

Seegene Investor Relations

Apr. 2019

Overview of Seegene

- CEO/CTO: Dr. Jong-Yoon Chun
- Established: Sept. 15, 2000
- Listed on KOSDAQ: Sept. 10, 2010
- Number of employees: 314 (as of Dec. 31, 2018)
- Product: Molecular Diagnostic (MDx) Reagent – RP, STI, GI, HPV
- Key proprietary MDx technologies
: DPO™(2004), TOCE™(2011), MuDT™(2015)

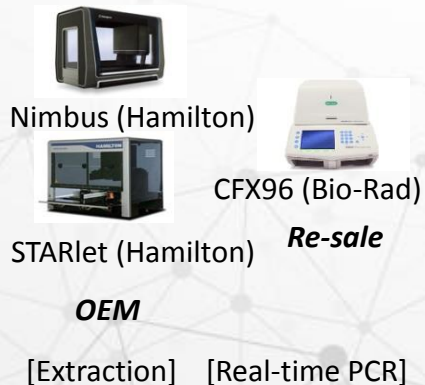
Major Products

MDx Reagents



- Respiratory Infection
- Gastrointestinal Infection
- Women's Health
- Other Infections disease

Instruments (OEM or re-sale)



Global Network

- Headquarter: Seoul, South Korea
- Foreign subsidiaries: Italy, Dubai, US, Canada, Germany
- Joint Venture: Mexico
- Supplying reagents/instruments through 86 agencies
 - 23 distribution agencies in Korea
 - 63 distribution agencies in 57 overseas markets

Foreign subsidiaries & Branch office

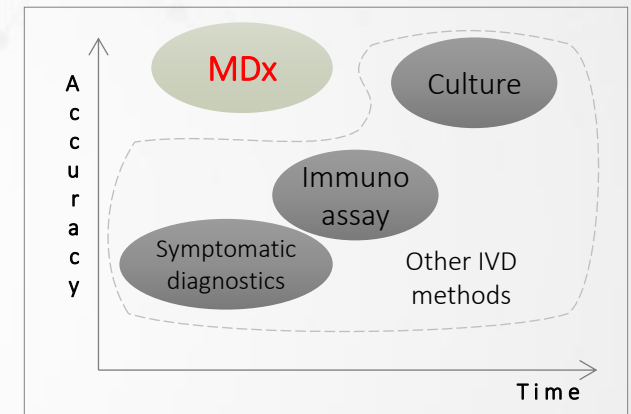
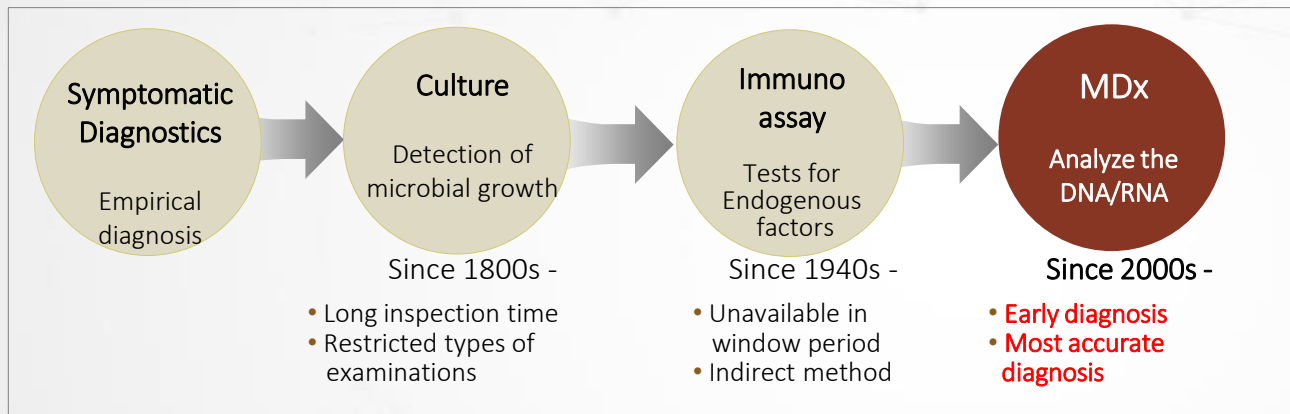


Industry Overview

Classification of Diagnostics Methods

- In vivo Diagnostics : Analyze the health status inside of the human body. ex) X-ray, CT, MRI
- In vitro Diagnostics : Analyze the specimens derived from the body such as blood, urine etc.

Evolving IVD Method



Process of MDx



MDx Market Trend

Market Size of IVD & MDx Industry

| Classification | | Market Size | | | | | CAGR (%) | |
|-----------------------------------|------------------------|-------------|------|--------|--------|--------|----------|-------------|
| | | `12 | `13 | `14(E) | `15(E) | `16(E) | | `17(E) |
| Global IVD Market (Unit : USD bn) | | 45.7 | 48.7 | 52.2 | 55.9 | 60.1 | 64.7 | 7.2 |
| MDx Market | Global (Unit : USD bn) | 5.0 | 5.6 | 6.3 | 7.2 | 8.1 | 9.1 | 12.6 |
| | Korea (Unit : KRW bn) | 57.7 | 64.9 | 73.0 | 82.6 | 93.5 | 106.4 | 13.0 |

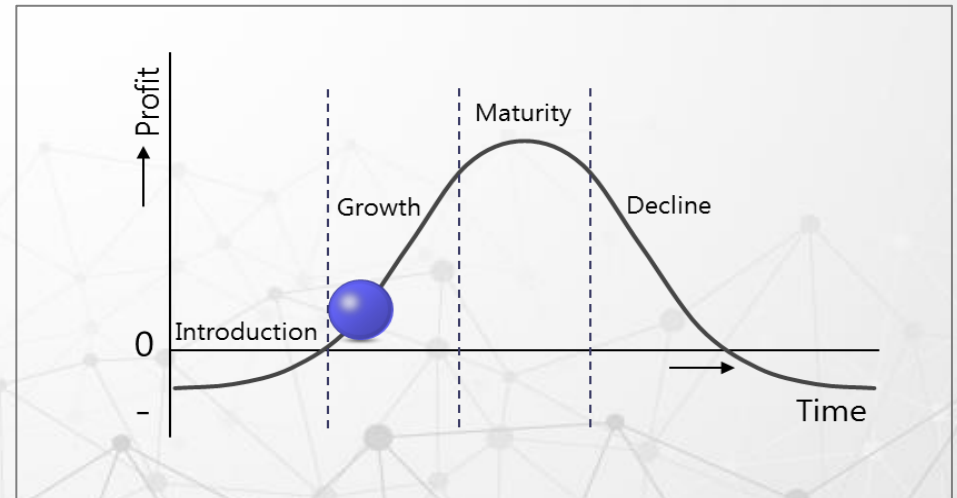
[Source] Analysis of the Global In Vitro Diagnostics Market, Frost & Sullivan(2013), Analysis of the Asia-Pacific Molecular Diagnostics Market, Frost & Sullivan(2013)

