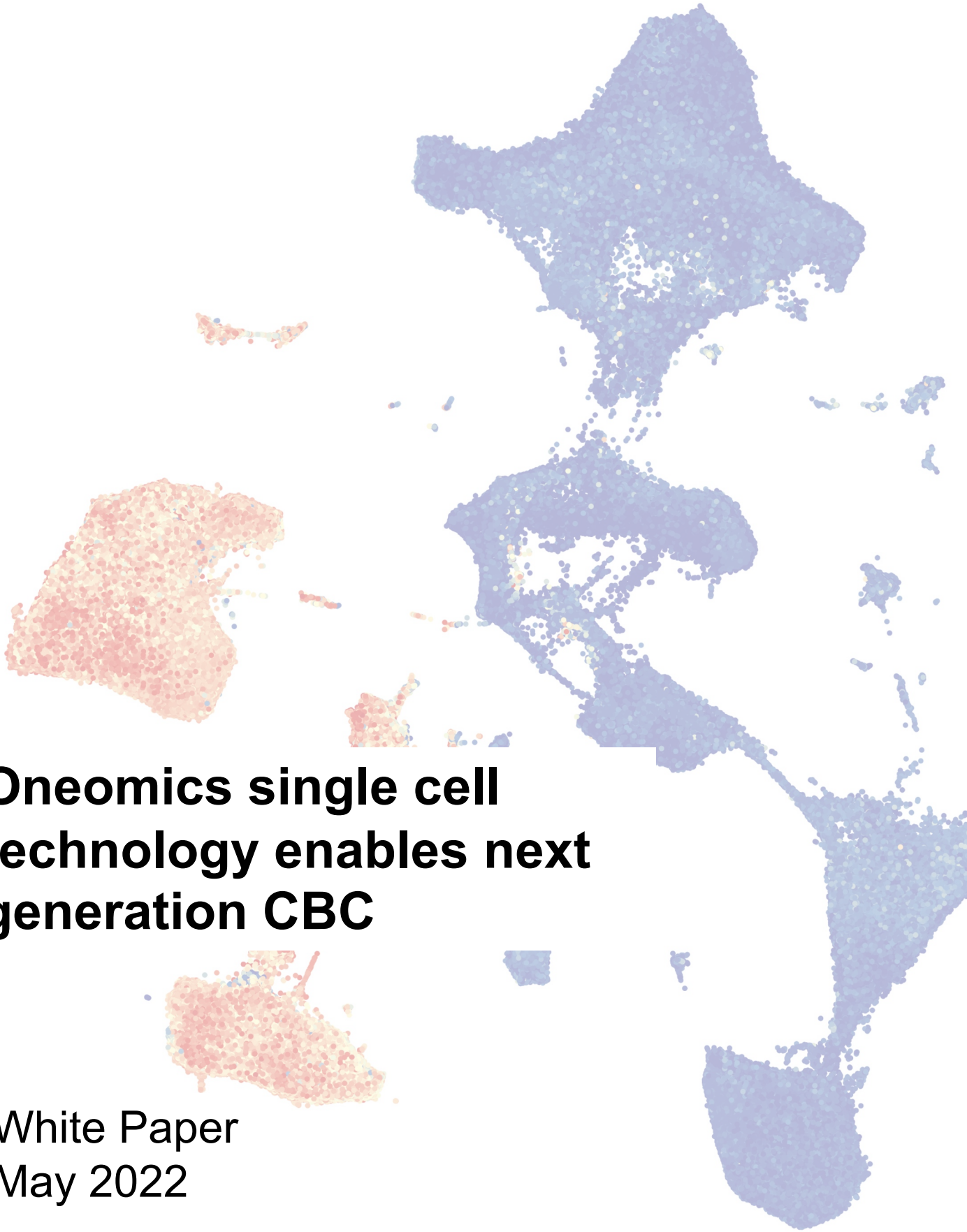
Oneomics



Oneomics single cell technology enables next generation CBC

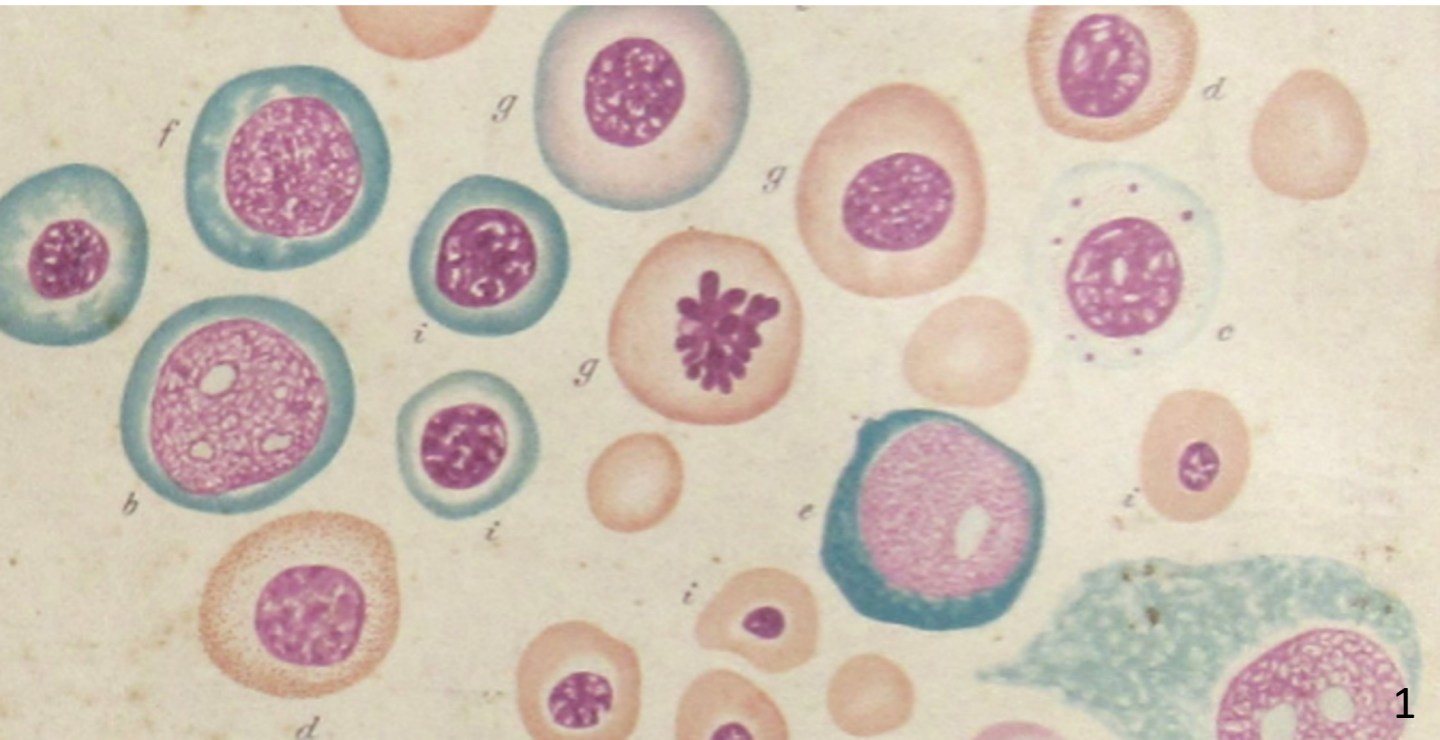
White Paper
May 2022

Introduction

We all have a unique immune system that helps to protect us from disease. Doctors have used this information ever since the first scientists looked through a microscope and observed the surprising diversity of blood cells. In fact, the most common lab test, complete blood counts (CBC) guides healthcare in a wide range of uses from annual health screening, detection of disease, and monitoring of treatments.

At Oneomics we are developing **N**ext **G**eneration **C**BC (**NGC**) a new single cell genomics technology to significantly expand on the standard CBC. Instead of only counting a few basic cell types, we use our single cell technology to report hundreds of distinct cell types and states. For the first time, we can begin to use the long-known complexity and cellular diversity of the immune system for precision medicine.

Here we present a preliminary analysis of our approach based on one of the trickier problems in healthcare – early cancer detection. We validate our overall approach and demonstrate how NGC can be used as a new tool in precision medicine.



How it works

The Oneomics test works by a simple annual blood sample. Here we use our approach to see if immune profiles from individuals with cancer can be differentiated from those without (A, below). When a sample arrives, we generate libraries for sequencing using our proprietary single cell technology (B, below). Importantly, our technology is both significantly less expensive and more sensitive than any other available single cell RNA-seq method. Our analytical test then clusters cell types and identifies outlier immune profiles related to disease status. Finally, the patient level score either indicates no disease or disease to be followed up by additional diagnostic testing.

