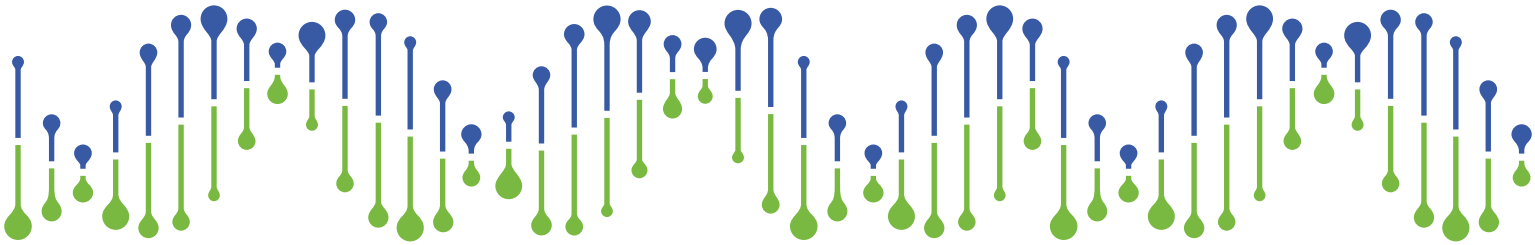
Datasheet



Cell3™ Target: Bladder Cancer Panel

A comprehensive NGS panel for translational and clinical research into urothelial bladder cancer (UBC).

Highlights

Clinically relevant content for bladder cancer

Our comprehensive Bladder Cancer panel targets of 451 clinically relevant somatic mutations found in 96% of bladder cancer cases.

Highest confidence calling of ultra-low frequency somatic variants

Our built-in error suppressor technology, unique molecular tags and dual indexes support accurate and confident calling of ultra-low frequency mutations down to 0.1% VAF.

Validated on cell-pellet DNA and ctDNA from urine

We have validated our Bladder Cancer panel on urinary cell-pellet (cpDNA) and ctDNA from urine to ensure you get robust results.

A non-invasive alternative to cystoscopy

The ultra-sensitivity of our Bladder Cancer panel provides clinical and translational researchers with a viable non-

Introduction

Currently the main method for the detection of bladder cancer tumors is flexible cystoscopy, an invasive procedure that requires the insertion of a camera into the bladder. In the UK alone over 110,000 flexible cystoscopies are carried out each year at a cost of £55M to the NHS and significant discomfort to patients[1]. Some 88% of these are unnecessary as the patient has no abnormality or malignancy.

The Cell3™ Target Bladder Cancer panel, developed in partnership with researchers at the University of Birmingham, is a targeted NGS panel that covers the vast majority of somatic mutations found in bladder cancer.

Based on the ultra-sensitive Cell3™ Target chemistry developed by Nonacus, this sequencing panel enables researchers to sequence the tumor DNA found in the urine of bladder cancer patients to raw read depths in excess of 20,000x. This depth of coverage provides the sensitivity and accuracy needed to offer a viable genomic alternative to flexible cystoscopy for the profiling of bladder cancer.

NONACUS
Advancing Non-Invasive Healthcare

Comprehensive coverage of clinically relevant somatic mutations associated with bladder cancer

The Cell3™ Target Bladder Cancer panel is an NGS sequencing panel that targets promoter and exonic regions of 23 of the most relevant genes associated with bladder cancer.

Identified by a combination of publicly available data and deep exome sequencing the 451 somatic mutations present in the panel have been shown to detect 96% of bladder cancers in over 1,000 clinical samples[2].

Table 1. Bladder Cancer Panel gene content.

AKT1	ERBB2	NRAS
BRAF	ERBB3	PIK3CA
C3orf70	ERCC2	RHOB
CDKN1A	FBXW7	RXRA
CDKN2A	FGFR3	SF3B1
CREBBP	HRAS	TERT (promoter)
CTNNB1	KDM6A	TP53

Validated on urinary cpDNA and cfDNA samples

The Cell3™ Target Bladder Cancer Panel has been validated on both genomic DNA from urinary cell-pellet (cp) as well as cell-free (cf) DNA in urine ensuring robust results from as little as 20ng of cpDNA and 10ng cfDNA. Although both materials give good results and minor allele frequencies are highly correlated (Figure 1) the higher, more reliable yields of cpDNA make it more suited to clinical research.

