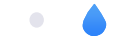




Lab. on a Smartphone



We offer a
solution to
manage
your health
care with a
drop of body
fluid



Global leader in mobile healthcare through technical innovation



1drop™

Solution for chronic disease management by using smart phone



1copy™

High sensitivity of qPCR with commercial PCR Machines

Company overview



Company Profile

Establishment
17.09.25

CEO
Joowon Rhee

No.of
employees
26

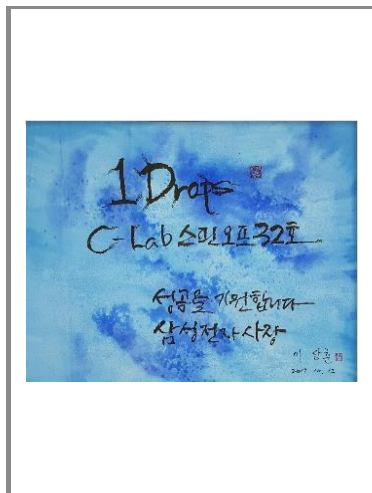
Product	Disposable Biosensor, Smartphone back-cover, App., Chronic disease management solution
Homepage	www.1drop.co.kr
Address	Keumkang Penterium IT Tower, 215, Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, 13217, Korea



Company history

2017.07	Spin-off company from Samsung electronics	2018.09	Movement of headquarters (Keumkang penterium IT Tower, Seongnam)	2019.03	Certification of medical-equipment manufacturer (By Korea ministry of food and drug safety, No.6385)
2017.09	Corporate founded	2018.12	Certification of manufacturing factory (By Korean government No. 411332018422852)	2019.04	Certification of ISO13485:2016 (By TÜV SÜD)
				2019.07	Certification of KGMP (By Korea ministry of food and drug safety)

Certification



32th Spin-off company from Samsung electronics



Certification of R&D center



Certification of Medical-equipment manufacturer



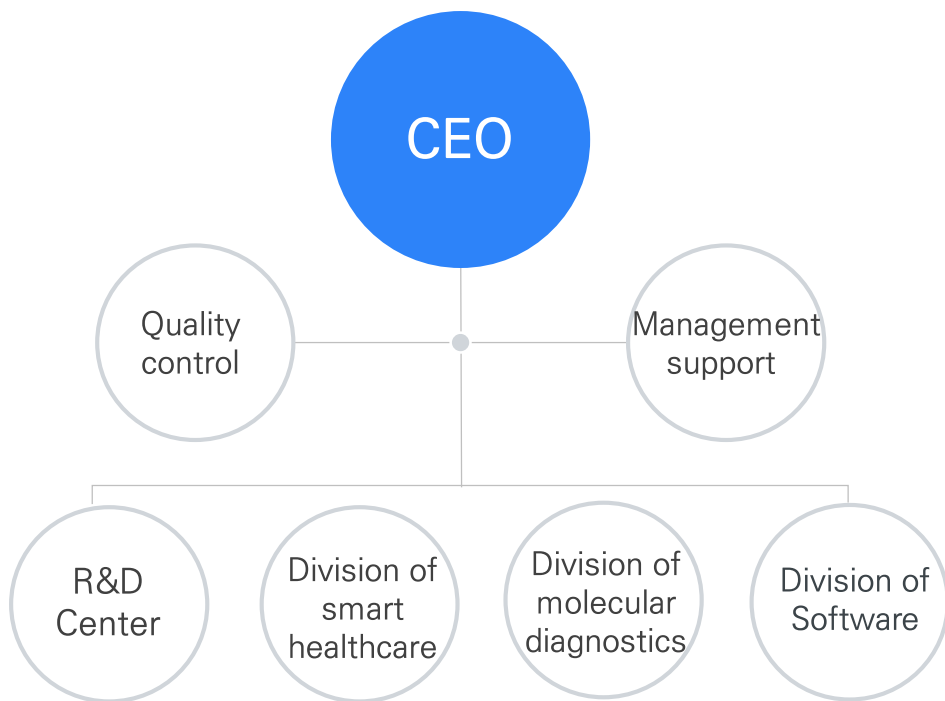
ISO13485:2016



KGMP

Country	KOREA	EU	USA	CHINA	JAPAN	BRAZIL
	MFDS	CE	FDA (~2022)	MMPA (~2023)	PMDA (~2024)	ANVISA (~2024)
Total	5	5	3	5	3	3
1drop™	4 (UA, TC, Glucose, Hemo)	4 (UA, TC, Glucose, Hemo)	3 (TC, Glucose, Hemo)	4 (UA, TC, Glucose, Hemo)	3 (TC, Glucose, Hemo)	2 (Glucose, Hemo)
1copy™	1 (BCR-ABL)	2 (BCR-ABL, COVID-19)	0	1 (BCR-ABL)	0	1 (BCR-ABL)

Organization/People



Minho Song Auditor

- KAIST, Industrial Engineering, B.S
- Director @ SBK partners

Science advisory board

- Prof. Jongwon Kim, M.D., Ph.D. Dep. Of Diagnostics, Samsung Medical Center
- Prof. Hyencheol Yoon, Ph.D. Dep. Of Biotechnology, Ajou University
- Prof. Hyunjin Yoon, Ph.D, Dep. Of Biotechnology, Ajou University



Joowon Rhee CEO

- Seoul National Uni., Biological engineering, M.S
- Former Principal Scientist @Samsung Advanced Institute of Technology, ~2017



Kwanghyun Ryu Director

- KAIST, Computer science, B.S
- ~19' Nexon, Engineer



Kobong Choi CTO

- POSTECH, Biology, Ph.D
- Former Principal Scientist @Samsung Bioepis, ~2017



Jeongho Park Senior researcher

- Sungkynunkwan Uni., Biology, Ph.D
- Senior researcher @Joongkyeom, ~2018



Jeongin Baeg COO

- KAIST, Industrial Design, B.S
- Former Co-founder, Director @ Philosys, ~2017



Wonjung Kim Senior researcher

- Kyungpook Uni., Genetic engineering, Ph.D
- Academic marketing @wealthbio, ~2016
- Senior researcher @ philomedix, ~2019



1drop™

Smart Health



Business area 1 : 1drop™

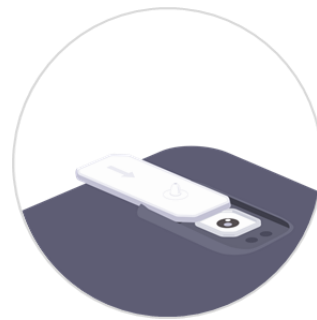


Based on camera/flash of commercial smartphones and disposable biosensor,
we provide a mobile healthcare solution for disease management

Smartphone,
Back-cover

Biosensor

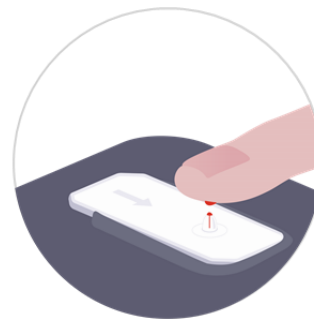
App.



