SINGULAR GENOMICS

# G4 BENCHTOP SEQUENCER: ENHANCE YOUR CORE LAB'S SEQUENCING CAPABILITY

WACD 2023

Presenter: Jordan Williams PhD

Sr Manager Field Application Science

# INTRODUCING G4
## THE WORLD'S MOST POWERFUL BENCHTOP SEQUENCER

| | |
|---|---|
| **Flexibility**<br>1–4 flow cells<br>4–16 lanes | Unparalleled operational efficiency |
| **Speed**<br>Daily Sequencing | Industry leading run times across applications |
| **Power**<br>up to 3.2 Billion Reads*<br>480 Gb | More data per day than any other benchtop sequencer |
| **Accuracy**<br>80–90% bases<br>≥ Q30 | Novel 4 color, Rapid SBS chemistry |


* 3.2 billion reads on Max Read Kits and 480Gb for F3 2x150

SINGULAR GENOMICS

# G4 SEQUENCER IS DESIGNED FOR DAILY SEQUENCING

| | Reagent Configuration [1] | Run Time [2] |
|---|---|---|
| **F2 Flow Cell** | 100 cycles | ~11 hours |
| | 200 cycles | ~15 hours |
| | 300 cycles | ~19 hours |
| **F3 Flow Cell** | 50 cycles | 8–11 hours |
| | 100 cycles | 11–14 hours |
| | 200 cycles | 15–19 hours |
| | 300 cycles | 19–24 hours |
| **Max Read** | 10x Single Cell | ~30 hours |
| | 10x Spatial FFPE | ~24 hours |

[1] Reagents include 50 additional cycles above what is represented to account for adapters and indices.
[2] Run time measured from run start through clustering, sequencing and instrument wash for non-indexed reads.

