

454
SEQUENCING

GS Junior System

The power of next-generation sequencing in your hands



A Complete Sequencing Solution

All on your benchtop



The GS Junior System includes:
GS Junior Instrument, high-performance desktop computer, and the complete suite of GS data analysis software.

Proven technology

- **Easily integrate next-gen sequencing into your research**
Established, easy-to-use technology, and comprehensive bioinformatics tools are biologist-friendly.
- **Make the most of sequencing in your projects**
Long, high-quality reads, short run times, and complete data analysis solutions help you uncover the biology.
- **Benefit from broad application diversity**
Long read lengths, right-sized throughput, and high sensitivity enable a variety of applications.
- **Gain independence in your research**
Harness the power of next-gen sequencing in your lab, on your bench-top, on your terms – without waiting.

Simplified Data Analysis

All GS Junior System data analysis can be performed on the accompanying computer, pre-configured with intuitively designed bioinformatics software, eliminating the need for command-line instructions or a costly high-end computer cluster. Go from sequencing to discovery with our easy-to-use, yet sophisticated software:

- **GS *De Novo* Newbler Assembler**
- **GS Reference Mapper**
- **GS Amplicon Variant Analyzer**

Next-gen sequencing tailored to your specific research needs

Perfectly sized for labs that require:

- Amplicon sequencing of 10's to 100's of samples & loci
 - Pathogen discovery and surveillance
 - *De novo* sequencing of whole microbial genomes
 - Metagenomic characterization of complex mixtures
 - Full-length cDNA sequencing and *de novo* assembly of transcriptomes
 - HLA typing with GS GType HLA MR & HR Primer Sets
 - Targeted sequencing of custom regions using NimbleGen Sequence Capture arrays
 - Sequencing of BAC pools
 - Epigenomic and methylation analysis
- ...and many more applications!

GS Junior System

The benchtop sequencer of choice for researchers worldwide

“We are currently utilizing the GS Junior System to assess major histocompatibility complex genotypes of large cohorts of SIV infected non-human primates. The throughput of the platform has allowed us to study much larger cohorts, giving us greater statistical power, and the long read lengths allow accurate discrimination of haplotypes that would be difficult using reads shorter than 400 bp.



The GS Junior System has allowed us to begin thinking outside the box, with an emphasis on big picture science. We now run an average of four GS Junior System runs per week, leading to enormous amounts of data that we are using to generate multiple manuscripts. Overall, we found the GS Junior System was easily adaptable to a small academic lab setting.”

*David O'Connor, PhD
University of Wisconsin-Madison*

Recent Publications Using GS Junior System

Transcriptionally Abundant Major Histocompatibility Complex Class I Alleles are Fundamental to Non-Human Primate SIV-specific CD8+ T Cell Responses. Budde ML *et al.* (2011) *J Virology* 85(7):3250-61.

Novel, Divergent Simian Hemorrhagic Fever Viruses in a Wild Ugandan Red Colobus Monkey Discovered Using Direct Pyrosequencing. Lauck M, *et al.* (2011) *PLoS One* 6(4): e19056.0

“The focus of our lab is on understanding the role of genes, particularly HLA, in complex, autoimmune diseases such as type 1 diabetes. Our previous experience with the GS FLX System revealed to us that the long reads produced by 454 systems are critical for high-resolution, high-throughput genotyping of this highly variable genomic region.



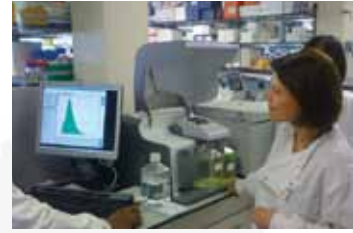
Now that we have access to this technology in our lab with the GS Junior System, we are in control of our own scheduling and can manage multiple projects simultaneously. The system allows us to generate data with significantly higher resolution than we were able to get with our previous genotyping system, allowing us to generate more accurate data for our own projects and those of our collaborators.”