STEP1

INSERT

Insert a biosensor
to a smartphone



STEP2

DROP

Apply a drop of blood
into a biosensor



STEP3

RESULT

Check results via
smartphone App.



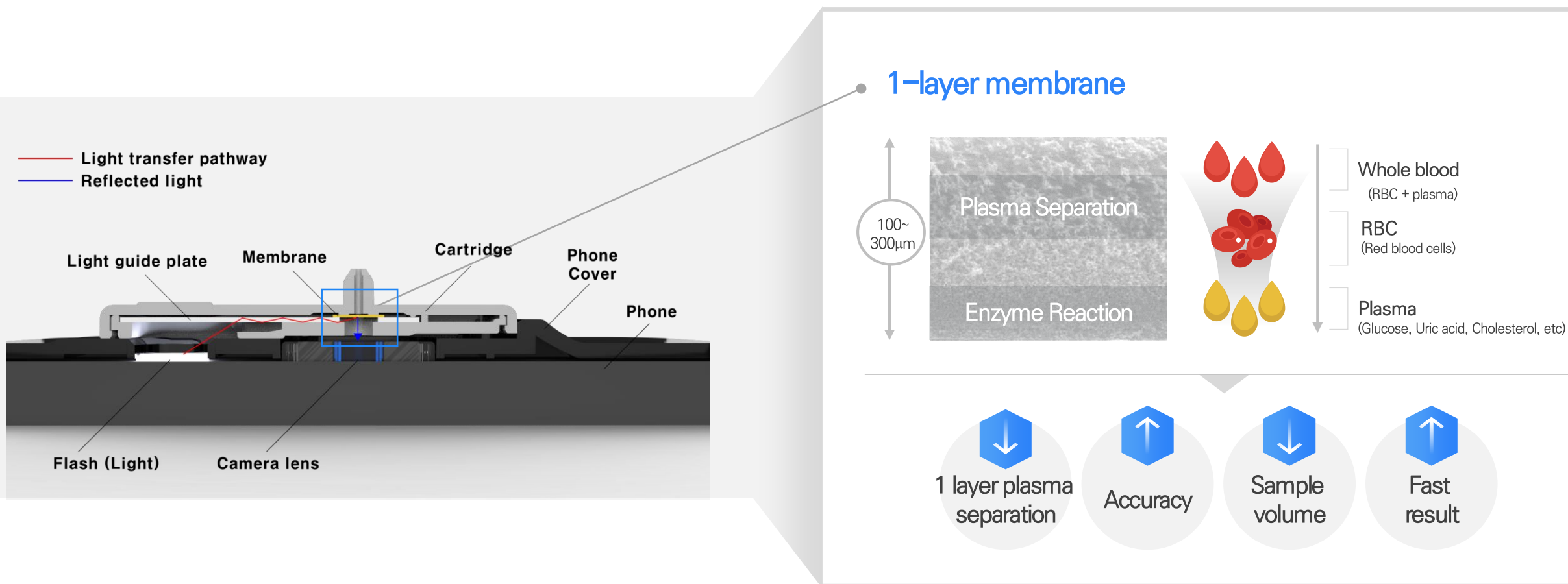
STEP4

SOLUTION

Communicate with
Healthcare professionals

Technology 1 1-Layer membrane_ simple structure biosensor



Technology 2 Light guide plate_ technology using total reflecting of commercial smartphone flash























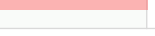


Platform technology which can easily expand test items up to 23 kinds.

Anemia/Gout/Cardiovascular/Diabetes are on sale

Liver inflammation, Hyperlipidemia, Jaundice related items are in development

 Now available
 R&D Complete

	2019	2020	2021	2022		2019	2020	2021	2022
Hemo					ALT				
UA					AST				
TC					ALB				
Glucose					TBIL				
TRIG					DBIL				
HDL					Na				
LDL					K				
CREA					Cl				
BUN					Anti-oxidant				
AMY					Reactive oxygen				
GGT					ALP				
TP									

Improved performance through innovative sensor technology



High accuracy

1drop™ shows high accuracy using 1-layer membrane, which can separate only plasma components in whole blood.



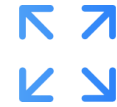
Small sample volume

Without a separate sampler, It can be measured only with 1drop of blood (4uL).



Multiple items with a single device

By a single smartphone, it is able to test multiple items



High expandability

Test items will be added continuously

Use a commercial smartphone



Lower device costs

No need to purchase separate devices, users can use a commercial smartphone with a smartphone cover.



Telemedicine service

Applied directly to telemedicine services by using the features of smartphones.



Smartphones coverage

High coverage of smartphone models.



Simple update

Through an update, adding test items or new features is available.



Easy interface

Easy and convenient user interface.



Tracking sales status

Identify the usage status collected by a Smartphone. For distributors, tracking the sales status through smartphone gives an increase in the margin rate.