SINGULAR GENOMICS

# FLOW CELL AND LANE COMPARTMENTALIZATION

## ACCOMMODATING DIVERSE EXPERIMENTAL NEEDS

**Lane Ownership**

**Multi-Lane Samples**

**Flow Cell Ownership**

**Flow Cell Ownership**

<u>F2 Flow Cell</u>

~50M Clusters per Lane

~200 M Clusters per Flow Cell

<u>F3 Flow Cell</u>

~100M Clusters per Lane

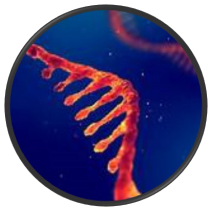
~400 M Clusters per Flow Cell

$150–$250 per Lane

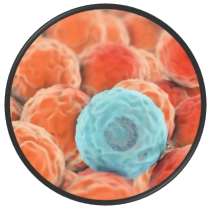
$600–$1,000 per Flow Cell

SINGULAR GENOMICS

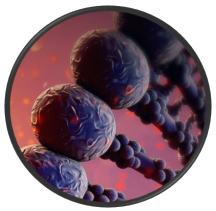
# SEQUENCING APPLICATIONS



RNA



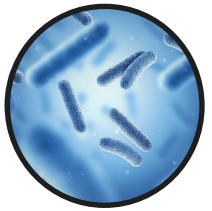
Single Cell RNA



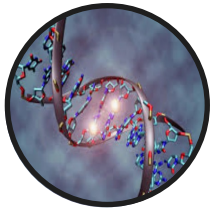
Targeted Panel

Whole Exome

Whole Genome



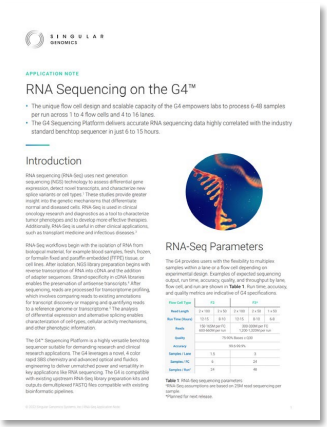
Metagenomics



Methyl-seq

## Unmatched Versatility Serving a Broad Range of Applications

G4 has been designed to deliver fast, flexible sequencing



SINGULAR GENOMICS

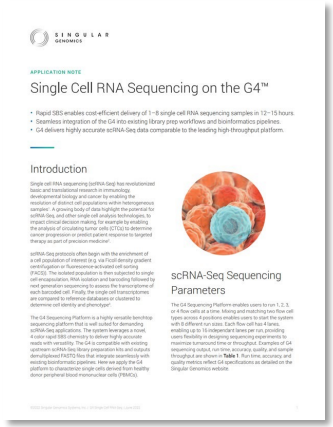
APPLICATION NOTE

RNA Sequencing on the G4™

- The unique flow cell design and scalable capacity of the G4 empowers labs to process 6–48 samples per run across 1 to 4 flow cells and 4 to 16 lanes.
- The G4 Sequencing Platform delivers accurate RNA sequencing data highly correlated with the industry standard benchtop sequencer in just 6 to 15 hours.

Introduction

RNA-Seq Parameters



SINGULAR GENOMICS

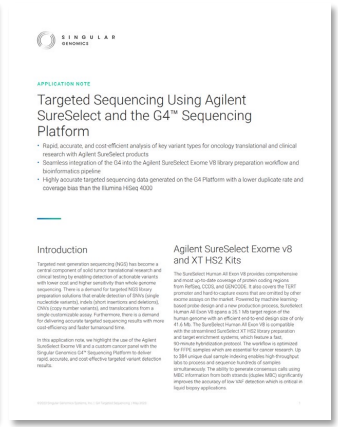
APPLICATION NOTE

Single Cell RNA Sequencing on the G4™

- Rapid SBS enables cost-efficient delivery of 1–8 single cell RNA sequencing samples in 12–15 hours.
- Seamless integration of the G4 into existing library prep workflows and bioinformatics pipelines.
- G4 delivers highly accurate scRNA-Seq data comparable to the leading high-throughput platform.

Introduction

scRNA-Seq Sequencing Parameters



SINGULAR GENOMICS

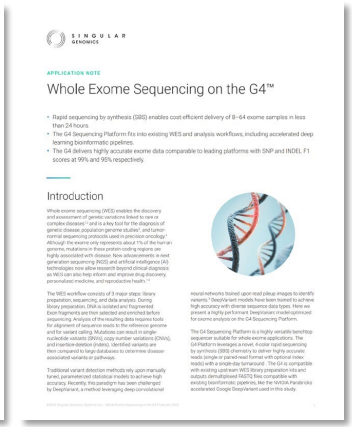
APPLICATION NOTE

Targeted Sequencing Using Agilent SureSelect and the G4™ Sequencing Platform

- Rapid, accurate, and cost-efficient analysis of key variant types for oncology translational and clinical research with Agilent SureSelect products
- Seamless integration of the G4 into the Agilent SureSelect Exome V8 library preparation workflow and bioinformatics pipeline
- Highly accurate targeted sequencing data generated on the G4 Platform with a lower duplicate rate and coverage bias than the Illumina HiSeq 4000

Introduction

Agilent SureSelect Exome v8 and XT HS2 Kits



SINGULAR GENOMICS

APPLICATION NOTE

Whole Exome Sequencing on the G4™

- Rapid sequencing by synthesis (SBS) enables cost-efficient delivery of 8–64 exome samples in less than 24 hours.
- The G4 Sequencing Platform fits into existing WES and analysis workflows, including accelerated deep learning bioinformatic pipelines.
- The G4 delivers highly accurate exome data comparable to leading platforms with SNP and INDEL F1 scores at 99% and 95% respectively.

Introduction

SINGULAR GENOMICS

TECHNICAL REPORT 1.0

Human Genome Sequencing

Performance Characterization of the G4 Sequencing Platform for Human Whole Genome Sequencing

