



PowerPlex[®] Y23 System

More Ys in Half the Time...See Y

The Power to Solve... *from Sample to Analysis*



The Power to Solve... from Sample to Analysis

More loci. Robust performance. Shortened workflows.

The PowerPlex® Y23 System allows Y-STR analysis of human forensic and database samples. The 5-dye STR multiplex amplifies 23 Y-STR loci, including two rapidly mutating Y-STR loci. While optimized for use with 0.5ng of DNA, the PowerPlex® Y23 System reproducibly amplifies trace template amounts as low as 100pg of DNA.

The system enables laboratories to:

- Detect more male DNA in the presence of excess female DNA
- Obtain a full profile from challenging casework samples, even those containing high concentrations of inhibitors
- Save time in every run with rapid-cycling protocols
- Simplify workflows with one kit for both casework and database samples

Amplify 23 Y-STR Loci in a Single Amplification Reaction

The inclusion of six highly informative loci can help improve a laboratory's ability to distinguish individuals from different parental lines, providing more meaningful analyses and making it ideal for:

- Forensic casework on sexual assault evidence
 - High female-to-male DNA ratio
 - Multiple male profiles
- Familial searching
- Paternity testing
- Missing persons investigations
- Migration and evolutionary studies
- Historical and genealogical research

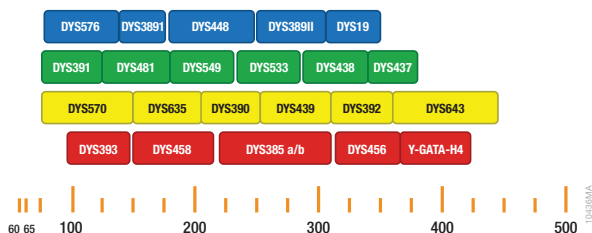


Figure 1. The PowerPlex® Y23 System allows co-amplification and four-color detection of 23 male-specific STR loci: DYS576, DYS389I/II, DYS448, DYS19, DYS391, DYS481, DYS549, DYS533, DYS438, DYS437, DYS570, DYS635, DYS390, DYS439, DYS392, DYS643, DYS393, DYS458, DYS385 a/b, DYS456 and Y-GATA-H4.

Gene Diversity of STR Loci in the PowerPlex® Y23 System¹

Locus	Overall Gene Diversity	Africa Gene Diversity	Asia Gene Diversity	Europe Gene Diversity	Native American Gene Diversity	Mixed American Gene Diversity
DYS385a/b	0.923	0.944	0.974	0.870	0.957	0.924
DYS481	0.834	0.852	0.839	0.805	0.802	0.813
DYS570	0.803	0.795	0.831	0.792	0.795	0.790
DYS458	0.791	0.750	0.825	0.780	0.778	0.775
DYS576	0.789	0.803	0.800	0.772	0.802	0.796
DYS390	0.746	0.605	0.744	0.721	0.648	0.688
DYS635	0.743	0.690	0.779	0.675	0.613	0.727
DYS643	0.720	0.777	0.759	0.651	0.559	0.666
DYS438	0.714	0.499	0.601	0.686	0.655	0.707
DYS456	0.706	0.582	0.603	0.737	0.647	0.680
DYS19	0.697	0.740	0.693	0.634	0.585	0.696
DYS448	0.694	0.670	0.758	0.634	0.754	0.708
DYS439	0.693	0.631	0.690	0.696	0.720	0.677
DYS549	0.665	0.648	0.635	0.653	0.712	0.691
DYS392	0.663	0.336	0.739	0.621	0.742	0.697
DYS389I,II	0.630	0.680	0.666	0.590	0.651	0.650
DYS533	0.625	0.548	0.630	0.592	0.642	0.627
DYS437	0.619	0.413	0.487	0.637	0.554	0.598
GATAH4	0.612	0.582	0.637	0.602	0.668	0.587
DYS389I	0.600	0.539	0.665	0.558	0.610	0.576
DYS393	0.534	0.619	0.655	0.446	0.608	0.472
DYS391	0.521	0.408	0.409	0.539	0.414	0.560

¹Purps, J. *et al.* (2014) A global analysis of Y-chromosomal haplotype diversity for 23 STR loci. *Forensic Sci. Int. Genet.* **12**, 12–23.

Table 1. Gene diversity of the Y-STR loci included in the PowerPlex® Y23 System. The loci with the highest gene diversities help laboratories to better distinguish individuals from different parental lines.

