4150 TapeStation System:

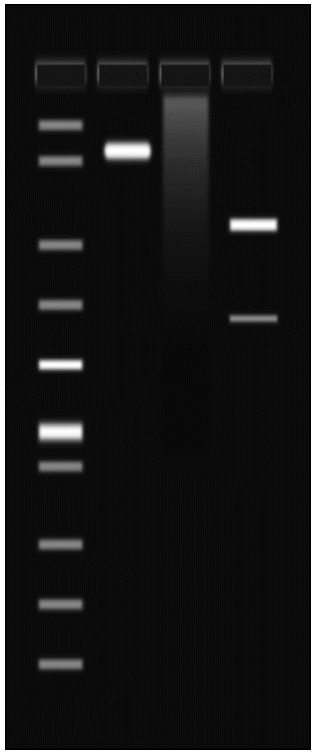
A complete solution for end-to-end electrophoretic quality control of **DNA** and **RNA** samples



DNA / RNA Electrophoresis







Assay

Miniaturization – Scale
Miniaturization – Speed
Automation – Simple



Introducing the 4150 TapeStation System



Made in Germany

Size: W25.4 x H41.7 x D51cm

Weight: 17.8kg

Complete System includes

- TapeStation Software
  (no license - free upgrades on webpage)
  - TapeStation Controller
  - TapeStation Analysis Software
- Vortexer with adaptor
- Plastic consumable start up kit
- TapeStation Test Tape
- ScreenTape Assay Quick Guides
- Installation & Familarization service

4200 TapeStation Instrument

Open Lid



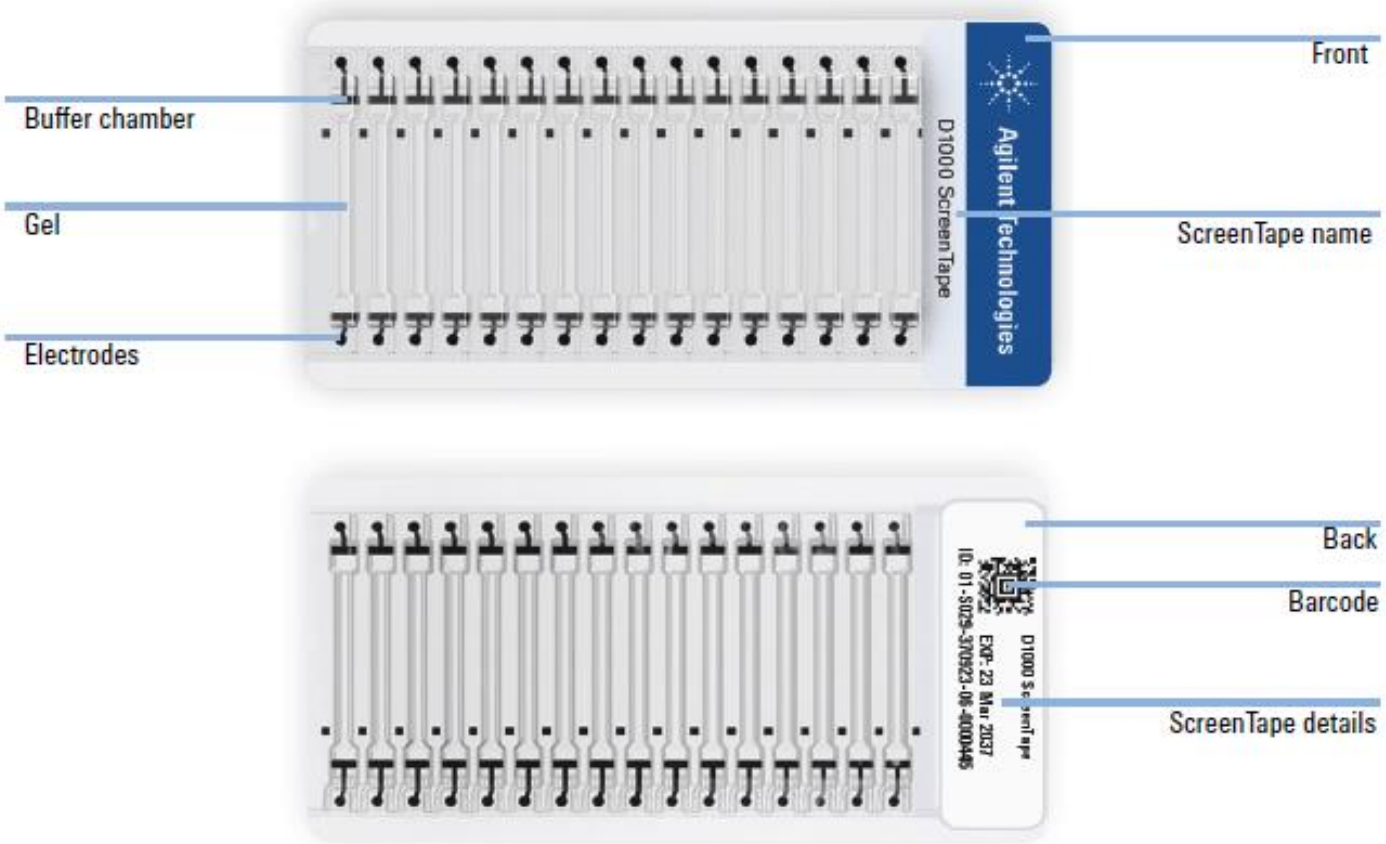
All moving parts covered

Instrument locked during run

Status Indicator

Power Button

Agilent ScreenTape Overview

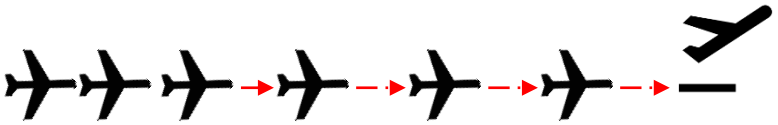


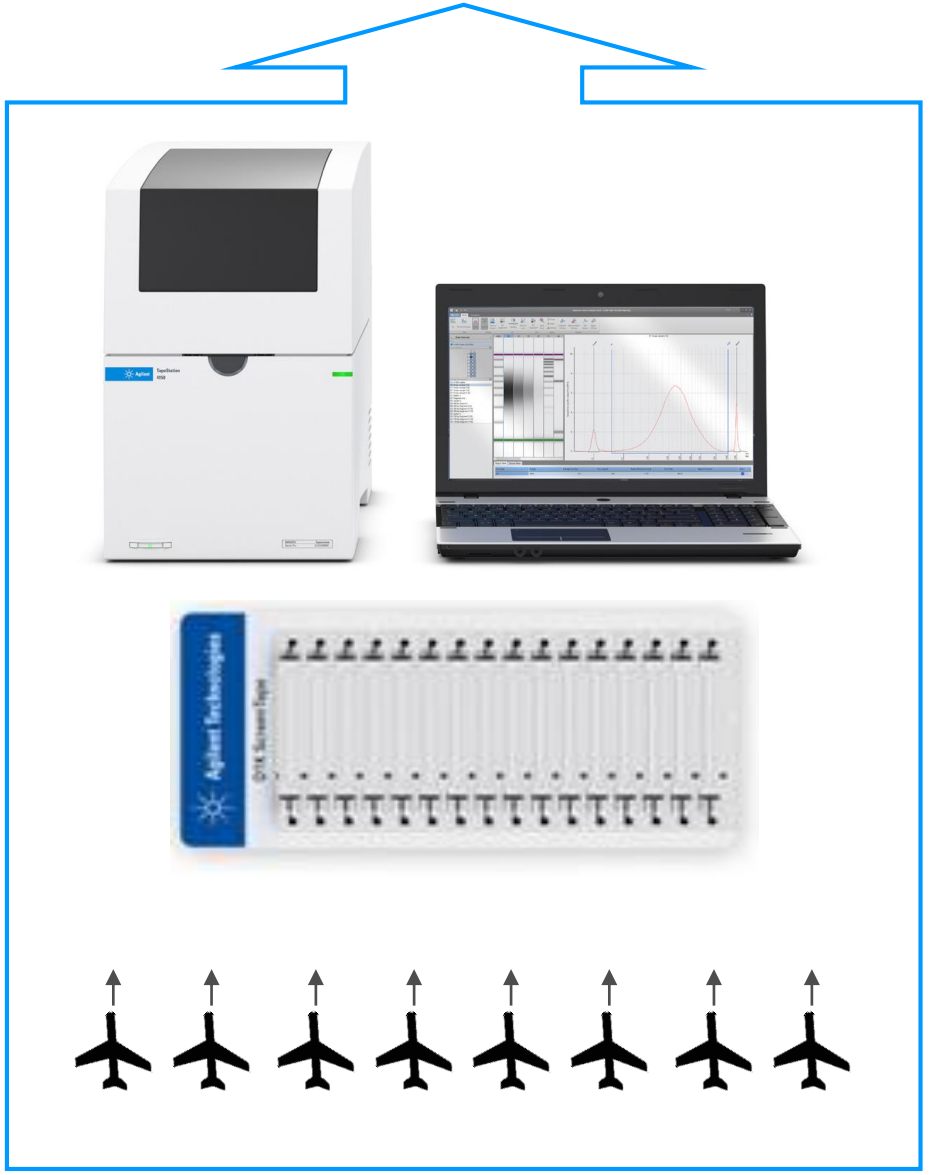


- **Ready to use:** ScreenTape is prefilled with separation matrix and running buffer. No long temperature equilibration or a need to prime
- **Electrodes incorporated:** eliminates the risk of cross contamination.
- **Variable throughput:** 1 to 96 samples can be run per experiment
- **Constant Cost – regardless sample number:** unused lanes can be kept for up to two weeks

