

## Introduction:

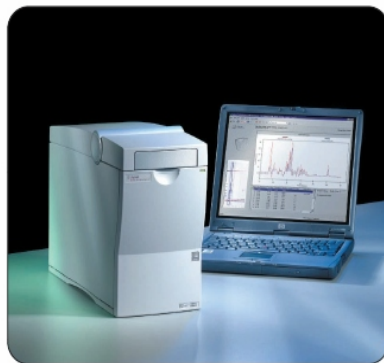
Within the fast-paced world of biotechnology, it is often difficult for the researcher to keep abreast of the rapidly evolving technological advances and to subsequently find the time to evaluate those products that will not only add value to existing infrastructure, but will also convey the necessary edge required to both remain competitive and meet with peer review in the global publication stakes. To achieve this end, the PLP e-Newsletter will provide a monthly snapshot of the latest technology from Agilent Technologies including useful notes, tips and application publications pertaining directly to the genomics and proteomics products represented. Each issue will focus on a specific application and will additionally include special offers, invitations and competitions exclusively available to e-Newsletter subscribers. Subscription is free of charge and available for first time readers at [www.pacificlab.com.au](http://www.pacificlab.com.au).

Our June issue of e-Newsletter focuses on the 2100 Bioanalyzer Real-Time Gel Electrophoresis System and one of the predominant applications for which it can be used: QC of RNA. Readers are also invited to take advantage of our Bioanalyzer promotion (strictly for a limited time only), the web-based e-seminar on "[Isolation of Total RNA with Extremely Low Levels of Genomic DNA](#)", and enter a competition to win an iPod shuffle. For more information, please email your enquiry to [sales@pacificlab.com.au](mailto:sales@pacificlab.com.au).

## Product Update:

### 2100 Bioanalyzer Real-Time Gel Electrophoresis System for Analysis of DNA, RNA, Protein and Cell Fluorescence

The Agilent 2100 bioanalyzer was the first commercially available instrument to use microfluidics technology for the analysis of biological samples. Today, it is the industry standard for RNA sample QC and has replaced gel electrophoresis for this application. It is also widely accepted for DNA fragment analysis and SDS-PAGE analysis of protein samples. A unique feature of the bioanalyzer is that it can be used for both electrophoretic separation and cell counting using its cell fluorescent accessory. This versatility makes the Agilent 2100 bioanalyzer an indispensable tool for the molecular biologist and biochemist. Automated, fast analysis with excellent data quality!



Agilent 2100 Bioanalyzer



Agilent 2100 Bioanalyzer with  
Electrophoresis Cartridge

## Inside:

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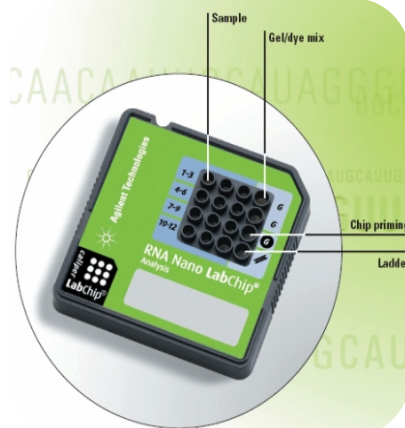
- ▶ Where can you find us?

#### Special Offers

- ▶ 10% discount on 2100 Bioanalyzer for e-Newsletter subscribers
- ▶ Acquire a free 2100 Bioanalyzer through Agilent Technologies University Philanthropic Program
- ▶ iPod Shuffle Competition Quiz

## Agilent LabChips (Lab-on-a-Chip Technology)

The Agilent 2100 Bioanalyzer uses state-of-the-art LabChips in place of the traditional agarose and acrylamide gels. The on-chip electrophoresis means that it is no longer necessary to spend time preparing gels and running buffers and then staining/destaining gels, taking photos/digital images and manually sizing and quantitating etc - all very time consuming procedures. Furthermore, the process of data collection, analysis, sizing and quantification is fully automated and data can easily be shared with remote collaborators or stored digitally for archiving.