1drop™ Feature of app. (For Hospital)

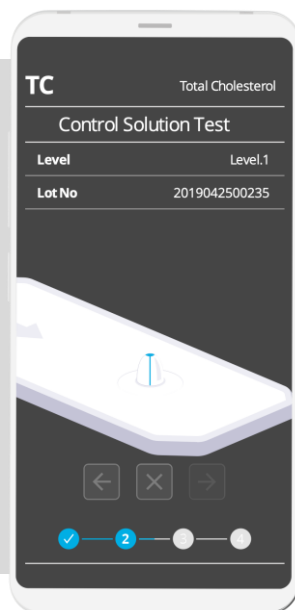


ID system (nurses & patients)



ID system using
QR code

Quality control



Easy quality control
system

EMR/EHR connection













Easy to connect to
server



1drop™ Smartphone coverage

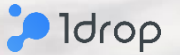
Strategy

Support smartphones with a high market share among global smartphone sales such as Samsung, Apple, Xiaomi and Huawei, etc.

iPhone 8	iPhone 11	Galaxy S7	Galaxy J3	Galaxy On7 prime
				
TCL Lx	Xiaomi Series	Vivo Series	Huawei Series	LG Series
				

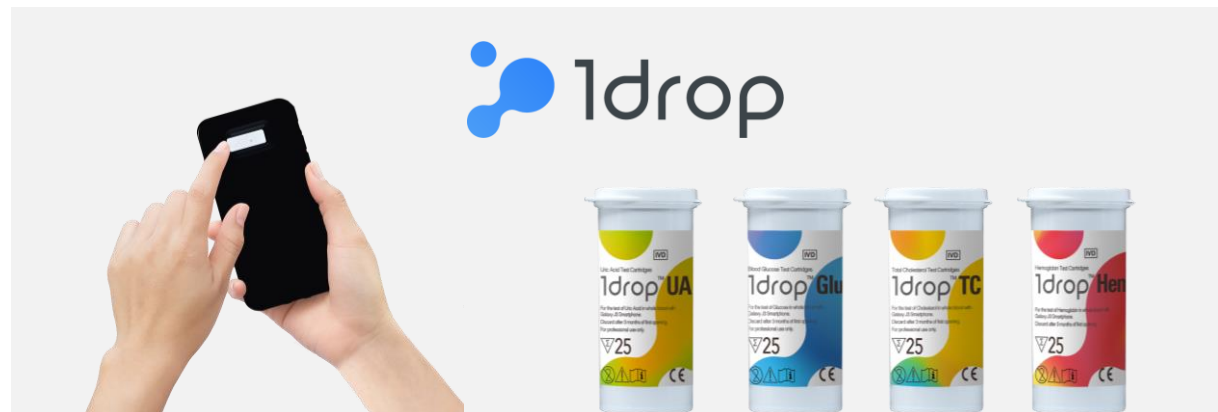
Others

Other smartphones → Customizable (More than MOQ 3,500)



Lab. On a Smart-Phone

1drop™ User scenario



Hospital/Clinical Lab

Diagnosis/Prescription
Consultation/Monitoring



Self-testing

Monitoring



Remote Patient Monitoring

Diagnosis/Prescription
Consultation/Monitoring

1drop™ Biosensor information



	1drop™ Hemo	1drop™ UA	1drop™ TC	1drop™ Glucose
Test Item	Hemoglobin	Uric Acid	Total Cholesterol	Glucose
Cat No.	H18190	U18190	C18190	G18190
Method	Colorimetric			
Range	5–25 g/dL	3–20 mg/dL	100–400 mg/dL	50–500 mg/dL
Time	15 sec	15 sec	60 sec	15 sec
Sample type	Capillary whole blood			
Sample volume	4 μl			
Accuracy	96.3%	95.0%	96.8%	97.0%
Certification	MFDS, CE			
Storage Temp.	1~30℃			
Shelf life	12 months			

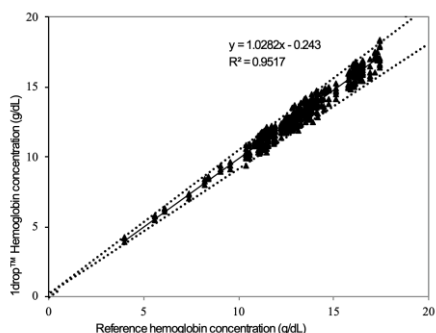
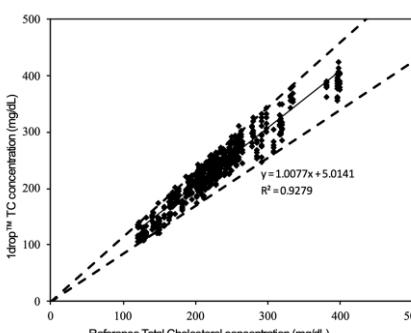
1drop™ Biosensor_performance evaluation

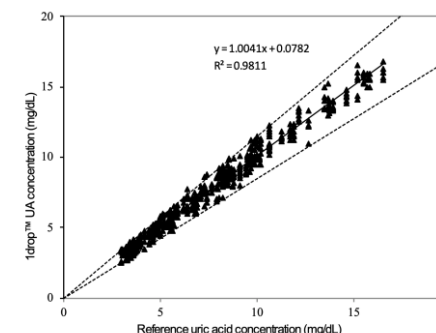
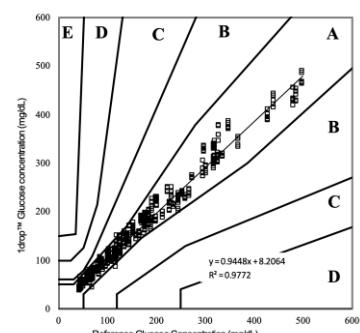
Hemoglobin

Total Cholesterol

Uric Acid

Glucose

Data	Hemoglobin		Total Cholesterol	
				
Capillary	Difference range	Accuracy % (No. of test)	Difference range	Accuracy % (No. of test)
	Within ± 7%	96.3% (578/600)	Within ± 15%	96.8% (581/600)
Venous	Difference range	Accuracy % (No. of test)	Difference range	Accuracy % (No. of test)
	Within ± 7%	95.8% (115/120)	Within ± 15%	96.5% (579/600)

Data	Uric Acid		Glucose	
				
Capillary	Difference range	Accuracy % (No. of test)	Difference range	Accuracy % (No. of test)
	Within ± 15%	95% (114/120)	Within ± 15mg/dL or Within ± 15%	97% (582/600)
Venous	Difference range	Accuracy % (No. of test)	Difference range	Accuracy % (No. of test)
	Within ± 15%	96% (576/600)	Within ± 15mg/dL or Within ± 15%	98.3% (590/600)