INTRODUCTION

Application Note

Multiplex PCR Targeted Enrichment Solution on the G4 Sequencing Platform

Abstract

Introduction

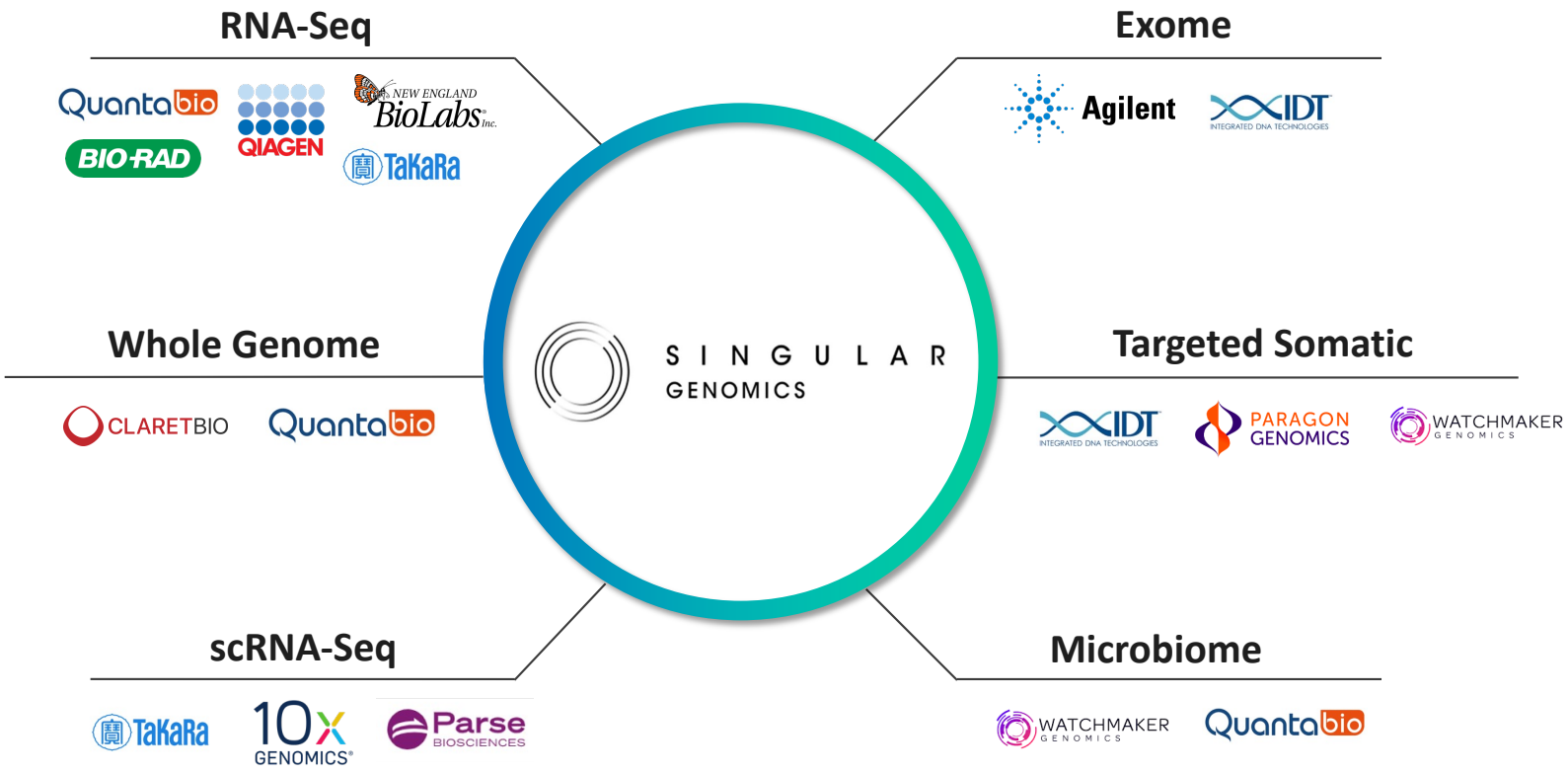
Application Focus

SINGULAR GENOMICS

PARAGON GENOMICS

# LEADING LIBRARY PREP COMPATIBILITY
## VALIDATED PROTOCOLS FOR EASE OF ADOPTION





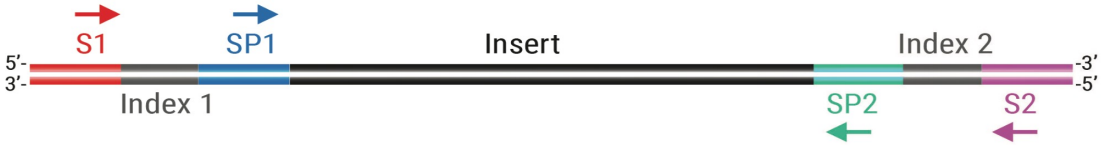



Click for G4 Workflow | Singular Genomics

# LIBRARY PREPARATION

## De novo

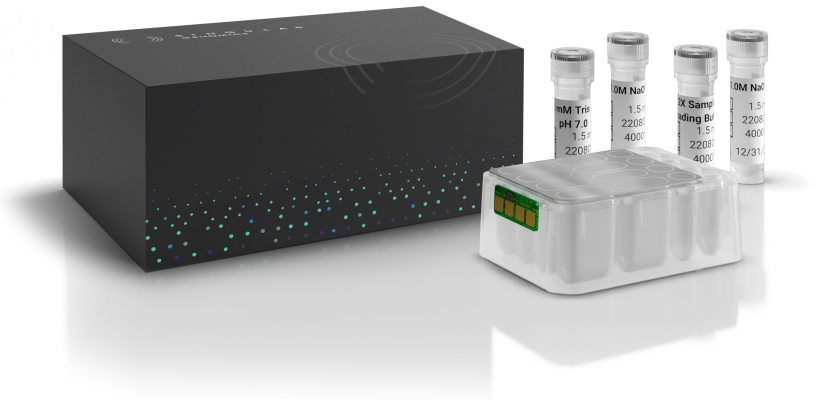
Through existing Library Prep partners.
Adapters for PCR and PCR-Free workflows
Indexed (96 UDI, 12 bp) and non-indexed PCR primers.




