

Shared Market Space

Shared Market Space

- Laboratory Developed Tests (LDTs; Homebrew)
- Competing Companies' Offerings
 - Gel and Capillary
 - NGS
 - NGS Products
 - NGS Services
 - MRD



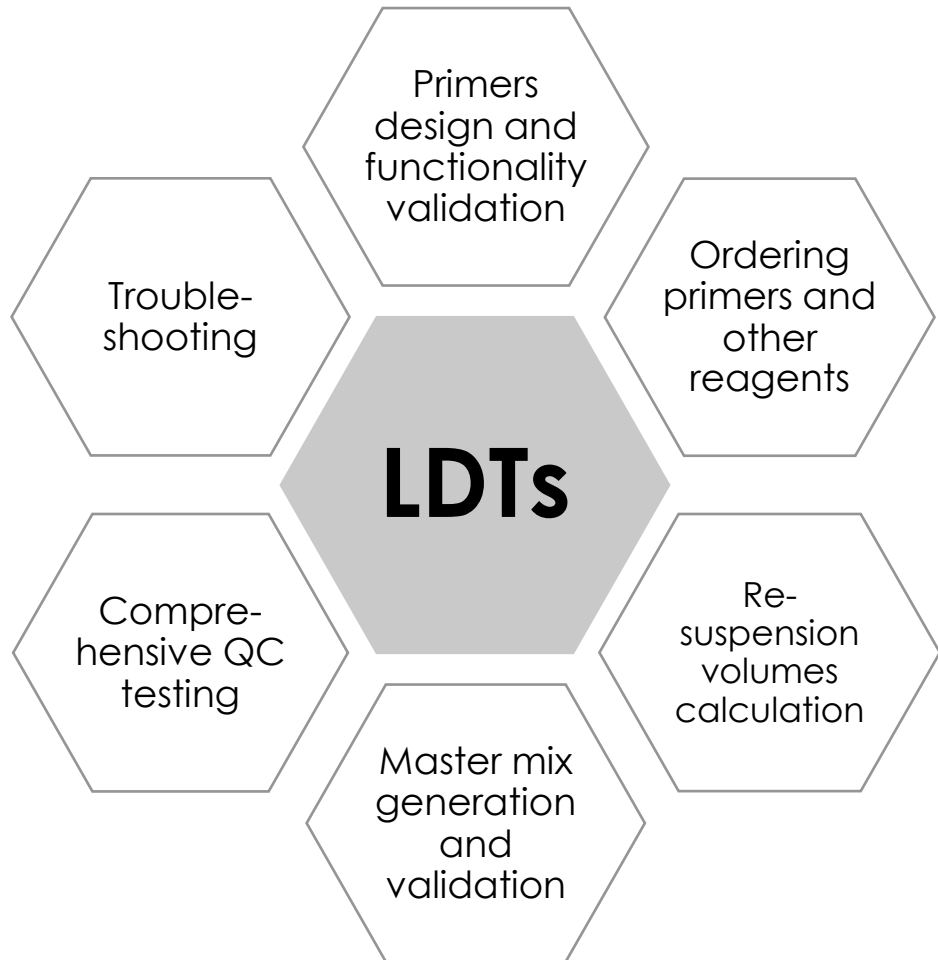
LDTs / Homebrew



IVS Assays vs. LDTs (Homebrew)



Consideration of Labor Time & Cost



 **invivoscribe**[®]
*Improving Lives with Precision Diagnostics**

Takes Care of All
These Steps
With **Standardized
Assays and Software***

*For NGS and selected assays

IVS Assays vs. LDTs (Homebrew)



Worldwide Shortage of Qualified Technologists

- Poor use of time generating homebrew primers that could be spent performing other tests

Overall Cost of Homebrew with Everything in Consideration **is Not Necessarily Cheaper!**



IVS Assays vs. LDTs (Homebrew)