*Janelle Noble, PhD
Children's Hospital Oakland Research Institute*

“We chose the GS Junior System to take advantage of the fast turnaround time and long reads for targeted gene sequencing in clinical research.

Currently we are using the system for shotgun and amplicon sequencing of plasmids, bacteria, viruses, human and rat genomes. We can now perform high-throughput confirmatory screens by quickly sequencing target regions of interest. Previously, we used Sanger sequencing and were limited to single PCRs. With the GS Junior System, we have been able to transition to PCR on multiple samples in a single run. Our experience has been very positive and we’ve found the system easy to use.”

*Korinne Northwood
MRC Clinical Sciences Centre, Imperial College London*



“With over 80 GS Junior users and 10 scientific talks the 2011 GS Junior Applications Symposium was a huge success.”



Participants in the first GS Junior Applications Symposium highly appreciated the possibility for experience exchange within the growing German GS Junior community as well as the broad selection of scientific talks covering applications, studies, workflow options, methods and bioinformatics.

*GS Junior Applications Symposium
Mannheim, Germany*

"We have found the GS Junior System to be particularly powerful for our research on detection of viral quasispecies in HIV and hepatitis, and also for whole viral genome sequencing.



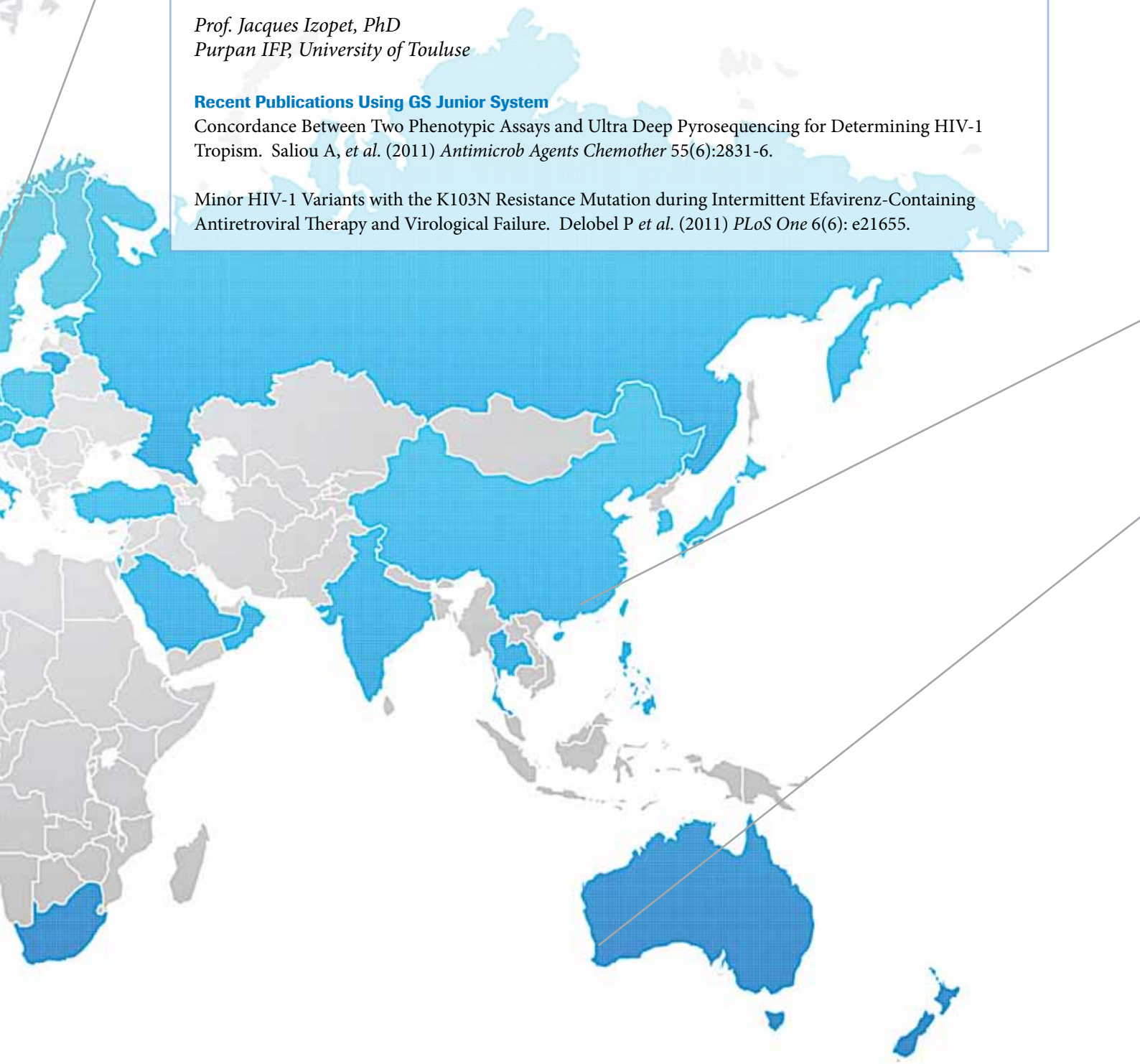
The GS Junior System allows our lab to pursue studies that were simply not possible using standard methodologies due to technical, cost and practicality reasons. Using this platform, we can answer specific scientific questions in a rapid, cost-effective manner."