Amplify Only Male DNA

Y-STRs are particularly useful for analyzing evidence when a male suspect is involved, as is often the case in violent crimes such as sexual assaults. Mixtures of bodily fluids from different individuals are common, and unlike autosomal STR analysis, Y-STR analysis enables detection of male DNA in male/female mixtures. As shown in Figures 2 and 3, the PowerPlex® Y23 System can successfully amplify trace amounts of male DNA, particularly in the presence of excess amounts of female DNA.

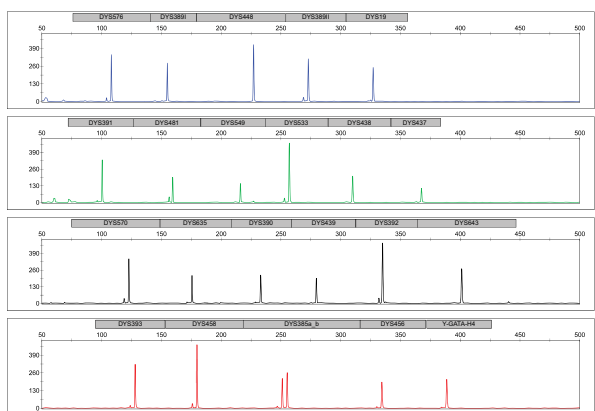


Figure 2. Amplification of 62.5pg of male DNA in the presence of 400ng of female DNA using 30 cycles and the PowerPlex® Y23 System. Amplified products were separated on an Applied Biosystems® 3130 Genetic Analyzer (3kV, 5-second injection).

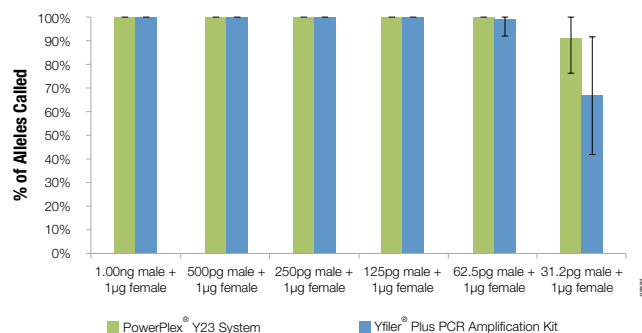


Figure 3. Amplification of decreasing amounts of male DNA in the presence of 1µg of female DNA with two Y-STR kits: PowerPlex® Y23 System and Yfiler® Plus PCR Amplification Kit. Amplified products were separated on an Applied Biosystems® 3500xL Genetic Analyzer (1.2kV, 24-second injection).

Obtain Full Profiles from the Most Challenging Samples

The PowerPlex® Y23 System is a robust multiplex that is tolerant of many amplification inhibitors, including tannic acid and humic acid. The robust performance of the kit results in more interpretable data and less need for re-amplification of inhibitor-laden samples.

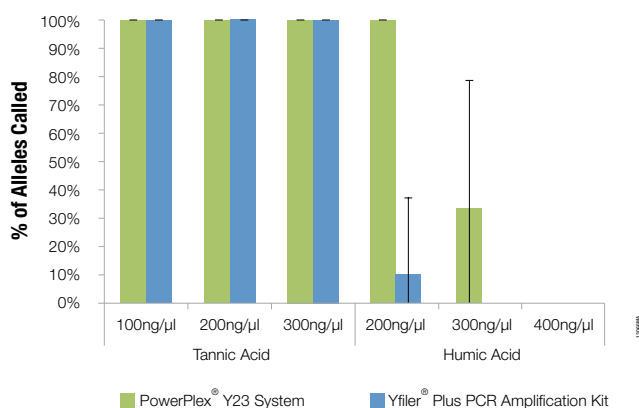


Figure 4. Amplification of 500pg of male DNA (PowerPlex® Y23 System) or 1.0ng of male DNA (Yfiler® Plus PCR Amplification Kit) in the presence of increasing amounts of common inhibitors. DNA was amplified for 30 cycles, and amplified products were separated on an Applied Biosystems® 3500xL Genetic Analyzer (1.2kV, 24-second injection).

Cut Your Amplification Time in Half

The PowerPlex® Y23 System allows users to perform amplifications in about 1.5 hours, freeing up approximately 2 hours per run, thereby improving efficiencies and productivity. Laboratories then can use the time savings for more value-added activities such as data interpretation and analysis.