Application Fields of MDx

| Classification | | Share |
|------------------------|------------------|-------|
| Infectious disease | | 63% |
| Non-infectious disease | Cancer | 20% |
| | Genetic disorder | 9% |
| | Pharmacogenomics | 8% |

[Source] Molecular Diagnostics: Market Segmentation and Opportunities October 2010, DeciBio and Frost & Sullivan (2013)

MDx Industry Life Cycle



Competitive Positioning of Real-time PCR Technology

| Patent | DNA amplification technologies | Companies | Homogeneous (Closed System) | Multiplex (> 10-plex) | SNP (> 10 point mutations) | Quantification (> 10 analytes) | |
|--------|--------------------------------|------------|-----------------------------|-----------------------|----------------------------|--------------------------------|--|
| 1983 | PCR | Roche | | | | | |
| 1989 | bDNA | Siemens | → | | | | |
| 1989 | Line Probe | Fujirebio | → | | | | |
| 1990 | TaqMan | Roche | → | | | | |
| 1991 | NASBA | bioMerieux | → | | | | |
| 1992 | SDA | BD | → | | | | |
| 1993 | Hybrid Capture | Qiagen | → | | | | |
| 1995 | TMA | Hologic | → | | | | |
| 1995 | Invader | Hologic | → | | | | |
| 1996 | Molecular Beacon | PHRI | → | | | | |
| 1997 | Hyb Probe | Roche | → | | | | |
| 1999 | Scorpions | Qiagen | → | | | | |
| 1999 | Bead Technology | Luminex | → | | | | |
| 2011 | TOCE | Seegene | → | | | | |
| 2014 | MuDT | Seegene | → | | | | |

Trends in HPV Test for Cervical Cancer Screening

Comparison of Cervical Cancer(HPV) Products



Performance Proved by Customers-WHO LabNet

WHO LabNet 2014 HPV DNA Proficiency study, 2015 IPV conference, Portugal, 2015

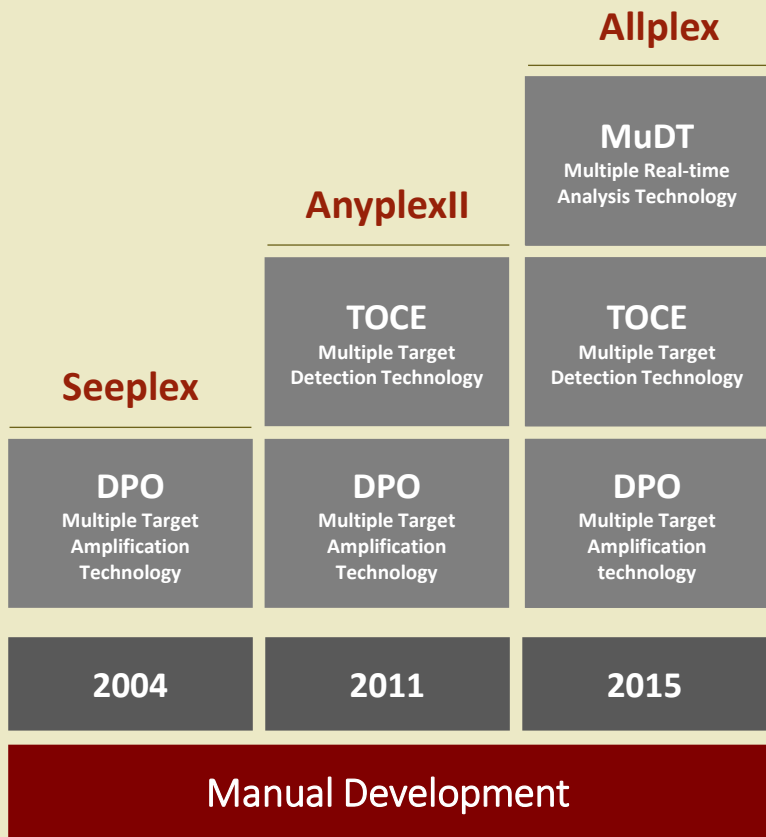
| Type of HPV assay | No. of datasets | 100% proficient | 99-90% proficient | 89-80% proficient | <80 % proficient | Not proficient |
|---|-----------------|-----------------|-------------------|-------------------|------------------|----------------|
| All assays | 146 | 86 | 16 | 9 | 5 | 30 |
| Anyplex II HPV28 (Seegene) | 10 | 10 | 0 | 0 | 0 | 0 |
| Onclarity (BD) | 5 | 4 | 1 | 0 | 0 | 0 |
| Linear Array (Roche) | 14 | 7 | 1 | 1 | 0 | 5 |
| HPV Direct Flow-chip (Master Diagnostica) | 14 | 9 | 0 | 0 | 0 | 5 |
| Papillocheck (Greiner) | 5 | 4 | 1 | 2 | 1 | 1 |
| CLART HPV 2/3 (Genomica) | 4 | | | | | 0 |
| In- house PCR (Luminex) | 8 | | | | | 3 |
| Realtime PCR (Abbott) | 3 | | | | | 0 |

- 100% proficiency at all 10 Lab participants.
- Detection of all 5 HPV subtypes and its multiple co-infection
- The best Results regarding Sensitivity, Specificity and Reproducibility

