Comprehensive Adaptive Immune Receptor Profiling for All Immune Cell Types

Immune Receptor Profiling is a powerful tool for characterizing adaptive immune responses to cancer, auto-immune and infectious diseases, allergies, vaccinations, and therapeutic treatments. The unique sequences of the T-cell and B-cell receptors (TCRs and BCRs), and antibody variable regions (CDR3) that recognize foreign antigens define the individual differences in adaptive immune responses. Profiling the TCR and BCR variable regions using RT-PCR and NGS provides critical data for the discovery of novel, disease-associated immunity biomarkers.

What is the DriverMap™ AIR Profiling Assay?

The DriverMap™ Adaptive Immune Receptor (AIR) profiling assay is the only assay in the market that profiles **all 7 TCR/BCR isoforms (TRA, TRB, TRG, TRD, IGH, IGK, IKL) in a single reaction** (Fig 1).

- **Start from all immune sample types:** The assay is compatible with various sample types; whole blood or PBMC, cancer biopsies and tissue samples without rRNA, mitochondrial and globin depletion (Fig 2).
- **Profile small samples directly from lysed cells:** The DriverMap AIR protocol is based on hybridization of gene-specific primers with target RNA so the assay can be run directly from immune cells without isolating the RNA of purified immune cells, FFPE microsamples and whole blood microsamples (30 µl). (Fig 2)
- **Detect only functional genes:** By using messenger RNA (mRNA) instead of genomic DNA (gDNA), the assay profiles the CDR3 region of only the functional isoforms without pseudogenes, ORFs and non-rearranged genes.
- **Obtain more quantitative repertoire coverage:** Starting with the same amount of total RNA, the DriverMap AIR assay robustly detects more overlapping clonotypes in replicate samples than other RNA-based immune receptor profiling methods. For example, the DriverMap AIR assay detects three-fold more clonotypes than the conventional SMART®-based 5'-switch oligo TCR assay (Fig 3).

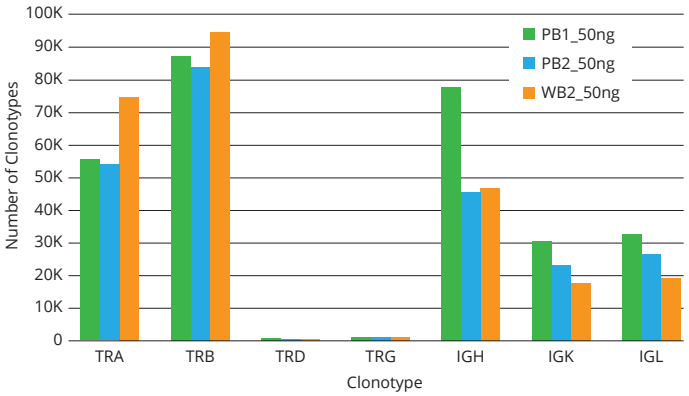

Figure 1

The number of clonotypes for 7 TCR/BCR chains *detected from 50ng of PBMC and whole blood RNA samples in triplicate.*

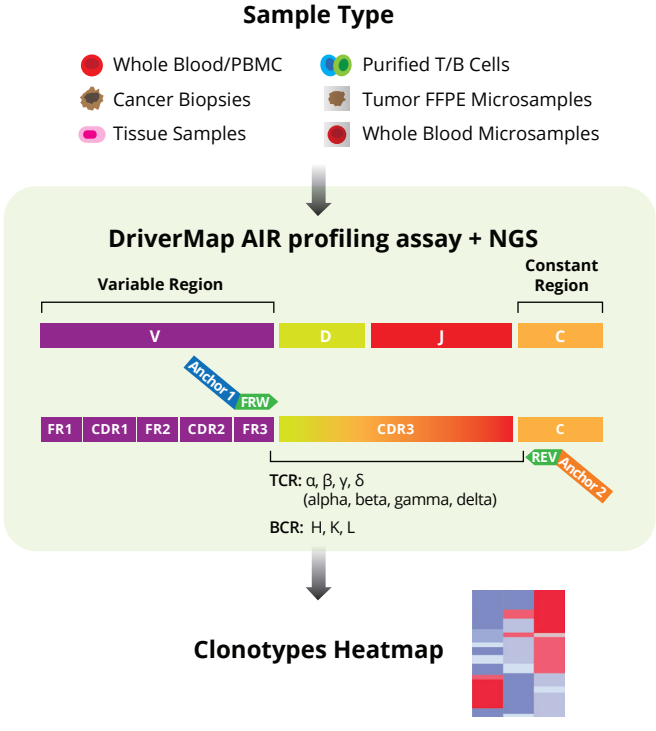

Figure 2

DriverMap AIR profiling assay works with various sample types with 10 ng – 1 µg of total RNA *using multiplex RT-PCR reaction and NGS profiling to provide quantitative clonotype analysis.*

