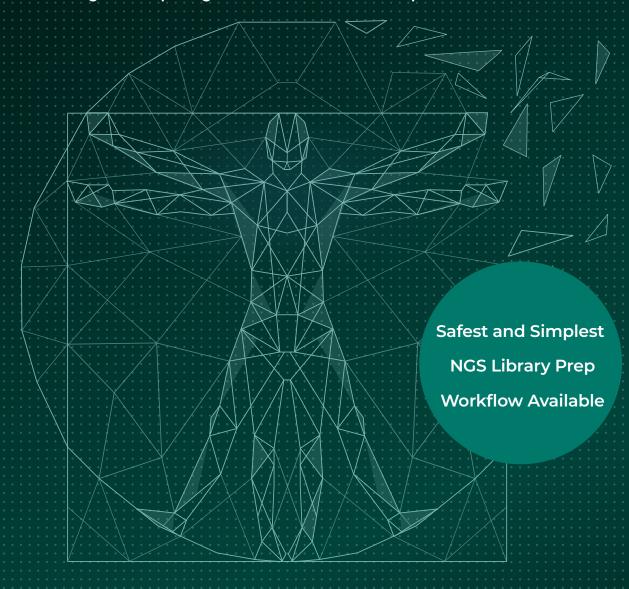
EasySeq™

Human Gene Sequencing Human WES WGS Sample Tracking Kit

NGS Library Prep by Reverse Complement PCR



 Helping laboratories safeguard sample identity, and associated Whole Exome and Whole Genome Sequencing data integrity and validity



Introduction

Complex sample preparation workflows and challenges handling multiple Next-generation Sequencing (NGS) samples make misidentification of samples at any stage of the analytical process a recognizable concern.

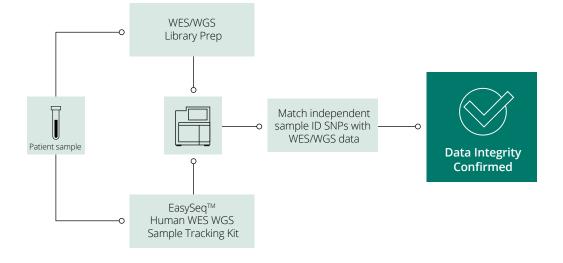
A method for independent confirmation of sample identity is therefore highly desirable, preferably using an identification method that is intrinsic to the WGS/WES data of the biological sample and simple to incorporate into the existing NGS workflow.

EasySeq[™] Human WES WGS Sample Tracking Kit, powered by patented Reverse Complement PCR (RC-PCR) technology,

facilitates an effective end-to-end identification and tracking of independent samples in a single targeted sequencing assay that is purpose-designed for fast and efficient lab processing.

EasySeq™ Human WES WGS Sample Tracking is complementary to both Whole Exome and Whole Genome Sequencing Sample workflows (Figure 1). Sample IDs are matched with WES/WGS data and, as a result, data integrity and validity can be confirmed.

Figure 1 | Integrated Sample Tracking and Data Confirmation Workflow



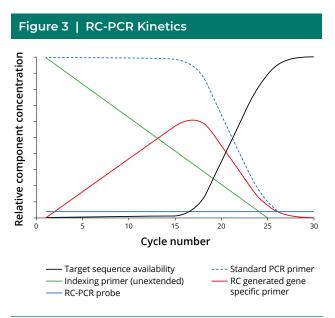


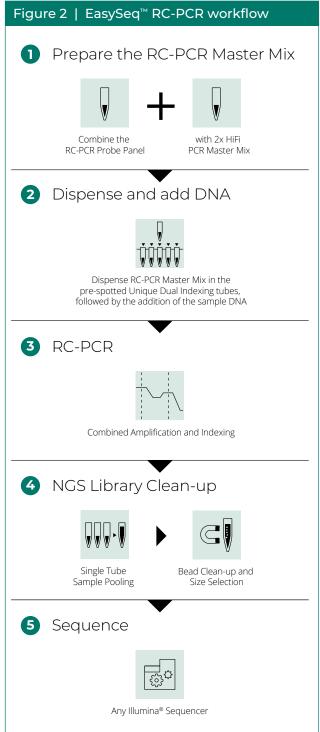
EasySeq™ NGS Library Prep by RC-PCR The Next Revolution in Human Genetics NGS

Our unique kits utilize RC-PCR technology to create a simple and safe one-tube, single reaction NGS library prep workflow. Multiplex target amplification, sequencing adaptor addition and sample-specific unique dual indexing all occur simultaneously in a closed-tube workflow, as simple as any normal PCR reaction. Multiplex reactions are then pooled and cleaned-up in a single tube using magnetic beads, thereby eliminating the need to clean-up reactions separately (Figure 2). Therefore, RC-PCR greatly reduces the amount of hands-on steps and the associated risks of pipetting errors, as well as sample swaps and cross-contamination.