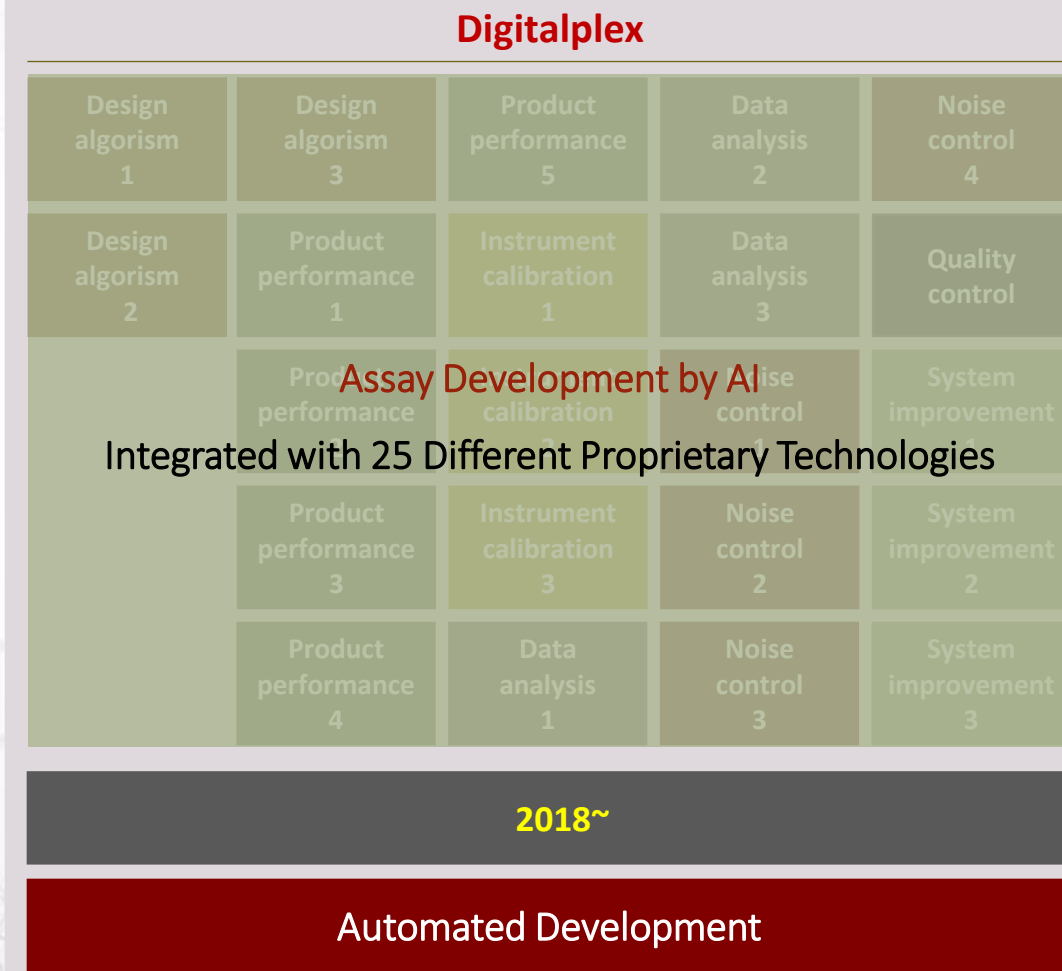
Business Strategy

History of Seegene's Technologies and Products

Development of Proprietary Technologies for
『Chemistry』



Development of Proprietary Technologies for
『Digitalized Development System』



New Product Plan – Project 100

Project 100

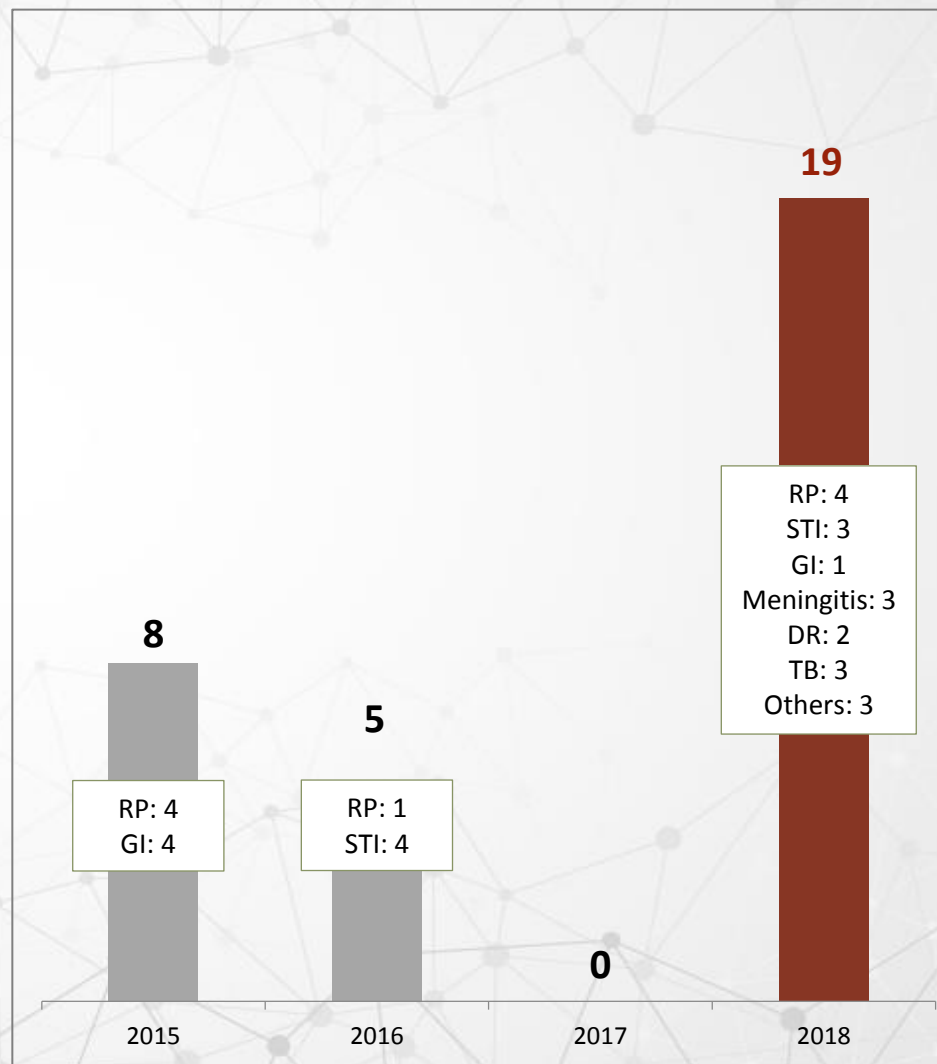
One Platform

All test products for molecular diagnostics

| Category | # of tubes |
|---------------------|------------|
| Infectious disease | 54 |
| Drug-resistance(DR) | 12 |
| Oncology | 21 |
| Genetics | 8 |
| Total | 95 |

