



2000/2001 MSPPSA SERIES

# MOLECULAR BIOLOGY REAGENT SYSTEMS

VOLUME 1.

ISOLATION & PURIFICATION KITS

AN ANALYSIS OF  
MARKET SIZE & GROWTH,  
MARKET SHARE, PURCHASE PLANS &  
SUPPLIER ASSESSMENT FOR  
THE U.S. LIFE SCIENCE RESEARCH MARKET

*A Multi-Client Report*

by  
PhorTech International  
San Carlos, California

February 13, 2001

Copyright 2001 by PhorTech International, 238 Crestview Drive, San Carlos CA 94070. All rights reserved. No material contained in this report may be reproduced in whole or in part without the written permission of the publisher. This report is not intended to be, and should not be construed as a recommendation for the purchase or sale of any securities mentioned herein. The information has been derived from statistical and other sources which we deem reliable but their completeness cannot be guaranteed. Opinions expressed herein are based upon our interpretation of available information and are subject to change.



# TABLE OF CONTENTS

<b>I. BACKGROUND .....</b>	<b>9</b>
A. Survey Objectives.....	10
B. Survey Methodology.....	13
<b>II. DEMOGRAPHIC SEGMENTATION .....</b>	<b>15</b>
#1. Current Use of Molecular Biology Reagents .....	16
#12. Distribution by Type of Organization .....	27
#11. Years Experience with Molecular Biology Techniques.....	35
<b>III. MARKET SIZE.....</b>	<b>41</b>
#1+. Current Size of Market for Molecular Biology Reagents .	42
#2. Research Group Size .....	44
#3. Usage of Various Types of Isolation/Purification Kits.....	47
#4. Market Size Estimate for Isolation/Purification Kits .....	51
<b>IV. MARKET SHARE .....</b>	<b>55</b>
#4+ Isolation/Purification Kit Market Share Analysis.....	56
<b>V. PURCHASE PLANS .....</b>	<b>107</b>
#4+. Sales Projections for Isolation/Purification Kits.....	108
<b>VI. SUPPLIER ASSESSMENT .....</b>	<b>117</b>
#5. Reasons Given for Brand Selection .....	118
#6. Rejected Brands & Reasons.....	130
#8. Ranked Suppliers' Performance.....	137
<b>VII. FUTURE EXPECTATIONS.....</b>	<b>143</b>
#7. Desired Improvements in Isolation/Purification Rgts .....	144
#10. Desired Improvements in Molecular Biology Kits.....	153
#9. Suggested Applications for Future Kit Development.....	164
<b>VIII. QUESTIONNAIRE .....</b>	<b>169</b>