2100 Bioanalyzer and 4150 TapeStation







4200/4150 TapeStation ScreenTape Portfolio

more details in appendix

	DNA					RNA		
	D1000	HS D1000	D5000	HS D5000	Genomic DNA	RNA	HS RNA	Cell-free DNA assay
Sizing range	35 to 1000bp	35 to 1000bp	100 to 5000bp	100 to 5000bp	200 to >60kbp	100 to 6000nt	100 to 6000nt	50–800 bp
Required sample volume	1µl of sample	2µl of sample	1µl of sample	2µl of sample	1µl of sample	1µl of sample	2µl of sample	2 µL
Quantification range	0.1 – 50ng/µl	10 – 1000pg/µl	0.1 – 50ng/µl	10 – 1000pg/µl	10 – 100ng/µl	25 – 500ng/µl	500 – 10,000pg/µl	100–5000 pg/µL
Limit of detection	LOD 0.1 ng/uL	LOD 5 pg/uL	LOD 0.1 ng/uL	LOD 5 pg/uL	LOD 0.5 ng/uL	LOD 5 ng/µL	LOD 100 pg/µL	20 pg/µL
					DNA Integrity Number (DIN)	RNA Integrity Number equivalent (RIN[e])		%cfDNA





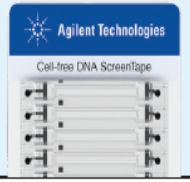






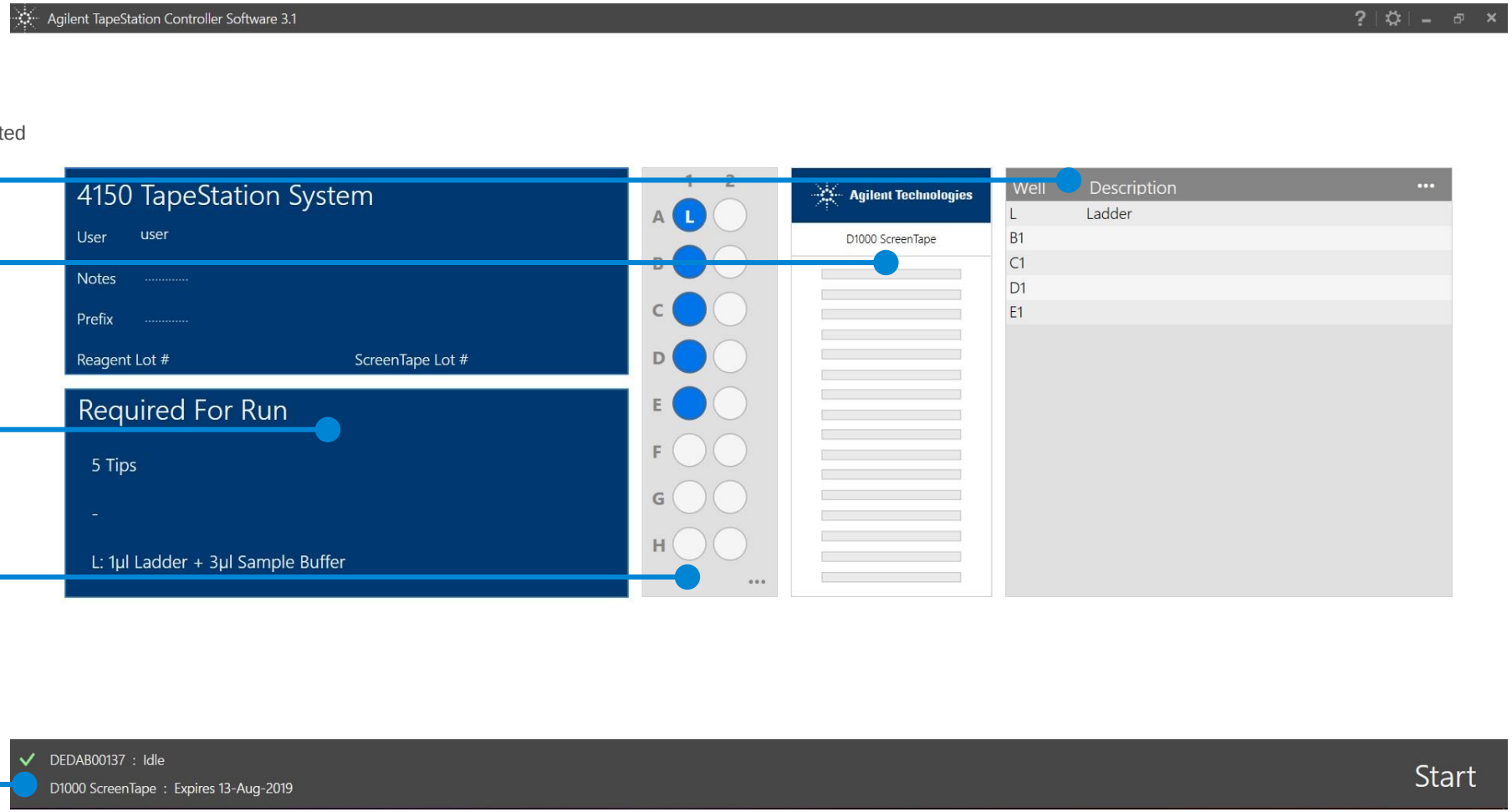






Agilent 4150 TapeStation Controler Software

Easy and automated



Easy population of sample descriptions
Sample names can be entered by copy/pate or imported from a previous file

Automatic Assay Selection
Barcode recognises assay type and available number of ScreenTape lanes for analysis

Required Consumables
Software calculates the required consumables based on number of samples for analysis

Intuitive sample selection
Full flexibility for sample selection independent on sample location.

System status & Observations
Status, warnings and errors are displayed in the task bar

Agilent TapeStation Analysis Software

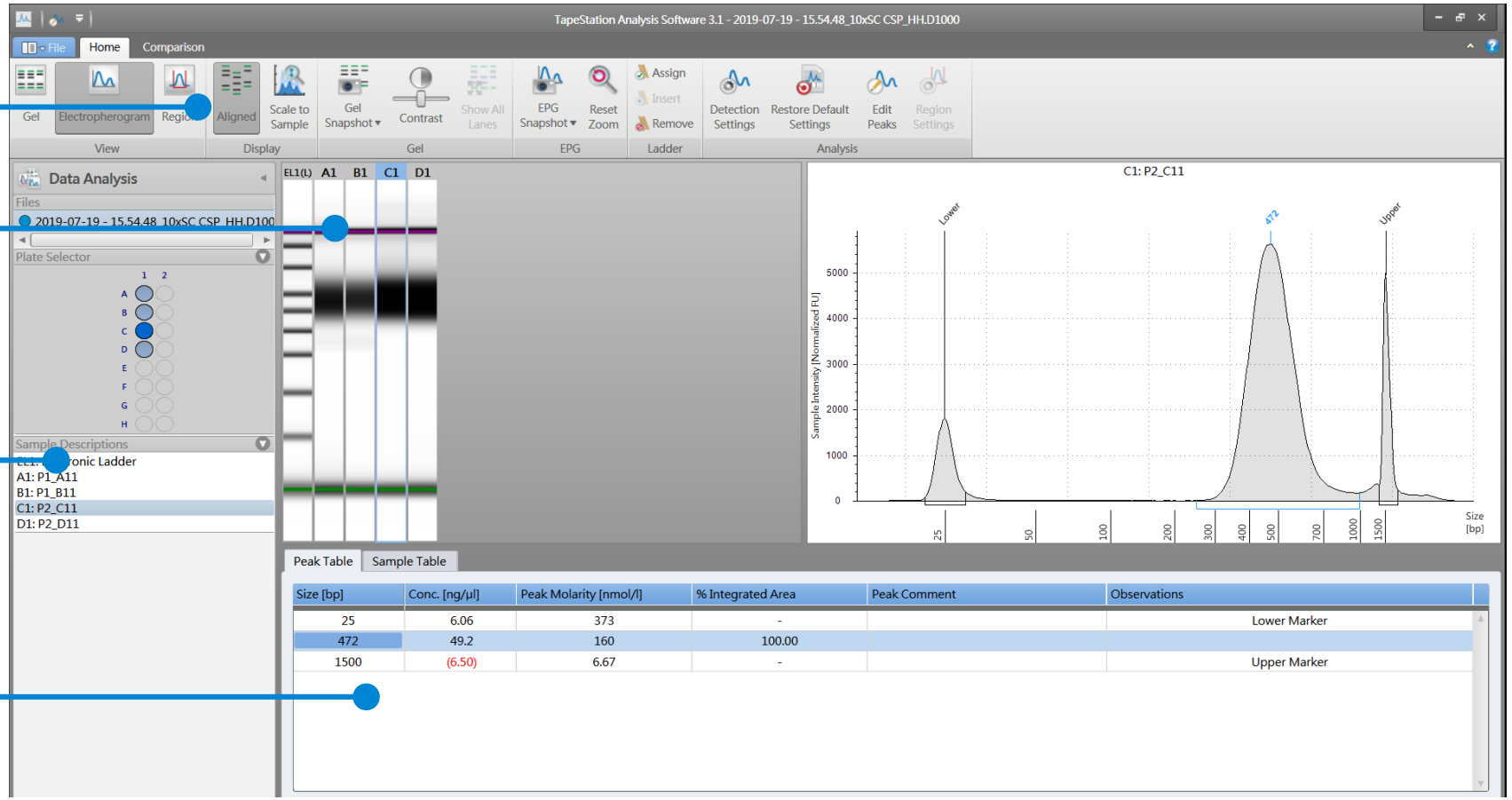
Intuitive and familiar

Analysis Functions
Functions are navigated through a context sensitive ribbon.

