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www.celemics.com

CELEMICS

EXPERIENCE LOW-COST
MULTIPLE GENETIC TESTING

PRODUCT SERVICE CATALOG

Celemics Inc.

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ISO 9001 certified

CELEMICS

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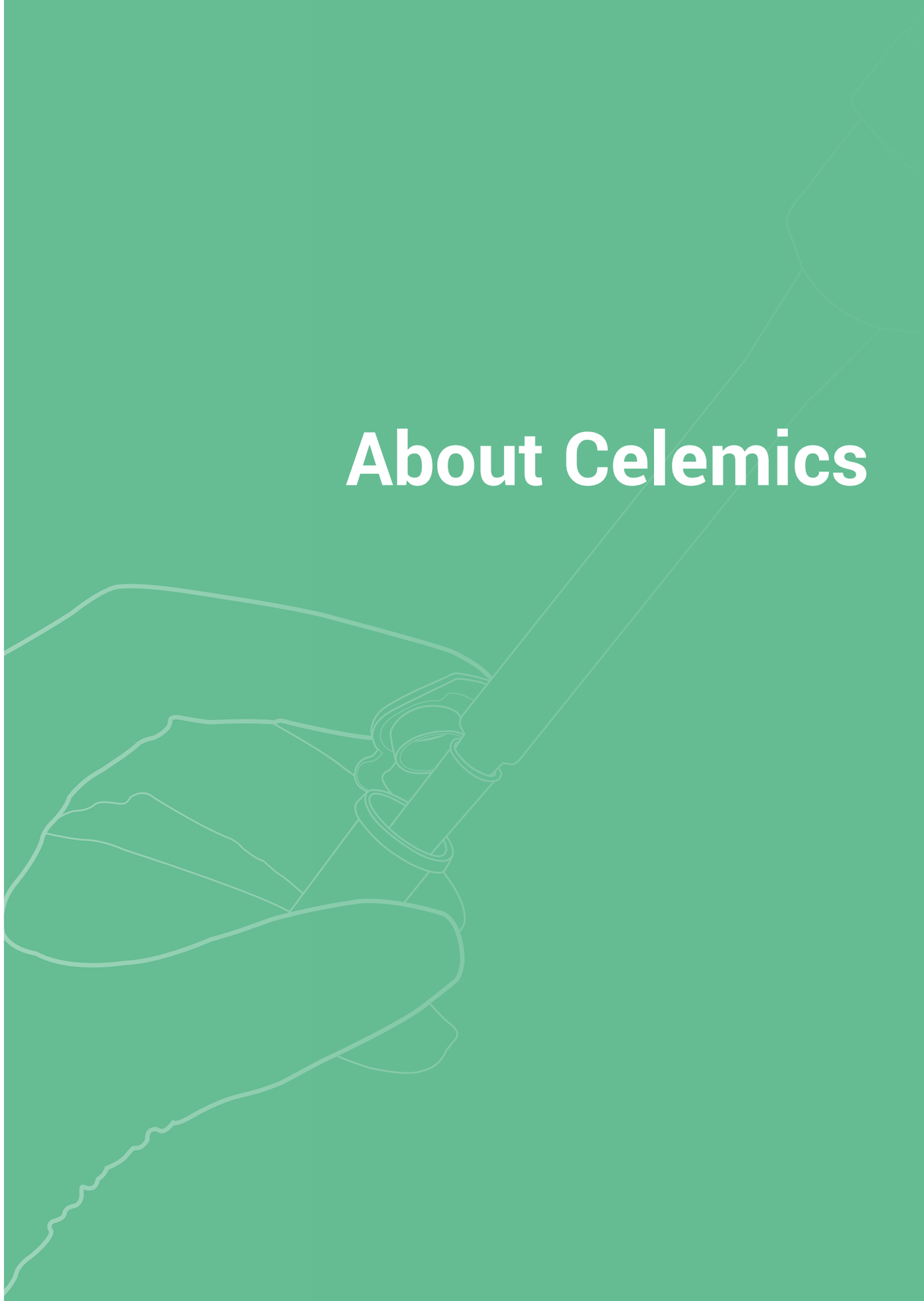
- Comprehensive bioinformatics platform

About Celemics



YOUR DNA IS A KEY TO YOUR BETTER LIFE

At Celemics, we developed our own target enrichment method to prepare DNA sample. Our target enrichment method is based on in-solution hybrid capture technology. Using the target enrichment method, target genomic regions specifically isolated from whole genome. And prepared DNA sample is applicable to Next Generation Sequencing platform.

Next Generation Sequencing is a new engine to understand your DNA

- Next Generation Sequencing (NGS) technology facilitates genetic testing more quickly, accurately and cost-effectively. By utilizing the NGS, multiple genes can be screened in a single run and sufficient genetic data are provided to gain a much deeper genetic insights.

Targeted sequencing, a technology accessible to everyone

Our Targeted Sequencing technology enables quickest and most accurate genetic test at affordable prices

At Celemics, we are working to build the future genetic testing to promote and improve accessibility to both patients and clinicians.