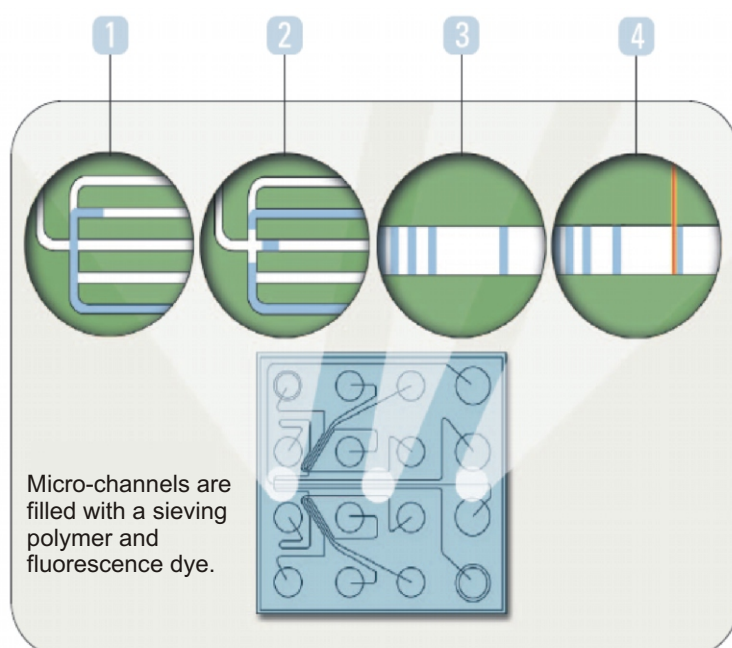


## Advantages of the 2100 Biolanalyzer Lab-on-a-Chip Technology

- Minimal sample consumption (only 1 uL for DNA and RNA samples and as little as 5mg of total RNA or 25 mg of mRNA)
- Fast set-up (5 -10 min) and run times (25 - 30 min) 30-40 min total for 12 samples.
- No messy gels and minimum exposure to ethidium bromide or other hazardous materials
- Automated data collection, analysis and digital archiving using 2100 Expert Software
- Alternative data display options, results shown in gel-like image, electropherogram, and tabular formats
- User friendly software and unique RIN (RNA Integrity Number) feature
- RNase-free reagents and chips to avoid sample degradation during analysis
- 21 CFR part 11 compliant software (FDA approved)
- Electrophoresis (for DNA, RNA and Protein) and/or flow cytometry options all on one instrument!



## Microfluidics Technology - The Basics:



- 1 The sample moves through the micro-channels from the sample well.
- 2 The sample is injected into the separation channel.
- 3 Sample components are electrophoretically separated.
- 4 Components are detected by their fluorescence and translated into gel-like images (bands) and electropherograms (peaks).

The electrophoresis option for the Agilent 2100 Bioanalyzer enables scientists working with nucleic acids and/or proteins to carry out automated quality control, sizing and quantification. The system uses micro-fabrication technology to transfer laboratory processes onto miniature glass chips that contain a network of interconnected channels and reservoirs. Filling the channels with a gel matrix and the wells with buffer or sample, allows electrophoresis to be carried out on a miniaturized scale. Choosing the appropriate LabChip kit (containing chips, buffer, gel, intercalating dye and standards) enables the analysis of DNA, RNA or protein samples. This integration of sample preparation, fluid handling and biochemical analysis offers several advantages over traditional gel electrophoresis in terms of speed, automation, sample use and data quality.

For more information, download the full PDF (5989-1197EN) from [www.agilent.com/chem/labonachip](http://www.agilent.com/chem/labonachip)

(NB. First time visitors to the Agilent Technical Library will need to register to gain access.

This process is fast. If you experience any difficulty accessing this site, please email: [sue\\_broughton@agilent.com](mailto:sue_broughton@agilent.com))

# RNA Integrity Number (RIN) the ideal tool for QC of RNA

The assessment of RNA integrity is a critical first step in obtaining meaningful gene expression data. In particular, high quality, high integrity RNA is a key element for successful microarray or RT-PCR analyses. Using as little as 50 pg of total RNA or 250 pg of mRNA, the Agilent 2100 Bioanalyzer, 2100 Expert Software and RNA LabChip Kits enable researchers to accurately assess the quality of RNA prior to further analysis. Data files from the Agilent 2100 Bioanalyzer include information pertaining to sample concentration, ribosomal ratios and a visual inspection of RNA integrity. More importantly, the 2100 Expert Software includes the patented RNA Integrity Number (RIN) algorithms.

## What is RIN?

The RNA integrity number (RIN) algorithms in the 2100 Expert Software allows the automated and objective classification of RNA integrity, assigning a degradation factor to your RNA samples. Every RNA sample is evaluated using 6 key parameters and a value ranging from 1-10 is assigned. The highest integrity RNA will achieve a value of 10 whilst the lowest quality, highly degraded RNA will be assigned a value of 1. This feature enables the researcher to determine the quality of the RNA sample prior to undertaking applications such as real-time PCR and microarray analysis, each of which requires high integrity RNA and which can be costly.

By comparison with the freeware Degradometer, the 2100 Expert software RIN feature enables simultaneous RNA QC analysis of up to 12 samples at a time (vs. single sample for Degradometer) and is more robust, demonstrating fewer unclassified samples (ie. 10% for RIN, 35% for Degradometer). The RIN is unparalleled and is the most comprehensive tool for RNA sample QC.