# LIST OF TABLES & FIGURES

<b>I. BACKGROUND .....</b>	<b>9</b>
Survey Objectives.....	10
Survey Methodology .....	13
Survey Response Rates .....	13
95% Confidence Intervals for Various Percentages & Sample Sizes .....	14
<b>II. DEMOGRAPHIC SEGMENTATION.....</b>	<b>15</b>
Molecular Biology Reagent Use, All Respondents.....	16
Verbatim Comments Regarding Reasons Behind Format Selection .....	17
Most Frequently Mentioned Reasons for Format Selection, Kit Users .....	26
Distribution by Type of Organization, All Respondents .....	27
Organizations Represented by Respondents to this Survey.....	28
Mean, Median and Modal Years of Experience, All Users.....	35
Years of Experience, All Molecular Biology Reagent Users.....	35
Years of Experience, All Molecular Biology Reagent Users (Exponential Scale)....	36
Mean Years of Experience, Users of Individual Rgts vs. Kit Users .....	36
Years of Experience, Users of Individual Reagents vs. Kit Users .....	37
Level of Experience, Kit Users vs. Users of Individual Reagents .....	38
Level of Experience, According to Organization .....	39
Mean Years of Experience, by Type of Organization .....	39
<b>III. MARKET SIZE.....</b>	<b>41</b>
Pop'n Estimate of U.S. Life Science Resrchs Using Mol Biology Reagents .....	43
Pop'n Estimate of U.S. Life Science Resrchs Using Mol Biology Kits .....	43
Mean, Median & Mode Group Size, Isolation/Purification Kit Users.....	44
Reported Group Sizes, Isolation/Purification Kit Users .....	44
Mean Annual Isoltn/Purificat'n Kits Consumed per Resp, by Group Size.....	45
Mean Annual Isoltn/Purificat'n Kits Consumed per Researcher, by Group Size....	46
Share of Mentions, Categories of Isolation/Purification Kits.....	48
Frequency of Usage by Category of Isolation/Purification Kits .....	49
Extrapolated Pop'n of U.S. Life Science Resrchs Using Each Type of Kit .....	50
Total Consumption & Dollar Spend, Isoltn/Purificat'n Kit Installed Base Audit..	51
Mean Consumption & Dollar Spend, Isoltn/Purificat'n Kit Installed Base Audit .	51
Mean Cost per Kit, Isoltn/Purificat'n Kit Installed Base Audit.....	51
Unit Share Distribution of Kits in Audit, by Isolation/Purification Kit Category ..	52
Dollar Share Distribution of Kits in Audit, by Isolation/Purification Kit Category	53
Estimate of Total Dollar Market for Isolation & Purification Kits .....	53
Annual U.S. NA Isoltn/Purificat'n Dollar Sales Extrapolations, 2000.....	54
Comparison of Total Dollar Market Estimate with Qiagen's Sales.....	54
<b>IV. MARKET SHARE.....</b>	<b>55</b>
Unit Market Share for Major Suppliers, Isolation & Purification Kits .....	57
Dollar Market Share for Major Suppliers, Isolation & Purification Kits.....	58
Nucleic Acid Isolation/Purification Kit Suppliers in the 'Other' Category.....	58

<b>Plasmid DNA Isolation/Purification Analyses.....</b>	<b>60</b>
Mean Annual Consumption and Dollar Spend per Respondent .....	60
Estimate of Annual U.S. Unit and Dollar Market Size for 2000 .....	60
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	60
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	60
Unit Market Share for Major Suppliers, Plasmid DNA Purification Kits .....	61
Dollar Market Share for Major Suppliers, Plasmid DNA Purification Kits .....	61
Plasmid DNA Isolation/Purification Kit Suppliers in the 'Other' Category.....	62
Most Frequently Mentioned Kits for Plasmid DNA Isolation/Purification .....	63
Mean and Mode Preps per Kit, Plasmid DNA Isolation/Purification Kits.....	63
Mean Price per Prep, Plasmid DNA Isolation/Purification Kits.....	63
Preps per Kit, Plasmid DNA Isolation/Purification Kits .....	64
<b>Total RNA Isolation &amp; Purification Kits .....</b>	<b>64</b>
Estimate of Annual U.S. Unit and Dollar Market Size for 2000 .....	64
Mean Annual Consumption and Dollar Spend per Respondent .....	65
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	65
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	65
Unit Market Share for Major Suppliers, Total RNA Isolation Kits .....	65
Dollar Market Share for Major Suppliers, Total RNA Isolation Kits .....	66
Total RNA Isolation Kit Suppliers in the 'Other' Category .....	66
Most Frequently Mentioned Kits for Isolation of Total RNA .....	67
Unit Market Share for Distributors, MRC TRIzol/TRI Reagent Kits.....	68
Dollar Market Share for Distributors, MRC TRIzol/TRI Reagent Kits .....	68
Mean, Median and Mode Preps per Kit, Total RNA Isolation Kits .....	69
Mean Price per Prep, Total RNA Isolation Kits.....	69
Preps per Kit, Total RNA Isolation Kits .....	69
<b>The Isolation and Purification of Genomic DNA .....</b>	<b>69</b>
Estimate of Annual Unit and Dollar Market Size for 2000 .....	69
Mean Annual Consumption and Dollar Spend per Respondent .....	69
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	70
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	70
Unit Market Share for Major Suppliers, Genomic DNA Purification Kits .....	70
Dollar Market Share for Major Suppliers, Genomic DNA Purification Kits .....	71
Genomic DNA Purification Kit Suppliers in the 'Other' Category .....	71
Most Frequently Mentioned Kits for Purification of Genomic DNA .....	72
Mean and Mode Preps per Kit, Genomic DNA Purification Kits .....	73
Mean Price per Prep, Genomic DNA Purification Kits .....	73
Preps per Kit, Genomic DNA Purification Kits.....	73
<b>Kits for the Purification for Auto-Sequencing Reaction Products .....</b>	<b>73</b>
Estimate of Annual Unit and Dollar Market Size for 2000 .....	73
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	73
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	73
Mean Annual Consumption and Dollar Spend per Respondent .....	74
Mean Price per Kit.....	74
Unit Market Share for Major Suppliers, Auto-Sequencing Rxn Prod Purificat'n...	74
Dollar Market Share for Major Suppliers, Auto-Sequencing Rxn Prod Purificat'n	75
Auto-Sequencing Rxn Prod Purificat'n Kit Suppliers in the 'Other' Category.....	75
Most Frequently Mentioned Auto-Sequencing Rxn Prod Purificat'n Kits .....	75
Preps per Kit, Auto-Sequencing Rxn Prod Purificat'n Kits .....	76
Mode for Preps per Kit, Auto-Sequencing Rxn Prod Purificat'n Kits .....	76
Mean Price per Prep, Auto-Sequencing Rxn Prod Purificat'n .....	77