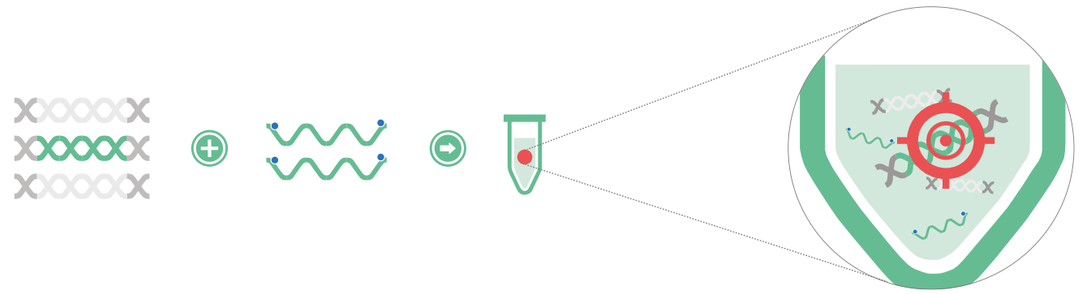
Our genetic tests are based on :

- **Targeted sequencing**
- **Whole exome sequencing**

• Our own target enrichment method

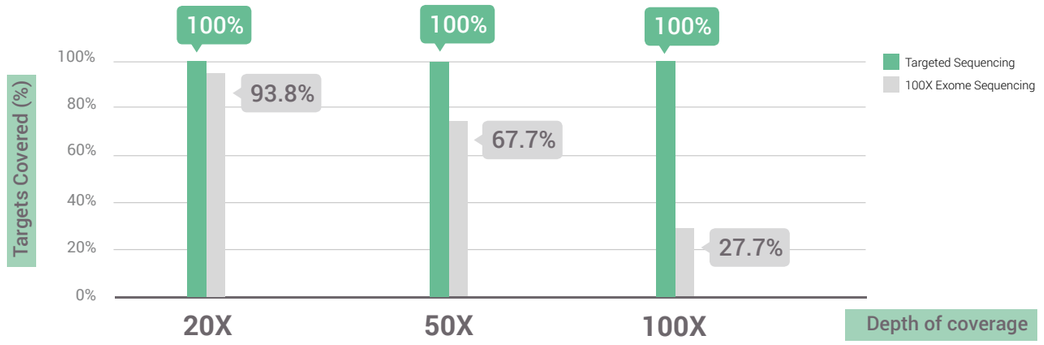
- Focus on your TARGET

At Celemics, we developed our own target enrichment method to prepare DNA sample. Our target enrichment method has been developed based on in-solution hybrid capture technology. Using the target enrichment method, target genomic regions specifically isolated from whole genome. And prepared DNA sample is applicable to Next Generation Sequencing platform.



• Clinical grade of capture performance

Performance of capturing and isolating target regions from whole genome is critical to validate the genetic testing results. And capture performance is determined by sequencing depth and coverage over target regions. Based on our target enrichment method, we verified the ability of capturing target regions yields **≥99.9% of average depth of coverage.**



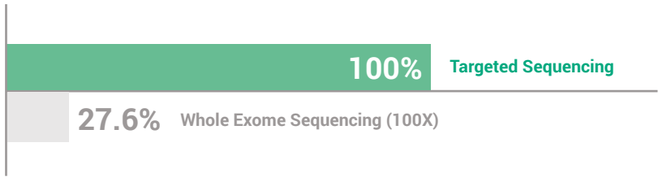
Source : Celemics, Performance of CeleScreen BRCA 1,2 Kit. Nov. 2014

CELEMICS CORE VALUES

Clinical Grade Performance

100.0% of coverage with proven test data.

DEPTH OF COVERAGE
100X



Fast Turnaround

After your purchase order and payment, we deliver our product in about 2 weeks for domestic purchase and 3 weeks for international purchase.

*International delivery period is fully dependent on a delivery destination of purchase.

Track&Trace, Process Automation

We systematically control the entire genetic test procedure and have established track & trace system to distinguish any case of procedure errors or sample contaminations.

Simple Low Cost

We offer comparatively reasonable and low costs that you cannot get from oversea brand.

Pre-performance Checkups

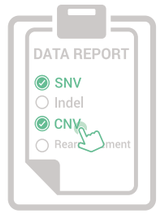
We run pre-performance checkups for all genetic test kits, even the customized test kit. From the pre-performance checkups, we ensure that each kit fulfills desired performance criteria prior to delivery. Because we believe that everyone deserves high quality of test results, no matter what test kit they use.

With Celemics, you are full of satisfaction on your test

- Celemics, an architect to design your test

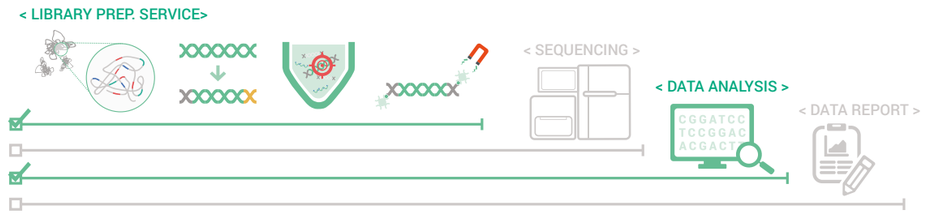
Our Panel Architect (PA) team helps you to design a new panel which surely detects your own interest target genes or regions. Upon your request, our expert PA will create your panel and optimize it to bring best performance in your test result. Once we generate a new panel, we conduct a pre-performance checkups to ensure that newly synthesized panel fulfills desired performance prior to mass production for a delivery.