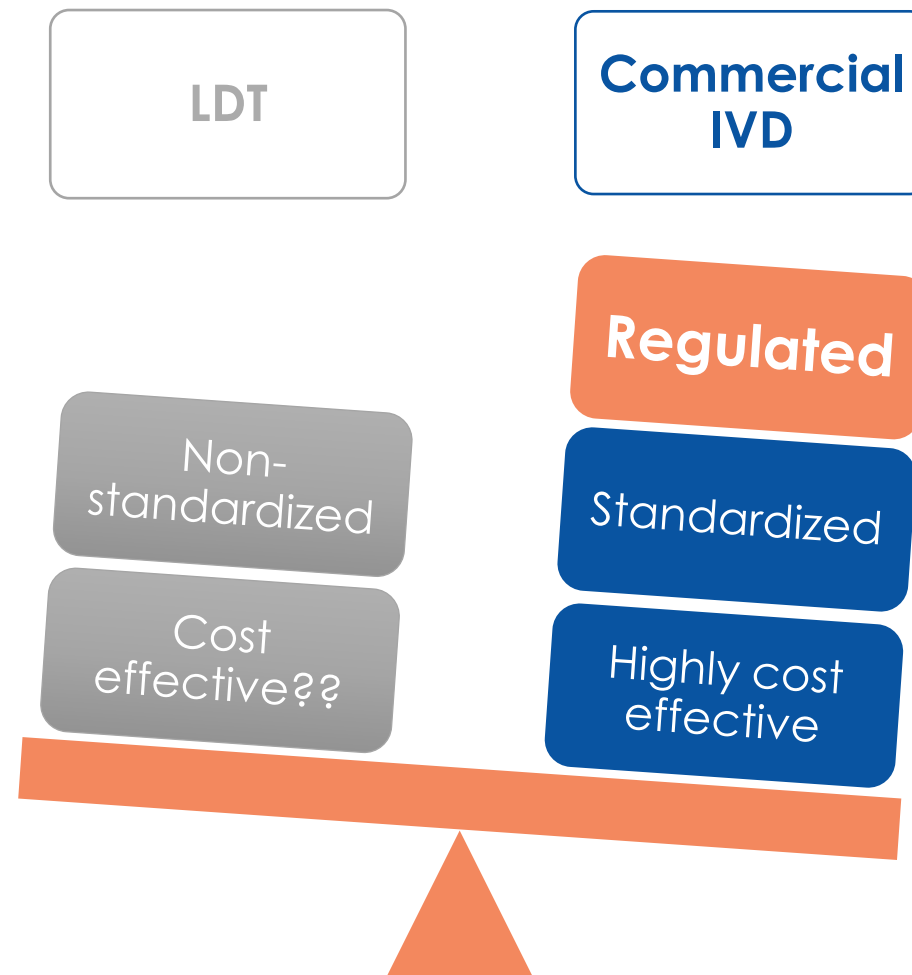


Regulatory Requirements Worldwide

- FDA
- EU IVD Regulation

Trend:

“The times are coming to an end when labs can develop and produce their LTDs largely unaffected by the legal requirements for in vitro diagnostics.”



<https://www.johner-institute.com/articles/regulatory-affairs/and-more/laboratory-developed-tests/>

IVS Assays vs. LDTs (Homebrew)



&



Value of Fully Validated Products

Commercial BIOMED-2 Primers are Tested & Manufactured Under cGMP & Standardized Conditions, all Delivered with Optimized Reagents.

“**Risk** of missing certain types of rearrangements and producing **false negative results** [sic].

...Should only be used when sufficient expertise are available within your laboratory to collect appropriate controls and QC the primers in individual pairs.

Without your own extensive primer testing, **we** would **recommend** to use **commercially produced and quality controlled primer mixes** [sic].”

Statement from EuroClonality Group on IVS vs. Homebrew BIOMED-2 Primers. Source: <http://www.euroclonality.org/faq/>

IVS Assays vs. LDTs (Homebrew)



Additional Advantages of Invivoscribe's Products:

- IVD level of confidence & guarantee as cGMP manufacturer
- Free access to comprehensive Technical Support
- Clear Protocols & Validation of New Technologies
- Improved Assays (IdentiClone[®] TCRG 2.0)
- Robust and accurate Controls and reagents to verify sample quality included with kits
- Standardized Assays, ensuring reproducible reporting of results worldwide