<b>Kits for the Purification of DNA from Gels</b> .....	<b>77</b>
Estimate of Annual Unit and Dollar Market Size for 2000 .....	77
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	77
Mean Annual Consumption and Dollar Spend per Respondent .....	77
Mean Price per Kit .....	77
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	77
Unit Market Share for Major Suppliers, Kits for Purification of DNA from Gels .	77
Dollar Market Share for Major Suppliers, Kits for Purificat'n of DNA from Gels.	78
Kits for the Purification of DNA from Gels Suppliers in the 'Other' Category.....	79
Most Frequently Mentioned Kits for Purification of DNA from Gels .....	79
Mode Preps per Kit, Kits for Purificat'n of DNA from Gels .....	80
Mean Price per Prep, Kits for Purificat'n of DNA from Gels .....	80
Preps per Kit, Kits for Purificat'n of DNA from Gels .....	81
 <b>Kits for the Purification of Amplification Products</b> .....	 <b>81</b>
Estimate of Annual Unit and Dollar Market Size for 2000 .....	81
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	81
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	81
Mean Annual Consumption and Dollar Spend per Respondent .....	81
Mean Price per Kit .....	81
Unit Market Share for Major Suppliers, Amp Product Purification Kits .....	82
Dollar Market Share for Major Suppliers, Amp Product Purification Kits .....	82
Amp Product Purification Kit Suppliers in the 'Other' Category .....	83
Most Frequently Mentioned Kits for Amp Product Purification Kits .....	84
Mode Preps per Kit, Amp Product Purification Kits .....	84
Mean Price per Prep, Amp Product Purification Kits.....	84
Preps per Kit, Amp Product Purification Kits .....	85
 <b>Kits for the Isolation &amp; Purification of mRNA</b> .....	 <b>85</b>
Estimate of Annual Unit and Dollar Market Size for 2000 .....	85
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	85
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	85
Mean Annual Consumption and Dollar Spend per Respondent .....	85
Mean Price per Kit .....	85
Unit Market Share for Major Suppliers, mRNA Isolation/Purification Kits .....	86
Dollar Market Share for Major Suppliers, mRNA Isolation/Purification Kits .....	86
mRNA Isolation/Purification Kit Suppliers in the 'Other' Category .....	87
Most Frequently Mentioned mRNA Isolation/Purification Kits .....	88
Mode Preps per Kit, mRNA Isolation/Purification Kits.....	88
Mean Price per Prep, mRNA Isolation/Purification Kits .....	88
Preps per Kit, mRNA Isolation/Purification Kits .....	89
 <b>M13 DNA Isolation/Purification Kits</b> .....	 <b>89</b>
Estimate of Annual Unit and Dollar Market Size for 2000 .....	89
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	89
Comparison with Annual Far East Unit and Dollar Market Size for 2000 .....	89
Mean Annual Consumption and Dollar Spend per Respondent .....	89
Mean Price per Kit .....	89
Most Frequently Mentioned M13 DNA Isolation/Purification Kit.....	89
Mode Preps per Kit, mRNA Isolation/Purification Kits.....	90
Preps per Kit, M13 DNA Isolation/Purification Kits .....	90
 <b>Kits for Oligo Purification</b> .....	 <b>90</b>