- Celemics sharpens your test result



Our target enrichment method specifically isolates your interest genomic loci out of the whole genome. Also, our rebalancing technology increases the sensitivity of detecting various mutations by sustaining higher average coverage and sequencing uniformity.

- Celemics supports you upon your laboratory condition



Our service is flexible and supportive from genomic DNA extraction to sequencing data report. You can ask us any range of NGS service that you want according to you laboratory conditions and your need. Our sales team will help you to receive a quote on your request in one business day. Please contact our sales team via **sales@celemics.com**

YOUR DNA HAS THE ANSWER

Our Products

BRCA 1,2 Kit

BRCA 1 BRCA 2

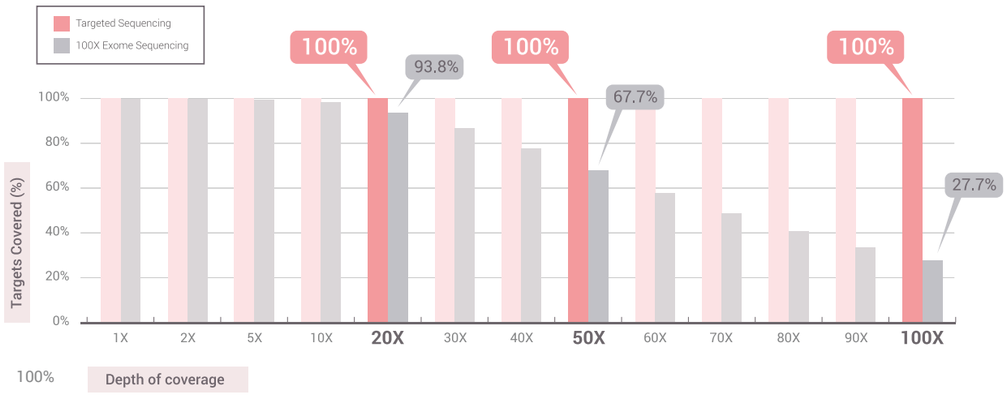
Celemics, on the basis of Next Generation Sequencing, provides BRCA Kit that can be used to identify people who carry a BRCA1or BRCA2 gene mutation. Our target enrichment method is capable of specifically isolating the whole CDS region of BRCA 1, 2 and thereby increasing the sensitivity of detecting genetic mutations.

PERFORMANCE

- Clinical Grade Performance of Target Enrichment

100.0% of coverage with proven test data. (Sequencing amount: 70Mb)

* Possible number of sample in a single Miseq run : approx. 96ea



Source : Celemics, Performance of BRCA 1,2 Kit. Nov. 2014

- Analysis of Single Nucleotide Variation (SNV)

Gene	Mutation Type	Amino Acid Change	Total Depth	REF Depth	ALT Depth	Variant Allele Frequency
BRCA 1	Non-SYN	p.S 1556 G	634	315	301	48.71%
BRCA 1	SYN	p.S 1389 S	876	501	370	42.48%
BRCA 2	Non-SYN	p.N 372 H	396	213	181	45.94%
BRCA 2	SYN	p.L 1521 L	289	0	281	99.29%

Source : Celemics, Performance of BRCA 1,2 Kit. Nov. 2014

GENERAL INFORMATION

Assay Genes	Whole CDS (+/- 40 bp) region of BRCA1 & BRCA2 (Target size: 17kb)
Detectable Mutation Type	SNV, Indel, CNV
Capture Range	Exon (Exon +/- 40 bp)

SAMPLE QUALITY RECOMMENDATION

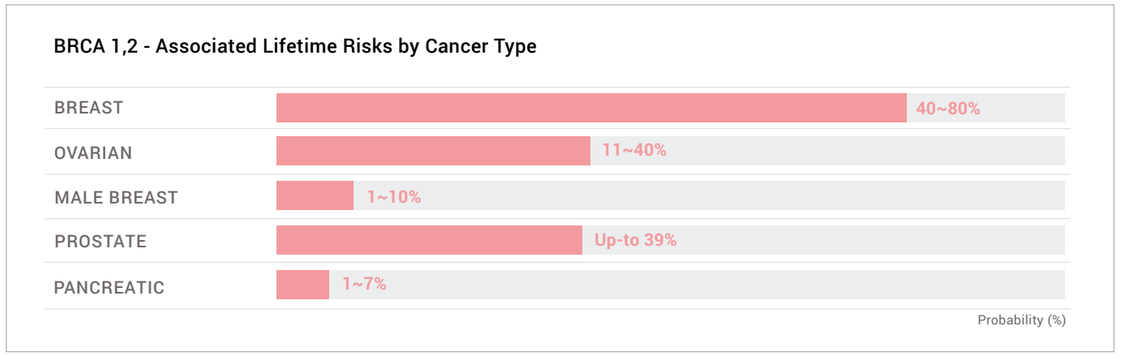
Sample Type	Amount	Concentration	Purity
Human genomic DNA extracted from blood, tissue, saliva	≥750ng	≥15ng/ul highly recommends the use of a fluorometric assay	A260/A280 = 1.8-2.0
Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	≥200ng	≥2.5ng/ul	A260/A280 = 1.8-2.0