*Prof. Jacques Izopet, PhD
Purpan IFP, University of Toulouse*

Recent Publications Using GS Junior System

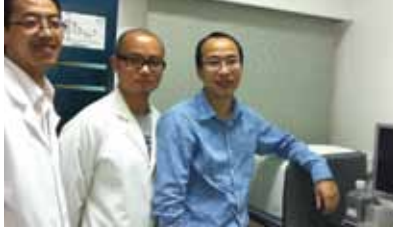
Concordance Between Two Phenotypic Assays and Ultra Deep Pyrosequencing for Determining HIV-1 Tropism. Saliou A, *et al.* (2011) *Antimicrob Agents Chemother* 55(6):2831-6.

Minor HIV-1 Variants with the K103N Resistance Mutation during Intermittent Efavirenz-Containing Antiretroviral Therapy and Virological Failure. Delobel P *et al.* (2011) *PLoS One* 6(6): e21655.



Blue shading represents countries with GS Junior Systems.

“The GS Junior System has been a great fit for our lab due to the long read lengths and affordable price



per run. We are using the system for a wide variety of projects, including metagenomics, transcriptome sequencing and viral genome sequencing.”

Since receiving the instrument, we’ve already initiated quite a lot of projects in our laboratory. The system has been particularly useful in speeding up the discovery of novel genes and microbial identification.”

*Simon Lee, Ph.D.
Institute of Chinese Medical Sciences, University of Macau*

“The GS Junior System was an ideal entry-level next generation sequencer for our laboratory due to its small footprint and low cost.



Our clients are redesigning their experiments to take advantage of the possibilities this opens up, for example opting for shotgun sequencing of virus-infected plant material in a single run on the GS Junior System over spending a year cloning and sequencing in the traditional Sanger method to obtain the virus sequence. Having the GS Junior System enables us to provide students and researchers with invaluable hands-on experience with next generation sequencing from sample preparation to bioinformatics at a low price and with manageable computing requirements.”

*Frances Brigg
Western Australia Agricultural Biotechnology Centre, Murdoch University*

**For life science research only.
Not for use in diagnostic procedures.**

GS Junior System and GS Junior Titanium Sequencing Kit

RESTRICTION ON USE: Purchaser is only authorized to use 454 Sequencing System Instruments with PicoTiterPlate devices supplied by 454 Life Sciences Corporation and in conformity with the operating procedures contained in the 454 Sequencing System manuals and guides.

GS Junior Titanium Sequencing Kit

This product incorporates technology licensed from Promega Corporation that is protected under US Patents 5,583,024 (exp. 12/10/2013), 5,674,713 (exp. 10/7/2014) and 5,700,673 (exp. 12/23/2014).