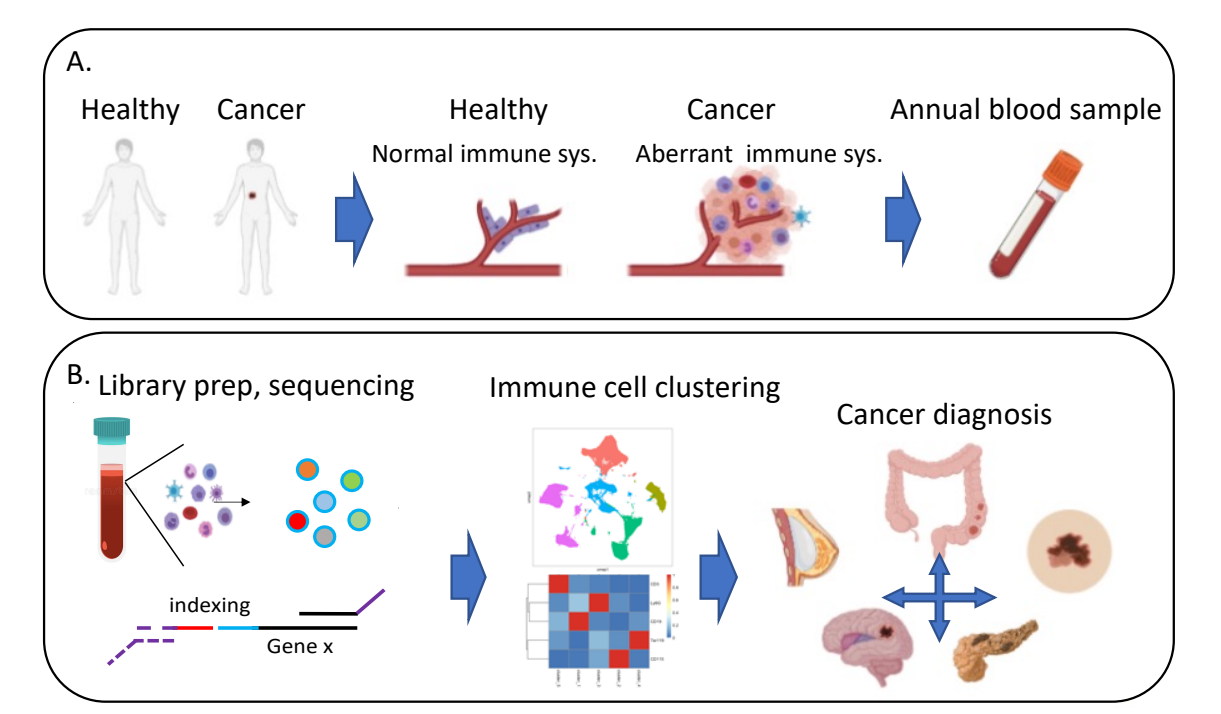


Figure 1: (A) general schematic representing systemic immune infiltaration and disruption in patients with cancer versus healthy individuals. (B) An overview of the steps of this test leading to the identification of disease.

Results

Disease and cell type clustering

Experimental data from 97 healthy and cancer blood samples were profiled and analyzed by our machine learning algorithm. High level clustering revealed main groups of cells corresponding to T cells, B cells, Myeloid cells, Monocyte/ Macrophages, and Platelets, Red blood cells, Dendritic cells and others. At this level there is a significant difference between healthy and cancer samples.