*** Important Note**
- sequencing results may very according to the quality of samples applied to a test.

*** Additional Note**
- Genomic DNA should be eluted in pure sterile water or TE buffer.

REFERENCE

Around half of hereditary breast and ovarian cancers caused by the mutations in the BRCA1,2 genes.
The BRCA 1,2 genes function as a tumor suppressor, thereby they have an essential role in both DNA repair and cell cycle control systems. And the studies have shown the BRCA1,2 gene mutation carriers have potential risk to develop specific cancers.



1. Castera, L., et al., Next-generation sequencing for the diagnosis of hereditary breast and ovarian cancer using genomic capture targeting multiple candidate genes. Eur J Hum Genet, 2014. 22(11): p. 1305-13
2. Walsh, T., et al., Detection of inherited mutations for breast and ovarian cancer using genomic capture and massively parallel sequencing. Proc Natl Acad Sci U S A, 2010. 107(28): p. 12629-33
3. NCBI Gene Reviews. BRCA1 and BRCA2 Hereditary Breast and Ovarian Cancer

OncoRisk Kit

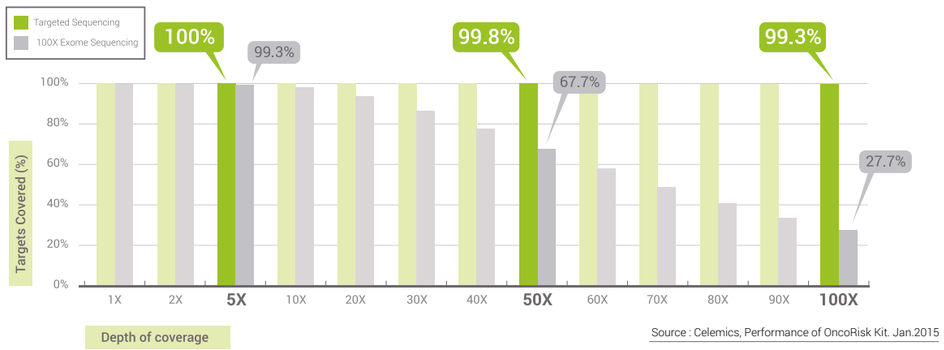
31+ GENES

A target enrichment kit designed to analyze 31 genes that are associated with Breast, Ovarian, Colorectal, Endometrial, Melanoma, Pancreatic, Gastric, Prostate and Lung cancers. Utilizing Next Generation Sequencing, our target enrichment method allows to specifically isolate whole CDS region of oncogenes and thereby increases the sensitivity of detecting genetic mutations

PERFORMANCE

- Clinical Grade Performance of Target Enrichment

100.0% of coverage with proven test data. (Sequencing amount: 200Mb)
* Possible number of sample in a single Miseq run : approx. 32ea



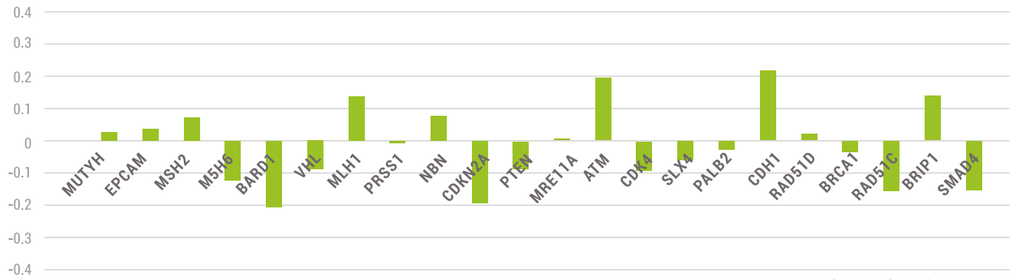
Source : Celemics, Performance of OncoRisk Kit. Jan.2015

- Analysis of Single Nucleotide Variation (SNV)

Gene	Mutation Type	Amino Acid Change	Total Depth	REF Depth	ALT Depth	Variant Allele Frequency
APC	SYN	p.S 1738 S	1008	590	415	41.17%
ATM	Non-SYN	p.D 1853 N	417	200	217	52.04%
BARD1	Non-SYN	p.R 658 C	829	435	394	47.53%
BMPR1A	Non-SYN	p.P 2 T	621	309	311	50.08%
BRCA1	SYN	p.S 1389 S	802	460	342	42.64%
BRCA2	SYN	p.V 2171 V	1026	0	1026	100%
BRIP1	SYN	p.Y 1137 Y	844	3	840	99.53%
CDH1	SYN	p.A 692 A	732	398	334	45.63%
EPCAM	Non-SYN	p.M 115 T	889	441	448	50.39%
MSH6	SYN	p.T 1102 T	292	143	149	51.03%
MUTYH	Non-SYN	p.Q 324 H	331	167	164	49.55%
NBN	SYN	p.P 672 P	604	299	305	50.50%
PMS2	Non-SYN	p.K 541 E	646	0	646	100%
PRSS1	SYN	p.N 246 N	921	0	921	100%
RAD51D	Non-SYN	p.R 53 Q	971	0	971	100%
SLX4	SYN	p.N 1500 N	993	493	500	50.35%
TP53	Non-SYN	p.P 33 R	850	438	410	48.24%