## By adapting existing libraries

- Option A: Original indexing information is kept
PCR protocol and PCR primers available (non-indexed primers).

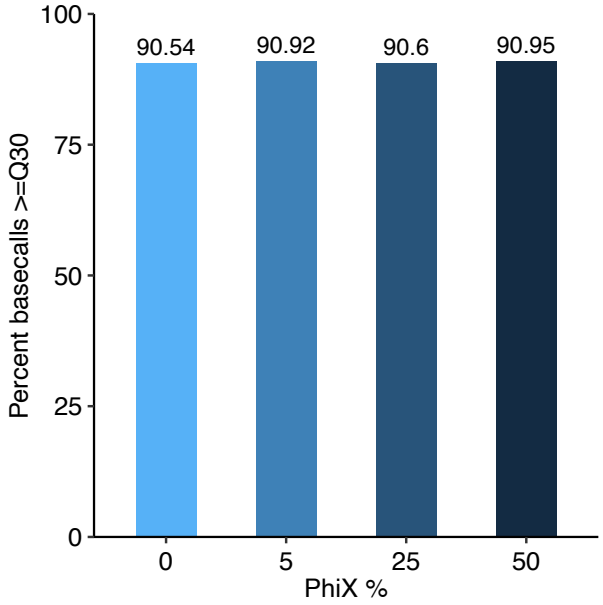
- Option B: Original indexing information can be replaced
PCR protocol and PCR primers available (indexed and non-indexed primers).



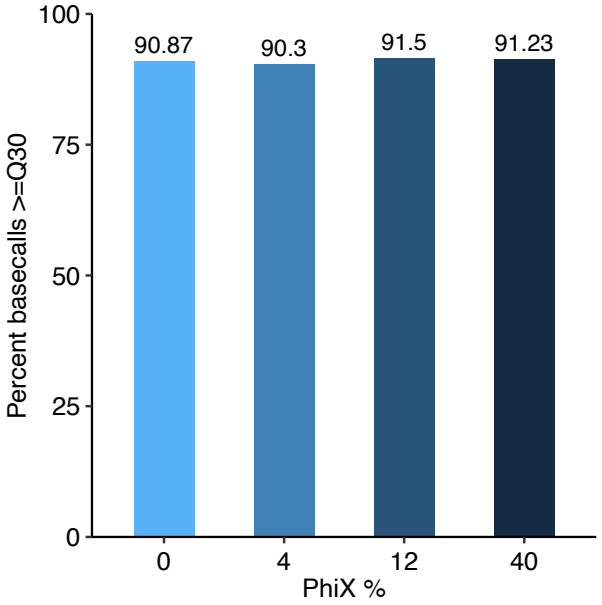
# STRONG PERFORMANCE WITH LOW DIVERSITY LIBRARIES

## NO NEED FOR PHIX

Percent PhiX vs quality score for EM-Seq library




Percent PhiX vs quality score for an extremely low diversity (two-amplicon) library