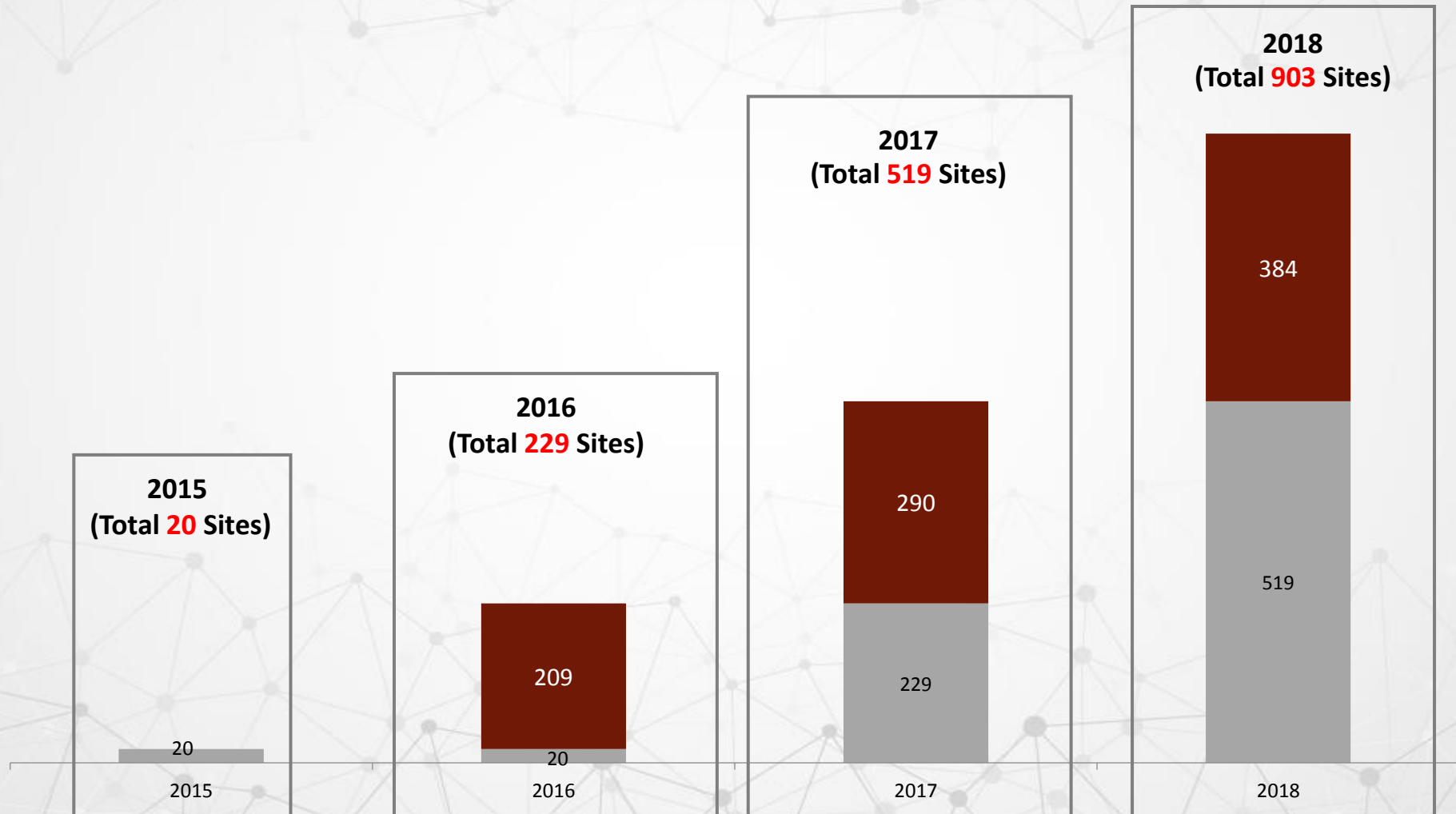


Release of Allplex by year

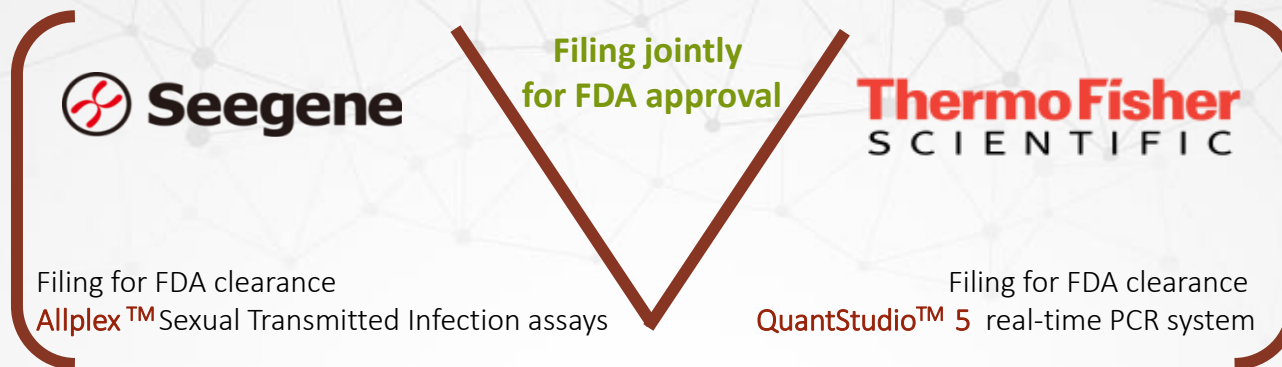


Allplex™ Promotion Status

- 903 customer sites (hospitals and laboratories) over 48 countries
- Respiratory Infection 421 Sites, Gastrointestinal Infection 246 Sites, Sexually Transmitted Infection 210 Sites, others 26 Sites



US penetration Strategies



FDA process

Allplex™ STI 3 assays

STI 6-plex assay



STI 5-plex assay



STI 7-plex assay



QuantStudio™ 5



- EU approved products that are easy to develop and get approval
- High multiplex products with high marketability and insurance coverage in the US

Financials

Stock Information

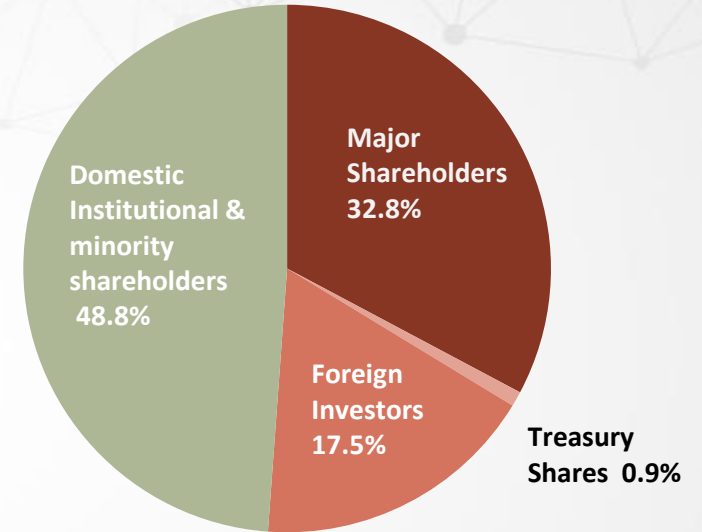
Overview of Stock Information

- Ticker : 096530 KQ
- Shares Outstanding: 26,234,020 (as of Dec. 31, 2018)
- Par value : KRW 500
- Market Cap: KRW 574.5bn (as of Mar. 31, 2019)
- 52 week High / Low : KRW 37,450 / 14,750

Subsidiaries

| Subsidiary | Date of establishment |
|--------------------------------|-----------------------|
| Arrow Diagnostics (Italy) | Jan. 2014 |
| Seegene Middle East (Dubai) | Oct. 2014 |
| Seegene Technologies (USA) | Apr. 2015 |
| Seegene Canada (Canada) | Jul. 2015 |
| Seegene Germany GmbH (Germany) | Aug. 2017 |