Source : Celemics, Performance of OncoRisk Kit. Jan.2015

- Analysis of Copy Number Variation (CNV)



Source : Celemics, Performance of OncoRisk Kit. Jan.2015

GENERAL INFORMATION

Assay Genes	APC, ATM, BARD1, BLM, BMPR1A, BRCA1, BRCA2, BRIP1, CDH1, CDK4, CDKN2A, CHEK2, EPCAM, MLH1, MRE11A, MSH2, MSH6, MUTYH, NBN, PALB2, PMS2, PRSS1, PTEN, RAD50, RAD51C, RAD51D, SLX4, SMAD4, STK11, TP53, VHL
Detectable Mutation Type	SNV, Indel, CNV
Capture Range	Whole CDS (+/- 40 bp) region (Target size: 97kb)

SAMPLE QUALITY RECOMMENDATION

Sample Type	Amount	Concentration	Purity
Human genomic DNA extracted from blood, tissue, saliva	≥750ng	≥15ng/ul highly recommends the use of a fluorometric assay	A260/A280 = 1.8-2.0
Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	≥200ng	≥2.5ng/ul	A260/A280 = 1.8-2.0

*** Important Note**
- sequencing results may very according to the quality of samples applied to a test.

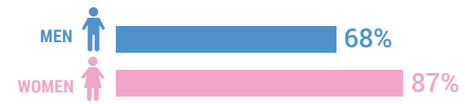
*** Additional Note**
- Genomic DNA should be eluted in pure sterile water or TE buffer.

REFERENCE

Studies have shown the specific genes carrying mutation have potential risk to develop certain types of cancers.

CDHI / Hereditary diffuse **GASTRIC CANCER**

Lifetime risk of developing cancer BY AGE 80



TP53 / Li-Fraumeni syndrome

lifetime risk of developing cancer BY AGE 30 **21~49%**

LIFETIME RISK lifetime risk of developing cancer **68~93%**

1. Pharoah, P.D., et al., Incidence of gastric cancer and breast cancer in CDH1 (E-cadherin) mutation carriers from hereditary diffuse gastric cancer families. Gastroenterology, 2001. 121(6): p. 1348-53.

2. Hwang, S.J., et al., Germline p53 mutations in a cohort with childhood sarcoma: sex differences in cancer risk. Am J Hum Genet, 2003. 72(4): p. 975-83.

CancerScreen Kit

SNV · Indel · CNV · FUSION

Utilzing Next Generation Sequencing our target enrichment method is capable of specifically isolating your interest genomic regions out of the whole exome and increases the sensitivity of detecting genetic mutations by producing higher coverage & depth sequencing data.

A single test, it covers multiple mutation types

A single kit of CancerScreen enables you to analyze multiple variants such as SNV, Indel, CNV, Rearrangement.

GENERAL INFORMATION

Assay Genes	**Rearrangement**: ALK, RET, ROS1 **Amplification:** ERBB2, MET **SNV, Indel:** APC, BRAF, EGFR, ERBB2, KRAS, MET, NRAS, PIK3CA, SMAD4, TP53
Detectable Mutation Type	SNV, Indel, CNV, Rearrangement
Capture Range	**Whole CDS region, Targeted fusion regions, Accurate CNV** (62Kb)

SAMPLE QUALITY RECOMMENDATION

Sample Type	Amount	Concentration	Purity
Human genomic DNA extracted from blood, tissue, saliva	≥750ng	≥15ng/ul highly recommends the use of a fluorometric assay	A260/A280 = 1.8-2.0
Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	≥200ng	≥2.5ng/ul	A260/A280 = 1.8-2.0

*** Important Note**
- sequencing results may very according to the quality of samples applied to a test.

*** Additional Note**
- Genomic DNA should be eluted in pure sterile water or TE buffer.

Customized
Target Enrichment Kit

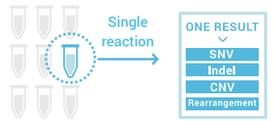
Custom

Take the liberty to design your own test!

Celemics has Panel Architect team who supports you to design your own test, which can be optimized upon your purpose for a test. Our target enrichment method is capable of specifically isolating your interest genomic loci out of the whole genome and increases the sensitivity of detecting genetic mutations by producing higher coverage & in-depth sequencing data.