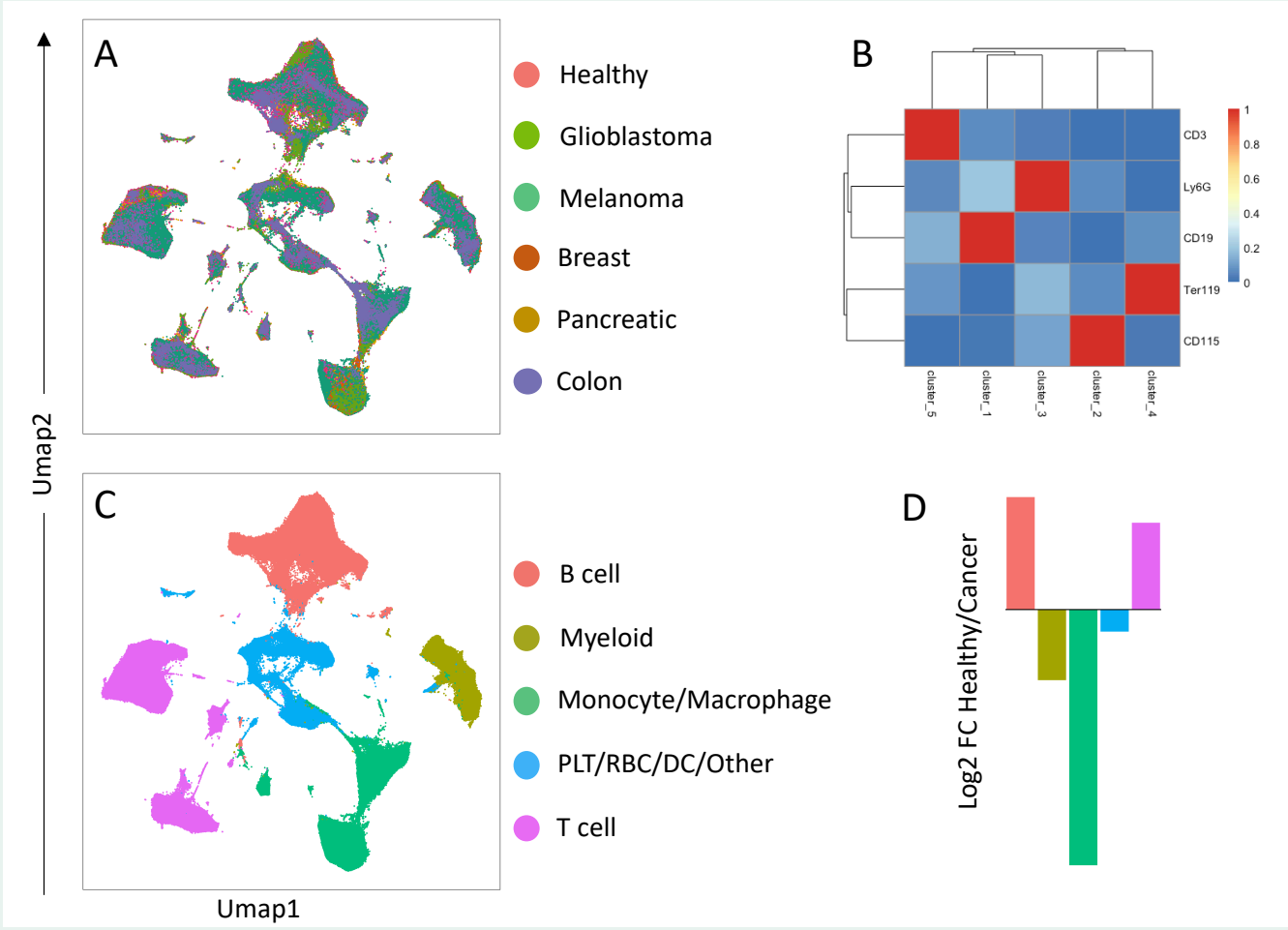


Figure 2: (A) UMAP projection of single cells colored by samples type (B) Main cluster types with average marker expression of key markers. (C) Projection colored by main cell types in B. (D) Log2 fold change between cancer and healthy.

High resolution immune profiles

Following high-level clustering Oneomics test utilizes granular clustering of distinct immune profiles (A, below). Shown here are the cluster of CD3+ T-cells into 32 subsets including CD4+, CD8+, Treg, NKT, CD8- CD4-, $\gamma\delta$, and other distinct T cell types based on known immune markers (B, below). Oneomics then identifies subsets with significant under or over representation in cancer of healthy samples (C, below).

This analysis is then performed across the entire immune macroenvironment including B cells, Myeloid cells, DCs, Monocytes, Macrophages, and other rare immune cells. Cumulatively this creates an overall score based on a samples over/under representation of key immune cell subsets that are significantly differentiated in cancer.