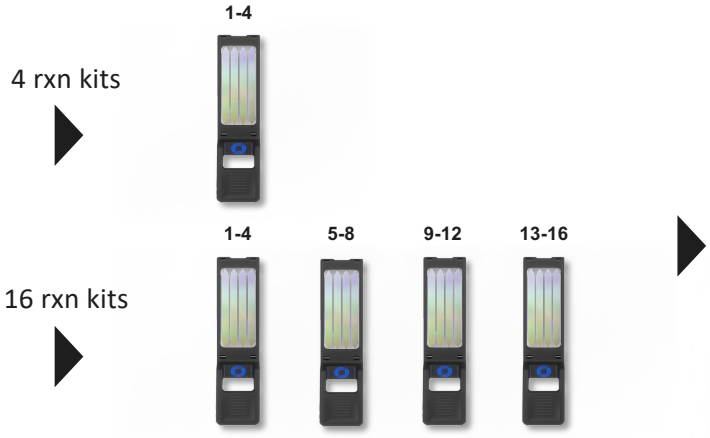
# MAX READ KITS WITH 10X CHROMIUM

2 G4 Platform

## Optimized Workflow

Unmatched 3.2 billion reads per run on a benchtop system
Perfectly matches existing Chromium kits


Chromium




Sample Flexibility

4–16 samples provides ultimate flexibility

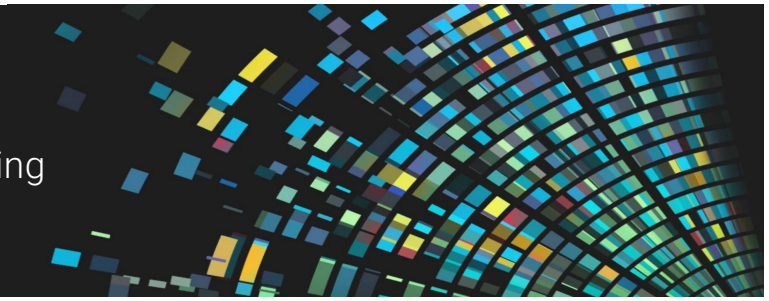

Sequence

# MAX READ KITS PRICING



## Scalable, Consistent Economics

Maximizing throughput and decreasing cost for single cell sequencing
Savings up to $600 per sample, or over $6,000 per run



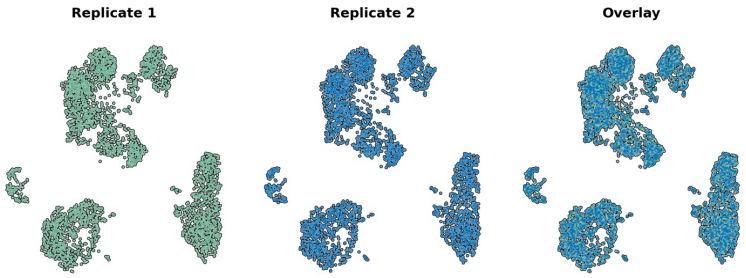
| | | 4 Samples | 16 Samples |
|---|---|---|---|
| **G4** | Flow Cell | M3 (800M reads) | 4x M3 (3,200M reads) |
| | Price / Sample | **$200** | **$200** |
| **NextSeq 2000** | Flow Cell[1] | P3 100 cycle (1,200M reads) | 3x P3 100 cycle (3 runs, 3,600M reads) |
| | Price / Sample[2] | **$832** | **$624** |

[1] Assumes 10,000 cells and 20,000 reads
[2] Reflects publicly available list prices