RC-PCR kinetics results in high sensitivity and specificity because target-specific primers are synthesized during the reaction. Therefore, concentrations of primers and amplicons are more in line, which reduces potential primer dimerization and off-target primer binding (Figure 3).

Every EasySeq™ NGS Library Prep Kit consists of two parts: one assay-specific part, that includes the target specific Probe Panel and the RC-PCR Master Mix, and one universal part consisting of the index (IDX) plate(s) containing prespotted and dehydrated Unique Dual Index primers.





Cost-efficient workflow

- · Breakable index plates ensures optimal usage, minimizing waste
- One closed-tube, single reaction workflow with simultaneous indexing and target amplification reduces labor time
- Single tube sample pooling for library clean-up significantly reduces usage of magnetic beads and consumables
- · Well-balanced read distributions maximizes sequencing instrument flow cell capacity

Confidence in test results

- Closed-tube RC-PCR workflow significantly reduces hands-on time and pipetting error, minimizing risk of sample contamination
- Sample tracking dye in pre-spotted Unique Dual Indexing plates ensures accuracy
- Unique RC-PCR kinetics promote high-target specificity and coverage uniformity (optimized read-depth balance) from low DNA input)

Choice and flexibility

- 8 variants of 96-well breakable Unique Dual Indexing plates available for matching your sample workload, facilitating up to 768 samples
- Automation compatibility for low to high-throughput workflows
- Compatible with various Illumina® platforms



EasySeq™ Human WES WGS Sample Identification Kit

The Next Revolution in Human Genetics NGS

EasySeq[™]Human WES WGS Sample Tracking Kit comprises an optimized panel of 36 single nucleotide polymorphisms (SNPs), the genotypic profile of which can be utilized to extract intrinsic identifiers from the human exome and genome: 34 exonic SNPs with high minor allele frequency (MAF), and Amelogenin X and Y to determine gender (Table 1).

| # dbSNP Chr# Location HG38 Gene MAF 1000 genomes 1 rs1410592 1 179551371 NPHS2 , AXDND1 C 0.4123 2 rs2229546 1 67395837 ILI2RB2 C 0.4449 3 rs10203363 2 227032260 COL4A4 T 0.495 4 rs2819561 3 4362083 SUMF1 A 0.2955 5 rs4688963 4 5748177 EVC C 0.4714 6 rs309557 5 83538811 VCAN, VCAN-AS1 C 0.4687 7 rs4735258 8 93923709 PDP1 C 0.4952 8 rs4870723 8 120216440 COL14A1 A 0.4099 9 rs7465584 8 123975238 FERIL6 C 0.3962 10 rs1381532 9 97428498 TDRD7 A 0.4551 11 rs1536928 9 102629130 ORIB1 G 0.4101 12 rs1572983 9 101371346 BAAT C 0.4371 13 rs577993 9 76706955 PRUNE2 C 0.4363 14 rs10883099 10 98459557 HPSE2 G 0.4702 15 rs4617548 11 16111867 SOX6 A 0.4942 16 rs7300444 12 884764 WNK1 T 0.399 17 rs495680 13 33129519 STARD13 T 0.4844 18 rs9532292 13 38859469 FREM2 G 0.4367 20 rs4577050 15 34236747 SLC12A6 G 0.4279 21 rs1026128 17 73201609 COG1 G 0.4766 22 rs1037256 17 73201609 COG1 G 0.4766 23 rs1292053 17 59886176 TUBD1 G 0.4681 24 rs2159132 17 14102122 COX10 A 0.4918 25 rs1805034 18 62360008 TNFRSFIIA C 0.4698 26 rs380661 18 63987229 SERPINB A 0.4591 27 rs9962023 18 2383905 LAMA3 T 0.3756 28 rs10373 20 6119441 FERMTI A 0.4581 30 rs4148973 21 42903480 RTL4 G 0.4125 31 rs560482 22 38782696 DNAL4 G 0.4691 32 rs296241 20 5469680 CYP24A1 A 0.4581 33 rs5930933 X 136349199 ADGRC4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 | Table 1 EasySeq™ Human WES WGS Tracking Kit Exon | | | | | | | |
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| 24 rs2159132 17 14102122 COX10 A 0.4918 25 rs1805034 18 62360008 TNFRSFI1A C 0.4058 26 rs3826616 18 63987229 SERPINB8 A 0.4515 27 rs9962023 18 23833905 LAMA3 T 0.3756 28 rs10373 20 6119441 FERMTI A 0.4754 29 rs2296241 20 54169680 CYP24A1 A 0.4581 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4856 35 AMELX X 112454808 RTL4 T 0.4856 | 22 | rs1037256 | 17 | 73201609 | COG1 | G | 0.4746 | |
| 25 rs1805034 18 62360008 TNFRSFIIA C 0.4058 26 rs3826616 18 63987229 SERPINB8 A 0.4515 27 rs9962023 18 23833905 LAMA3 T 0.3756 28 rs10373 20 6119441 FERMTI A 0.4754 29 rs2296241 20 54169680 CYP24A1 A 0.4581 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 23 | rs1292053 | 17 | 59886176 | TUBDI | G | 0.4812 | |
| 26 rs3826616 18 63987229 SERPINB8 A 0.4515 27 rs9962023 18 23833905 LAMA3 T 0.3756 28 rs10373 20 6119441 FERMTI A 0.4754 29 rs2296241 20 54169680 CYP24A1 A 0.4581 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X 0.4856 | 24 | rs2159132 | 17 | 14102122 | COX10 | А | 0.4918 | |
| 27 rs9962023 18 23833905 LAMA3 T 0.3756 28 rs10373 20 6119441 FERMTI A 0.4754 29 rs2296241 20 54169680 CYP24A1 A 0.4581 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 25 | rs1805034 | 18 | 62360008 | TNFRSF11A | С | 0.4058 | |
| 28 rs10373 20 6119441 FERMTI A 0.4754 29 rs2296241 20 54169680 CYP24A1 A 0.4581 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 26 | rs3826616 | 18 | 63987229 | SERPINB8 | А | 0.4515 | |
| 29 rs2296241 20 54169680 CYP24A1 A 0.4581 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 27 | rs9962023 | 18 | 23833905 | LAMA3 | Т | 0.3756 | |
| 30 rs4148973 21 42903480 NDUFV3 T 0.4698 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 28 | rs10373 | 20 | 6119441 | FERMTI | А | 0.4754 | |
| 31 rs760482 22 38782696 DNAL4 G 0.4125 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 29 | rs2296241 | 20 | 54169680 | CYP24A1 | А | 0.4581 | |
| 32 rs2073787 X 110451457 RTL9 A 0.374 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 30 | rs4148973 | 21 | 42903480 | NDUFV3 | Т | 0.4698 | |
| 33 rs5930933 X 136349199 ADGRG4 T 0.4734 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 31 | rs760482 | 22 | 38782696 | DNAL4 | G | 0.4125 | |
| 34 rs6568050 X 112454808 RTL4 T 0.4856 35 AMELX X | 32 | rs2073787 | X | 110451457 | RTL9 | А | 0.374 | |
| 35 AMELX X | 33 | rs5930933 | X | 136349199 | ADGRG4 | Т | 0.4734 | |
| | 34 | rs6568050 | X | 112454808 | RTL4 | Т | 0.4856 | |
| 36 AMELY Y | 35 | AMELX | X | | | | | |
| | 36 | AMELY | Υ | | | | | |

