ion torrent

# Oncomine tumor specific panels

## Because in precision oncology research, one size does not fit all

ThermoFisher SCIENTIFIC

# Panels for focused cancer research

Ion Torrent™ Oncomine™ tumor specific panels are small (15–30 genes), curated panels with verified performance that complement the Ion Torrent™ Oncomine™ menu of assays. They provide an end-to-end solution for molecular profiling in clinical research on specific tumors, such as bladder, prostate, melanoma, and others, from formalin-fixed, paraffin-embedded (FFPE) tissue samples.

Additionally, the Ion Torrent™ Oncomine™ tumor specific RNA panel complements the Oncomine tumor specific panels. It uses FusionSync™ technology to detect known, novel, and rare fusions across 49 genes; however, it is not available with the Oncomine Lymphoma Panel.

More features of Oncomine tumor specific panels:

- Low sample input requirement
- Bioinformatics and reporting solution
- Specialized support team
- Available via **ampliseq.com** and manufactured on demand

## Because every sample matters, performance matters

Each of the Oncomine tumor specific panels has been wet lab–tested on both low-quality (FFPE) samples and high-quality DNA controls. Results show uniformity greater than 95% for both sample types, which translates to more efficient use of reads to attain the depth of coverage desired (Figure 1).

Sensitivity and specificity for SNVs and indels were averaged across the panels and measured with the Thermo Scientific™ AcroMetrix™ Oncology Hotspot Control. Results for sensitivity and specificity were 95% and 99%, respectively. Positive predictive value averaged >99% (Figure 2). CNVs were evaluated against known truth datasets with 97% sensitivity (Figure 3). Overall, the Oncomine tumor specific panels demonstrated high sensitivity and specificity across samples types including controls, FFPE, and genomic DNA.

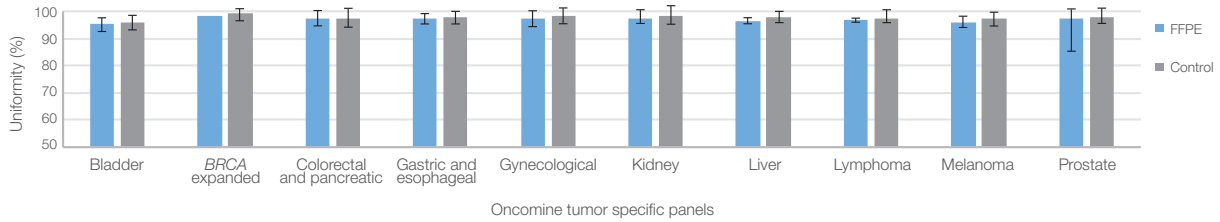


**Figure 1. Uniformity on Ion 530™ Chip with dual barcodes.** Uniformity is the percentage of bases with read counts above 20% of the average value.