Estimate of Annual Unit and Dollar Market Size for 2000.....	90
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	90
Comparison with Annual Far East Unit and Dollar Market Size for 2000.....	90
Mean Annual Consumption and Dollar Spend per Respondent.....	90
Mean Price per Kit.....	90
Unit Market Share for Major Suppliers, Oligo Purification Kits .....	91
Dollar Market Share for Major Suppliers, Oligo Purification Kits .....	92
Oligo Purification Kit Suppliers in the ‘Other’ Category .....	92
Most Frequently Mentioned Oligo Purification Kits .....	93
Mode Preps per Kit, Oligo Purification Kits.....	93
Mean Price per Prep, Oligo Purification Kits .....	93
Preps per Kit, Oligo Purification Kits.....	93
<b>Lambda DNA Isolation &amp; Purification Kits.....</b>	<b>94</b>
Estimate of Annual Unit and Dollar Market Size for 2000.....	94
Comparison with Annual U.S. Unit and Dollar Market Size for 1997 .....	94
Comparison with Annual Far East Unit and Dollar Market Size for 2000.....	94
Mean Annual Consumption and Dollar Spend per Respondent .....	94
Mean Price per Kit.....	94
Unit Market Share for Major Suppliers, Lambda DNA Isolat’n/Purificat’n Kits... ..	94
Dollar Market Share for Major Suppliers, Lambda DNA Isolat’n/Purificat’n Kits .....	95
Most Frequently Mentioned Lambda DNA Isolat’n/Purificat’n Kits .....	96
Mode Preps per Kit, Lambda DNA Isolat’n/Purificat’n Kits.....	96
Preps per Kit, Lambda DNA Isolat’n/Purificat’n Kits.....	96
<b>Product Mix for Leading Suppliers .....</b>	<b>97</b>
Estimate of Qiagen's Annual Dollar Sales.....	97
Qiagen Dollar Market Share Distribution, By Isolat’n/Purificat’n Application .....	97
Estimate of Promega's Annual Dollar Sales .....	98
Promega Dollar Market Share Distribution, By Isolat’n/Purificat’n Application .....	98
Estimate of Princeton Separations’ Annual Dollar Sales.....	98
Princeton Separations’ Dollar Market Share, By Isolat’n/Purificat’n Application ..	99
Estimate of the Molecular Research Ctr’s Annual Dollar Sales.....	99
Revised Princeton Septns’ \$ Market Share, By Isolat’n/Purificat’n Application.....	100
Mol Research Ctr’s Dollar Market Share, By Isolat’n/Purificat’n Application .....	100
Estimate of Gentra Systems’ Annual Dollar Sales .....	100
Gentra Systems’ Dollar Market Share, By Isolat’n/Purificat’n Application.....	101
Estimate of AP Biotech’s Annual Dollar Sales.....	101
AP Biotech’s Dollar Market Share, By Isolat’n/Purificat’n Application .....	101
Estimate of Life Technologies’ Annual Dollar Sales.....	102
Life Technologies Dollar Market Share, By Isolat’n/Purificat’n Application .....	102
Revised LTI \$ Market Share as Supplier & Distributor, By Application .....	103
Estimate of Bio-Rad’s Annual Dollar Sales .....	103
Bio-Rad’s Dollar Market Share Distribution, By Isolat’n/Purificat’n Application...	103
Molecular Biology Kit Sales (\$) by Category for Principal Suppliers .....	104