Gel and Electropherogram View
Results can be viewed in familiar gel view or Electropherogram view.

Navigation pane
Navigate through experiments and individual lanes. Lanes can be selected in any order from the Plate Selector.

Result Presentation
Customisable views of gel image, eletropherogram and data table.







A complete solution for complete success

Automated – walk-away operation with fully automated sample processing

Scalable – 1 up to 16 samples at constant cost / sample

Flexible – ready-to-use ScreenTape technology enable easy switching between assays

Fast – reliable results within 1-2 minutes / sample

TapeStation System - **DNA Applications**

DIN

Genomic DNA QC

NGS Workflow Sample QC

Multiplex PCR analysis



cDNA library QC

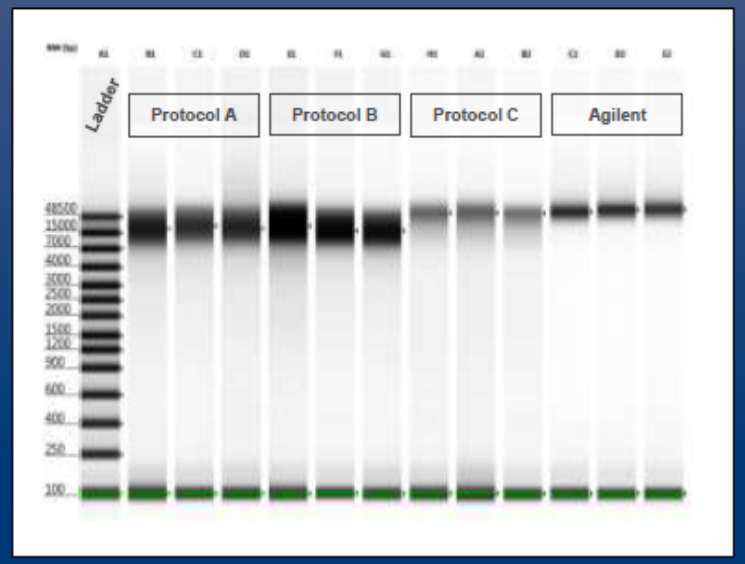
Veterinary diagnostics

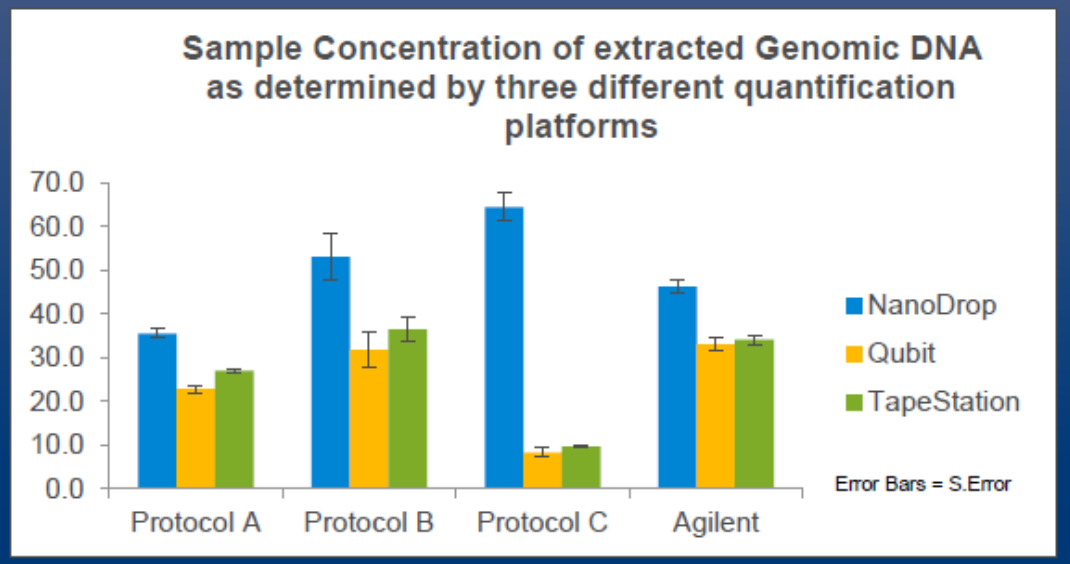
Mycoplasma detection

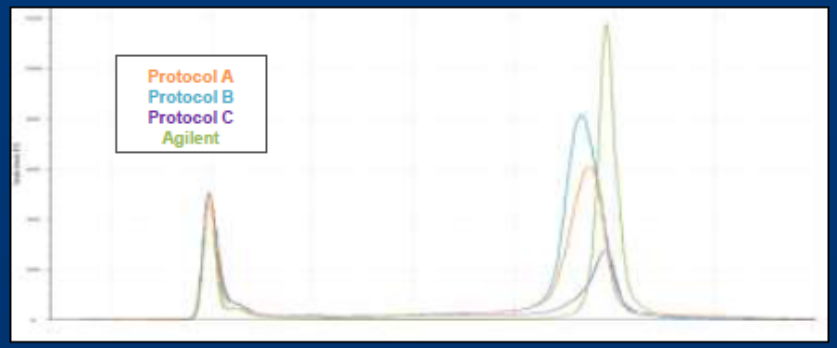
Genotyping

qPCR product QC

Genomic DNA ScreenTape Analysis







Analysis of high molecular weight genomic DNA using the Agilent 2200 TapeStation and Genomic DNA ScreenTape

Determining extraction kit efficiency

Download the application note:

http://www.chem.agilent.com/Library/applications/5991-1797EN.pdf

Introducing the DNA Integrity Number (DIN)
A new standard for genomic DNA QC



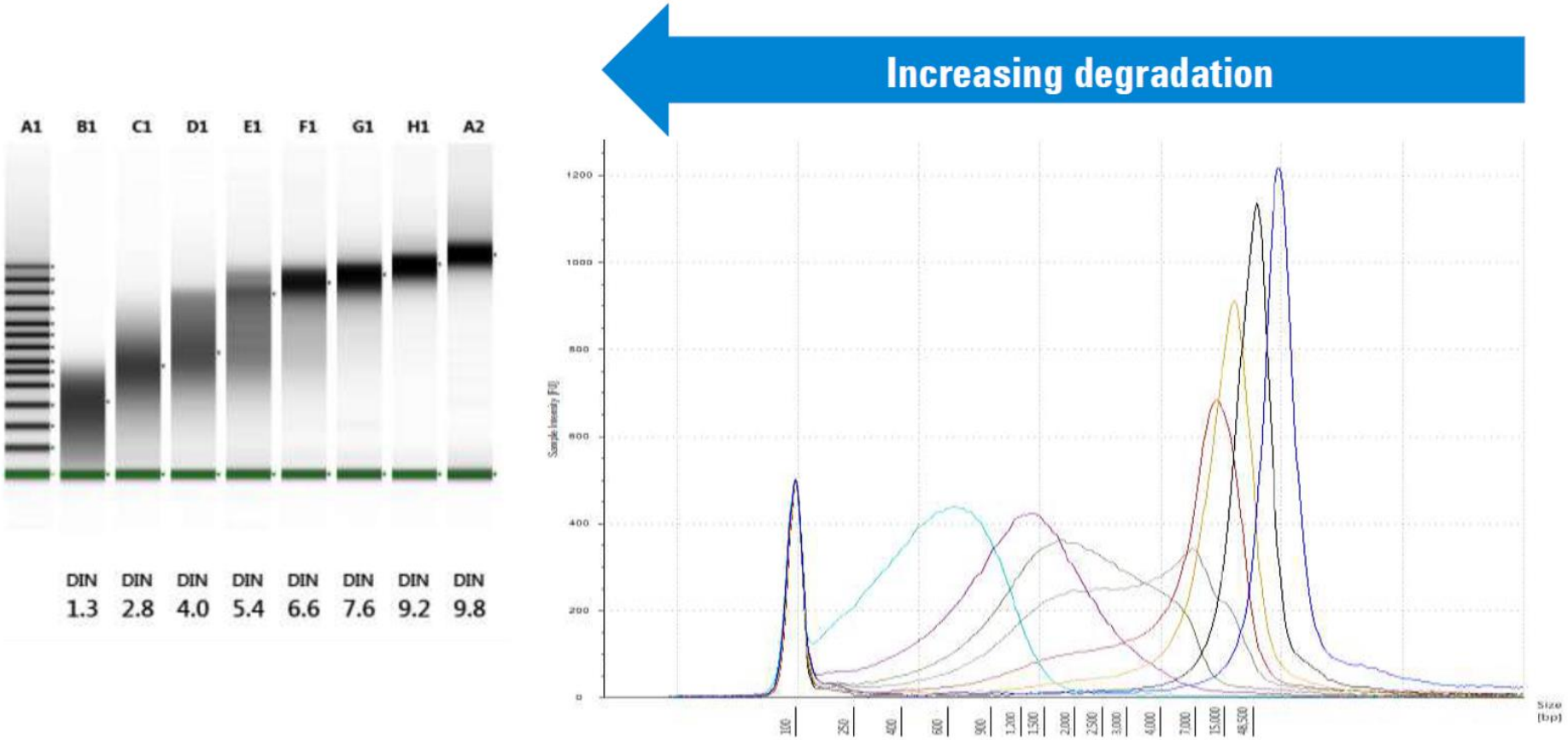
DIN functionality for the Genomic DNA ScreenTape assay.

- Automated numerical software assessment of sample integrity.
- Independent of sample concentration and analyst.
- full range of eukaryotic samples from degraded to intact gDNA.