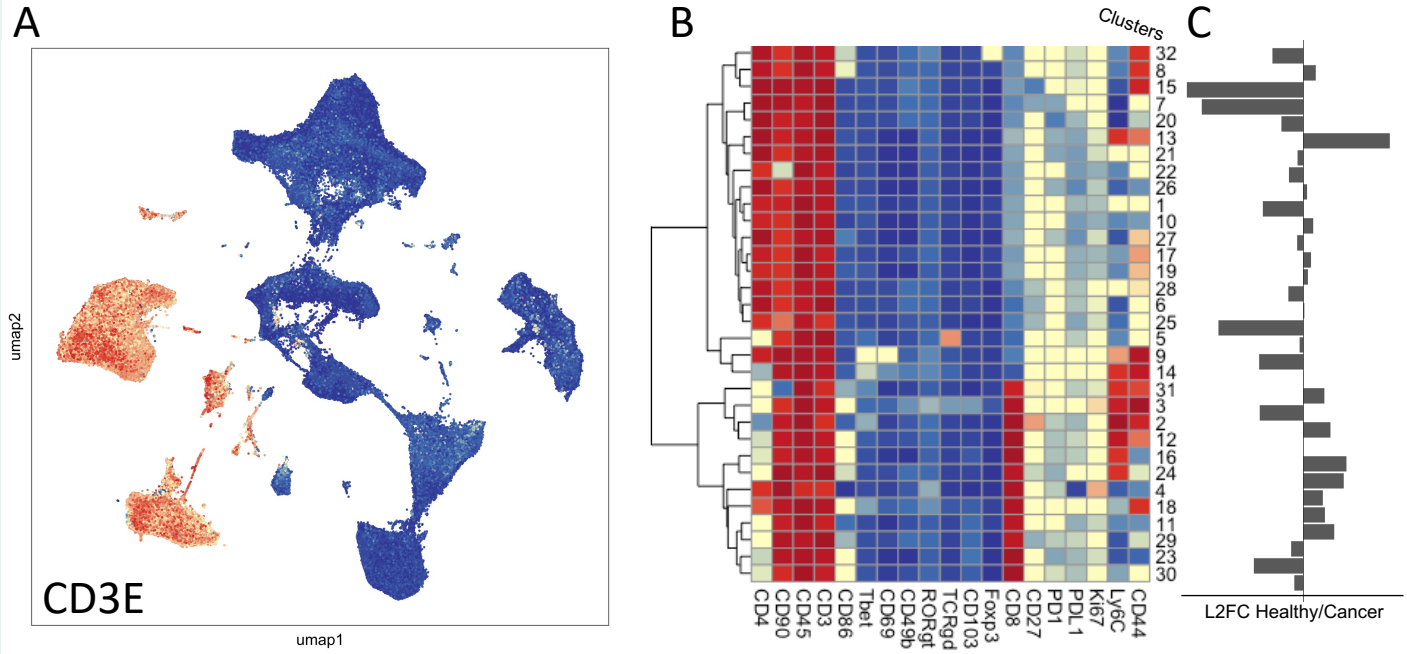
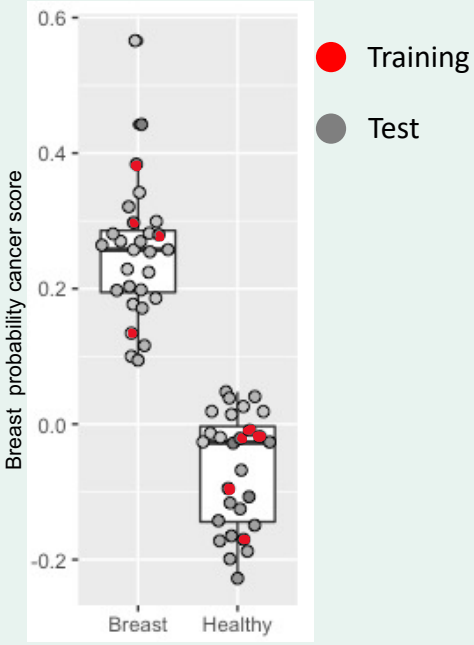


Figure 3: (A) UMAP projection of single cells colored by expression of pan T cell marker CD3E. (B) KNN clustering of T cells shown by mean expression in heatmap of relevant markers. (C) LOG 2 fold change between healthy and cancer samples in each distinct cluster.

Overall test performance

For each tumor type Oneomics test calculates an overall score based on the relative percentage of significantly dysregulate immune subtypes. Based on the machine learning based cuttof the prognostic positive or negative status is determined. Overall Oneomics has a 98.11% positive predicative percentage (PPP) and 100% negative predictive percentage (NPP).

A



B

Test	Reference: Positive	Reference: Negative
Positive	52	0
Negative	1	28
PPA	98.11%	
NPA	100 %	

Figure 4: (A) Representative of individual cancer type scoring with training (red) and test samples (grey) of breast cancer and healthy samples on the Oneomics test. (B) overall performance of Oneomics test in samples across the tested tumor types. Single discordant sample from melanoma.

Conclusions

This This study demonstrated the dramatic improvement in overall sensitivity and specificity of diagnostic liquid biopsy testing of the Oneomecs test. This is principally due to scalable single cell resolution profiling of the immune macro-environment.

In this preliminary proof of principle study, we demonstrate and overall performance of 98% positive predictive value and 100% negative predictive value. In further analysis this value is maintained across cancer staging, confirming the utility of this test.

More information

For more information about this study or our tests please contact info@1omic.com and visit our website at https://www.1omic.com/