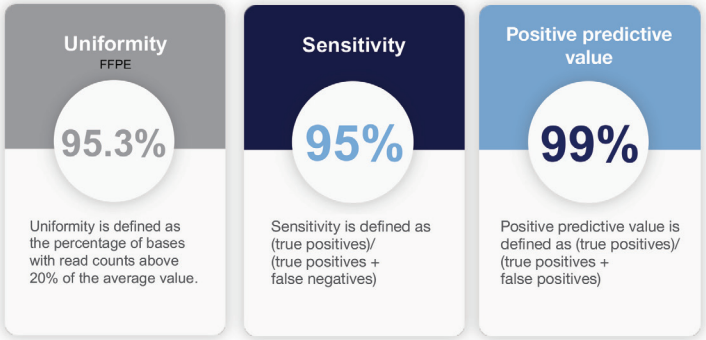


**Figure 2. Average results of Oncomine tumor specific panels using the AcroMetrix Oncology Hotspot Control.**

| Panel | Sample | Gene | Known truth CN | OTSP CN | OTSP call |
|---|---|---|---|---|---|
| Bladder | FFPE 1 | *KRAS* | 11.1 | 13.4 | Gain |
| | FFPE 2 | *ERBB2* | 23.4 | 24.5 | Gain |
| Colorectal and pancreatic | FFPE 1 | *KRAS* | 11.1 | 11.2 | Gain |
| | FFPE 2 | *ERBB2* | 23.4 | 21.5 | Gain |
| Gynecological | FFPE 2 | *ERBB2* | 22.6 | 24.1 | Gain |
| | FFPE 3 | *KRAS* | 8.2 | 10.7 | Gain |
| Liver | FFPE 3 | *KRAS* | 8.2 | 8.4 | Gain |
| Lymphoma | FFPE 4 | *MYC* | 13.8 | 12.0 | Gain |
| Melanoma | FFPE 1 | *KRAS* | 11.1 | 14.1 | Gain |

**Figure 3. High sensitivity of Oncomine tumor specific panels (OTSP) for CNVs.** Samples shown are a representative subset of data.

## Choose the right tool for different samples

While some aberrations can be found across many tumors, some are very specific to particular tumor types, and an array of tools is required to provide timely, relevant information for every sample while managing costs and available tissue material.

# Oncomine tumor specific panels for cancer research

## Ion Torrent™ Oncomine™ *BRCA* Expanded Panel

15-gene panel containing *BRCA1* and *BRCA2* as well as homologous recombination pathway genes important for ovarian, breast, and prostate cancer research. Contains genes such as *ATM, PALB2*, and *BRIP1*.

| ***BRCA* expanded** | | |
|---|---|---|
| *ATM* | *CHEK2* | *RAD51B* |
| *BARD1* | *FANCD2* | *RAD54L* |
| *BRCA1* | *MRE11* | *TP53* |
| *BRCA2* | *NBN* | |
| *BRIP1* | *PALB2* | |
| *CDK12* | *PPP2R2A* | |

## Ion Torrent™ Oncomine™ Gastric and Esophageal Panel

17-gene panel applicable to gastric, esophageal, and gastroesophageal adenocarcinoma. Contains genes such as *TP53, ERBB2,* and *CDKN2A*.

| **Gastric and esophageal** | | |
|---|---|---|
| *APC* | *FBXW7* | *PIK3CA* |
| *ARID1A* | *GNAS* | *PTEN* |
| *CDKN2A* | *KMT2C* | *RNF43* |
| *CTNNB1* | *KMT2D* | *SMAD4* |
| *ERBB2* | *KRAS* | *TP53* |
| *ERBB3* | *MYC* | |

## Ion Torrent™ Oncomine™ Kidney Panel

15-gene panel applicable to renal cell carcinomas, which account for the majority of kidney cancers. Contains genes such as *VHL, MTOR,* and *PBRM1*.

| **Kidney** | | |
|---|---|---|
| *ATM* | *PBRM1* | *TSC1* |
| *BAP1* | *PIK3CA* | *TSC2* |
| *KDM5C* | *PTEN* | *VHL* |
| *MET* | *SETD2* | |
| *MTOR* | *SMARCB1* | |
| *NF2* | *TP53* | |

## Ion Torrent™ Oncomine™ HRR Pathway Predesigned Panel

28-gene panel containing homologous recombination repair (HRR) pathway genes. Inclusive of genes found on the Oncomine *BRCA* Expanded Panel, plus additional non-HRR genes such as *KRAS* and *PIK3CA* that are important for ovarian, breast, prostate, and pancreatic cancer research.*

| **HRR pathway** | | |
|---|---|---|
| *ATM* | *KRAS* | *RAD50* |
| *BARD1* | *MRE11* | *RAD51* |
| *BRCA1* | *NBN* | *RAD51B* |
| *BRCA2* | *PALB2* | *RAD51C* |
| *BRIP1* | *PIK3CA* | *RAD51D* |
| *CDK12* | *POLD1* | *RAD52* |
| *CDK12* | *POLE* | *RAD54L* |
| *CHEK2* | *PPP2R2A* | *TP53* |
| *FANCD2* | *PTEN* | *XRCC2* |
| *FANCL* | | |