Competing Companies' Offerings

Gel and Capillary



Shared Market Space Gel & Capillary



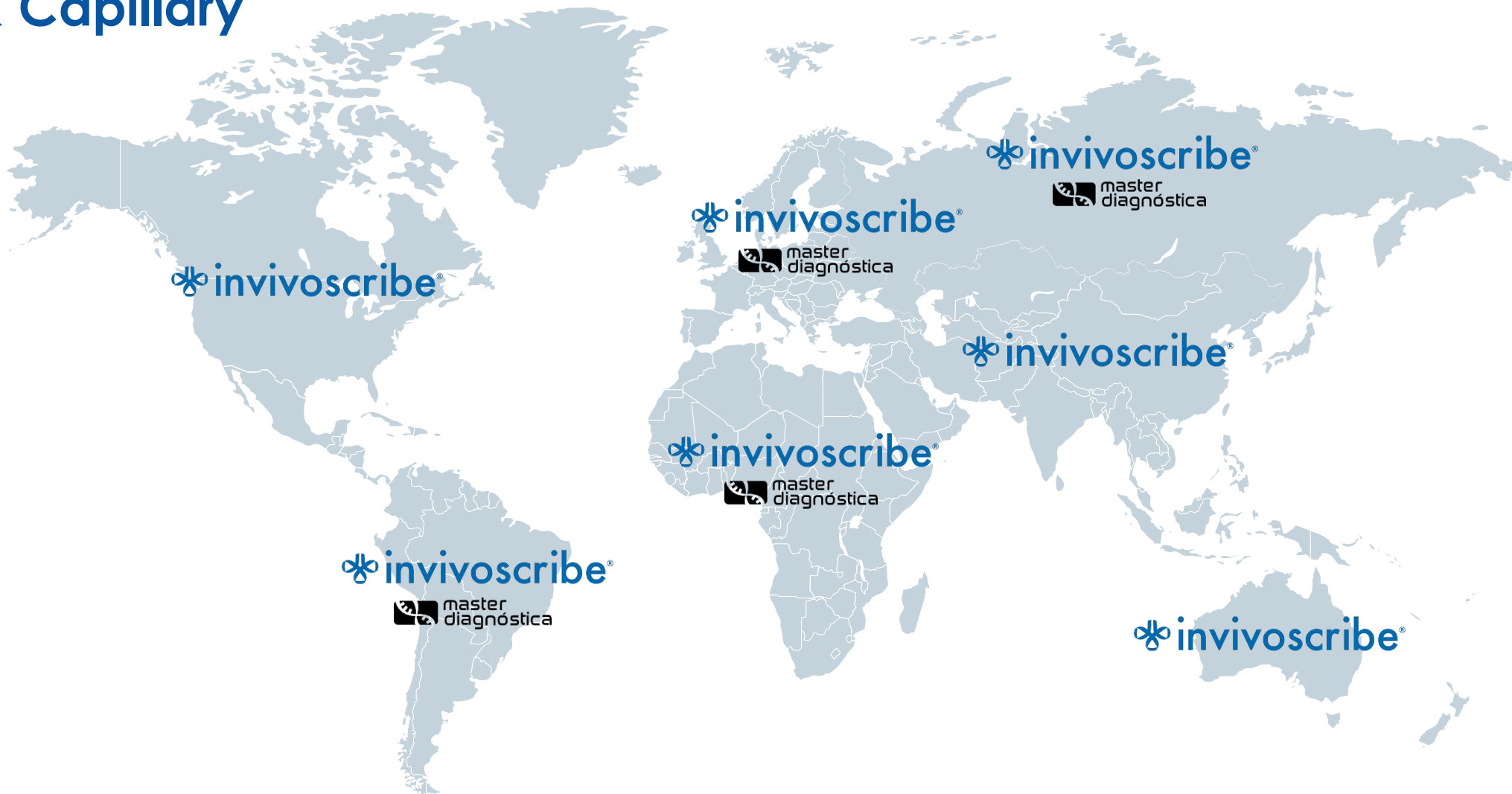
IVS vs. Main Competitors

	Gel &/or Capillary	B- and T-Cell Kits	BIOMED-2 based	Mut. and Transloc. Kits	Controls	RUOs	CE-IVDs
Invivoscribe	✓	✓	✓	✓	✓	✓	✓
Master Diagnostica	✓	✓	X	✓	X	X	✓
AB Analitica	✓	✓	X	✓	X	X	✓
Experteam	✓	✓	X	✓	X	✓	✓
Dia-Chem	✓	✓	X	✓	X	✓	✓

Main Competition by Region





Gel & Capillary



Invivoscribe vs. Master Diagnóstica



 master diagnóstica	 invivoscribe®
Gel and Capillary	Gel, Capillary and NGS
<i>IGH, IGK, IGL, TRG, TRB, t(14;18) and t(11;14)</i>	<i>IGH, IGK, IGL, TRG, TRB, TRD, t(14;18) and t(11;14) – BIOMED-2 design</i>
Amplification mix provided in colored 0.2 mL PCR tubes	Not limited to tube size = Flexibility
Customer feedback: unsatisfied with kit technical performance requirements and with kit handling*	Customers satisfied with products and tech support
Agarose gels – Resolution not sufficient to discern a monoclonal band from a polyclonal smear	PAGE gels – Necessary for heteroduplex analysis