Streamline Workflows with Direct Amplification

The PowerPlex® Y23 System is compatible with direct amplification, helping to streamline Y-STR databasing efforts. Amplification can be performed successfully with sample types such as FTA® card punches as well as pretreated swabs, Bode Buccal DNA Collector™ punches or S&S 903 punches.

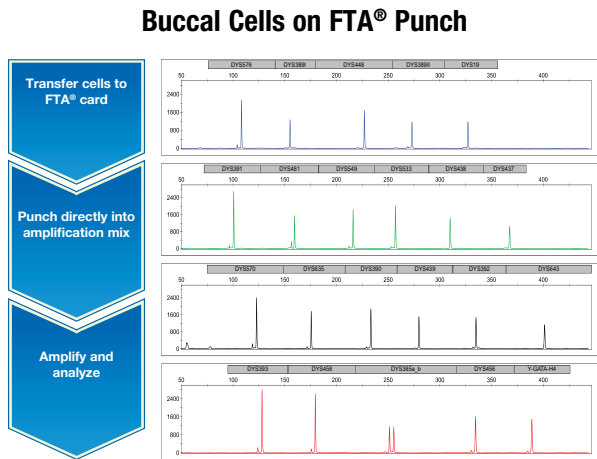


Figure 5. Amplification of two 1.2mm punches from buccal samples on an FTA® card using 27 cycles and the PowerPlex® Y23 System. Amplified products were separated on an Applied Biosystems® 3130x/ Genetic Analyzer (3kV, 5-second injection).

Buccal Cells on Cotton Swab

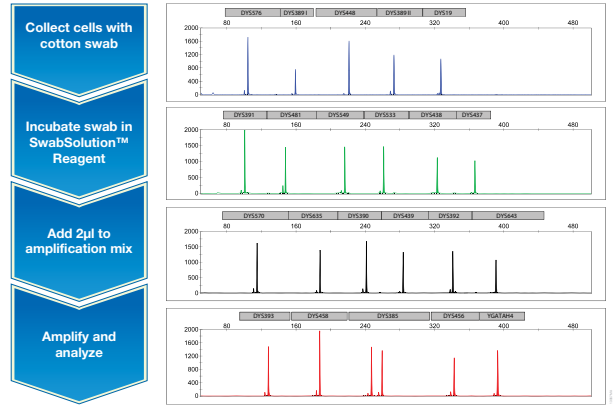


Figure 6. Amplification of DNA from a cotton swab pretreated with SwabSolution™ Reagent using 26 cycles and the PowerPlex® Y23 System. Amplified products were separated on an Applied Biosystems® 3130x/ Genetic Analyzer (3kV, 5-second injection).

Buccal Cells on Bode Buccal DNA Collector™ Device

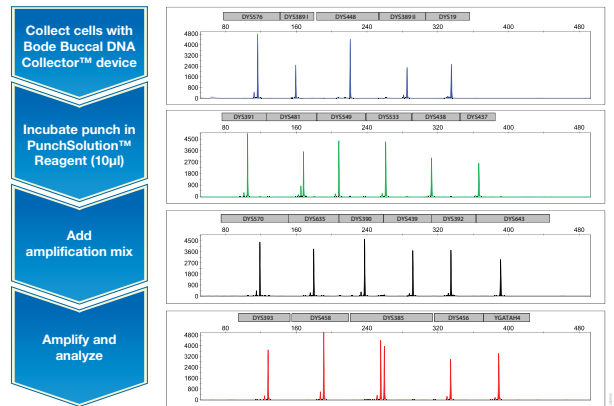


Figure 7. Amplification of one 1.2mm Bode Buccal DNA Collector™ punch preprocessed with the PunchSolution™ Reagent using 26 cycles and the PowerPlex® Y23 System. Amplified products were separated on an Applied Biosystems® 3130x/ Genetic Analyzer (3kV, 5-second injection).

PowerPlex® Y23 System

Each PowerPlex® Y23 System contains PowerPlex® Y23 5X Master Mix; PowerPlex® Y23 10X Primer Pair Mix; 2800M Control DNA, 10ng/μl; Water, Amplification Grade; PowerPlex® Y23 Allelic Ladder Mix and WEN Internal Lane Standard 500 Y23.