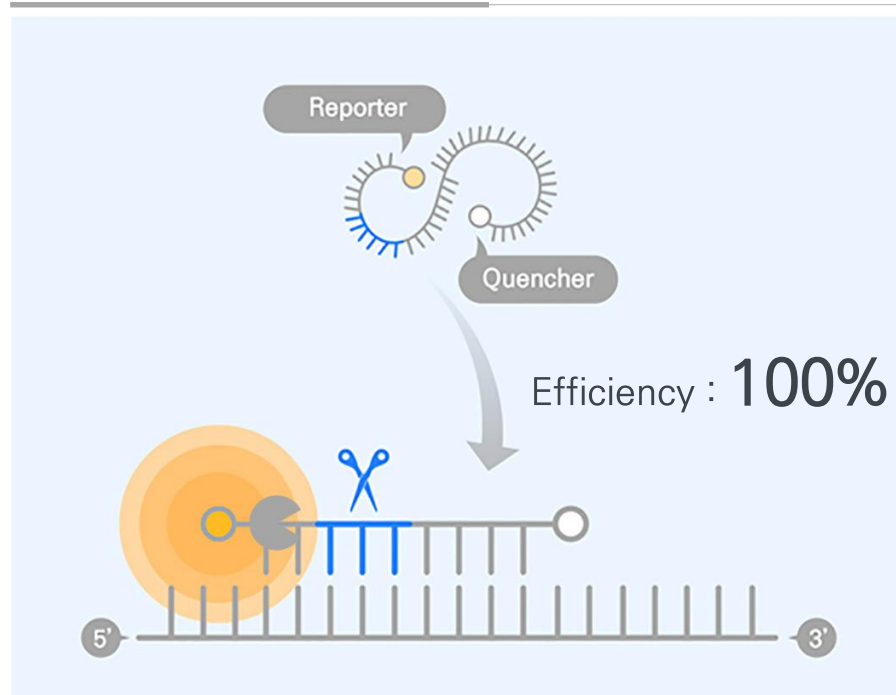
1copy™

Molecular Diagnostics



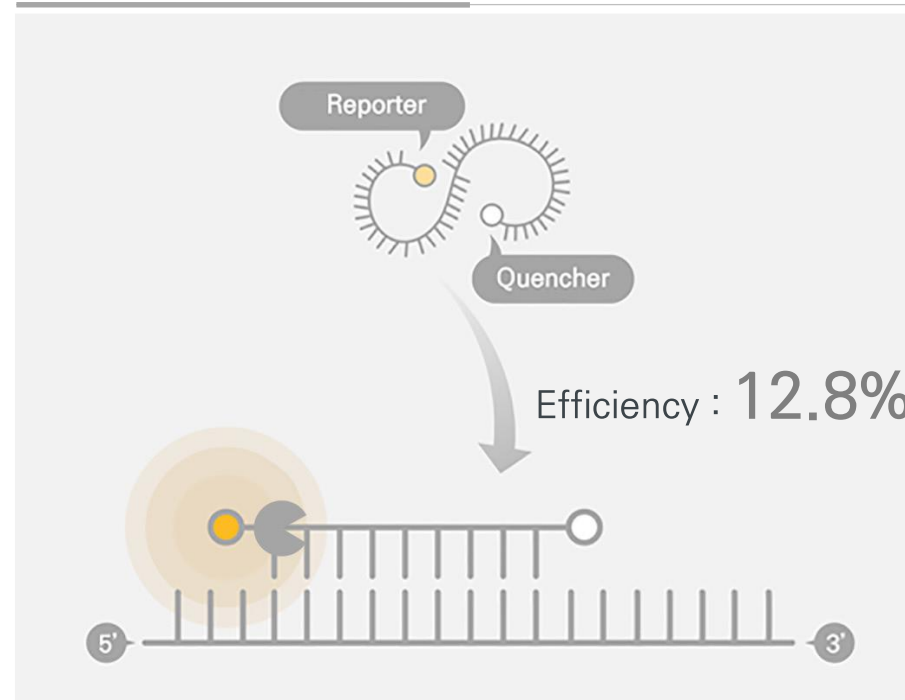
1copy™ Technology : Catacleave(DNA-RNA-DNA Hybrid probe) + RNase(Thermo-stable, Hot-start)

1copy™ Technology



More efficient probe degradation ↑
→ Higher fluorescence intensity ↑

Others (ex Taqman)



Less efficient probe degradation ↓
→ Lower fluorescence intensity ↓

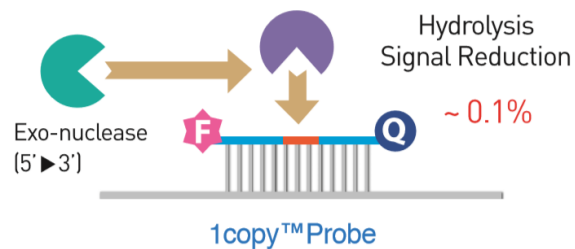
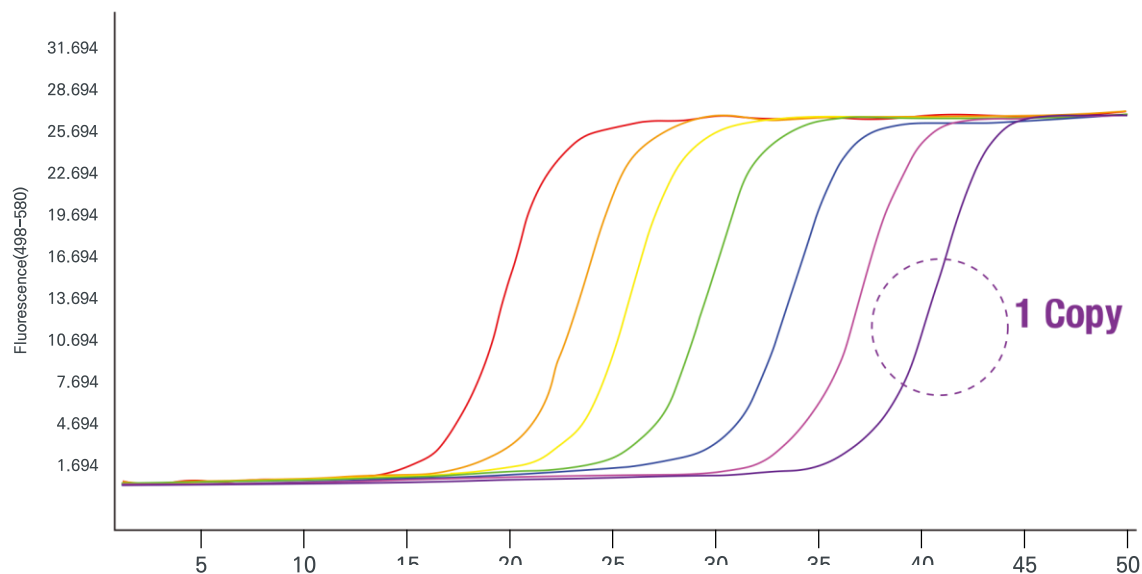
- DNA
- RNA
- DNA Polymerase
- ✂ RNase