Benefits:

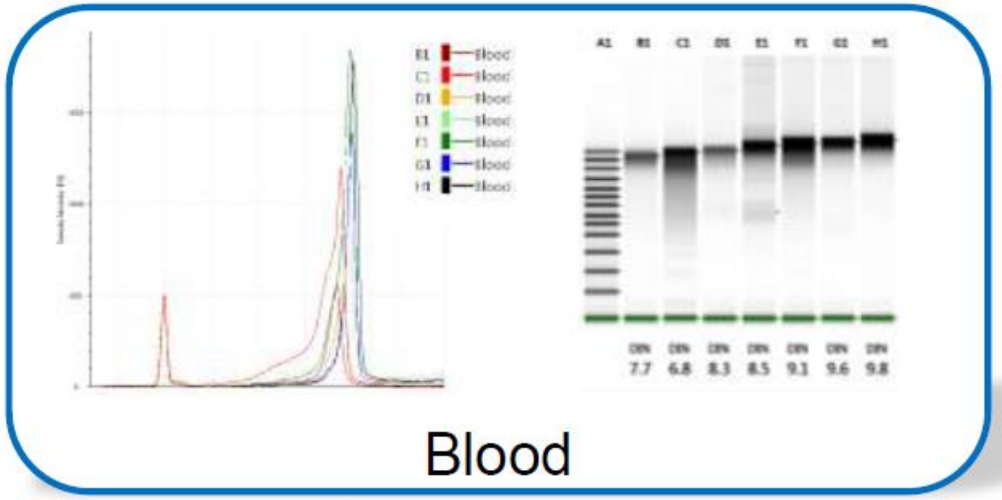
- Easy interpretation of results.
- Ensures repeatability of experiments.
- Enables comparison of samples by defining a DIN value or threshold for specific type of samples or preparation

DNA Integrity Number (DIN) measures DNA Integrity across the widest range of samples

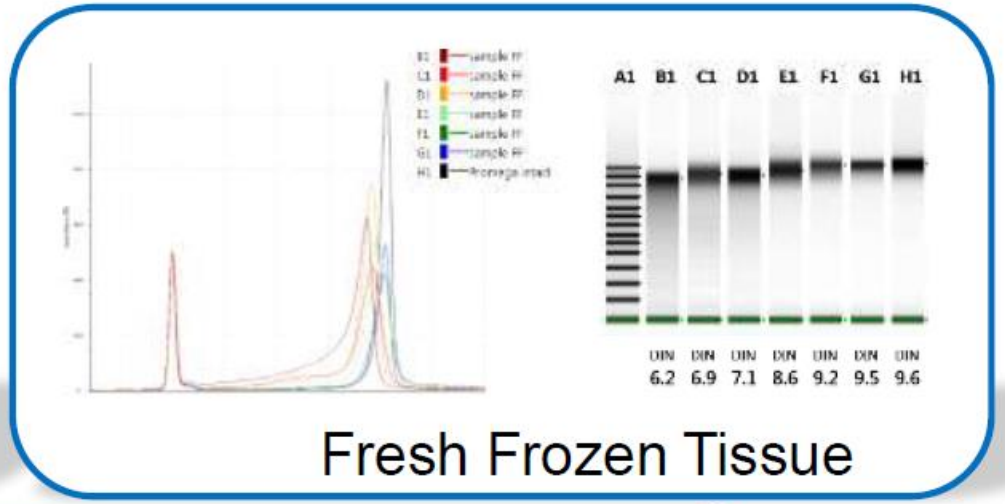


Automatic assignment of an integrity number in the range of 1 to 10 (highly degraded to highly intact).

Example DNA Integrity Number (DIN) results from various eukaryotic tissue samples

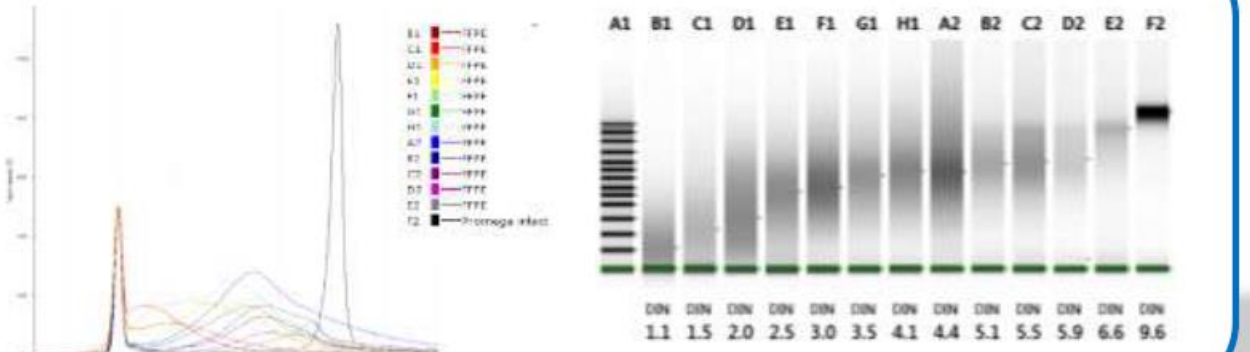


Blood

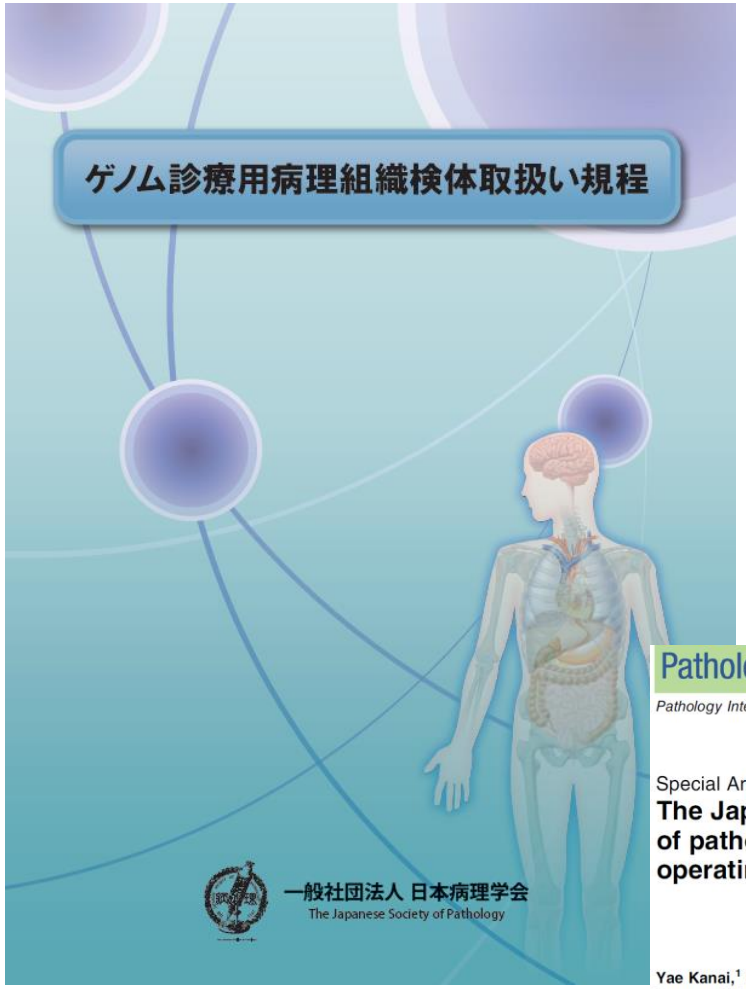


Fresh Frozen Tissue

FFPE



The Japanese Society of Pathology Guidelines on the handling of pathological tissue samples for genomic research



Pathology International

Pathology International 2018; **68:** 63–90 doi:10.1111/pin.1

Special Article

The Japanese Society of Pathology Guidelines on the handling of pathological tissue samples for genomic research: Standard operating procedures based on empirical analyses

Yae Kanai,[1] Hiroshi Nishihara,[2] Yohei Miyagi,[3] Tatsuhiro Tsuruyama,[4] Kenichi Taguchi,[5] Hiroto Katoh,[6] Tomoyo Takeuchi,[7] Masahiro Gotoh,[8] Junko Kuramoto,[1] Eri Arai,[1] Hidenori Ojima,[1] Ayako Shibuya,[9] Teruhiko Yoshida,[8] Toshiaki Akahane,[10] Rika Kasajima,[3] Kei-ichi Morita,[11] Johji Inazawa,[11] Takeshi Sasaki,[12] Masashi Fukayama[12] and Yoshinao Oda[13]