Just list up your genes and design your test

A Custom kit can be designed to cover a target size upto 1.5Mb. (Ask us, if your target is over 1.5Mb)



Sharpen up your sequencing result

Celemics rebalancing technology enables your kit to be elaborated to your purpose for detecting SNV, Indel, CNV, Rearrangement

Make sure performance before shipment

Interim performance report of your own kit can be provided in 3 weeks after your purchase order.

Scale up your business with your own custom kit

Celemics scalable system is capable of mass production of custom kit that you designed .

GENERAL INFORMATION

Assay genes	~ 1.5Mb (Ask us, if your target is over 1.5Mb)
Target region choice	CDS, CDS+UTR, UTR, Intron
Detectable Mutation Type	SNV, Indel, CNV, Rearrangement

Order Procedure

SAMPLE QUALITY RECOMMENDATION

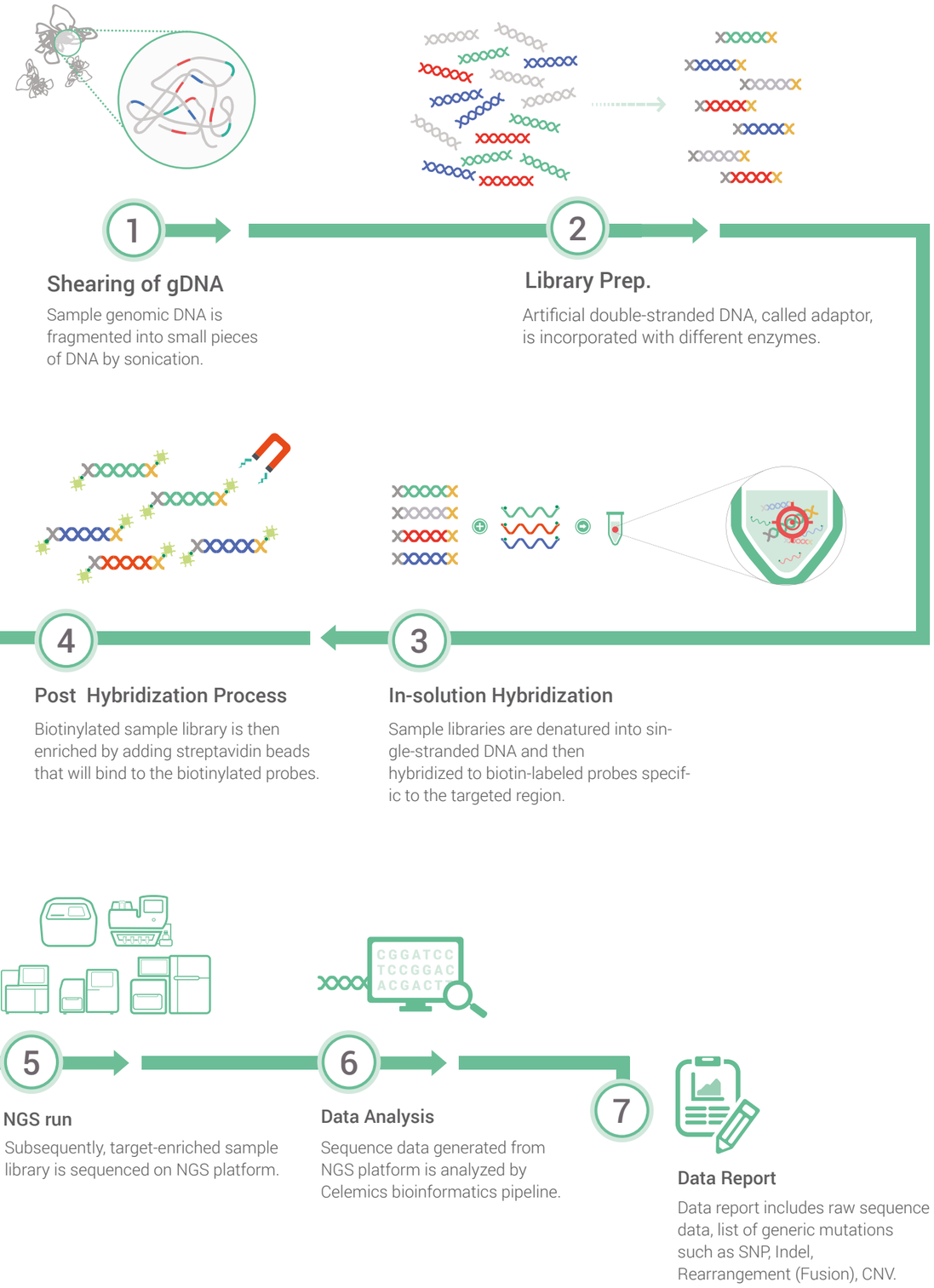
Sample Type	Amount	Concentration	Purity
Human genomic DNA extracted from blood, tissue, saliva	≥750ng	≥15ng/ul highly recommends the use of a fluorometric assay	A260/A280 = 1.8-2.0
Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	≥200ng	≥2.5ng/ul	A260/A280 = 1.8-2.0

*** Important Note**
- sequencing results may very according to the quality of samples applied to a test.

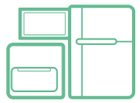
*** Additional Note**
- Genomic DNA should be eluted in pure sterile water or TE buffer.