1copy™ Advantage 1: High Sensitivity

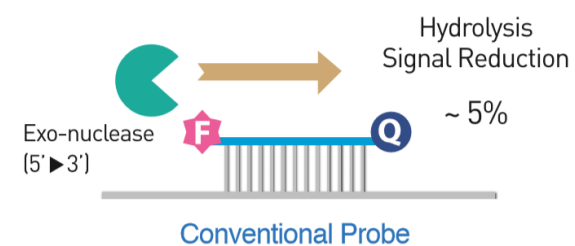
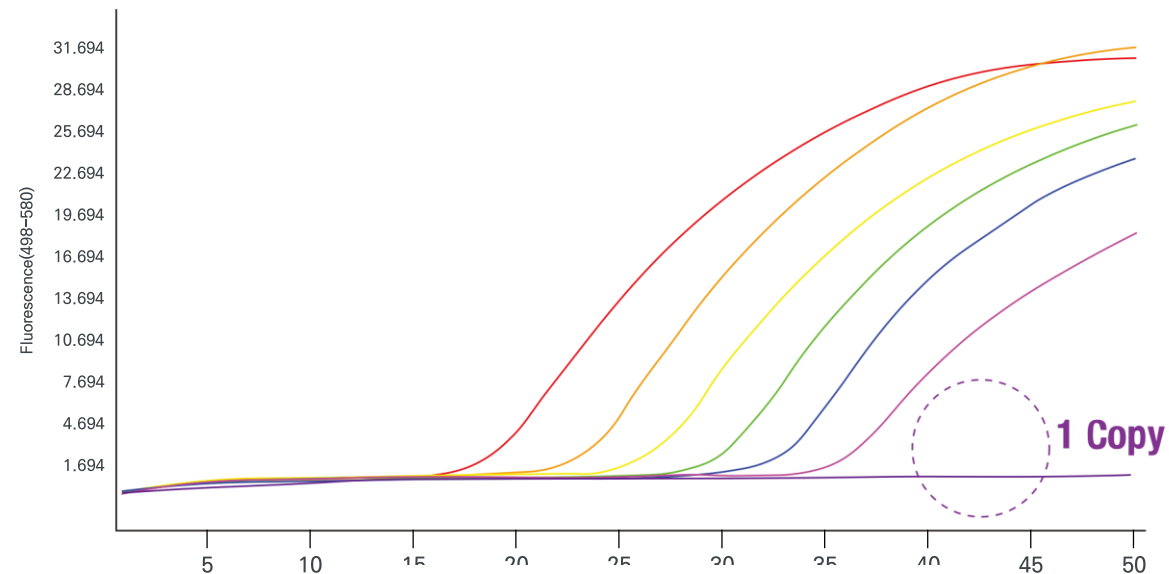
Single molecule RNA Detection

— 1 Copy — 10 Copy — 10^2 Copy — 10^3 Copy
— 10^4 Copy — 10^5 Copy — 10^6 Copy

1 copy™ Technology



Others



1copy™ Advantage 2: 1 step reaction

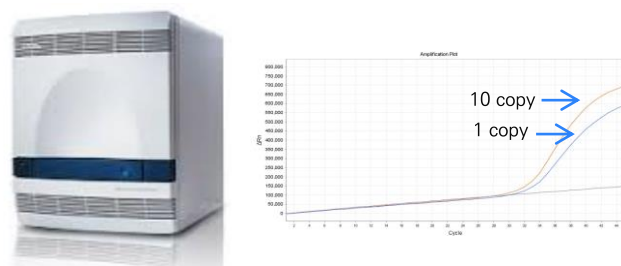
1 Step reaction according to increased sensitivity → **Time/Cost Saving**



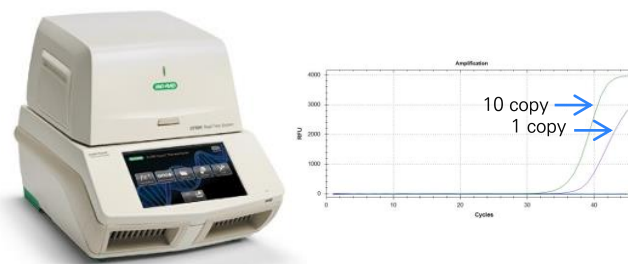
	1copy™ (1step)	Competitor (2steps)
Turn-around Time	2hr 25min	3hr 30min
Hands-on time	20min	1hr

1copy™ Advantage 3: High compatibility with commercial PCR machine

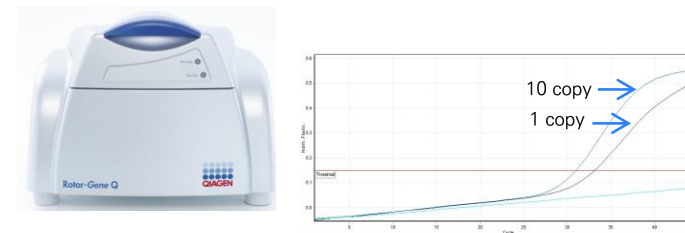
ABI7500 (ABI)



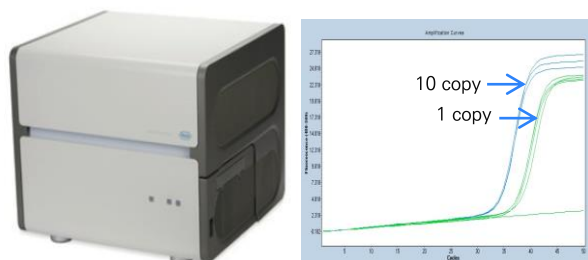
CFX96 (Bio-Rad)



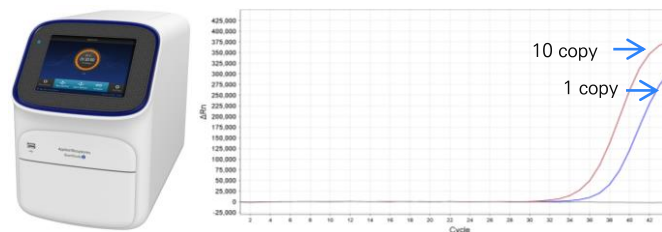
Rotor gene Q (Qiagen)



LC480 (Roche)



QuantStudio5 (ABI)



Other machines

Other machines will be updated continually.



