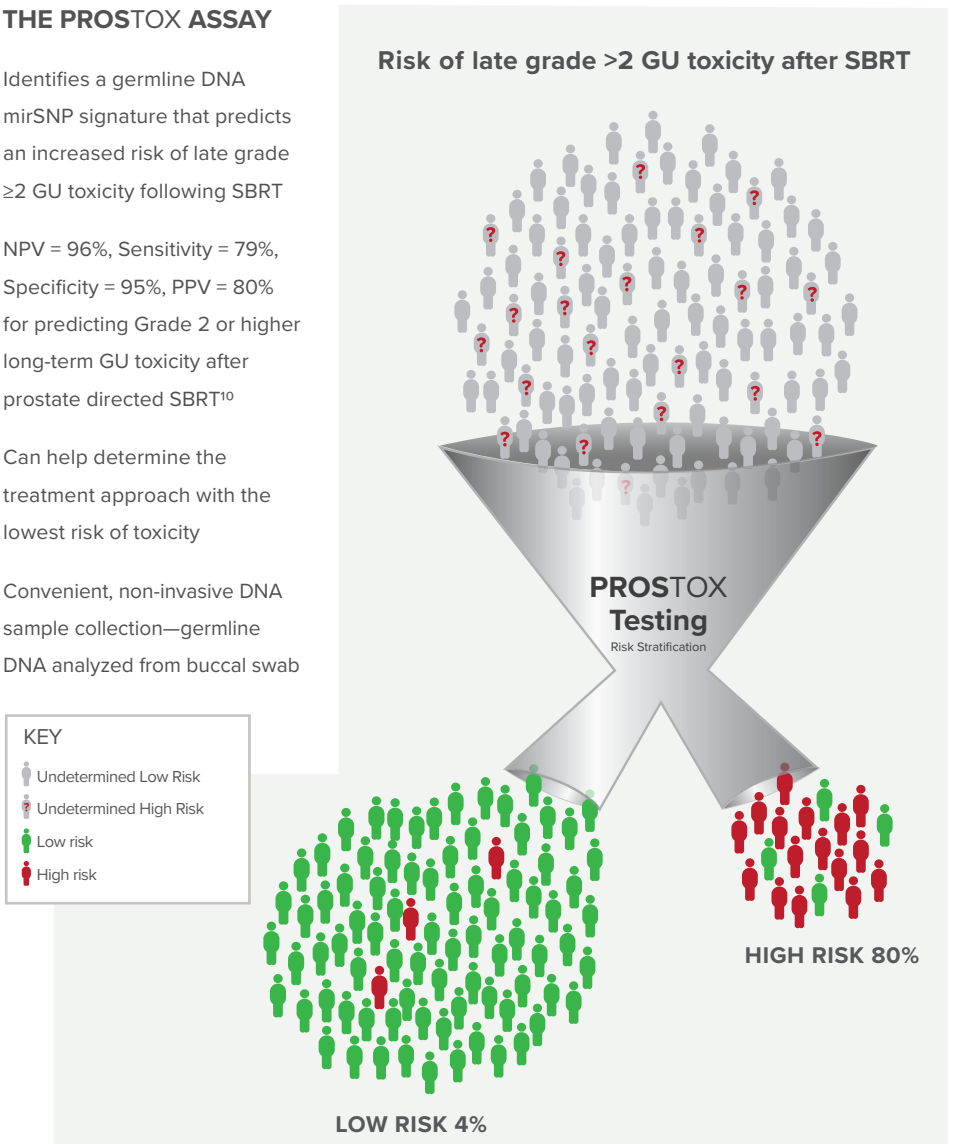
THE PROSTOX ASSAY

Identifies a germline DNA mirSNP signature that predicts an increased risk of late grade ≥2 GU toxicity following SBRT

NPV = 96%, Sensitivity = 79%, Specificity = 95%, PPV = 80% for predicting Grade 2 or higher long-term GU toxicity after prostate directed SBRT[10]

Can help determine the treatment approach with the lowest risk of toxicity

Convenient, non-invasive DNA sample collection—germline DNA analyzed from buccal swab

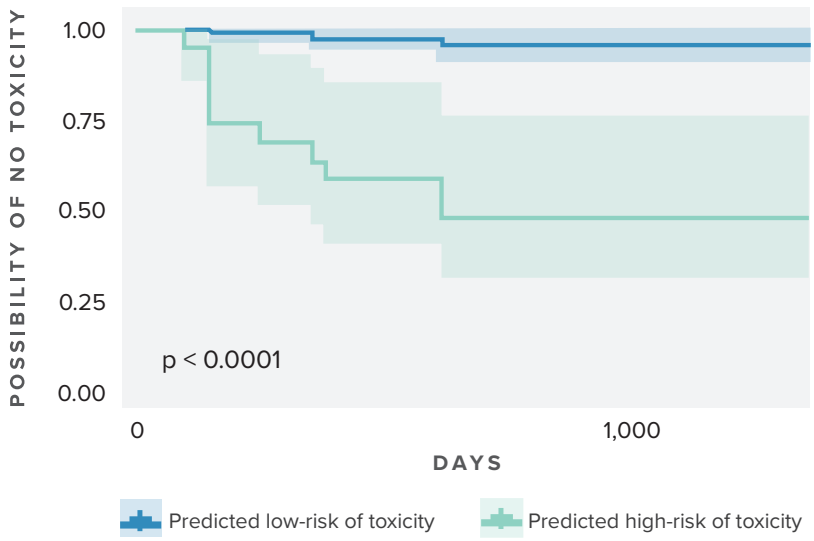


NEW CLASS OF GENETIC VARIANTS APPLIED

Recent studies have identified miRNA associated germline single nucleotide polymorphisms (mirSNPs) that appear to play a key role in determining a patient's response to radiation therapy.[8,9]

A 2022 study identified mirSNP signatures that predict late grade ≥2 GU toxicity following SBRT.[10] These studies have now been independently validated in a post-op SBRT study (SCIMITAR), as well as in a clinical utility study (GARUDA). **These signatures can be applied to allow the safest radiation treatment approach to be selected to help avoid radiation toxicity.**

Performance of predictive model for late grade ≥2 genitourinary toxicity after conventionally-fractionated radiotherapy or SBRT.



PROSTOX ORDERING INFORMATION

CLINICAL UTILITY	RANGE	METHOD	SPECIMEN TYPE/COLLECTION
Analysis of germline DNA to identify genetic variants that predict increased risk of late grade ≥2 GU toxicity following radiation therapy.	Low risk High risk	Predictive algorithm utilizing PCR-based Taqman genotyping	Oral mucosal cells collected with a swab and test kit and returned to MiraDX Laboratory

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