## Ion Torrent™ Oncomine™ Colorectal and Pancreatic Panel

24-gene panel applicable to colorectal and pancreatic adenocarcinoma and including DNA mismatch repair pathway genes. Contains genes such as *APC, KRAS*, and *NRAS*.

| **Colorectal and pancreatic** | | |
|---|---|---|
| *APC* | *KRAS* | *PTEN* |
| *ARID1A* | *MLH1* | *RNF43* |
| *BRAF* | *MSH2* | *SMAD4* |
| *CKDN2A* | *MSH6* | *SOX9* |
| *CTNNB1* | *MYC* | *TCF7L2* |
| *ERBB2* | *NRAS* | *TP53* |
| *ERBB3* | *PIK3CA* | |
| *FBXW7* | *PMS2* | |
| *GNAS* | *POLE* | |

## Ion Torrent™ Oncomine™ Gynecological Panel

19-gene panel applicable to endometrial, cervical, and ovarian carcinomas. Contains genes such as *PTEN, BRCA2,* and *CTNNB1*.

| **Gynecological** | | |
|---|---|---|
| *AKT1* | *ERBB3* | *POLE* |
| *ARID1A* | *FBXW7* | *PPP2R1A* |
| *BRCA1* | *FGFR2* | *PTEN* |
| *BRCA2* | *KRAS* | *RB1* |
| *CCNE1* | *MYC* | *TP53* |
| *CTNNB1* | *PIK3CA* | |
| *ERBB2* | *PIK3R1* | |

## Ion Torrent™ Oncomine™ Bladder Panel

25-gene panel applicable to urothelial carcinoma, which represents ~90% of bladder cancers. Contains genes such as *PIK3CA, FGFR3,* and *ERBB2*.

| **Bladder** | | |
|---|---|---|
| *AKT1* | *E2F3* | *MDM2* |
| *ARID1A* | *ERBB2* | *PIK3CA* |
| *ATM* | *ERBB3* | *PPARG* |
| *BRAF* | *ERCC2* | *PTEN* |
| *CCND1* | *FGFR2* | *RB1* |
| *CCNE1* | *FGFR3* | *TP53* |
| *CDKN1A* | *HRAS* | *TSC1* |
| *CDKN2A* | *KDM6A* | |
| *CTNNB1* | *KRAS* | |

## Ion Torrent™ Oncomine™ Liver Panel

22-gene panel applicable to hepatocellular carcinoma (HCC) and intrahepatic cholangiocarcinoma (ICC). Contains genes such as *TP53, MYC, TERT,* and *CTNNB1.*

| **Liver** | | |
|---|---|---|
| *ALB* | *IDH1* | *RB1* |
| *APOB* | *IDH2* | *RIT1* |
| *ARID1A* | *JAK1* | *RPS6KA3* |
| *ARID2* | *KEAP1* | *TERT* |
| *AXIN1* | *KRAS* | *TP53* |
| *CCND1* | *MYC* | *TSC2* |
| *CDKN2A* | *NFE2L2* | |
| *CTNNB1* | *PIK3CA* | |

*The HRR Pathway Predesigned Panel does not come with a preconfigured Ion Reporter analysis workflow.

## Ion Torrent™ Oncomine™ Lymphoma Panel

25-gene panel applicable to Hodgkin's and non-Hodgkin's lymphomas (primarily diffuse large B cell lymphoma (DLBCL)). Contains genes such as *BCL2, MYD88,* and *CARD11.*

| Lymphoma | | | | | |
|---|---|---|---|---|---|
| *ARID1A* | *BRAF* | *CDKN2A* | *HIST1H1E* | *MYD88* | *TNFAIP3* |
| *ATM* | *BTK* | *CREBBP* | *KMT2D* | *PIM1* | *TNFRSF14* |
| *B2M* | *CARD11* | *EZH2* | *MTOR* | *SOCS1* | *TP53* |
| *BCL2* | *CD79B* | *GNA13* | *MYC* | *SF3B1* | *XPO1* |
| *BCL6* | | | | | |