ExiCycler (Bioneer)

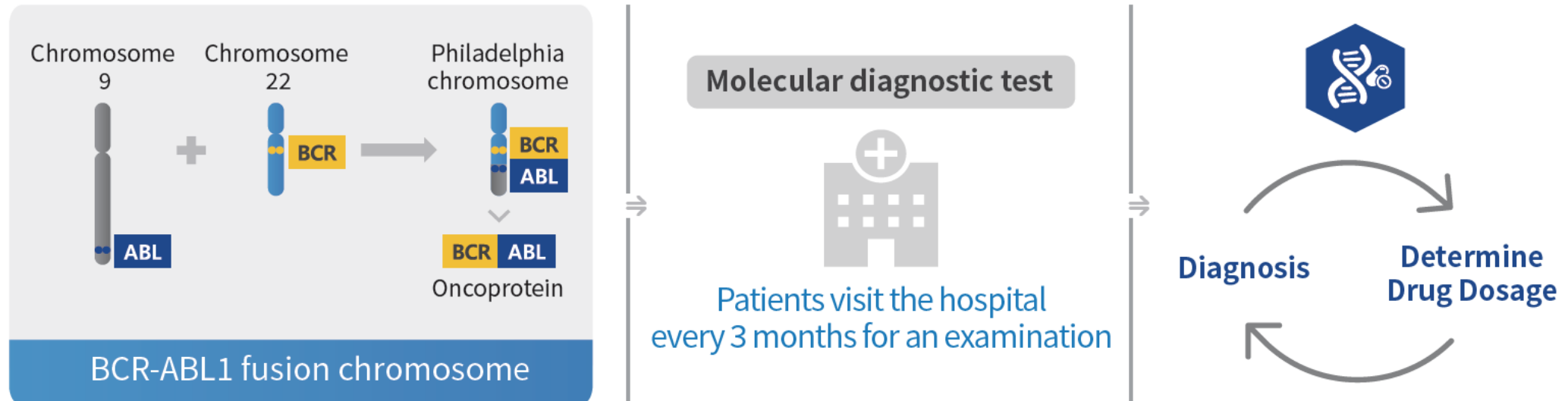
1copy™ Product pipeline

- Now available
- R&D/RUO
- Approval(MFDS, CE)

		2019	2020				2021			
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
CML	BCR-ABL	●								
AML	PML-RARA	●		●						
	RUNX1-RUNX1T1		●		●					
	CBFB-MYH11						●		●	
	ETV6-RUNX1						●		●	
	NPM1						●		●	
	WT1							●		●
	BAALC							●		●
	JAK2			●		●				
Cancer	BRAF			●		●				
	EGFR				●		●			
	COVID-19★		●							
Virus	HBV				●		●			
	HCV					●		●		
	HIV						●		●	

1copy™ BCR-ABL qPCR Kit _CML(Chronic Myeloid Leukemia, CML) Companion diagnosis 1drop

CML diagnostics & Gleevec treatment process

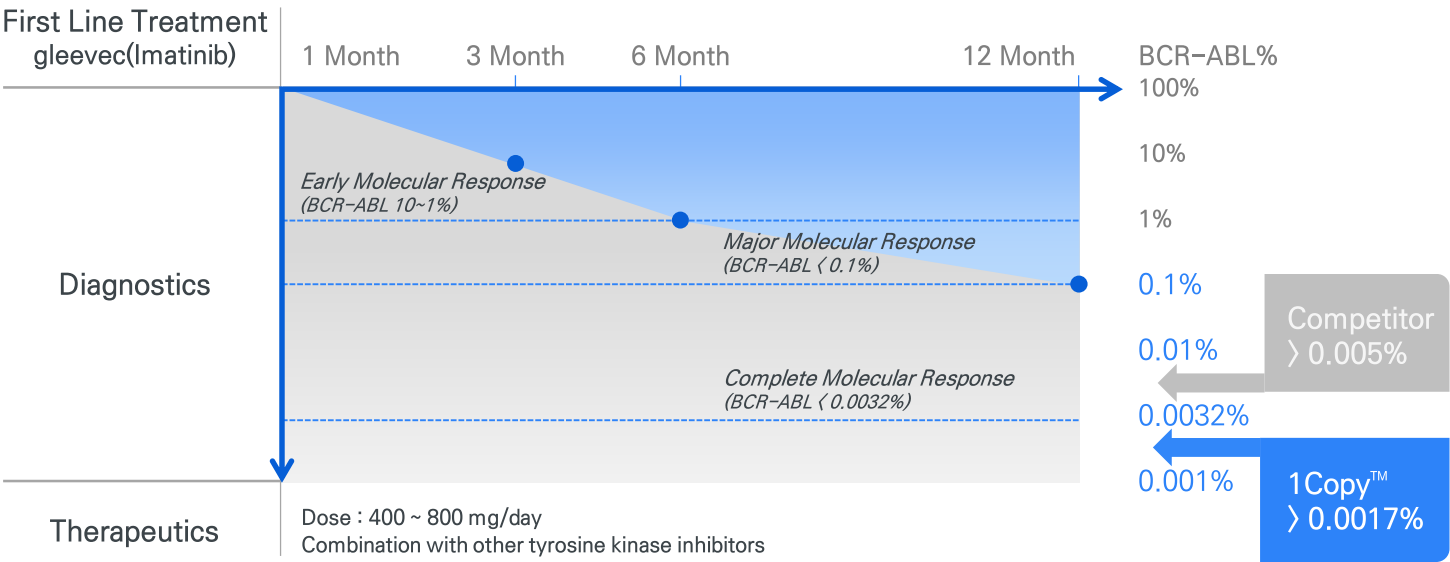


1copy™ BCR-ABL qPCR Kit _CML(Chronic Myeloid Leukemia, CML) Companion diagnosis 1drop

Due to existing commercial kits have difficulty in distinguish CMR, it creates the demand for Products with high sensitivity technology

CML Treatment guidelines

Classification	Period	Remarks
Early Molecular Response (EMR)	3 months	BCR-ABL ≤ 10%
Complete Cytogenetic Response (CCyR)	6 months	BCR-ABL ≤ 1%
Major Molecular Response (MMR)	12 months	BCR-ABL < 0.1%
Complete Molecular Response (CMR)	After 12 months	BCR-ABL < 0.0032%



M Baccarani et al. Blood. 2014 Jul 24;124(4):469-71. Molecular response in CML: where is the bar?