Shareholder Structure



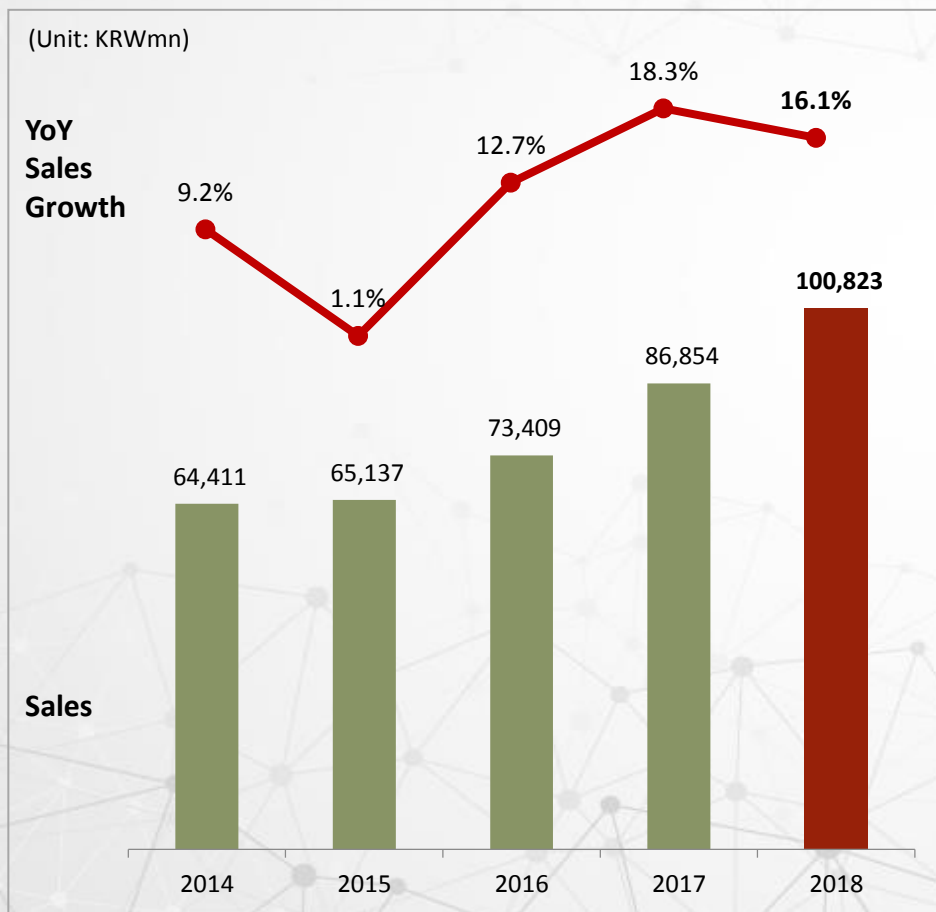
(as of Dec. 31, 2018)

| Major Shareholder | Ownership |
|-------------------|-----------|
| CEO | 18.1% |
| Related parties | 14.7% |

Financial Overview (1)

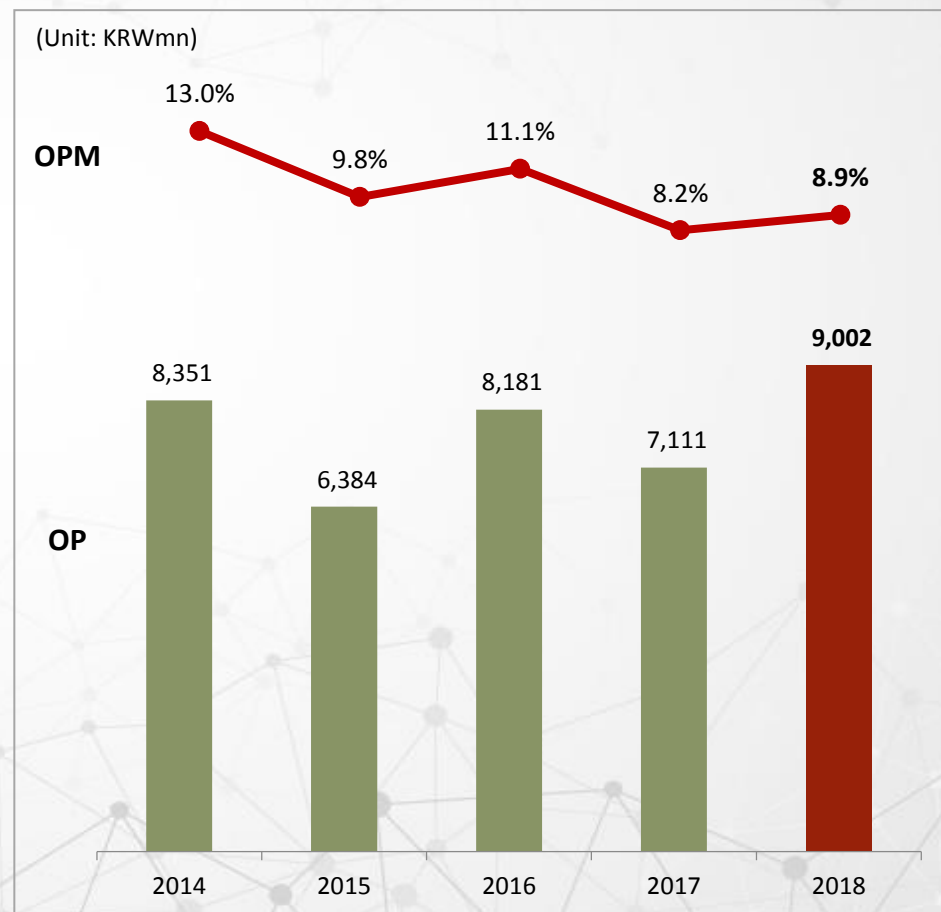
Sales Growth Trend

- Achieved a record-high sales of KRW100.8bn (YoY +16%)
- Sales growth driven by Allplex reagents and instruments



Operating Profit Growth Trend

- 2018 OP KRW9bn (YoY +27%)
- According to Korea financial authorities' accounting guidelines for R&D items, IS and BS are revised (2014~present)