*As reported by distributors in Europe

Competing Companies' Offerings

NGS Products



Shared Market Space NGS



IVS vs. Main Competitors

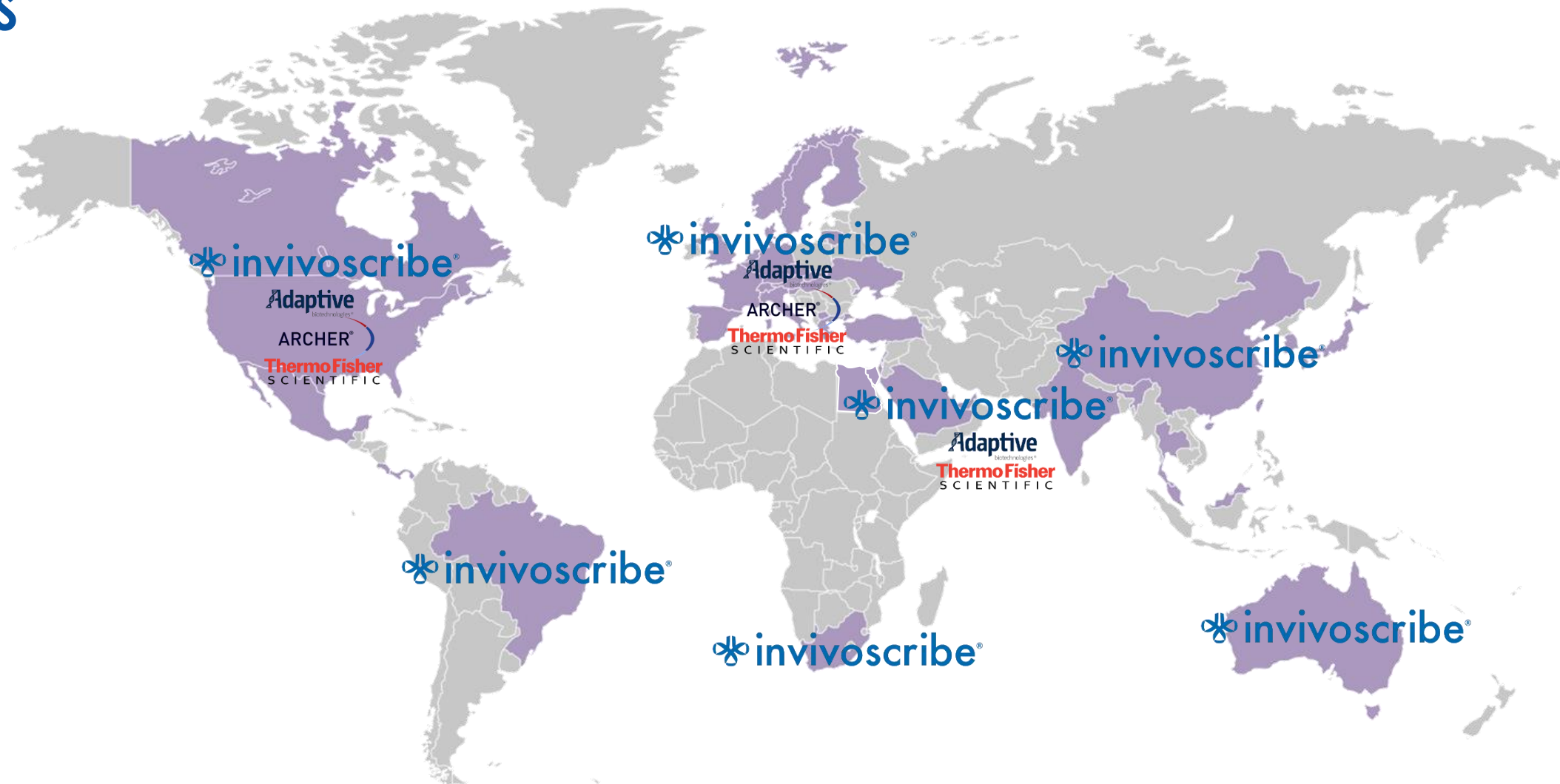
	Global Presence				Service Accreditations			Products					
	US	Europe	Asia	ROW	CAP/CLIA	NY State	DAKKS	Illumina NGS	Ion Torrent NGS	IVD (submitted to regulatory body)	Stand Alone Software	LIMS Compatible Output	Raw data available
invivoscribe®	●	●	●	●	●	●	●	●	●	●	●	●	●
Adaptive biotechnologies®	●	●	●		●	●	●	●					
ARCHER®	●	●	●		●			●			● *	● *	
ThermoFisher SCIENTIFIC Precision Oncology	●	●	●	●	Centers of Excellence				●		● *	● *	

*stand alone software comes at a heavy price and requires additional customization (without database access)

Main Competition by Region



NGS



NGS Market Players



clonoSEQ®

- FDA-cleared IVD assay to detect and monitor MRD (Single-site service)
- BM sample from CLL, MM, and ALL
- Available as RUO kit in EU

immunoSEQ®

- Service in *TCRB, TCRG, TCRA/D, IGH*
- TCRB Kit
- Service and product both in RUO