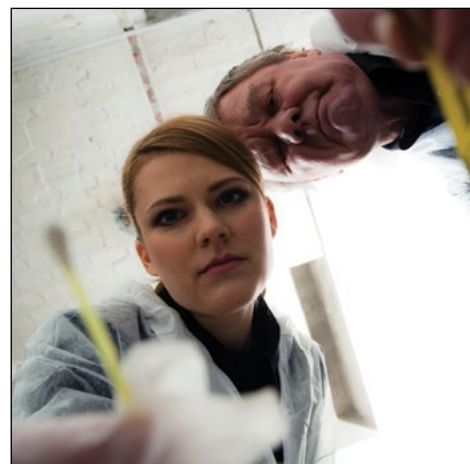
Ordering Information

Product	Size	Cat. #
PowerPlex® Y23 System	50 reactions	DC2305
	200 reactions	DC2320
WEN Internal Lane Standard 500 Y23	200μl	DG5201
PowerPlex® 5C Matrix Standard	5 preps	DG4850
2800M Control DNA, 10ng/μl	25μl	DD7101
PunchSolution™ Kit	100 preps	DC9271
SwabSolution™ Kit	100 preps	DC8271
















The PowerPlex® Y23 System is designed specifically for use with the ABI PRISM® 3100 and 3100-*Avant* Genetic Analyzers and Applied Biosystems® 3130, 3130*xl*, 3500 and 3500*xL* Genetic Analyzers.


For more information, visit:




www.promega.com/powerplexY23



The Power to Solve

			
Preprocessing & Differential Extraction	DNA Isolation	Human-Specific DNA Quantitation	STR Amplification
<p>» Differex™ System </p> <p>Easy separation of sperm and epithelial fractions</p> <p>» Slicprep™ 96 Device</p> <p>Disposable device for high-throughput sample processing directly from solid supports</p> <p>» Preprocessing Buffers</p> <p>Specialized buffers for bone, tissue and hair</p>	<p>» DNA IQ™ System </p> <p>Automatable purification of DNA free of PCR inhibitors</p> <p>» Maxwell® 16 Forensic Instrument</p> <p>A compact, plug-and-play instrument for automated DNA extraction</p> <p>» DNA IQ™ Casework Pro Kit for Maxwell® 16</p> <p>Optimal extraction of DNA from forensic casework samples</p> <p>» Casework Extraction Buffer</p> <p>A preprocessing reagent designed to help extract DNA from challenging forensic casework samples</p>	<p>» PowerQuant® System </p> <p>A 5-dye, 4-target hydrolysis probe-based quantitative PCR assay for assessing total human and male DNA concentrations, degradation levels and the presence of inhibitors</p> <p>» Plexor® HY System </p> <p>Quantitative PCR for both total human and Y-chromosomal DNA in a single reaction</p>	<p>» PowerPlex® Fusion 6C System </p> <p>A rapid 27-plex, including SE33, suitable for casework and databasing testing and designed to meet the new CODIS recommendations</p> <p>» PowerPlex® Fusion System </p> <p>A rapid 24-plex suitable for casework, paternity and database testing and designed to meet the new CODIS recommendations</p> <p>» PowerPlex® ESX and ESI Fast Systems </p> <p>Rapid human identification STR assays that meet ENFSI recommendations for use in casework, paternity and database testing</p> <p>» PowerPlex® 18D System </p> <p>A rapid 18-plex for database and paternity testing (includes CODIS loci), optimized for direct amplification</p> <p>» PowerPlex® 21 System </p> <p>A fast and flexible 21-plex for casework, paternity and database testing</p> <p>» PowerPlex® Y23 System </p> <p>Male-specific STR genotyping kit with 23 Y-STR loci; includes protocols for both casework and databasing</p> <p>» PowerPlex® CS7 System </p> <p>A supplementary multiplex for relationship testing</p> <p>» SwabSolution™ Kit, PunchSolution™ Kit and 5X AmpSolution™ Reagent</p> <p>Rapid processing solutions for analyzing database, paternity and reference samples</p>

 **Identity Automation™** Fully developed and tested high-throughput solutions with Promega installation, training and support

 Automation  Chemistry  Software

Products may be covered by pending or issued patents or may have certain limitations. Please visit our Web site for more information. Maxwell, Plexor, PowerPlex and PowerQuant are registered trademarks of Promega Corporation. AmpSolution Differex, DNA IQ, Identity Automation, PunchSolution, Slicprep and SwabSolution are trademarks of Promega Corporation.

ABI PRISM, Applied Biosystems, AmpF/STR and Y-Filter are registered trademarks of Applied Biosystems. Bode Buccal DNA Collector is a trademark of the Bode Technology Group, Inc. FTA is a registered trademark of Flinders Technologies, Pty, Ltd., and is licensed to Whatman.

Products may be covered by pending or issued patents or may have certain limitations. Please visit our Web site for more information.