**V. PURCHASE PLANS ..... 107**

Forecast Growth for Kit Use, Plasmid DNA Isolation/Purification Kits.....	109
Forecast Growth for Kit Use, Total RNA Isolation Kits .....	110
Forecast Growth for Kit Use, Isolation/Purification of Genomic DNA.....	110
Forecast Growth for Kit Use, Auto-Sequencing Rxn Product Purification .....	111
Forecast Growth for Kit Use, Purification of DNA from Gels .....	112

Forecast Growth for Kit Use, Amplification Product Purification Kits .....	112
Forecast Growth for Kit Use, mRNA Isolation/Purification Kits .....	113
Forecast Growth for Kit Use, M13 DNA Purification Kits .....	113
Forecast Growth for Kit Use, Oligo Purification Kits .....	114
Forecast Growth for Kit Use, Lambda DNA Purification Kits .....	115
Forecast Growth Rate, Weighted Average by Isolation/Purification Kit Category .	116
Forecast Growth Rate, Weighted Average for All Isolation/Purification Kits.....	116
<b>VI. SUPPLIER ASSESSMENT .....</b>	<b>117</b>
Verbatim Comments Regarding Respondent's Choice of Brands.....	118
Reasons for Supplier Selection, Frequency of Most Common Themes.....	128
Overall Customer Satisfaction Rate .....	130
Dissatisfied Customers, All Isolation & Purification Kits .....	130
Satisfied Isolation/Purification Kit Users, Sorted by Brand .....	131
Satisfaction Rates & 65% Confidence Levels for Major Kit Suppliers.....	132
Verbatim Reasons for Not Purchasing Specific Brands, Sorted by Brand .....	132
Verbatim Comments from Respondents Satisfied with Current Suppliers .....	135
NA Isolation/Purification Suppliers' Ranking: Best Value for Money .....	137
NA Isolation/Purification Suppliers' Ranking: Most Consistent Quality.....	138
NA Isolation/Purification Suppliers' Ranking: Fastest Delivery .....	139
NA Isolation/Purification Suppliers' Ranking: Best Application Support .....	139
NA Isolation/Purification Suppliers' Ranking: Highest Yield .....	140
NA Isolation/Purification Suppliers' Ranking: Greatest Purity .....	141
<b>VII. FUTURE EXPECTATIONS .....</b>	<b>143</b>
Suggested Improvements in Nucleic Acid Isolation & Purification Kits .....	144
Most Frequently Mentioned Improvements, NA Isolation & Purification Kits.....	151
Suggested Improvements for All Molecular Biology Reagent Kits .....	153
Most Frequently Mentioned Improvements, All Molecular Biology Reagent Kits .	162
Suggested Applications for Future Molecular Biology Kit Development .....	164
<b>VIII. QUESTIONNAIRE .....</b>	<b>169</b>

# I. BACKGROUND

## A. SURVEY OBJECTIVES

The purpose of this survey was to provide the management of our client companies with an analysis of the current market for molecular biology reagent systems (dealing exclusively with the isolation and purification of nucleic acids from various sources) in the U.S. and of the attitudes of a cross section of researchers who utilize these kits in their work. This is a companion to the upcoming report on other molecular biology reagents, which covers consumption of commercial kits for DNA sequencing, amplification, nucleic acid labeling and other applications.

The surveying was blind, with no reference made to any clients for the survey. To encourage respondents to express themselves freely and without bias, the survey was anonymous, and made frequent use of open-ended questions.

The two demographic screens used to characterize respondents include years of experience with molecular biology techniques and the respondents' type of organization.

Early on in the survey, respondents were asked whether or not they currently used molecular biology reagents or procedures in their work, and whether they used reagents in kit format as opposed to purchasing all reagents individually. Those who indicated that they used kits were then asked to indicate the smallest group of people that share the most reagents and equipment in the lab group. Respondents were then directed to detailed audit questions.

Users were asked to itemize the nucleic acid isolation & purification kits they utilized, including the brand and type of kit, number of kits used annually, preps per kit, approximate price and the forecast percent change for each of the following kit categories: plasmid DNA, genomic DNA, lambda DNA, M13 DNA, mRNA, total RNA, oligo purification, purification of DNA from gels, amplification product purification and auto-sequencing reaction purification.