RESTRICTION ON USE: As a condition of sale of this product, purchaser agrees not to use the product to perform less than 1,536 sequencing reactions on a sample or samples without changing the substrate. Failure to comply with this restriction will result in an infringement of patent rights and other intellectual property rights of seller or third parties and a breach of the terms of sale of this product.

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GS Junior System

Performance

Read Length	400 bp average; Longest reads up to 600 bp
Throughput Profile	85% of total bases from reads >400 bp in length* 45% of total bases from reads >500 bp in length*
Throughput	~35 Mb
HQ Reads Per Run	~100,000 shotgun, ~70,000 amplicon
Accuracy	Q20 read length of 400 bp (99% accuracy at 400 bp and higher for preceding bases)
Run Time	10 hours
Multiplexing	Multiplex Identifiers (MIDs): 132

Dimensions

Size	16" W x 24" D x 16" H (40 cm x 60 cm x 40 cm)
Weight	55 lbs (25 kg)

Power Requirements

Power supply	100 VAC-240 VAC 50/60 Hz 400VA (The instrument will operate from a minimum of 85 VAC to a maximum of 264 VAC at 50/60 Hz)
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GS Junior Attendant Computer

Make and Model	HP Z-400 Workstation
Processor	1x Intel Xeon with Hyper-Threading
Memory	12 GB ECC RAM
Storage	160 GB SATA HDD (O/S & applications) 500 GB SATA HDD (data)

*Throughput profile based on shotgun sequencing of bacterial gDNA. Actual results depend on specific sample and genomic characteristics.

Ordering Information

Ordering Information	Cat No.
GS Junior Complete System	05 922 160 001
GS FLX Titanium Rapid Library Prep Kit	05 608 228 001
GS Junior Titanium emPCR Kit Lib-L	05 996 481 001
GS Junior Titanium emPCR Kit Lib-A	05 996 520 001
GS Junior Titanium PicoTiterPlate Kit	05 996 619 001
GS Junior Titanium Sequencing Kit	05 996 554 001

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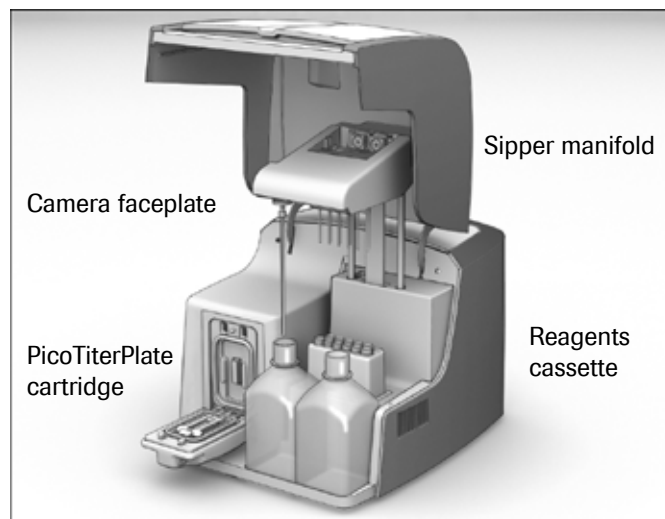


Figure 1: GS Junior Instrument. The fluidics subsystem (sippers, pumps, reagents cassette) facilitates accurate reagent dispensing, flow, and removal. The optics subsystem consists of a CCD camera which captures the light emitted in the PicoTiterPlate device wells during sequencing. The attendant computer (not shown) controls the fluidics and optics subsystems and processes the digital images sent by the camera to extract the DNA sequence information.

Purchase of the GS Junior System Includes:

- GS Junior Instrument
- GS Junior Attendant Computer
- Display, Keyboard and Mouse
- Software Package (Data Acquisition, Data Processing, GS *De Novo* Assembler, GS Reference Mapper, and GS Amplicon Variant Analyzer)
- GS Junior Bead Deposition Device, Counterweights and Adaptors
- GS Junior Bead Counter
- Waste Bottle

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