Immunoverse™

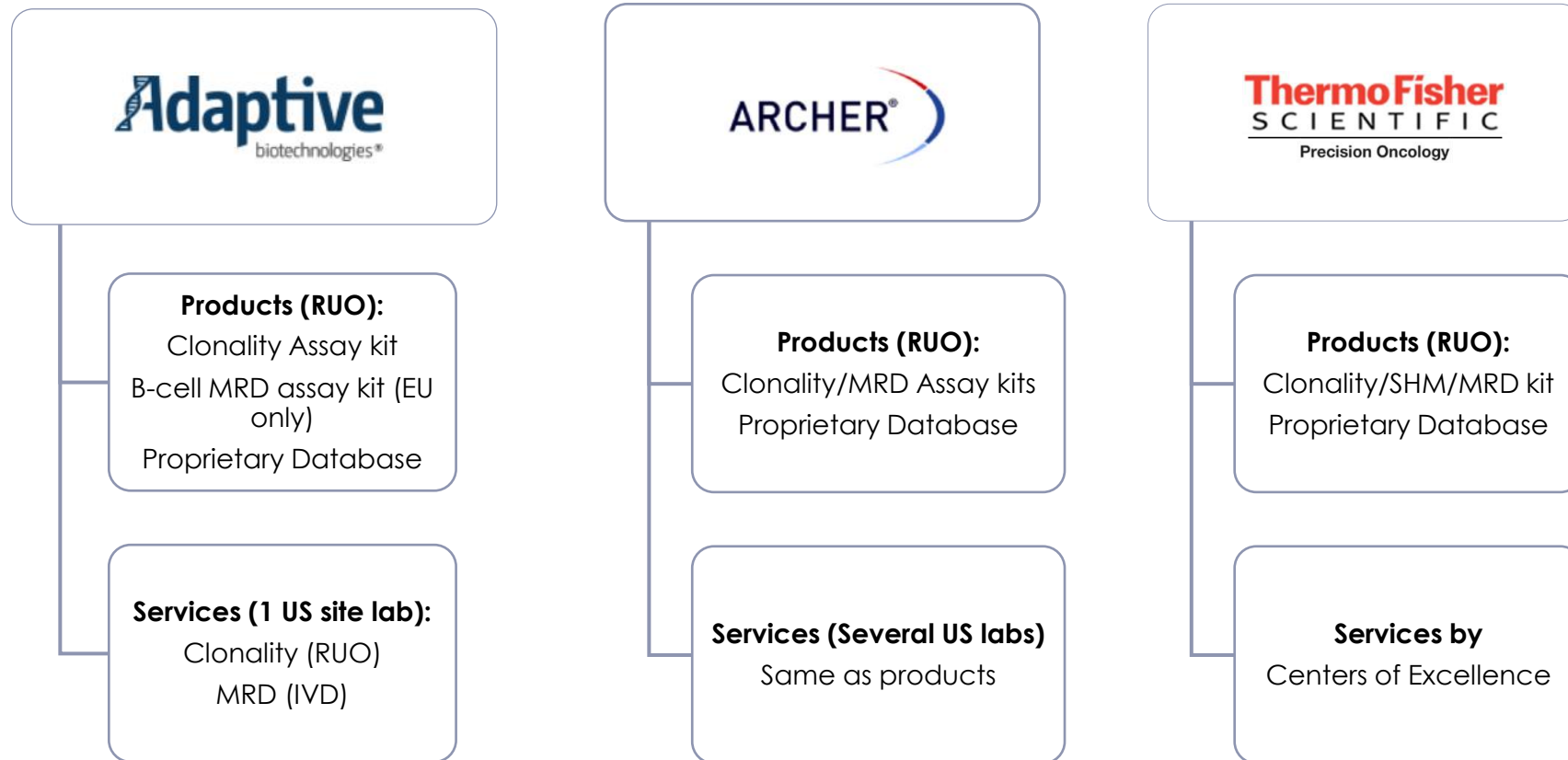
- RNA-Based immune repertoire analysis (Kit and Service)
- *IGH, IGK and IGL; TCRB, TCRG, TCRA and TCRD*
- Cloud-Based analysis or local analyzer
- Both kit and service in RUO only



Oncomine

- *BCR IGH* and *TCRB LR* and SR(DNA/RNA) assays
- Clonality, SHM and MRD
- Local analyzer with pricey annual subscription fee
- RUO only

NGS Market Players - Overview



Proprietary Database



Raw sequencing data



Report

Key Invivoscribe Benefits vs. Archer



Reagents

- Archer kits only available as Research Use Only (RUO)

Global Distribution

One-Step Library Prep

- Archer Kits Require More Steps = Contamination Risk Increased

MiSeq[®] and Ion S5/PGM[™]

- Archer Supports Solely Illumina Systems

Price

IVS benefits vs. Adaptive and ThermoFisher



RUO and CE-IVD Assays for *IGHV*, *IGH FR1/2/3*, *IGK*, *TRB* and *TRG* vs.

- Adaptive: Service Focused - Only *TRB* RUO kit for MiSeq®/HiSeq®
- ThermoFisher: Only *TRB* and *BCR IGH* RUO kit for Ion S5™

Single-step PCR – Simplified Workflow vs.