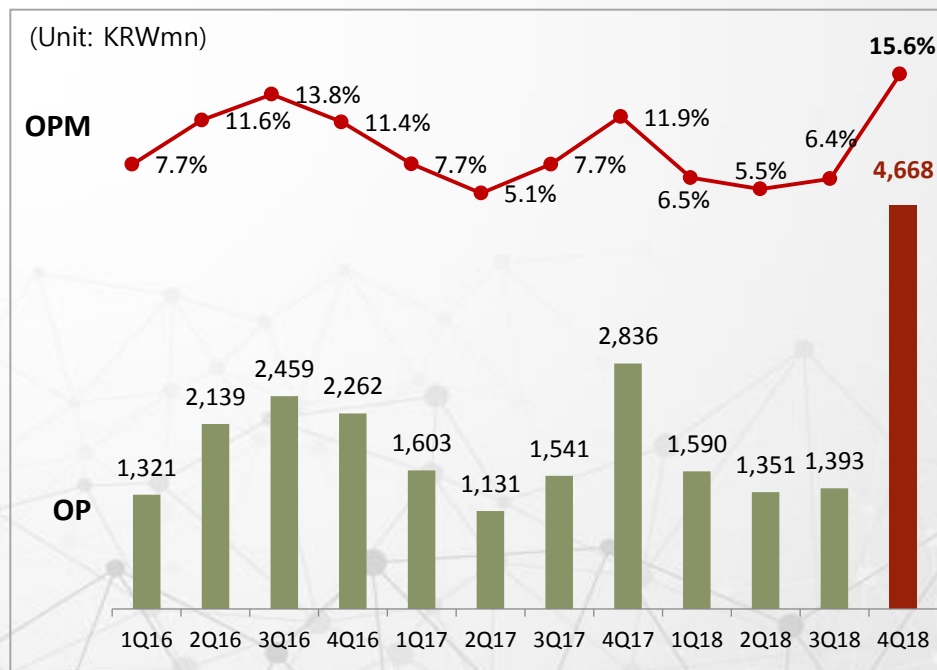
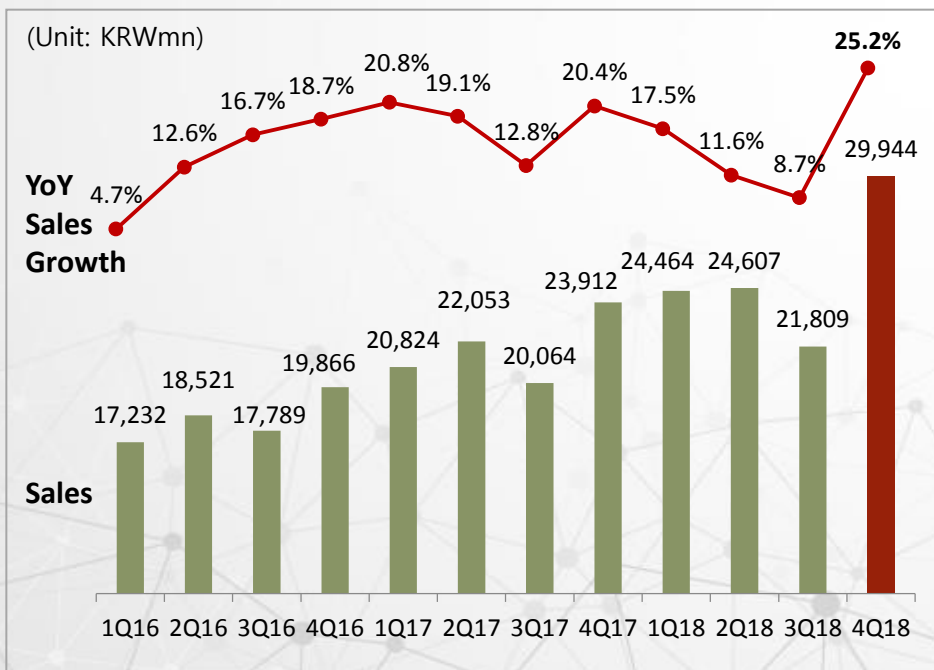


Financial Overview (2)

Q4 2018 Business Results

- 4Q sales KRW29.9bn (+25% YoY, +37% QoQ) due to rise in sales of STI products and seasonality (RP)
- 4Q OP KRW4.7bn (+65% YoY, +235% QoQ) / OPM 16%
- 4Q Pre-tax profit KRW4.3bn (T/B YoY, +221% YoY) backed by base effect (FX effect)

| (Unit : KRW mn) | 4Q'18 | 3Q'18 | QoQ | 4Q'17 | YoY |
|------------------|--------|--------|--------|--------|----------|
| Sales | 29,944 | 21,809 | 37.3% | 23,912 | 25.2% |
| Operating Profit | 4,668 | 1,393 | 235.0% | 2,836 | 64.6% |
| (%) | 15.6% | 6.4% | | 11.9% | |
| Pre-tax Profit | 4,269 | 1,331 | 220.7% | -1,438 | T/B |
| (%) | 14.3% | 6.1% | | -6.0% | |
| Net Profit | 5,421 | 911 | 494.8% | 150 | 3,511.3% |
| (%) | 18.1% | 4.2% | | 0.6% | |