Our Services Guide

ASSAY PROCEDURE



APPLICATION NGS PLATFORM

Illumina			Ion-Torrent	
				
Hiseq2500	NextSeq	Miseq	PGM	Proton

PRODUCT COMPOSITION

Sample Library Preparation	End repair enzyme mix / A-tailing enzyme mix / Ligation enzyme mix
Hybridization	• Target specific hybridization probe • Hybridization Buffers and Blocking mix
Index Kit	• 16rxn package includes 16 index (Single index type) • 24rxn package includes 24 index (Single index type) • 48rxn package includes 48 index (Dual index type) • 96rxn package includes 96 index (Dual index type)
Post Hybridization Wash	• Buffers for post hybridization wash

SAMPLE QUALITY RECOMMENDATION

Celemics, Inc strongly recommends the submission of samples according to the following guidelines.
Please inquire if the minimum requirements cannot be met so we can propose an alternate optimized solution on a case by case basis.

Sample Type	Amount	Concentration	Purity
Human genomic DNA extracted from blood, tissue, saliva	≥750ng	≥15ng/ul highly recommends the use of a fluorometric assay	A260/A280 = 1.8-2.0
Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	≥200ng	≥2.5ng/ul	A260/A280 = 1.8-2.0

*** Important Note**
- For strongly degraded templates, such as FFPE samples, Celemics recommends to submit highest possible amount.
- And sequencing result may vary according to the quality of samples applied to a test.

*** Additional Note**
- Genomic DNA should be eluted in pure sterile water or TE buffer.

TEST RECOMMENDATION

Read Length	75 ~ 150 bp (recommended, but depending on sequencer type)
Supplement	• Plastic wares • Magnetic beads for DNA purification (Example: Ampure XP magnetic bead) • Streptavidin coated magnetic bead (Example: Dynabead T1) • Polymerase for amplification (Example: Kapa Library Amplification kit, Herculase II, Phusion Polymerase)
Equipment	• DNA shearing device (Example: Covaris) • DNA quantification device (Example: Bioanalyzer, LabChip GX, Tapestation, Qubit) • Thermocycler (PCR machine) • Magnetic Rack • Speed vaccum system

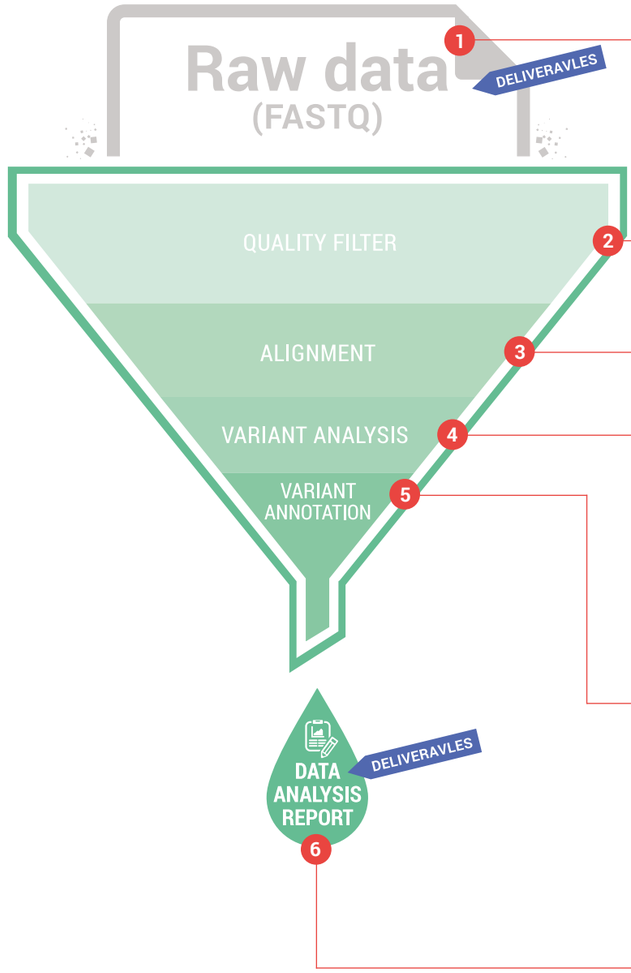
* Research use only
** Kit performance may vary upon a quality of sample's gDNA.
*** Any of items in the Test Recommendation section is not provided by Celemics.

SAMPLE DELIVERY METHOD

DHL or Fedex	highly recommend to use trackable shipping carrier

COMPREHENSIVE BIOINFORMATICS PLATFORM

This process derives statistically accurate analysis of genetic mutation from you sequencing raw data.



Row data (FASTQ)

Pure sequence data from NGS Platform.

Quality Filter

Low quality data which can degrade a final result are filtered.

Alignment

BWA is applied to read alignments.

Variant Call

Variant calls from aligned reads.

Variant Annotation

Our BI solution built from public data base automatically brings variant annotations through its algorithm. The BI solution continues to be updated with public data base which is widely accepted in Bioinformatics field.

Data Analysis Report

Data report includes raw sequence data, list of generic mutations such as SNV, Indel, CNV, Rearrangement (Fusion).