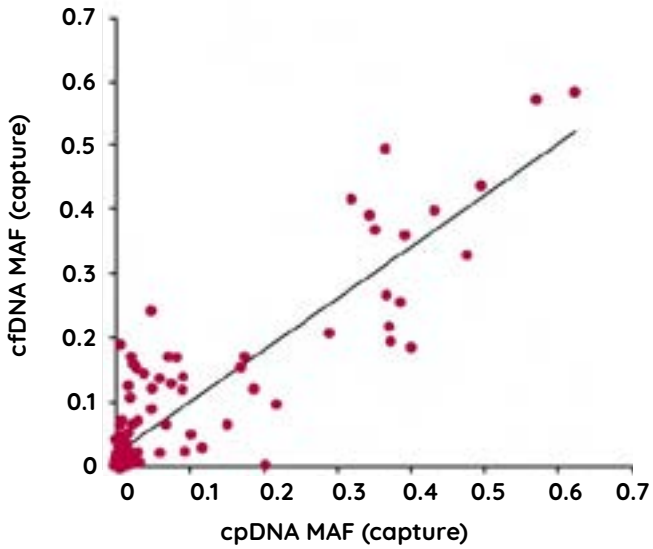


Figure 1. Correlation between MAFs in cfDNA and cpDNA determined by capture-based urine DNA analysis using Nonacus Bladder Cancer Panel in paired samples from

Ultra-sensitive low frequency variant detection for cancer exome sequencing

Flexible cystoscopy has a sensitivity and specificity of around 85-90% for identifying tumors in the bladder[3,4]. To provide a viable alternative, a DNA-based assay must be close to or even match this.

Cell3™ Target enrichments incorporate error suppression technology including unique molecular indexes (UMIs) and unique dual indexes (UDI's) which remove both PCR and sequencing errors and index hopping events. This allows confident and accurate calling of mutations down to 0.1% VAF from as little as 20ng of cell-pellet genomic DNA or 10ng cfDNA input. Recent data has shown that the Cell3™ Target Bladder Cancer panel provides a much more sensitive test than previous methods and would get very close to matching the sensitivity and specificity of flexible cystoscopy[2].

We provide advice and provision of ready to go analysis scripts for error removal using UMI's.

Optimised performance

The baits used in the Cell3™ Target Bladder Cancer panel are designed to deliver excellent uniformity of coverage. By improving uniformity of coverage and reducing the number of low coverage exons this panel optimises sequencing efficiency and sample capacity per sequencing run.

Custom content for profiling cancer with a reduced cost, better uniformity and quicker delivery time

Designed to be flexible, the Cell3™ Target enrichments allow you to add extra content specific to your project. Whether this is additional content or increased coverage of existing content, our Probe Design Tool makes this a simple and easy process to implement. The Cell3 Target manufacturing process enables customers to design, order and receive a completely custom panel within just 4 weeks. All custom exomes are validated by NGS to ensure that uniformity of coverage meets our strict QC requirements.

Quick and convenient workflow

The Cell3™ Target technology enables enzymatic shearing of high molecular weight genomic DNA as well as conventional End-repair/A-tailing for ctDNA. The streamlined workflow with 8 sample pre-capture pooling for exomes reduces hands-on time and pipetting steps and takes less than 10 hours (from DNA sample to enriched library) with less than 2 hours hands-on time. It allows both manual or automated preparation of between 1 – 96 samples at a time with 384 sample indexes available for even the highest throughput laboratory.

Learn more

To learn more about the Cell3™ Target Bladder Cancer Panel and to download the protocols, application notes and white papers please visit:
www.nonacus.com

References

1. Kelly JD, Fawcett DP, Goldberg LC (2009). Assessment and management of non-visible haematuria in primary care. **BMJ2009;** 338 https://doi.org/10.1136/bmj.a3021
2. Ward DG, Gordon NS, Boucher RH, et al (2019) Targeted deep sequencing of urothelial bladder cancers and associated urinary DNA: a 23-gene panel with utility for non-invasive diagnosis and risk stratification.**BJU Int.** Sep; 124(3):532-544. https://doi.org/10.1111/bju.14808.
3. Zheng C, Lv Y, Zhong Q, Wang R, Jiang Q (2012) Narrow band imaging diagnosis of bladder cancer: systematic review and meta-analysis. **BJU Int.** 2012 Dec;110 (11 Pt B):E680-7. http://doi: 10.1111/j.1464-410X.2012.11500.x.
4. Svatek RS, Hollenbeck BK, Holmäng S, Lee R, Kim SP, Stenzl A, Lotan Y (2014). The economics of bladder cancer: costs and considerations of caring for this disease. Eur Urol. 2014 Aug;66(2):253-62. doi: 10.1016/j.eururo.2014.01.006.

Ordering information

Product	Catalogue No.
Cell3™ Target: Bladder Cancer Panel, 16 samples Frag	(NGS_C3T_BCP_FR_16)
Cell3™ Target: Bladder Cancer Panel, 16 samples Non Frag	(NGS_C3T_BCP_NF_16)
Cell3™ Target: Bladder Cancer Panel, 96 samples Frag	(NGS_C3T_BCP_FR_96)
Cell3™ Target: Bladder Cancer Panel, 16 samples Non Frag	(NGS_C3T_BCP_NF_96)

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