表4　FFPE検体の核酸品質確認のための主な指標

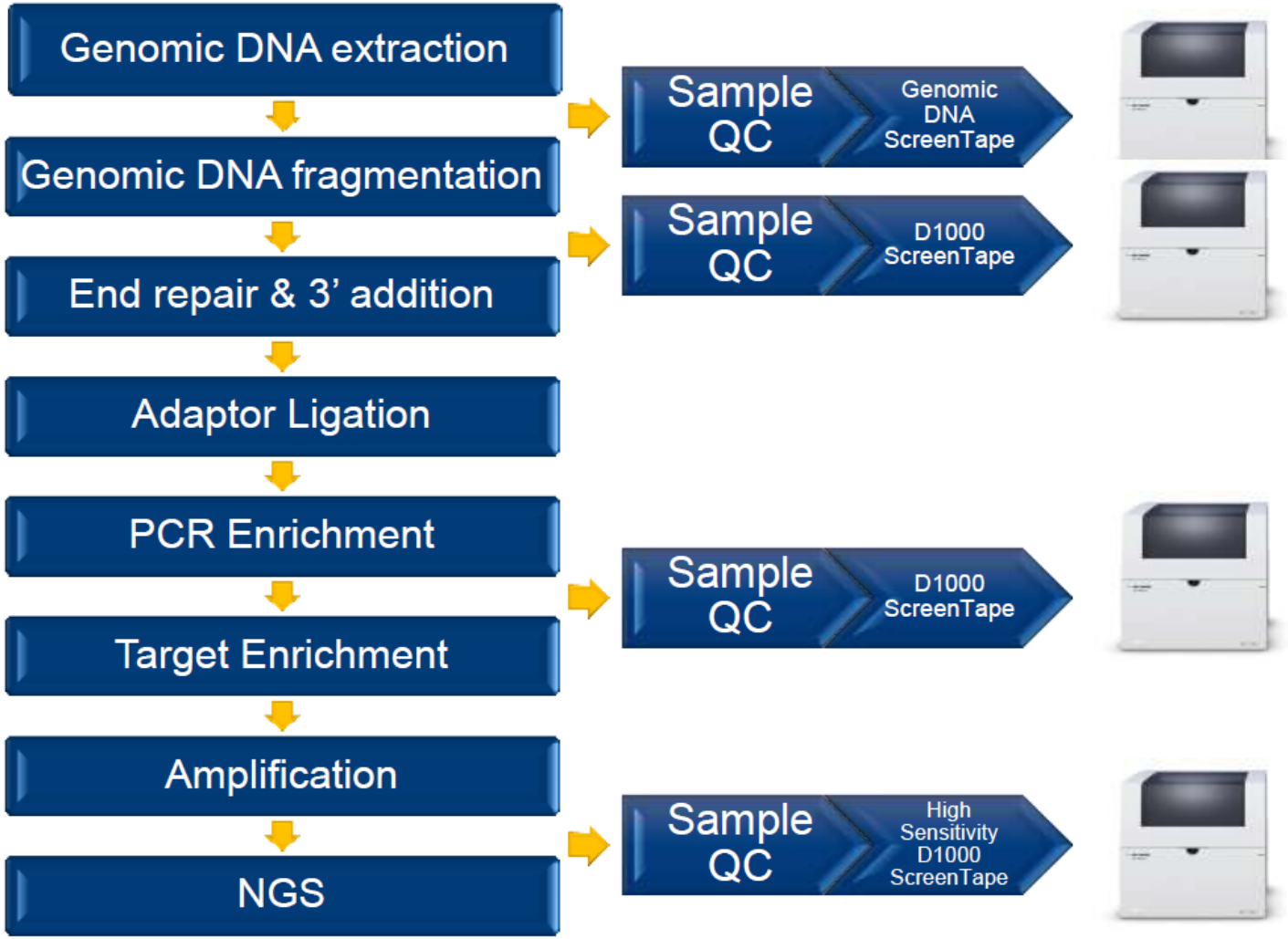
指　標	対　象	説　　明
Ct値/ΔCt値	DNA/RNA	リアルタイムPCR (DNA)もしくはリアルタイムRT-PCR (RNA)法により得られるCt値を用いて核酸品質を評価する方法で，特殊な機器を必要としない簡便な方法である．DNA品質評価では，異なる長さの2種のアンプリコンサイズ (例：50～100 bp程度の短鎖アンプリコンと，100～300 bp程度の長鎖アンプリコンなど)から得られるCt値の差 (ΔCt値)を指標とする方法が，一般に用いられている．国内大規模ゲノムスクリーニング研究 (SCRUM-Japan/GI-SCREEN試験[文献25])においては，2000例を超えるFFPE検体に対し，Thermofisher社が開発したΔCt値アッセイが行われ，その有用性が示されている．
DIN	DNA	DIN (DNA Integrity Number)はアジレント社のAgilent 2200/4200 TapeStationシステムを用いたGenomic DNA ScreenTape assayで測定したデータをgDNAの分解度に応じて1～10にスコア化された値であり，FFPE検体のDNA品質評価が可能である．
Q-value	DNA	Q-valueは国立がん研究センター中央病院が開発したDNAの品質指標であり[文献25]，リアルタイムPCR法を用いて得た測定値 (Ct値)を蛍光法による測定値(dsDNA濃度)で割った値である．Q-value 0.2以上におけるシーケンス(NCCオンコパネルv2使用時)の成功率は約85%である．
DV_{200}	RNA	DV_{200}はイルミナ社が開発したRNAの品質指標であり，AATI社のFragment Analyzer またはアジレント社のAgilent 2100 bioanalyzerを用いて，200ヌクレオチド以上のRNA断片の割合を算出する．DV_{200}による品質区分は，>70%の場合はHigh，50～70%の場合はMedium，30～50%の場合はLow，<30%はToo degradedとしており，<30%のFFPE検体では，RNAシーケンスのライブラリー調製への使用を推奨していない．

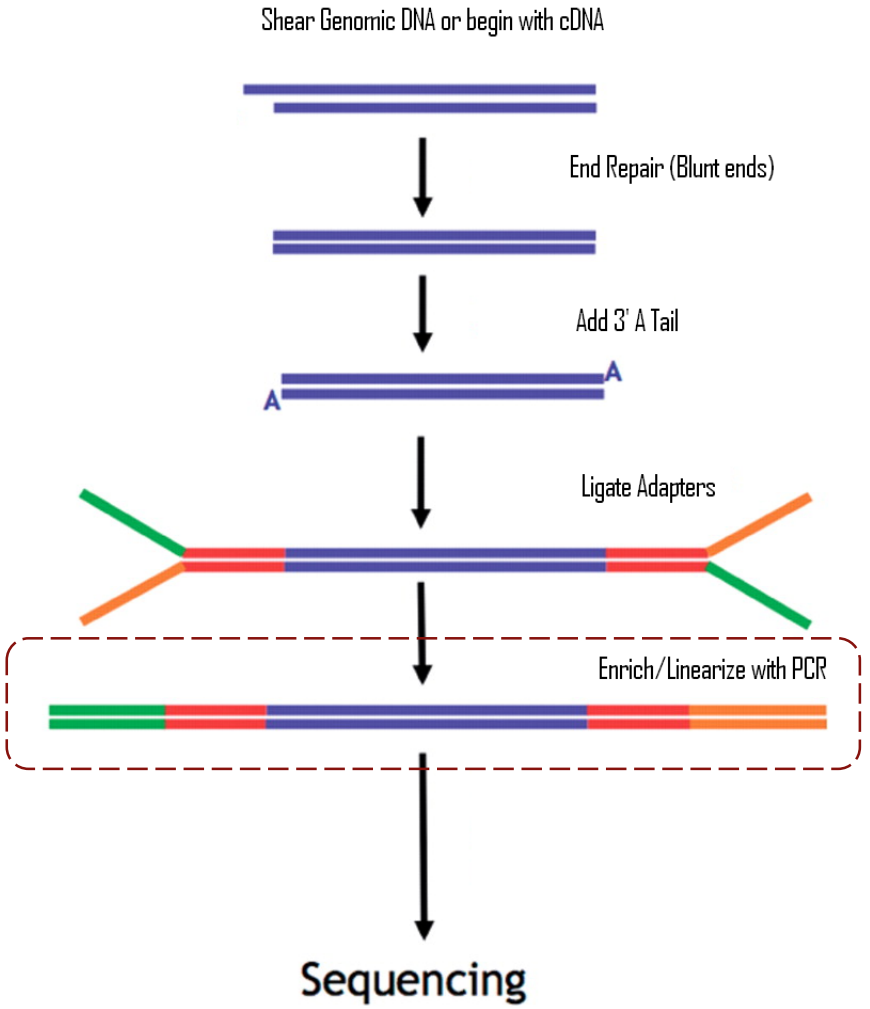
The D1000 / HS D1000 ScreenTape Assay

- Use as little as **1µl / 2ul** of precious sample
- Rapid time to result, at around 1 minute per sample
- Detection of DNA fragments as low as 5pg/µl
- Ideally suited for the QC of libraries in the **NGS workflow**
- Also ideal for these applications:
  - qPCR product QC
  - Mycoplasma detection
  - cDNA library QC