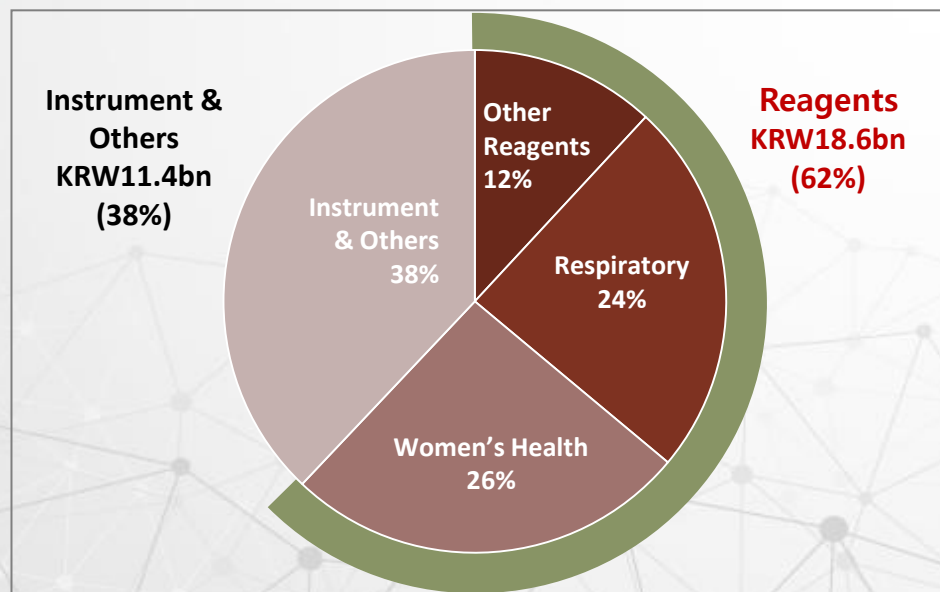


Sales Breakdown by Product

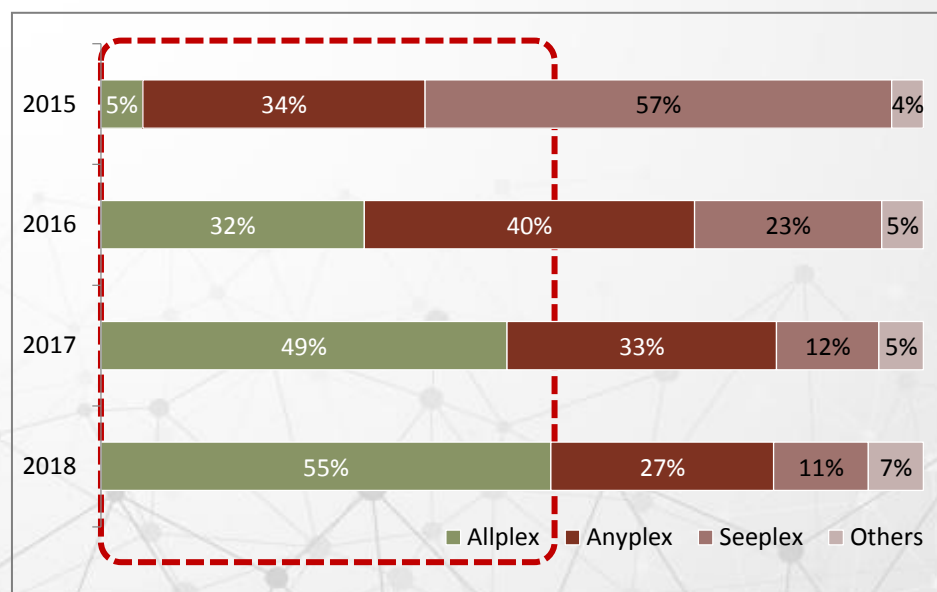
Reagent & Instrument Sales

| (Unit : KRW mn) | 1Q '17 | 2Q '17 | 3Q '17 | 4Q '17 | 1Q '18 | 2Q '18 | 3Q '18 | 4Q '18 | QoQ | YoY |
|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|
| Reagent | 14,347 | 14,359 | 14,262 | 16,179 | 17,065 | 16,780 | 15,121 | 18,581 | 22.9% | 15.4% |
| Instrument/Others | 6,477 | 7,695 | 5,803 | 7,733 | 7,399 | 7,827 | 6,688 | 11,363 | 69.9% | 45.4% |
| Total Sales | 20,821 | 22,053 | 20,064 | 23,912 | 24,464 | 24,607 | 21,809 | 29,944 | 37.3% | 25.2% |

Sales by Product (4Q 2018)



Reagent Sales Trend by Product Group

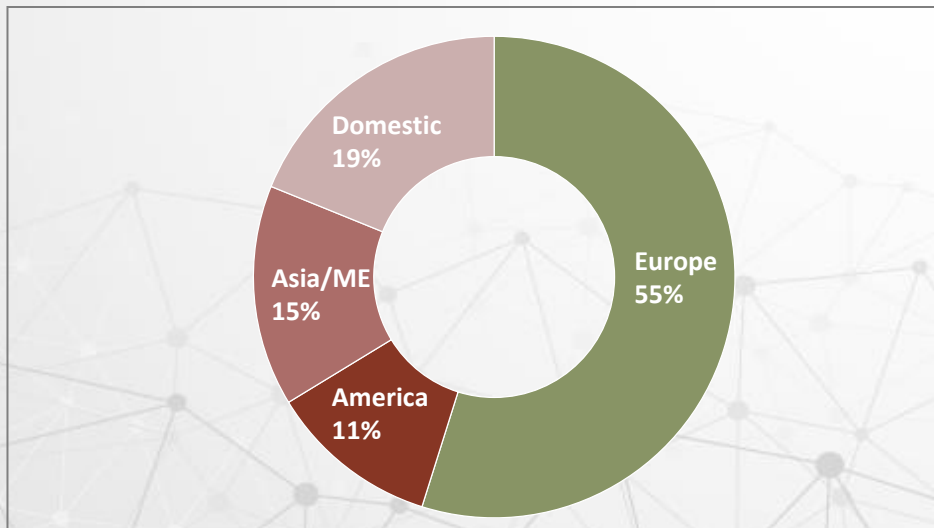


Sales Breakdown by Region

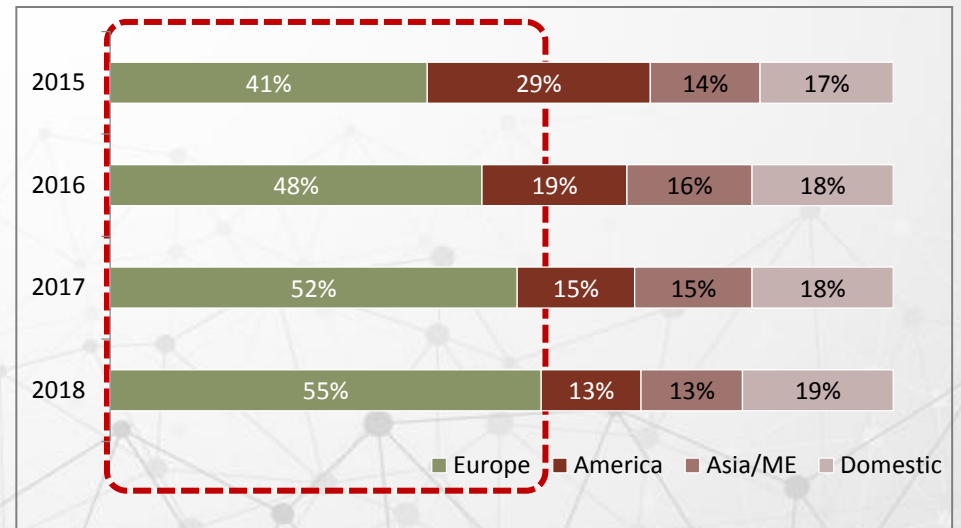
Sales by Region

| (Unit : KRW mn) | 1Q '17 | 2Q '17 | 3Q '17 | 4Q '17 | 1Q '18 | 2Q '18 | 3Q '18 | 4Q '18 | QoQ | YoY |
|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|
| Europe | 11,260 | 10,963 | 10,373 | 13,701 | 14,450 | 11,958 | 12,699 | 16,424 | 29.3% | 19.9% |
| America | 3,866 | 3,451 | 2,844 | 3,207 | 3,850 | 3,033 | 2,541 | 3,427 | 34.8% | 6.8% |
| Asia / Middle East | 2,506 | 2,717 | 3,475 | 2,841 | 2,360 | 3,785 | 2,461 | 4,446 | 80.6% | 56.5% |
| Domestic | 3,192 | 4,922 | 3,372 | 4,162 | 3,804 | 5,830 | 4,108 | 5,648 | 37.5% | 35.7% |
| Total Sales | 20,824 | 22,053 | 20,064 | 23,912 | 24,464 | 24,607 | 21,809 | 29,944 | 37.3% | 25.2% |

Sales by Region (4Q 2018)



Sales Trend by Region

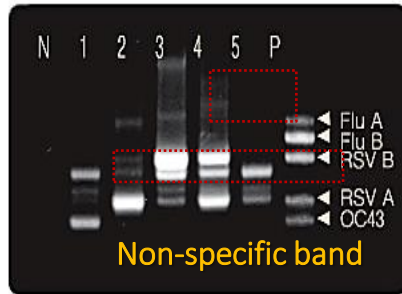


Key Proprietary Technologies

DPO™ (Dual Priming Oligonucleotide)