## Ion Torrent™ Oncomine™ Melanoma Panel

29-gene panel applicable to cutaneous and uveal melanoma. Contains genes such as *BRAF, NRAS,* and *CDKN2A.*

| Melanoma | | |
|---|---|---|
| *AKT3* | *GNAQ* | *NRAS* |
| *ARID2* | *GRIN2A* | *PIK3CA* |
| *BRAF* | *HRAS* | *PPP6C* |
| *CCND1* | *IDH1* | *PTEN* |
| *CDK4* | *KIT* | *RAC1* |
| *CDKN2A* | *KRAS* | *RB1* |
| *CTNNB1* | *MAP2K1* | *TERT* |
| *ERBB4* | *MDM2* | *TP53* |
| *EZH2* | *MITF* | *TYR* |
| *GNA11* | *NF1* | |

## Ion Torrent™ Oncomine™ Prostate Panel

21-gene panel applicable to prostate adenocarcinoma. Contains genes such as *AR*, *PTEN,* and *MYC*.

| Prostate | | |
|---|---|---|
| *AKT1* | *FOXA1* | *MYC* |
| *APC* | *HRAS* | *PIK3CA* |
| *AR* | *IDH1* | *PIK3R1* |
| *BRAF* | *KDM6A* | *PTEN* |
| *BRCA2* | *KMT2D* | *RB1* |
| *CDK12* | *KRAS* | *SPOP* |
| *CTNNB1* | *MED12* | *TP53* |

## Ion Torrent™ Oncomine™ tumor specific RNA panel

49-gene research panel complements the Oncomine tumor specific panels; however, it is not available with the Oncomine Lymphoma Panel. This RNA-only panel uses FusionSync technology to detect known, novel, and rare fusions from even small sample inputs. This panel cannot be customized.

| RNA: driver genes | | |
|---|---|---|
| *AKT1* | *FGFR2* | *PPARG* |
| *AKT2* | *FGFR3* | *PRKACA* |
| *AKT3* | *MAP3K8* | *PRKACB* |
| *ALK* | *MET* | *RAF1* |
| *AR* | *MTAP* | *RARA* |
| *BRAF* | *MYB* | *RELA* |
| *BRCA1* | *MYBL1* | *RET* |
| *CDKN2A* | *NOTCH1* | *ROS1* |
| *EGFR* | *NOTCH2* | *RSPO2* |
| *ERBB2* | *NOTCH3* | *RSPO3* |
| *ERBB4* | *NRG1* | *STAT6* |
| *ERG* | *NTRK1* | *TERT* |
| *ESR1* | *NTRK2* | *TFE3* |
| *ETV1* | *NTRK3* | *TFEB* |
| *ETV4* | *NUTM1* | *YAP1* |
| *ETV5* | *PIK3CA* | |
| *FGFR1* | *PIK3CB* | |

Explore the stock of genes for Oncomine tumor specific panels at **thermofisher.com/oncomine-specific-search**

ion torrent

## Informatics for efficiency

Ion Reporter™ Software supports preconfigured workflows to help save time and allows for streamlined, automated data analysis and variant calling. The Oncomine HRR Pathway Predesigned Panel is a notable exception in Ion Reporter v5.16, as preconfigured analysis workflows are absent. However, all of the content needed for the analysis is provided and outlined in the user guide. Ion Torrent™ Oncomine™ Reporter is a curated knowledgebase and reporting software that enables custom reporting. These tools help simplify the bioinformatics workflow and enable researchers to focus on finding the biological meaning of the data.

## We are here to help

Our support team enables the rapid implementation of each panel on the Ion 530 Chip or the Ion 540 Chip. We are here to help enable the workflows that make your labs more effective and accelerate time to implementation.

### Ordering information

| Product | |
|---|---|
| Oncomine tumor specific panels | Order at **ampliseq.com** |

Find out more at **thermofisher.com/oncomine-specific**

ThermoFisher SCIENTIFIC