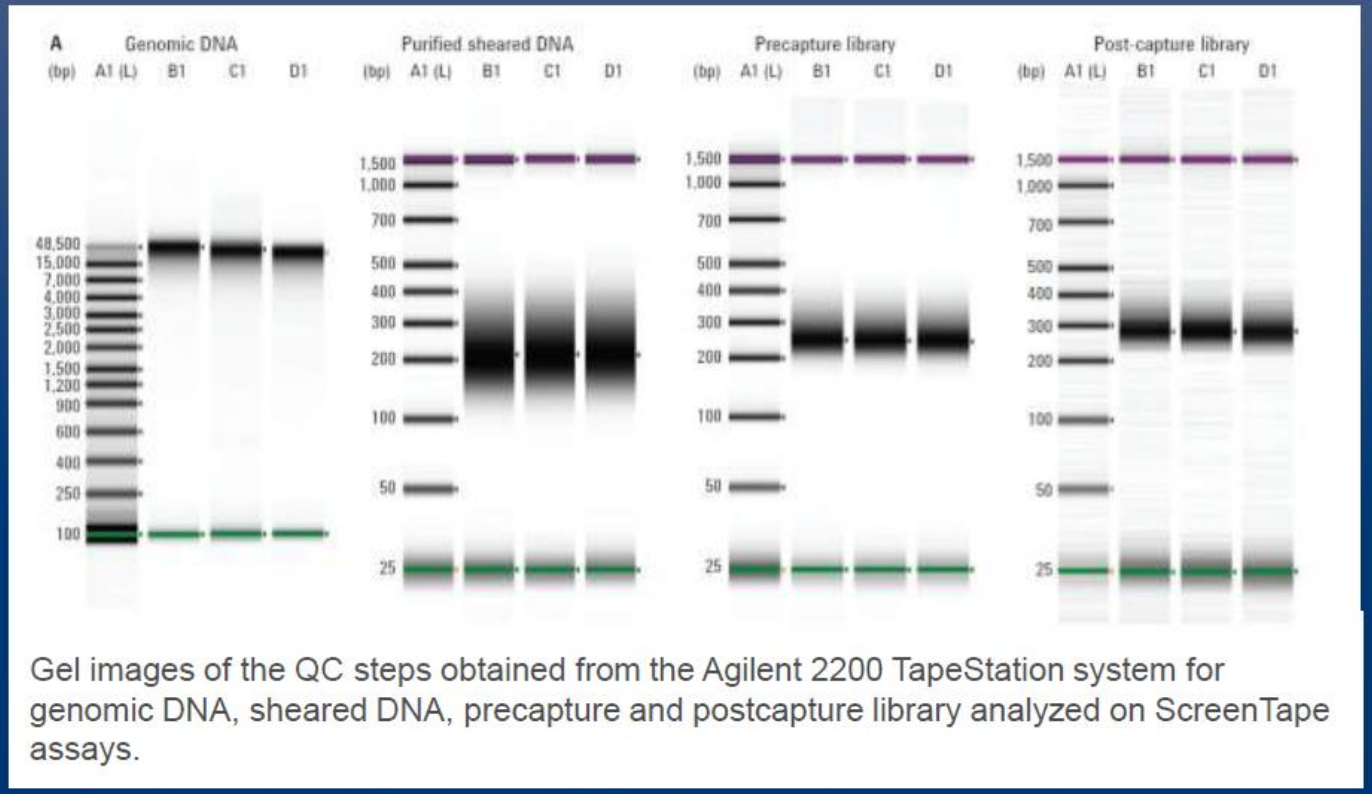


Sample Preparation for Next Generation Sequencing using SureSelect and Haloplex





DNA ScreenTape Literature for NGS Workflow Integration



Gel images of the QC steps obtained from the Agilent 2200 TapeStation system for genomic DNA, sheared DNA, precapture and postcapture library analyzed on ScreenTape assays.

End to End Sample Quality Control for Next Generation Sequencing Library Preparation and SureSelect Target Enrichment on the Agilent 2200 TapeStation System

Download the application note:

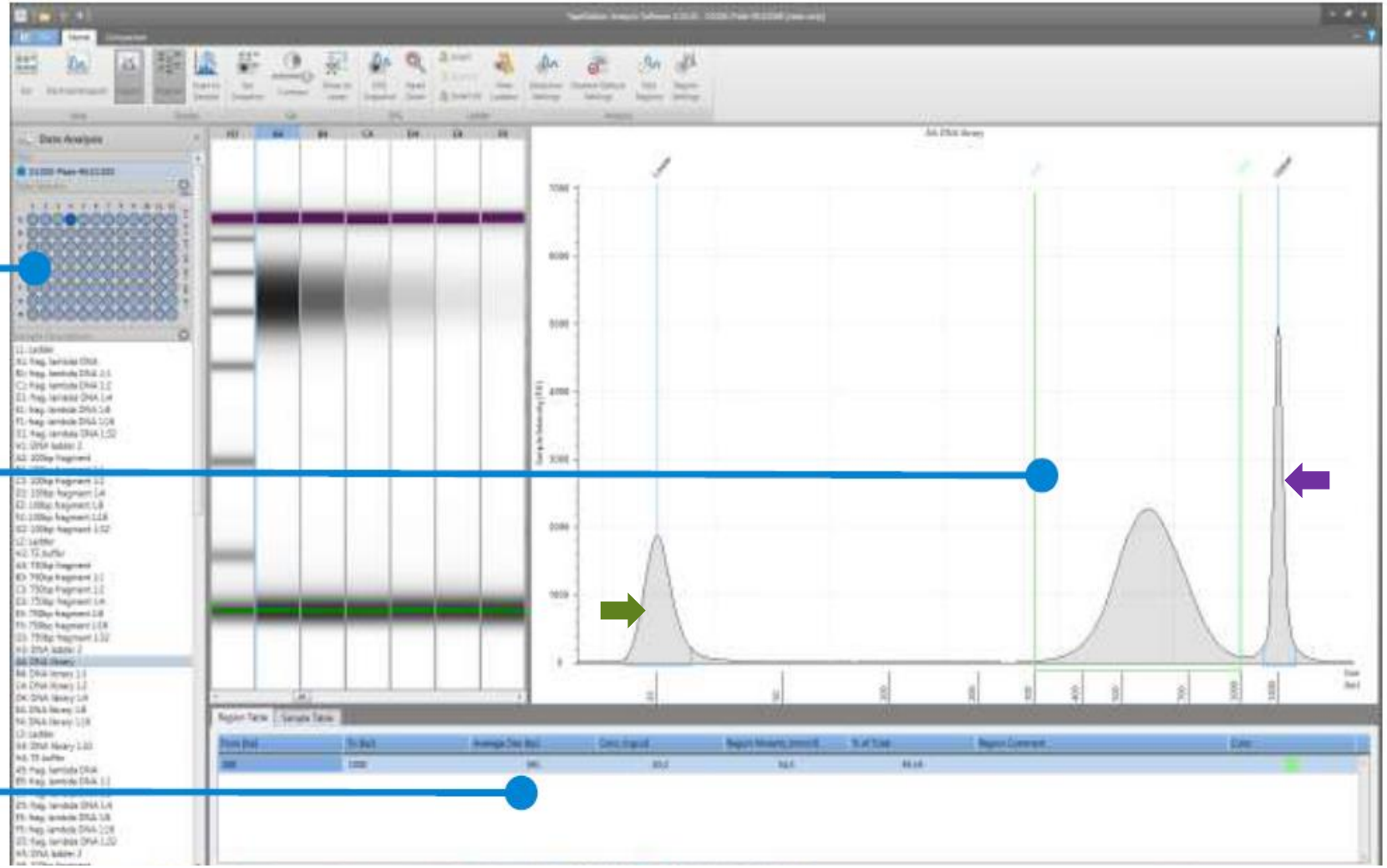
https://www.chem.agilent.com/Library/applications/5991-3654EN.pdf

TapeStation System Features for NGS Sample QC

96 well plate capability
Generate results from a 96 well plate, meeting higher throughput needs.

Regions easily defined
Regions are applied either manually or automatically

Region Table
Data presented in a table, includes average size, concentration and molarity.



TapeStation Systems - **RNA Applications**

RNA Sample QC

RNA Sample QC for microarray

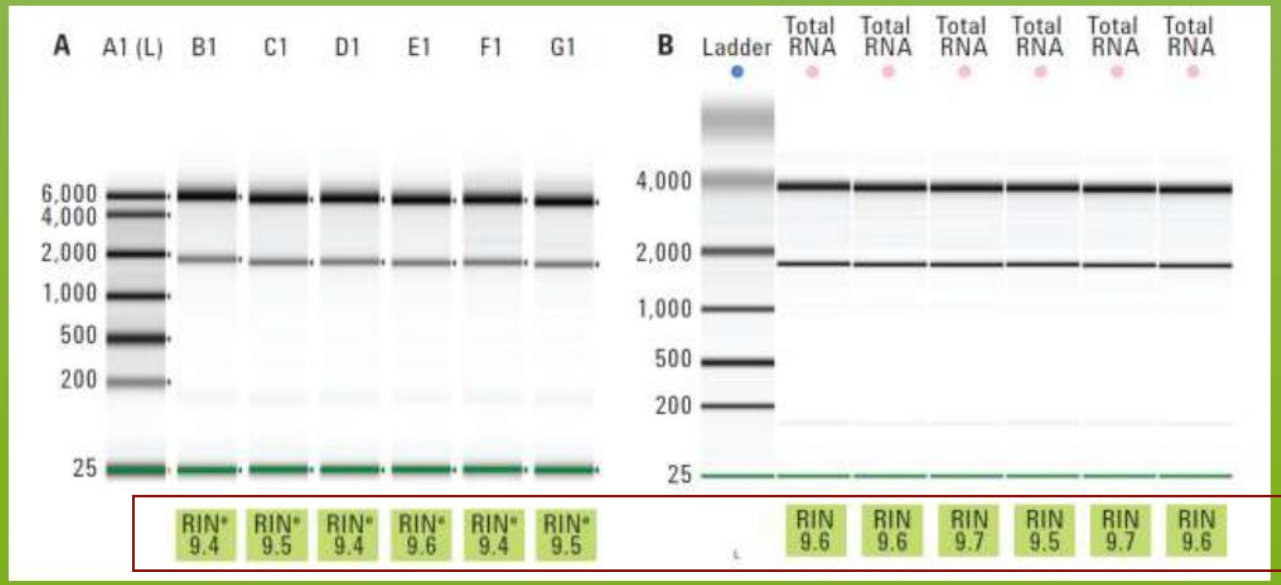
RNA Sample QC for quantitative RT-PCR



RNA Sample QC for NGS

Gene expression profiling

RNA ScreenTape Literature for Total RNA QC



RINe

Gel images of total RNA samples run on the 2200 TapeStation (A) and the 2100 Bioanalyzer (B) prior to SureSelect Strand Specific Library Preparation

Quality Control for SureSelect Strand-Specific RNA Library Preparation Using the Agilent 2200 TapeStation System