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Focus on Relevant TCR/BCR Clonotypes

Amplifying mRNA rather than gDNA increases the sensitivity of the assay (Fig 4). The DriverMap AIR assay detects 1.5-2x more TCR/BCR clonotypes than gDNA using the leading gDNA assay. Further, activation of the adaptive immune response induces significant up-regulation of TCR and BCR transcription in antigen-specific clonotypes (e.g., up to 1,000-fold for plasma B cells) increasing their detection level with the mRNA-based DriverMap AIR assay. The resulting profile of up-regulated clonotypes can provide insights with regard to therapeutic responses and strategies.

Integrating AIR Profiling Data with Immunophenotyping of Immune cells

The DriverMap technology platform allows you to generate both AIR and targeted expression profiles for 300+ key T/B cell subtyping and activation marker genes from the same cell sample (immune cell fractions or single-cells). As a result, **you can obtain both phenotypic cell typing data and immune receptor profiles from the same samples.**

Conclusion

When compared to the immune receptor profiling options available to researchers today, the **DriverMap Adaptive Immune Receptor (AIR) Profiling Assay is the most complete, sensitive and straightforward way** to obtain insights into your immune cell samples.

DriverMap AIR Profiling Assay is available as a kit or service. **Learn more at cellecta.com/DriverMapAIR**

Get Early Access to Cellecta's Adaptive Immune Receptor Profiling Service

Cellecta is currently offering an **Early Access Program for the DriverMap Adaptive Immune Receptor (AIR) Profiling Assay.** If you have blood, PBMC, or other immune cell samples that you would like to have analyzed, please contact us at **collaborate@cellecta.com** for more information.

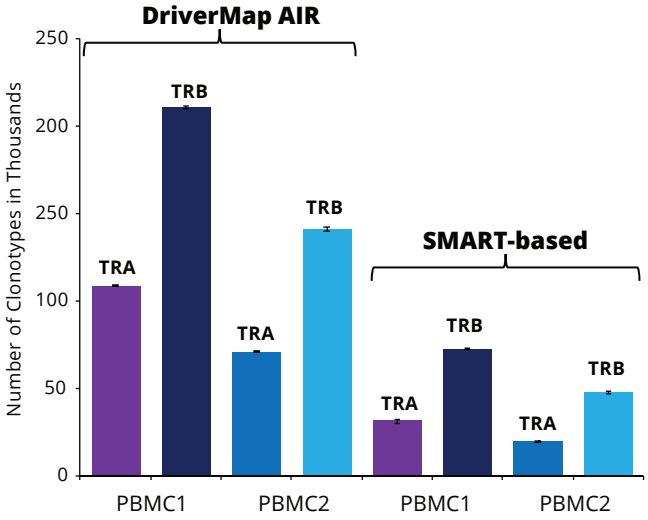

Figure 3

Comparison of TCR clonotypes detected by DriverMap AIR vs SMART assay. *Both assays were run with 50 ng of total RNA isolated from PBMC. The DriverMap AIR assay detects ~ 3X more TCR clonotypes than the SMART assay.*

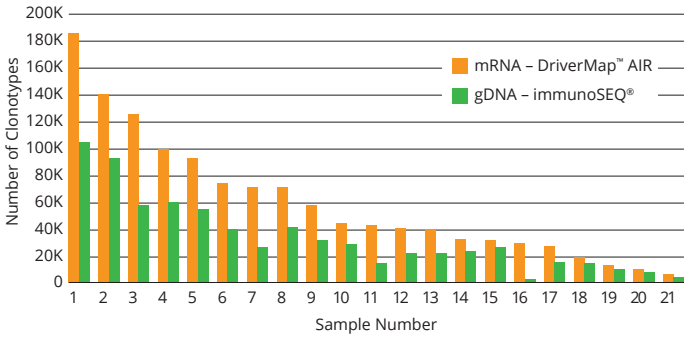

Figure 4

Comparison of clonotypes detected by DriverMap AIR (mRNA) vs ImmunoSEQ (gDNA) assay from 21 patient tumor samples. *DriverMap AIR assay run on mRNA samples detects 1.5-2x more TCR/BCR clonotypes than gDNA samples run using the immunoSEQ assay.*

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