- Two-step PCR (with ligation) – additional possibility of contamination

Included Bioinformatics

- Cloud based analysis – labs don't like sending data out of lab

Competitive pricing

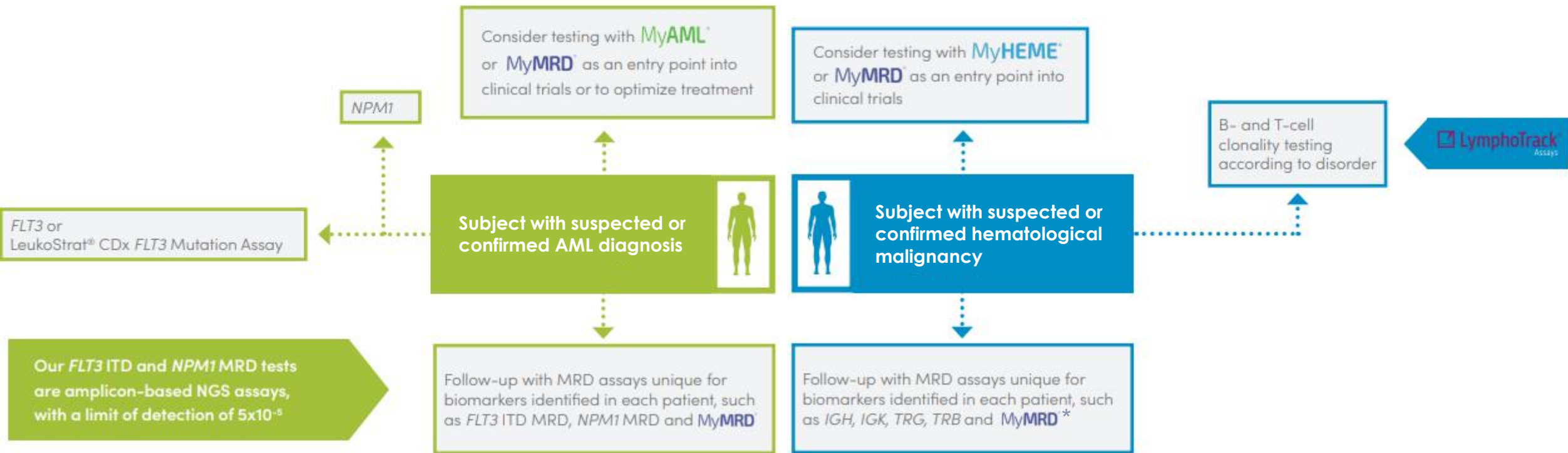
- Adaptive and Thermo's reagents are much more expensive
- Thermo's local analyzer with pricey annual subscription fee

Competing Companies' Offerings

NGS Services



Invivoscribe Services Testing Guide



* These services are Research Use Only (RUO)
MyMRD and MyHEME are RUO

Market Space



Only one Laboratory
located in US

clonoSEQ®
immunoSEQ®

immunoSEQ Analyzer



Certified Laboratories
located in US

Immunoverse™

ARCHER
Analysis



Offered via Centers of
Excellence

Oncomine™

Ion Reporter

Competing Companies' Offerings

MRD



Adaptive and MRD: ClonoSEQ



Claims

- Cleared by the FDA for the detection and monitoring of MRD in bone marrow samples from CLL, MM and B-ALL patients
- Available for use in other lymphoid cancers as a LDT
- Intend to expand the FDA label indications to include Non-Hodgkin Lymphoma (NHL) and whole blood as a sample type
- \$1800 per time point

Reagent Set

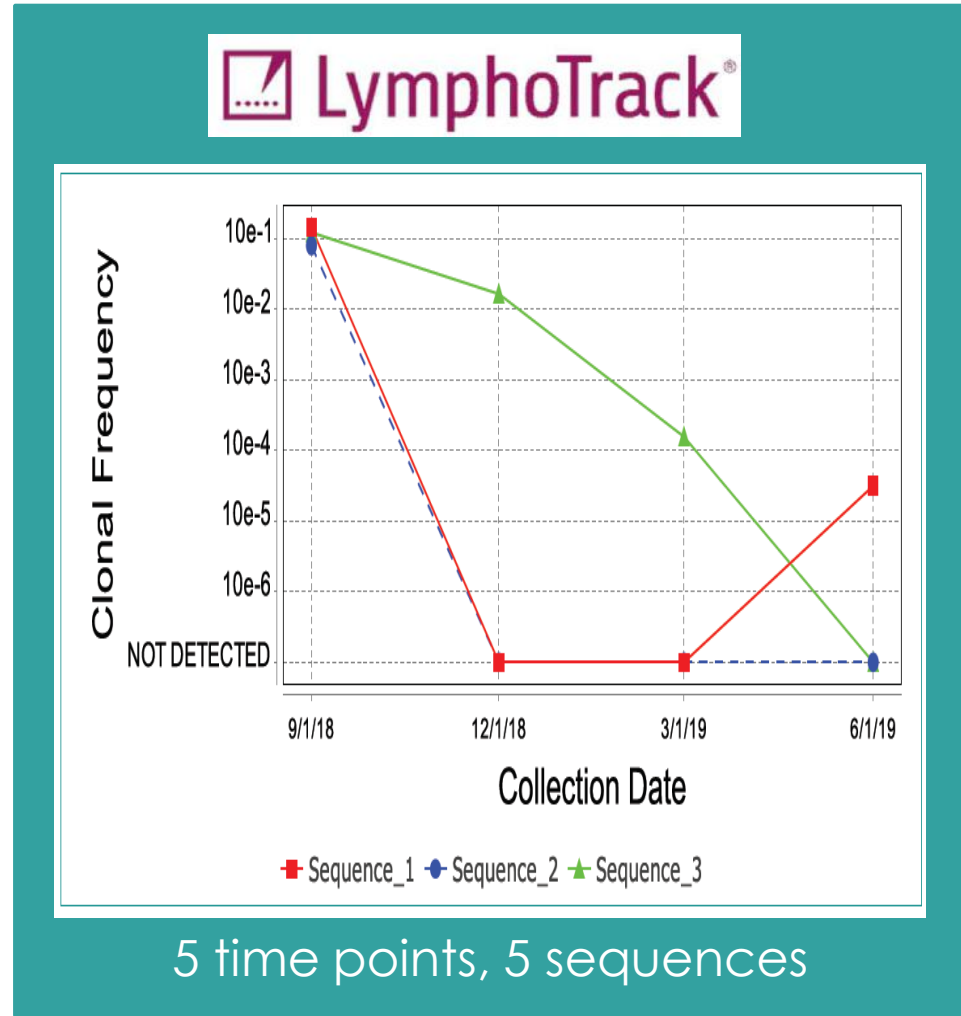
- Currently offered as a kit in EU (CE marked)

Targets

- *IGH* (VDJ), *IGH* (DJ), *IGK*, and *IGL* receptor gene sequences
- Translocated *BCL1/IGH* (J) and *BCL2/IGH* (J) sequences
- Housekeeping gene (HKG)

Note: This is only offered as a service in the US.