Source : Korea guidelines for treating CML,(The korea society of hematology, 2015)

1copy™ BCR-ABL qPCR Specification

1copy™	
Steps	1 step
LOD	4pg (~8 copies, > 95%CI)
	MR 4.77 (MR value)
Target	4 types of fusion mRNA (b3a2, b2a2, e1a2, e19a2)
Turn-around time	2 h 25 min

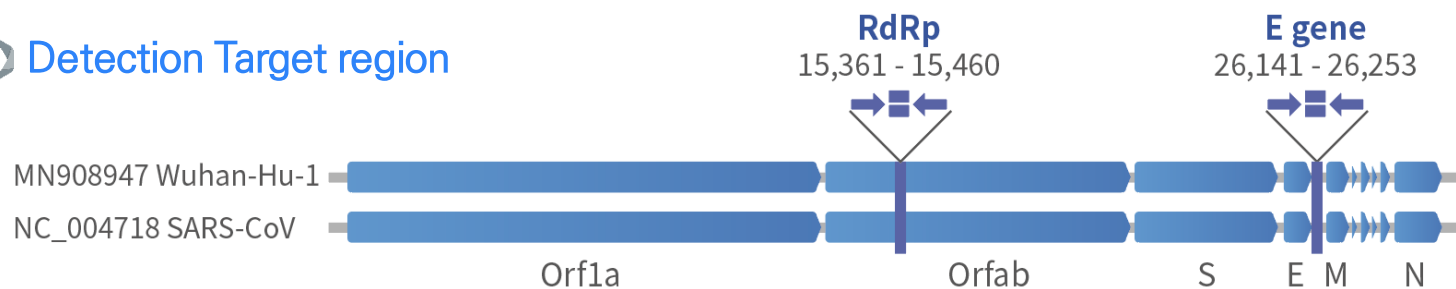
Kit contents (100 Test/Kit)

- Master mix
- Primer Probe mix
- BCR-ABL Standard
(b3a2, b2a2, e1a2, e19a2)
- ABL Standard
- Positive control
- Negative control
- DEPC Water

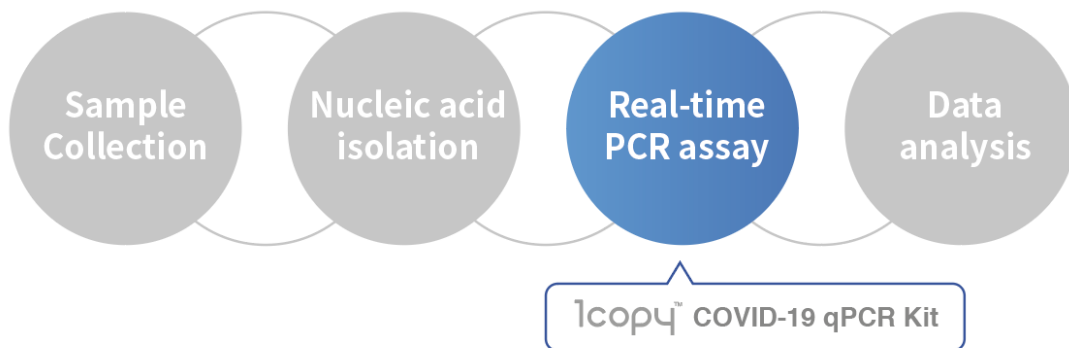


1copy™ COVID-19 qPCR kit

Detection Target region



Process



Real-time PCR instruments

- Roche Light Cycler® 480
- Qiagen Rotor-Gene® Q 5plex HRM
- Applied Biosystems® Quantstudio5
- Applied Biosystems® 7500 Real-Time PCR system
- Bio-RAD CFX96™ Real-Time PCR Detection system

Detection target in technical guidelines by WHO

Country	Institute	Target gene
China	China CDC	ORF1ab, N
Germany	Charite	RdRP, E, N
Korea	KCDC	RdRP, E
Hongkong	HKU	ORF1b-nsp14, N
Japan	NIH	Pancorona and multiple targets, spike protein
Thailand	NIH	N
USA	CDC	Three target in N gene
France	Institut Pasteur	Two target in RdRP

Specimen type

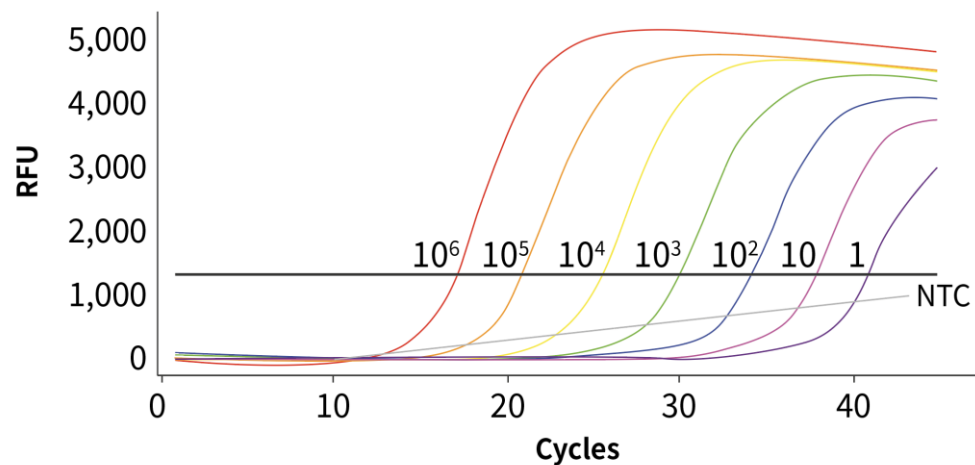
- Nasopharyngeal swab
- Oropharyngeal swab
- Sputum