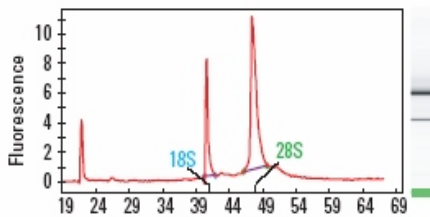
## Quality of RNA

RNase degradation of RNA samples is a common reason for failed experiments. The Agilent 2100 bioanalyzer shows the results of an RNA quality analysis in both gel-like image as well as electrophoretic data (see below) making it easy to detect even small degradation effects. In addition to quantification, sizing, ribosomal ratios and RIN values, visual inspection of the data clearly distinguishes a high integrity RNA sample (Figure A) from a low integrity degraded sample (Figure B).

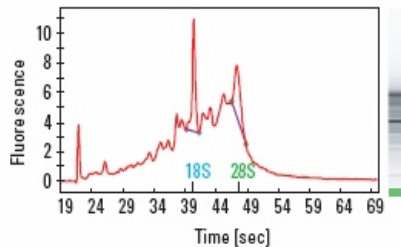
### Indications for RNA degradation are:

- Decreasing ratio of ribosomal bands
- Additional peaks below the ribosomal bands
- Decrease in overall RNA signal
- Shift towards shorter fragments
- A low RNA Integrity Number (RIN)

## Identifying Degradation of Total RNA



**Fig. A:** Intact RNA



**Fig. B:** Degraded RNA

For more information, download the full PDF (5988-3197EN) or (5989-1165EN) from [www.agilent.com/chem/labonachip](http://www.agilent.com/chem/labonachip)

## What's New?

### Release of Series II LabChip Kits

For superior data quality! The new Series II RNA Labchip kits now include the RNA ladder for your convenience and are also more tolerant to samples containing up to 50 mM NaCl. For more information on the new Series II Labchip kits, please email [sales@pacificlab.com.au](mailto:sales@pacificlab.com.au).

Requires free 2100 Bioanalyzer firmware upgrade. Please download from Agilent Technical Support - Downloads or request CD from David Tunks ([david\\_tunks@agilent.com](mailto:david_tunks@agilent.com)).



## News and Events:

### Where can you find us?

- ▶ Please come and visit our combined displays at the 11th International Congress of Human Genetics, August 6-10th at the Brisbane Convention and Exhibition Centre.
- ▶ CGH (Comparative Genomic Hybridisation) Workshop at International Congress of Human Genetics - You are invited to a "Lunch and Learn" workshop with Dr Swaroop Aradhya from Stanford University Hospital and Dr Carsten Rosenow from Agilent Technologies. Learn about the latest in high resolution oligo array CGH innovations and how to extract the most relevant information using CGH Analytics. Wednesday 9th August, 12.30 - 1.30 pm.  
For more information please visit the link [CGH Workshop at ICHG](#)
- ▶ Visit the Agilent e-seminars for a fast tutorial! Agilent e-Seminars are a convenient way to obtain the latest information from Agilent about instruments or general analytical topics of interest that do not require skills development. These 60 to 90 minute online seminars save you time and money by eliminating travel and placing information at your fingertips. Agilent e-Seminars enable you to keep up-to-date with today's latest technology and newest developments for FREE!

E-seminar for June issue: ["Isolation of Total RNA with Extremely Low Levels of Genomic DNA"](#)

## Special Offers:

- ▶ **Take advantage of our special promotional offer on the Bioanalyzer Complete Package** (PN: G2939AA) exclusively available to e-Newsletter readers. Mention e-Newsletter issue 1 and receive a 10% discount on the complete package! Offer valid until 31st July, 2006. Not available in conjunction with other offers.
- ▶ **Acquire an Agilent 2100 Bioanalyzer for free!**

### Agilent Technologies University Philanthropic Program

Agilent Technologies has a long history of supporting teaching and, over the years, and have contributed many millions of dollars to universities around the world to assist in providing a higher standard of education.

In keeping with their history of philanthropic donations, Agilent Technologies Australia will be providing a complete 2100 Bioanalyzer to a university in Australia for life science teaching.

For more information on the bioanalyzer go to <http://www.agilent.com/chem/labonachip>

- ▶ **Answer the questions below and win an iPod Shuffle** (valued at A\$99)
  - (1) What are 3 advantages of the Agilent 2100 Bioanalyzer over conventional gel electrophoresis?
  - (2) What type of technology does the Agilent 2100 Bioanalyzer use?
  - (3) What is the sample volume required for DNA and RNA samples on the Agilent 2100 Bioanalyzer?
  - (4) How long does it take for sample set-up (DNA or RNA) plus run time on the Agilent 2100 Bioanalyzer?
  - (5) What is RIN and what does it do?
  - (6) By comparison with the Degradometer, what are two advantages of the RIN feature?

Please email your answers to [marketing@pacificlab.com.au](mailto:marketing@pacificlab.com.au). Good luck!



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**E-Newsletter: An Agilent Technologies  
and Pacific Laboratory Products Initiative**

### ➔ In the next issue:

Our July issue of E-Newsletter will feature Part 2 of RNA Integrity and QC, with a focus on isolation and analysis of RNA from various species and various sample sources.