Invivoscribe vs. Adaptive



clonoSEQ® is an in vitro diagnostic (IVD) test service provided by Adaptive
 Report obtained on October 27 2020 from https://www.clonoseq.com/wp-content/uploads/NP-US-cSEQ-0006-1_clonoSEQ_ReportsWalkthrough_WEB.pdf



Claims

- Workflow using the Ion Chef templating system and Ion GeneStudio S5 sequencing system
- DNA or RNA needed for *TCRB* SR and for LR assay RNA is needed as starting material prior to cDNA synthesis
- *BCR IGH-LR* Assay LOD of 10^{-4}
- *BCR IGH-SR* Assay LOD of 10^{-6}
- Higher prices per reaction compared to IVS

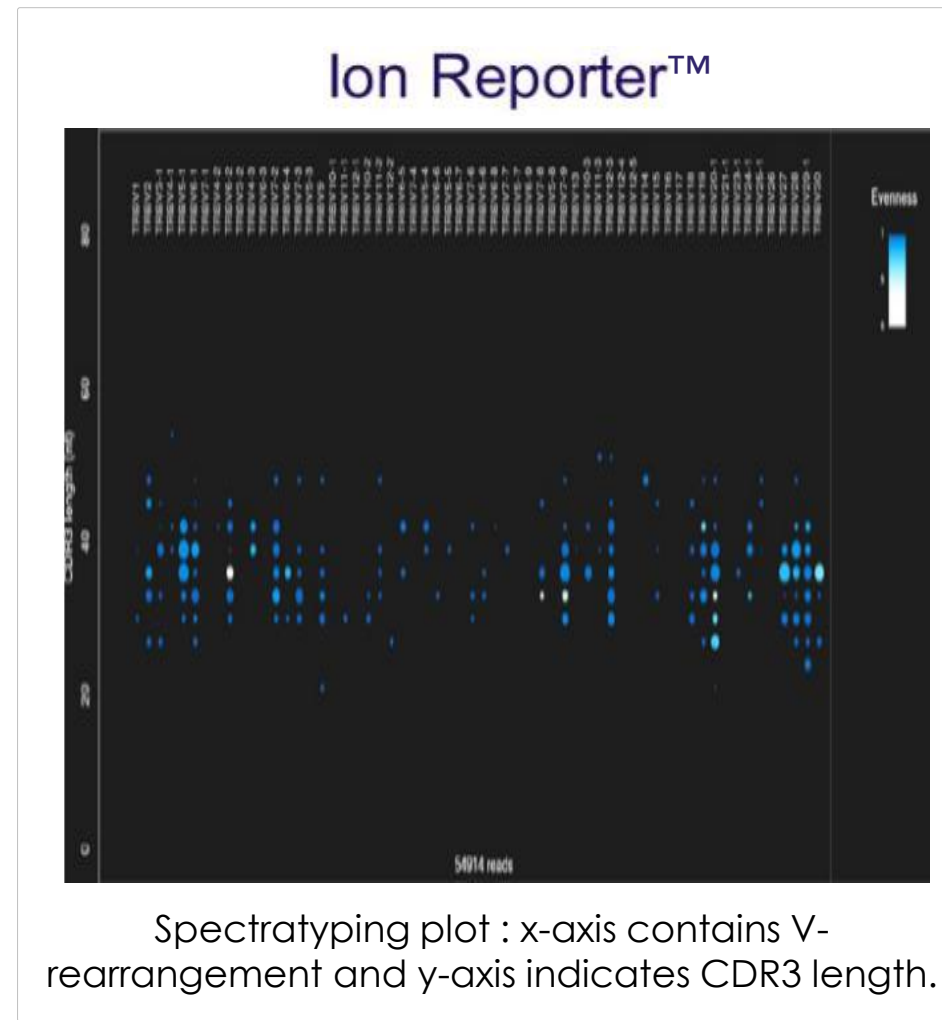
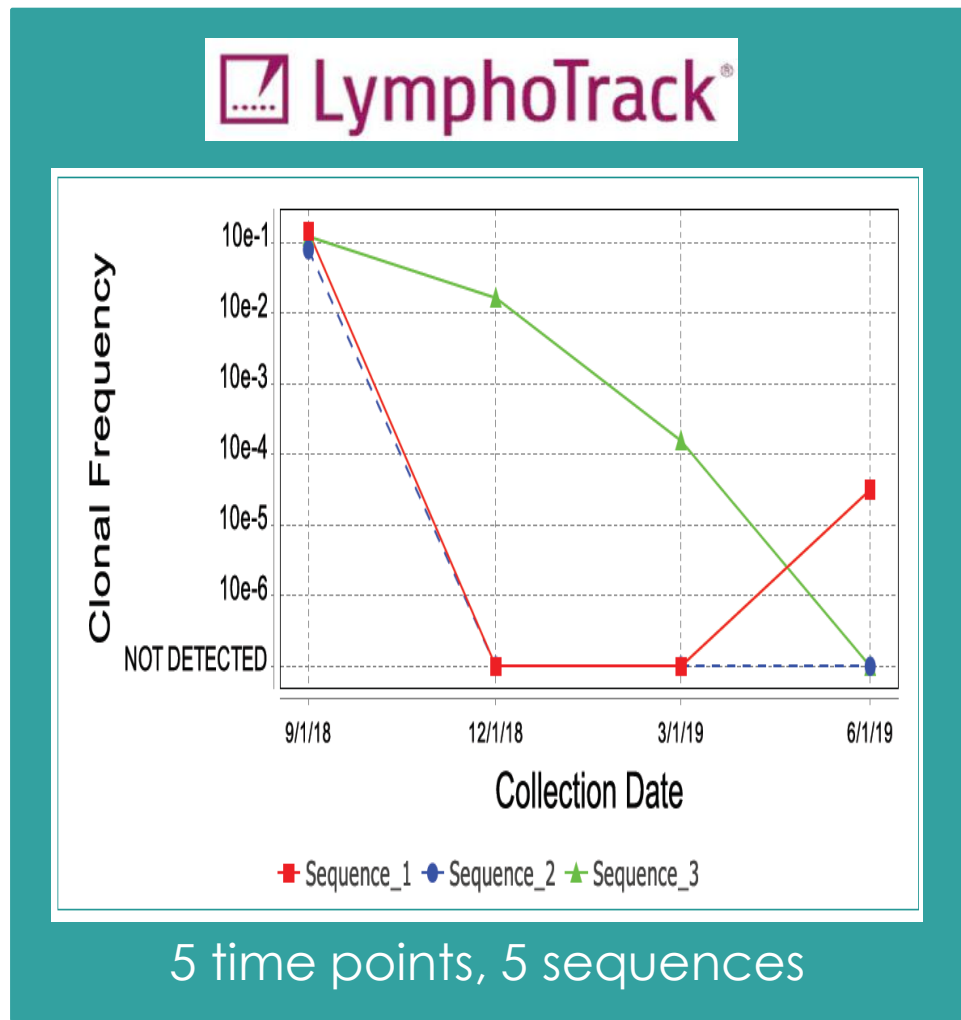
Reagent Set