1copy™ COVID-19 qPCR kit

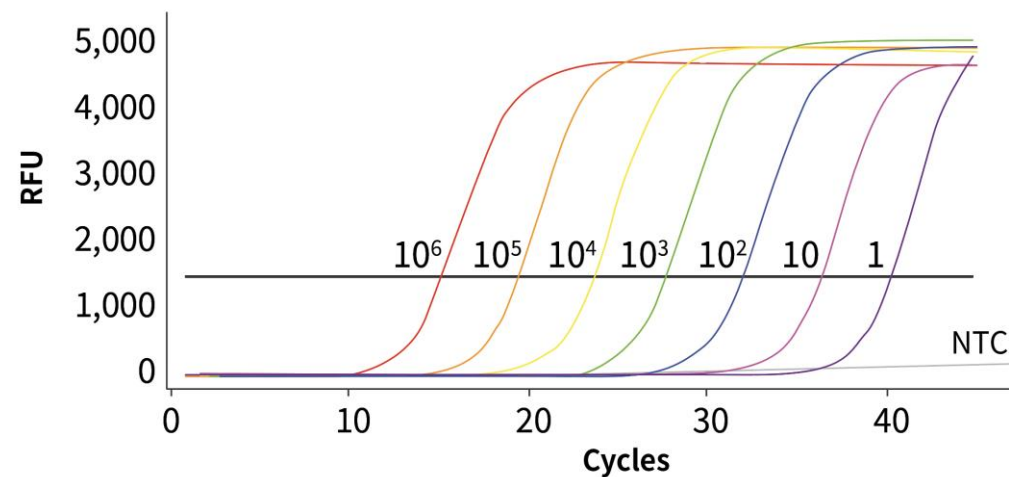
Performance

Copy/reaction	10 ³ copies	10 ² copies	10 copies	8 copies	4 copies	2 copies	1 copy	0 copy
RdRp gene Detection rate	100%	100%	100%	100%	98%	90%	78%	0%
E gene Detection rate	100%	100%	100%	100%	97%	87%	64%	0%

RdRp gene LoD : 4copies/reaction → 0.2 copy/ μ l



E gene LoD : 4copies/reaction → 0.2 copy/ μ l



1molecule qPCR

1copy™ COVID-19 qPCR kit



Product specification

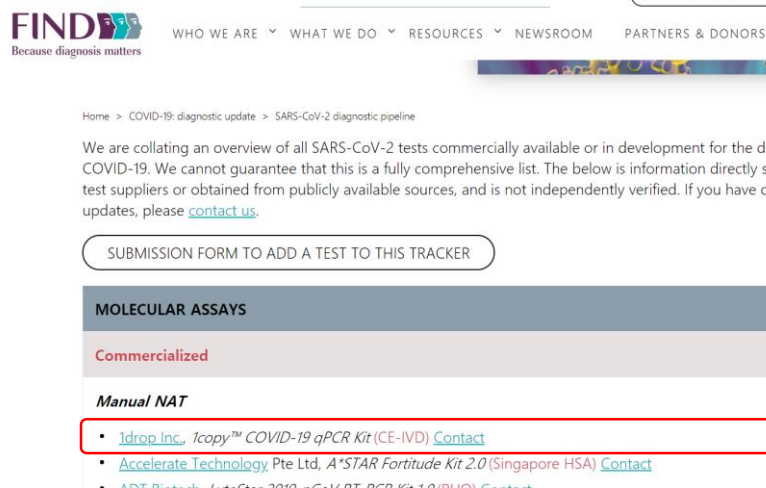
1copy™		Components (100 Test/Kit)
Steps	1 step	<ul style="list-style-type: none"> Master mix : 2ea
LoD	0.2copy/μl (4copies/reaction)	<ul style="list-style-type: none"> Primer/Probe mix (E gene) : 1ea Primer/Probe mix (RdRp gene) : 1ea
Target	ReRp, E gene	<ul style="list-style-type: none"> Control 1 (E gene) : 1ea Control 2 (RdRp gene) : 1ea
Turn-around time	1 hour, 30 minutes	<ul style="list-style-type: none"> DEPC Water



Certification status

Country	status
Korea (MFDS EUA*)	Application completed (2020.02.28)
CE-IVD (Europe)	Certification (2020.03.04)

*EUA : Emergency Use Authorization

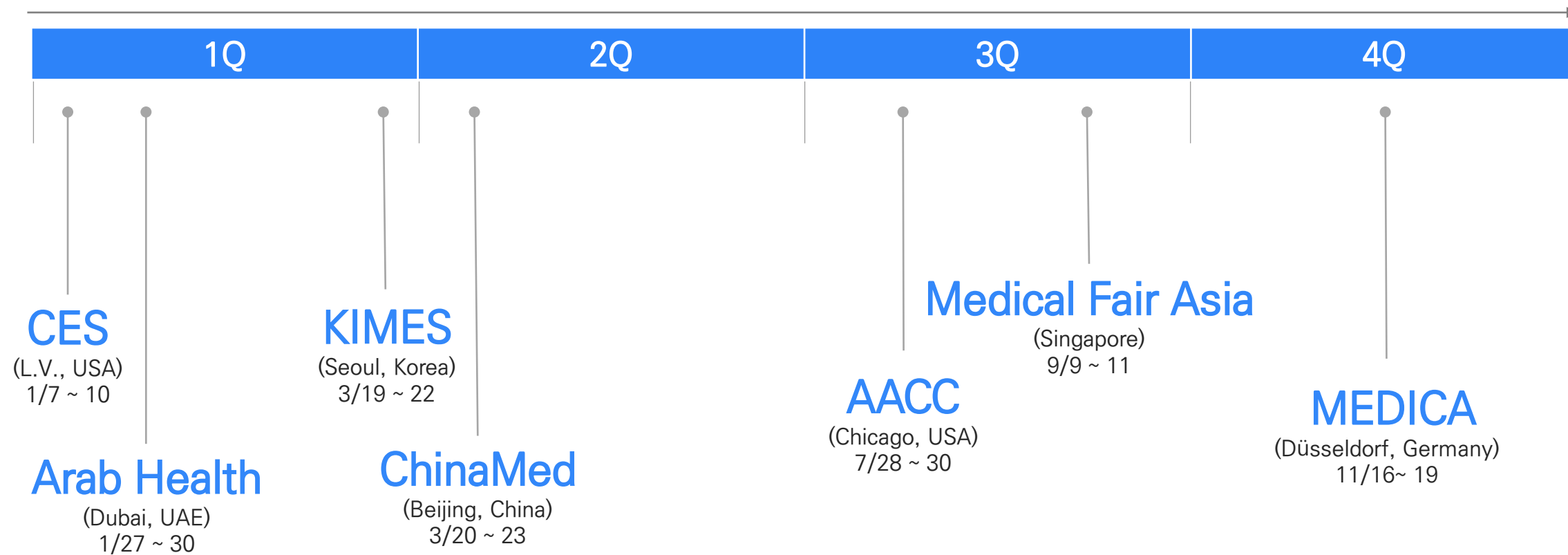


→ Product registration on FIND (International non-profit organization)

<https://www.finddx.org/covid-19/pipeline/>

Exhibition schedule

2020



Thank you !!