Download the application note:

http://www.chem.agilent.com/library/applications/5991-4116EN.pdf

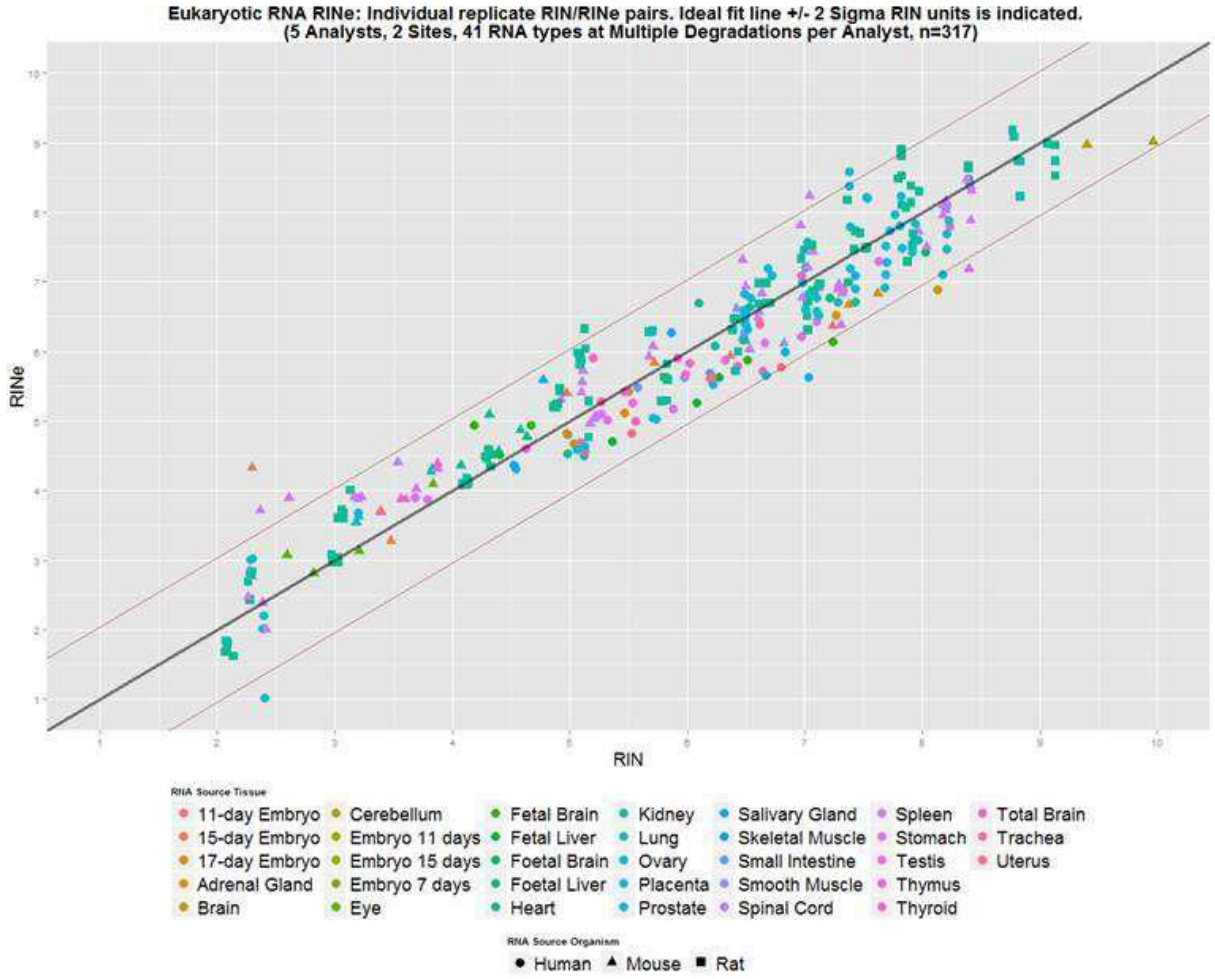
Agilent RNA ScreenTape Quality Metric – RIN^e

Eukaryotic RIN^e validated against Bioanalyzer RIN

- 41 different tissue types
- Subset of tissues subjected to heat degradation and dilution across concentration range.
- Overall >300 individual RNA data points (see figure)
- Median error ±0.4 RIN units

Prokaryote RIN^e validation

- Similar to above, prokaryote samples subjected to heat degradation and dilution across concentration range
- >200 individual RNA data points (not shown)
- Median error < ±0.4 RIN units



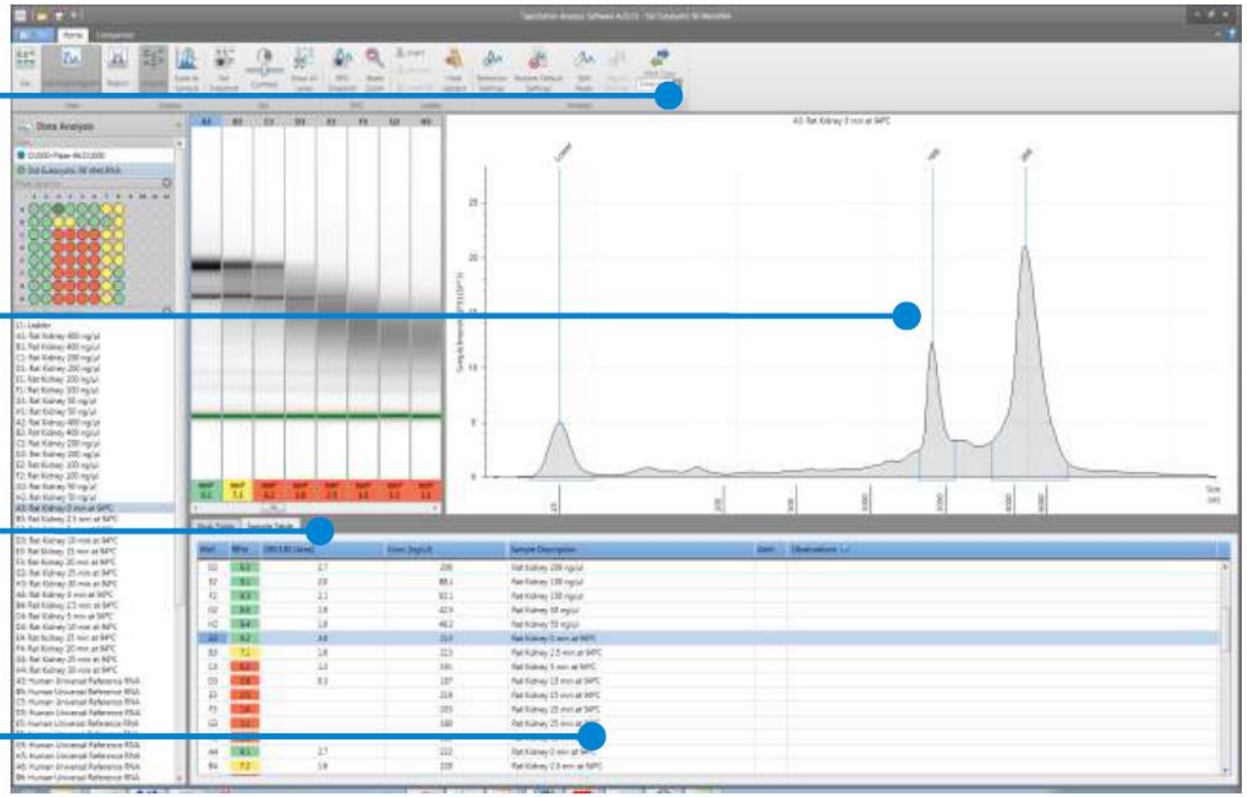
Agilent RNA ScreenTape Results Overview

RNA type switching
Eukaryote and Prokaryote RNA quality assessment available

Bioanalyzer like separation
Performance improvements deliver more Bioanalyzer separation of the large ribosomal subunits

RIN^e optional colour coding
Values for RINe represented below the gel image can be colour coded for rapid identification of RNA quality

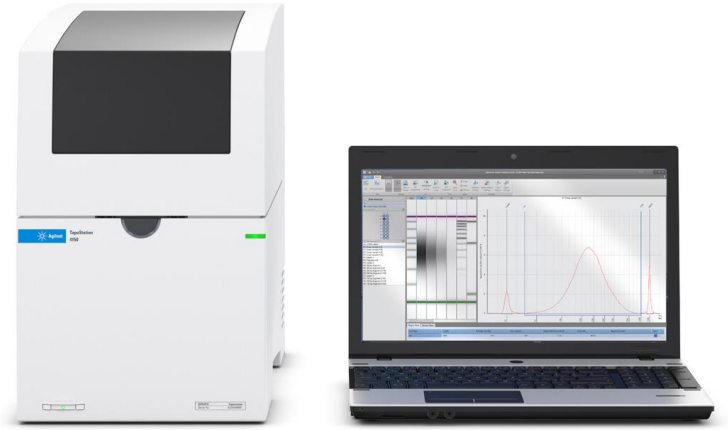
RNA data table
RIN^e Colour coding (if implemented) exported to a report along with 28/18S ratios, reliable concentration and description.



- **Equivalent quality metric to Bioanalyzer RIN:** The extensively validated RIN^e is shown to be equivalent to the market leading RNA quality metric RIN from the Bioanalyzer.
- **96 well Compatible:** Accelerate RNA QC to unprecedented levels. Full 96 analysis delivered in as little as 100 minutes with no instrument set up time!