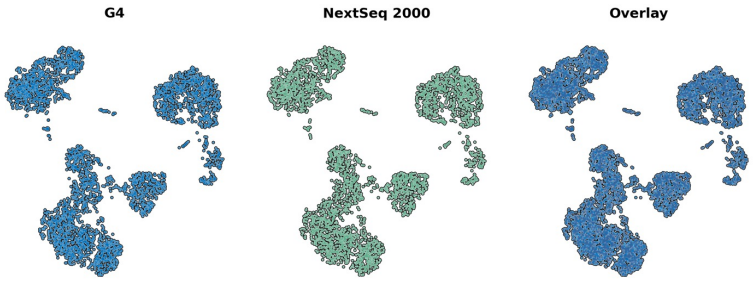
# MAX READS METHOD HIGHLY ACCURATE FOR SINGLE CELL SEQ

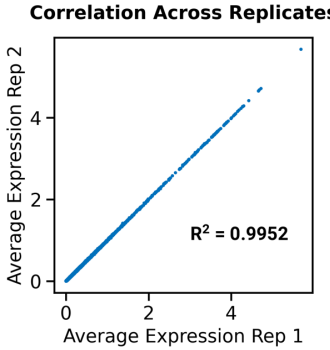
## CONCORDANT WITH INDUSTRY STANDARD SEQUENCING

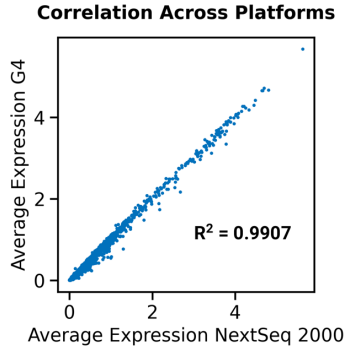
### Technical Replicate Performance



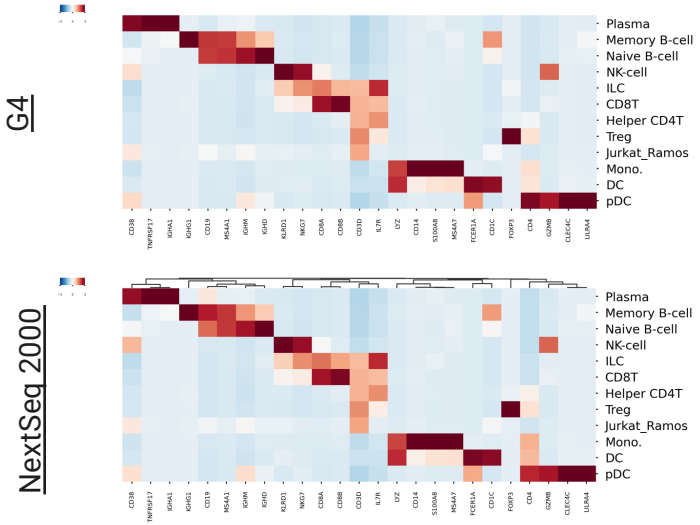

### Comparison to NextSeq 2000




### Immune Cell Marker Expression




SINGULAR GENOMICS

# ON-MARKET FEEDBACK
## CUSTOMER QUOTES



"The flexibility and speed of the G4 has enabled our Spatial Technologies Unit to use a single instrument for new single cell and spatial transcriptomic assay pilots as well as production, decrease turnaround times, and meet demanding deadlines for our clients."

HARVARD UNIVERSITY

"We have been very excited by the enthusiasm of the researchers we support for the G4 with many labs already submitting projects to be run on the sequencer. These include samples for RNA-Seq (both standard and high-throughput), CUT&RUN, as well as custom protocols where the laboratories are preparing their own libraries."

"… I'm blown away by the fact that we're able to get such high-quality sequencing results back in less than a day! We're looking forward to continuing to collaborate with Singular Genomics in 2023 and being able to share some of the exciting sequencing projects we're working on!"

MEDICAL COLLEGE OF WISCONSIN

The UNIVERSITY of VERMONT

"The flexibility and consumable costs were undeniably compelling to purchase the G4. Substantially better than an Illumina instrument with excellent flexibility in flow cell loading tolerances. Output is much higher than reported in company spec sheets."

# SUMMARY

## Industry Leading Speed and Flexibility

The G4 combines rapid SBS with flexible throughput to reduce turnaround times for sequencing labs.

## Plug and Play

The G4 fits into the existing lab ecosystem and enables superior flexibility.

## Highly Accurate

The G4 shows high concordance with the leading NGS platform across applications.

## Max Reads

Maximizing throughput and decreasing cost for single-cell sequencing.

SINGULAR GENOMICS

# THANK YOU