Conventional PCR

<Conventional Primer>

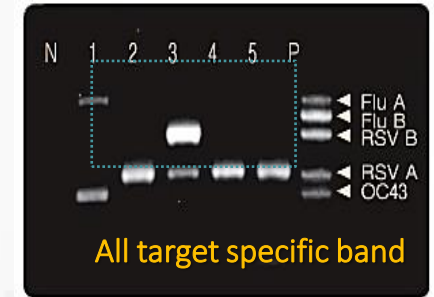
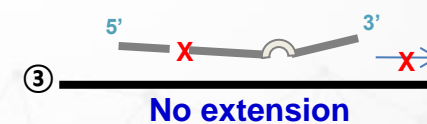
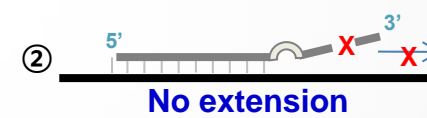


P: Positive marker N: Negative marker / Lane 1~5: patients

- Non-target genes are amplified together
- Limited multiplexing

DPO PCR

<DPO Primer>



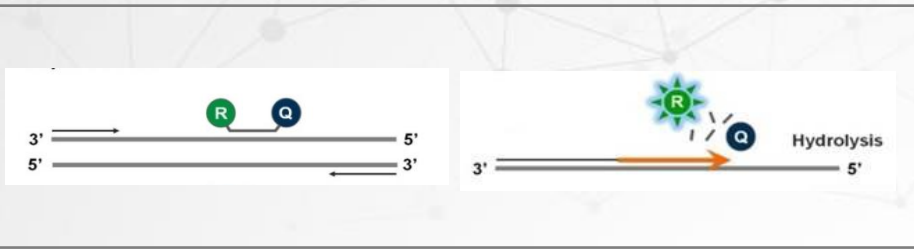
P: Positive marker N: Negative marker / Lane 1~5: patients

- Only the target gene is specifically amplified
- Highly reliable multiple target amplification

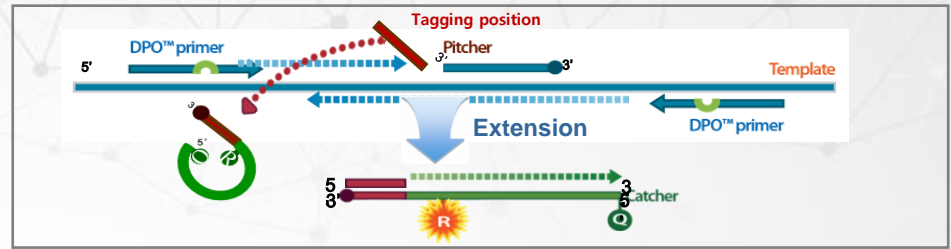
Multiplex + High Accuracy = Realization of Multiplex MDx

TOCE™ (Tagging Oligonucleotide Cleavage & Extension)

Conventional Real-time PCR



TOCE Real-time PCR



Detect 1 pathogen per 1 channel
→ Detect 4 pathogens using 4 fluorescence channel

- virus1
- virus2
- virus3
- virus4

- virus4
- virus3
- virus2
- virus1

- Detection of 1 target per a single channel
- The Maximum limit 4 targets

Detect 5 pathogen per 1 channel
→ Detect 20 pathogens using 4 fluorescence channel

- virus 1
- virus 2
- virus 3
- virus 4
- virus 5
- virus 6
- virus 7
- virus 8
- virus 9
- virus 10
- virus 11
- virus 12
- virus 13
- virus 14
- virus 15
- virus 16
- virus 17
- virus 18
- virus 19
- virus 20

Melting curve Analysis

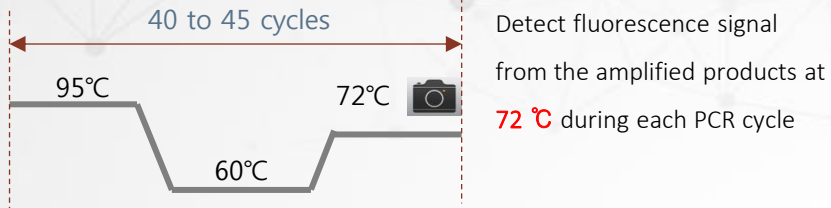
- Detection of 5 targets per a single channel
- Multiplex in a single channel using Catcher-Tm
- As sensitive as singleplex real-time PCR

High Multiplex Real-time PCR + Quantitative Analysis(Melting Curve Analysis)

MuDT™ (Multiple Detection Temperatures)

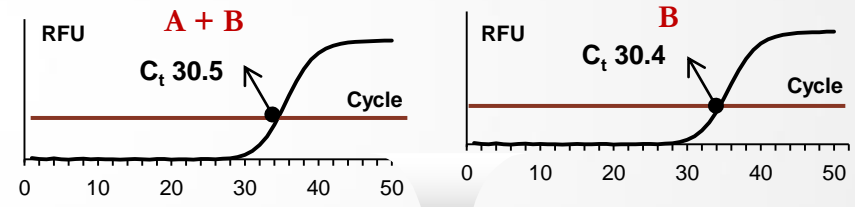
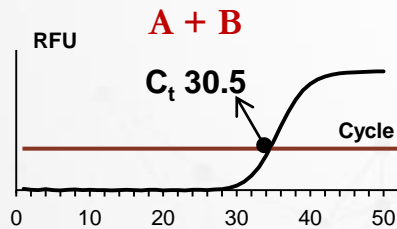
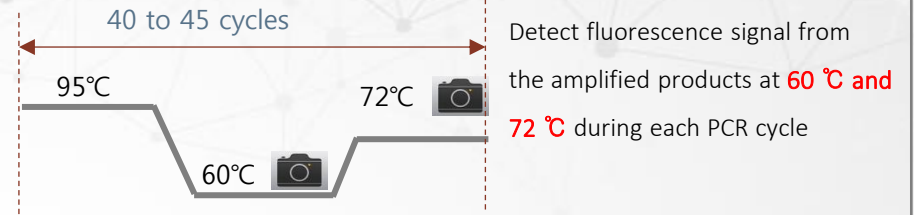
Conventional Real-time PCR

[PCR cycle]

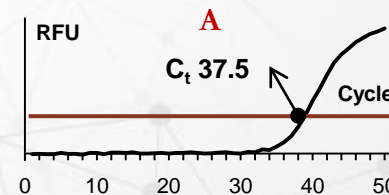


MuDT Real-time PCR

[PCR cycle]



Software Analysis



Multi qualitative/quantitative Analysis in Single channel = **Multi C_t value in Single channel**

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