Confidence in Data Integrity and Validity

EasySeq™ Human WES WGS Sample Tracking Kit offers laboratories the simplest and safest workflow for NGS sample tracking available in the market. RC-PCR in combination with the optimize panel provides a number of distinctive features and benefits that help safeguarding sample identity and data integrity:

- MAF SNPs selected in combination with RC-PCR kinetics provide high discrimination power
- Minimizing pipetting error and preventing sample swaps ensures that correct data interpretation and the right critical samples are matched
- Costly sample re-runs are prevented by capturing misidentified samples
- Complementary to both Whole Exome and Whole Genome Sequencing workflows
- Also validated with challenging cfDNA and FFPE DNA samples



Ordering Information

EasySeq[™] NGS Library Prep Kit for Human Sample Identification

| Part Number | Description |
|-------------|--|
| RC-HEST096 | EasySeq™ Human WES WGS Sample Tracking Kit |
| | 1 pool/sample, includes PCR Master Mix, 96 rxn |

Unique Dual Index Plates for use with Easy-Seq™ Human WES WGS Sample Tracking Kit

| Part Number | Description | | |
|-------------|---|--|--|
| IDX096-U01 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0001-0096 | | |
| IDX096-U02 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0097-0192 | | |
| IDX096-U03 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0193-0288 | | |
| IDX096-U04 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0289-0384 | | |
| IDX096-U05 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0385-0480 | | |
| IDX096-U06 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0481-0576 | | |
| IDX096-U07 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0577-0672 | | |
| IDX096-U08 | 96 Dehydrated, Colored Unique Dual Indexes Pre-spotted in 96-well plate - UDI #0673-0768 | | |

NımaGen.

Product and Company Information

NimaGen B.V.

Hogelandseweg 88 6545 AB Nijmegen The Netherlands

T +31 (0)24 820 0241 E info@nimagen.com www.nimagen.com

Product Name

EasySeq™ Human WES WGS Sample Tracking Kit

Product Use

For Research Use Only

Version 2.3 – June 2023

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