- Currently offered as a kit in EU (RUO)

Targets

- *TRB*, *BCR IGH (VDJ)*, *BCR IGH (DJ)*

Invivoscribe vs. ThermoFisher



Ion Reporter[™] is trademark of Thermo Fisher Scientific or its subsidiaries.

Key Invivoscribe Advantages



Diverse Portfolio / Global Distribution

- Available RUO and CE-IVD
- Includes controls, reagents and assay kits
- Comprehensive:
 - Kits and services
 - Panels, B and T-cell solutions
- Standardized methods and analyses
- Expertise: specialize in hemato-oncology assays

Simplified Workflow

- One-Step Library Prep
- Faster Time-to-Result
- Scalable – decreases cost

Stand-Alone Software (complimentary)

- Raw data available for LIMS integration
- No network requirements
- No need to compromise confidential patient data in the cloud

Take Home Message – LymphoTrack[®] (Dx) Assays

- Compatible with full range of specimen types
- One-step PCR
- Multiplexing - reduces costs
 - Combine Multiple Samples - up to 12 (S5/PGM[™]) & 24 (MiSeq[®])
 - Combine Multiple Assays - up to 72 or 168 samples
- Unparalleled sensitivity
 - Unparalleled clonality detection with the ability to identify and track the specific sequence of clonal populations for MRD studies.
- Analysis Software is included with all assays free of charge

Quiz





Which company exclusively focuses on Hemato-oncology solutions?

1. Invivoscribe
2. Master Diagnóstica
3. Thermo Fisher Scientific
4. Archer Dx



Which companies provide both products and services?

1. Invivoscribe
2. Adaptive Biotechnologies
3. Thermo Fisher Scientific
4. Archer Dx
5. All of the above



Which assay from Adaptive Biotechnologies is FDA approved?

1. ClonoSEQ
2. ImmunoSEQ



Which NGS assay utilizes 1 step PCR in library preparation?

1. LymphoTrack from Invivoscribe
2. ImmunoSEQ from Adaptive Biotechnologies
3. Immunoverse from Archer Dx



Which company provides complimentary Stand-Alone Software?

1. Invivoscribe
2. Adaptive Biotechnologies
3. Thermo Fisher Scientific
4. Archer Dx