QC for NGS

Agilent 4150 TapeStation



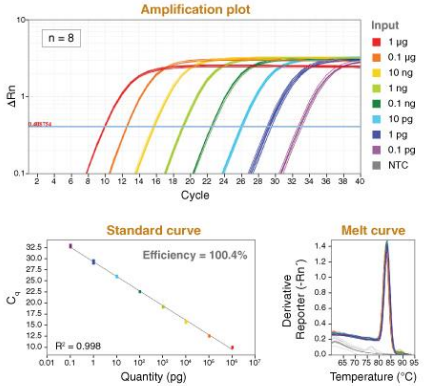
NanoDrop



Invitrogen Qubit™

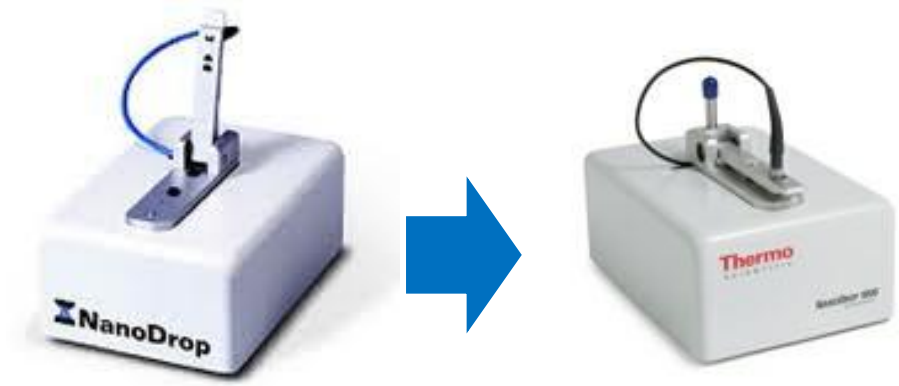


QPCR



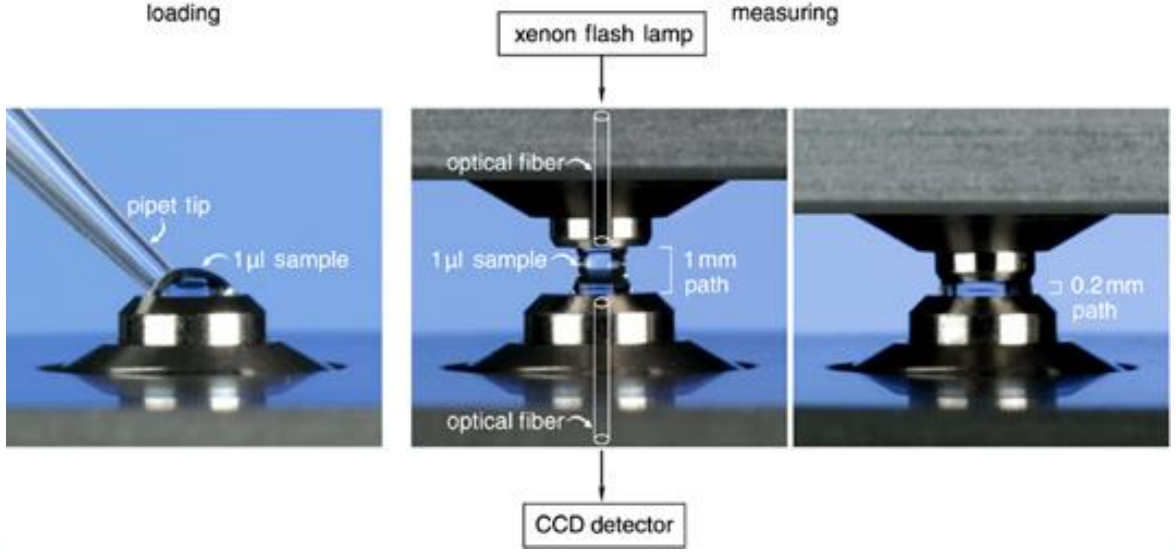
NanoDrop

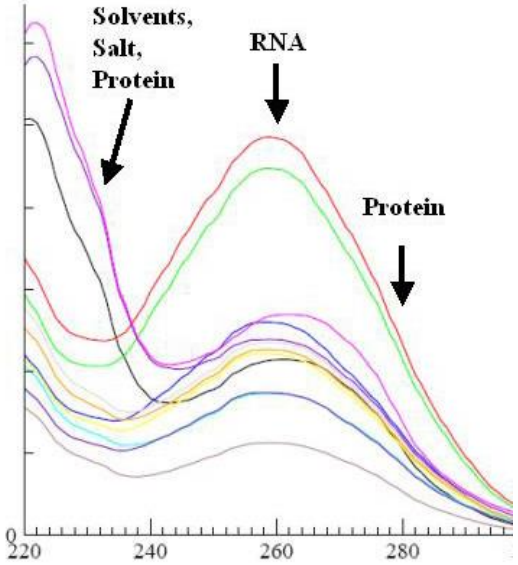
UV-Vis **spectrophotometers**



A loading

B measuring



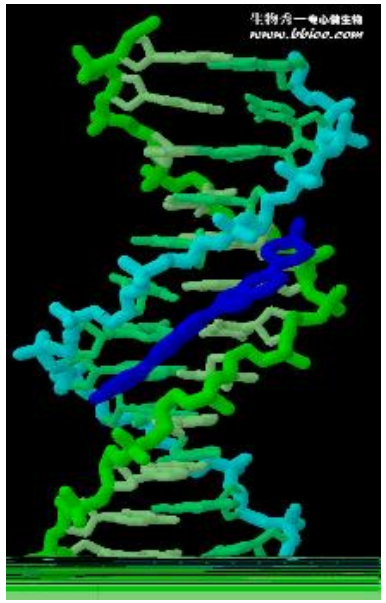


Invitrogen Qubit™
Quantitation Platform

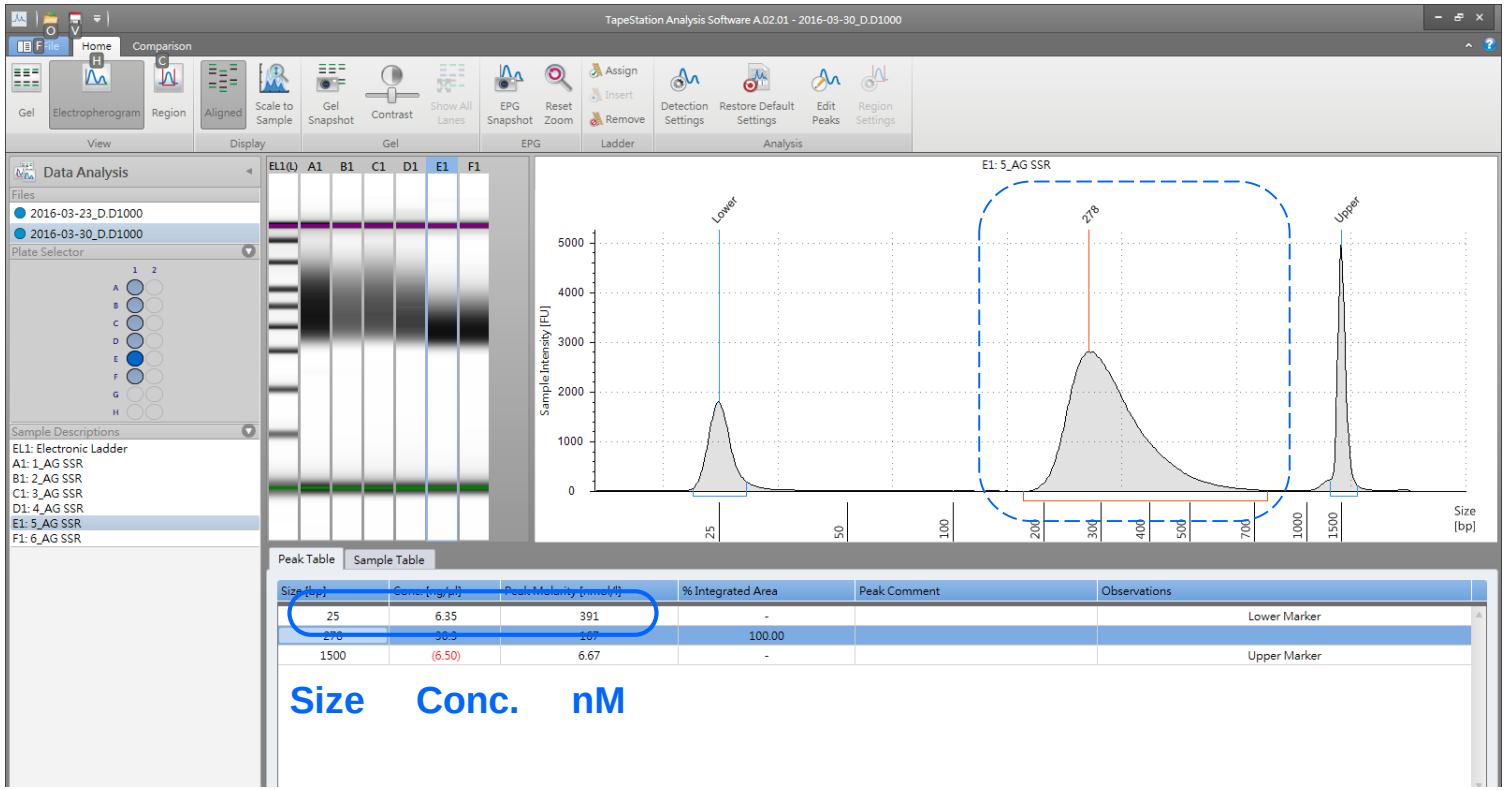


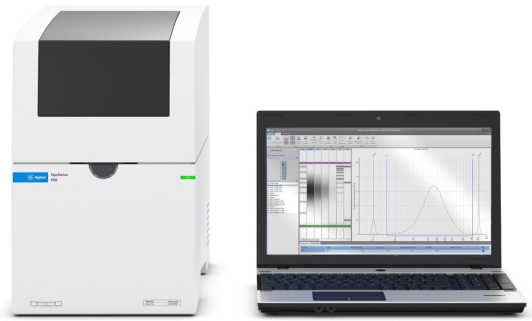
A better solution for your routine RNA, DNA, and protein quantitation

Only



Agilent 4150 TapeStation
Validate Library





Thank You !

and Have a nice day!