Respondents were next questioned regarding their reasoning behind choosing these brands of isolation and purification kits, whether there were any brands that they would not buy and were asked to explain their reasons. They were then asked to detail desired improvements in isolation and purification reagents and to select the highest-rated manufacturer in six key areas. In particular, respondents were asked to choose the top-ranked supplier among eight leading molecular biology reagent manufacturers in the following areas: best value for money, most consistent quality, fastest delivery, best application support, highest yield and greatest purity.

Major objectives of the survey were to estimate the present size and growth rate for the molecular biology kit market as a whole and for major segments within this market. Secondly, we wanted to determine the present market share for major kit categories among leading companies in the U.S. and to project which supplier had the best prospects for growth in the coming year. Finally, profiles of respondents most likely to purchase the various kits would be carefully examined.

The audit should permit the evaluation of our clients' present market positions, identify marketing strengths and weaknesses, and suggest strategies to develop or improve sustainable competitive advantage.

This report is the second 2000/2001 study in a growing series of market research analyses that began in 1993. We plan to continue the series, adding titles and alternating between U.S. and international markets, depending upon our clients' suggestions and support.

Further reports in the U.S. series to be published in 2000/2001 include:

Electrophoretic Instrumentation & Reagents  
Molecular Biology Reagent Systems, Vol. 2.

The series also includes the following international studies:

European Densitometers & Image Analysis (published Feb 12<sup>th</sup>)  
DNA Sequencing in the Far East

The following titles were published in the 1999/2000 U.S. series:

DNA Amplification  
DNA Sequencing  
Monoclonal Antibodies.

Already released is a report covering the Far East market for:

Molecular Biology Reagent Systems, Vol. 1.

In the 1999/2000 series, we have also released the following European reports covering:

Microplate Equipment.

We also introduced two reports in 1997/8 covering the Far East market for:

DNA Amplification  
Molecular Biology Reagent Systems, Vol. 2.

The following titles have been released in the U.S. series for 1997/8:

Cell & Tissue Culture  
Cytokines & Growth Factors  
DNA Sequencing  
HPLC in the Life Sciences  
Molecular Biology Reagent Systems, Vol. 1  
Molecular Biology Reagent Systems, Vol. 2  
Molecular Diagnostics.

These titles were also available covering the U.S. market in 1995/6.

In addition, we also published a special report covering the U.S. market for:

Recombinant Protein Expression Systems.

The reports previously released covering the European markets are:

DNA Amplification  
DNA Sequencing  
Electrophoretic Gel Media

Clients are reminded that additional copies of any of these reports that have been purchased in the past are available at a modest cost. Please contact us for further details.

Clients wishing to know publication dates for any of these reports, or wanting to read summaries of the 62 reports in this series are invited to visit our Web site at: [www.phortech.com](http://www.phortech.com)

## B. SURVEY METHODOLOGY

E-mail invitations to take part in the survey were sent to a selected cross-section of life science researchers from our panel of 4,000 U.S. life science researchers. After selection for appropriate areas of interest, invitations were sent to 1,395 U.S. members of the panel who have been in contact with us in the last year and previously indicated their involvement in work with nucleic acids, amplification or sequencing techniques. Customized email invitations to the web site survey were sent on October 16<sup>th</sup>. Over the following week an additional 500 invitations were sent to researchers who had completed the survey for Volume 2 which was running concurrently. The survey was kept open until October 25<sup>th</sup> at which time over 500 responses had been received.

Each participant received an email invitation including the web address of the survey and a unique validation code.

To improve response rates, respondents were able to select from a choice of six prizes for completing the survey. These were a custom designed tee-shirt, a \$5 gift card towards any purchase at a Barnes & Noble bookstore, a box of Ferrero Rocher chocolates, a laser pointer, a AAA mini-Maglite flashlight or 1 pound of Starbuck's coffee.

No reference was made to any of our clients as sponsors of the survey. The questionnaires were anonymous, a combination of tabular entry, check-offs, and open-ended probes. Apart from the prizes, no inducements were employed. However, the majority of respondents did identify themselves by filling in the prize form. This made it possible for us to double-check the responses to some questions by contacting respondents which improved the accuracy of the data.