Report Formet

FASTQ, Variant call & annotation

DELIVERY

Offline delivery	HDD (Extra fee can be charged for HDD)
Online delivery	FTP server

* Free storage period : 3 month

PRE-SET ORDER GUIDE (3~4 Week)

1 Order Request

2 Order Confirmation (in one business day)

3 Payment

4 Kit Production

5 Kit Shipment

Celemics, Inc. also provides comprehensive analysis service by utilizing BRCA, OncoRisk, and CancerScreen Kit at low price.
Please contact us and experience our powerful and affordable analysis service!

ORDER CHART

	Product	BRCA 1,2	OncoRisk
General Information	Catalog No.	P001 A/B/C/D	P002 A/B/C/D
	Packge type	16 / 24 / 48 / 96 (rxn)	16 / 24 / 48 / 96 (rxn)
	Assay genes	BRCA1, BRCA2	APC, ATM, BARD1, BLM, BMPR1A, BRCA1, BRCA2, BRIP1, CDH1, CDK4, CDKN2A, CHEK2, EPCAM, MLH1, MRE11A, MSH2, MSH6, MUTYH, NBN, PALB2, PMS2, PRSS1, PTEN, RAD50, RAD51C, RAD51D, SLX4, SMAD4, STK11, TP53, VHL
	Detectable mutation Type	SNV, Indel, CNV	SNV, Indel, CNV
	Target region	Exon (Exon +/- 40 bp)	Whole CDS (+/- 40 bp) region (Target size: 97kb)
	Platform	Illumina : Hiseq / NextSeq / MiSeq Ion-Torrent : PGM, Proton	Illumina : Hiseq / NextSeq / MiSeq Ion-Torrent : PGM, Proton
Sample Recommandation	Type	**A.** Human genomic DNA extracted from blood, tissue, saliva	
		B. Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	
	Amount	**A.** ≥750ng	
		B. ≥200ng	
	Concentration	**A.** ≥15ng/ul (highly recommends the use of a fluorometric assay)	
		B. ≥2.5ng/ul	
	Purity	**A.** A260/A280 = 1.8-2.0	
		B. A260/A280 = 1.8-2.0	
	Read length	75~150 bp	
	Important Note	For strongly degraded templates such as FFPE samples, Celemics recommends to submit samples as much of the amount you have as possible	
	Additional Note	Genomic DNA should be eluted in pure sterile water, or TE buffer	
Delivery	Sample delivery method	DHL or Fedex : highly recommend to use trackable shipping carrier	
	Delivery period	Domestic purchase : 2~3 Weeks International purchase : 3~4 Weeks	

CUSTOM KIT ORDER GUIDE

1 Order Requst with gene list

2 Order Confirmation (in 1 business day)

3 Payment

4 Design panel

5 Panel QC

6 Kit Production

7 Kit Shipment

* Research use only .
* Kit performance may vary upon a quality of sample's gDNA .
* Any of items in the Test Recommendation section is not provided by Celemics.

	Product	CancerScreen	Customized Target Enrichment
General Information	Catalog No.	P004 A/B/C/D	P000 A/C/D
	Packge type	16 / 24 / 48 / 96 (rxn)	16 / 48 / 96 (rxn)
	Assay genes	**Rearrangement:** ALK, RET, ROS1 **Amplification:** ERBB2, MET **SNV, Indel:** APC, BRAF, EGFR, ERBB2, KRAS, MET, NRAS, PIK3CA, SMAD4, TP53	~ 1.5Mb (Ask us, if your target is over 1.5Mb)
	Detectable mutation Type	SNV, Indel, CNV	SNV, Indel, CNV, Rearrangement
	Target region	Whole CDS region, Targeted fusion regions, Accurate CNV (62Kb)	Target region choice : CDS, CDS+UTR, UTR, Intron
	Platform	Illumina : Hiseq / NextSeq / MiSeq Ion-Torrent : PGM, Proton	Illumina : Hiseq / NextSeq / MiSeq Ion-Torrent : PGM, Proton
Sample Recommandation	Type	**A.** Human genomic DNA extracted from blood, tissue, saliva	
		B. Human genomic DNA extracted from FFPE; Formalin-Fixed Paraffin-Embedded	
	Amount	**A.** ≥750ng	
		B. ≥200ng	
	Concentration	**A.** ≥15ng/ul (highly recommends the use of a fluorometric assay)	
		B. ≥2.5ng/ul	
	Purity	**A.** A260/A280 = 1.8-2.0	
		B. A260/A280 = 1.8-2.0	
	Read length	75~150 bp	
	Important Note	For strongly degraded templates such as FFPE samples, Celemics recommends to submit samples as much of the amount you have as possible	
	Additional Note	Genomic DNA should be eluted in pure sterile water, or TE buffer	
Delivery	Sample delivery method	DHL or Fedex : highly recommend to use trackable shipping carrier	
	Delivery period	Domestic purchase : 2~3 Weeks International purchase : 3~4 Weeks	Domestic purchase : 4~6 Weeks International purchase : 5~7 Weeks