Since 144 web invitations were returned as undeliverable, the total number of invitations received by researchers is 1,751. By the close of the survey, 516 responses had been received for an overall response rate of 29.5%, which was significantly better than expected.

We felt that respondents spent considerable time explaining their positions on the open-ended questions. We have no reason not to believe that the survey is representative of the entire U.S. population of molecular biology kit and reagent users.

Based upon these responses, the overall statistical results presented in this report are accurate to within  $\pm 4.3$  percentage points at the 95% confidence level. In cases where we only calculate the percentages of respondents that use kits, the results are accurate to  $\pm 4.5\%$ . In our experience, 95% confidence levels are appropriate primarily for scientific experiments. Most business people making decisions are content to be right more often than they are

wrong. In this case, a 65% confidence level, (in which you would be right twice as often as you would be wrong) is more appropriate. Conveniently, 65% confidence levels are nearly exactly one half the size of the 95 % level, thus our 65% levels would be  $\pm 2.2\%$  for both all respondents and all users.

According to the binomial distribution theory, these values are valid when the measured event has about a 50% probability. When the measured event is considerably more rare than this, the corresponding confidence intervals get smaller. On the other hand, these confidence intervals are valid for answers based upon the complete pool of respondents. When analyzing data for a group that includes only a small segment of respondents, the answers are less certain and confidence intervals are correspondingly larger.

In this report, we will calculate more exact individual confidence intervals when appropriate. In our comments, we will note whether given differences are significant at either the 65% or 95% level. To aid our clients in determining the appropriate confidence interval for various combinations of sample size and measurements, we have created the following table. Just read the closest percentage on the left and find the closest sample size column. The intersection will show the confidence interval for that combination. For example, a measured 35% value with a sample size of 200 has a 95% confidence interval of  $\pm 6.6\%$ .

**95% Confidence Intervals for Various Percentages & Sample Sizes**

Percent	n=10	n=20	n=50	n=100	n=200	n=500	n=1000
5%	$\pm 13.5\%$	$\pm 9.6\%$	$\pm 6.0\%$	$\pm 4.3\%$	$\pm 3.0\%$	$\pm 1.9\%$	$\pm 1.4\%$
10%	$\pm 18.6\%$	$\pm 13.1\%$	$\pm 8.3\%$	$\pm 5.9\%$	$\pm 4.2\%$	$\pm 2.6\%$	$\pm 1.9\%$
20%	$\pm 24.8\%$	$\pm 17.5\%$	$\pm 11.1\%$	$\pm 7.8\%$	$\pm 5.5\%$	$\pm 3.5\%$	$\pm 2.5\%$
35%	$\pm 29.6\%$	$\pm 20.9\%$	$\pm 13.2\%$	$\pm 9.3\%$	$\pm 6.6\%$	$\pm 4.2\%$	$\pm 3.0\%$
50%	$\pm 31.0\%$	$\pm 21.9\%$	$\pm 13.9\%$	$\pm 9.8\%$	$\pm 6.9\%$	$\pm 4.4\%$	$\pm 3.1\%$
65%	$\pm 29.6\%$	$\pm 20.9\%$	$\pm 13.2\%$	$\pm 9.3\%$	$\pm 6.6\%$	$\pm 4.2\%$	$\pm 3.0\%$
80%	$\pm 24.8\%$	$\pm 17.5\%$	$\pm 11.1\%$	$\pm 7.8\%$	$\pm 5.5\%$	$\pm 3.5\%$	$\pm 2.5\%$
90%	$\pm 18.6\%$	$\pm 13.1\%$	$\pm 8.3\%$	$\pm 5.9\%$	$\pm 4.2\%$	$\pm 2.6\%$	$\pm 1.9\%$
95%	$\pm 13.5\%$	$\pm 9.6\%$	$\pm 6.0\%$	$\pm 4.3\%$	$\pm 3.0\%$	$\pm 1.9\%$	$\pm 1.4\%$