



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 FAR EAST LIFE SCIENCE RESEARCH  
MARKET

*A Multi-Client Report*

by  
PhorTech International  
San Carlos, California

June 30, 2000

Copyright 2000 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>17</b>
#0. Respondent's Geographic Distribution .....	18
#1. Current Use of Molecular Biology Reagents .....	21
#12. Distribution by Type of Organization .....	30
#11. Years Experience with Molecular Biology Techniques.....	38
<b>III. MARKET SIZE .....</b>	<b>43</b>
#1+. Current Size of Market for Molecular Biology Reagents ..	44
#2. Research Group Size .....	47
#3. Usage of Various Types of Isolation/Purification Kits .....	50
#4. Market Size Estimate for Isolation/Purification Kits.....	55
<b>IV. MARKET SHARE .....</b>	<b>61</b>
#4+ Isolation/Purification Kit Market Share Analysis.....	62
<b>V. PURCHASE PLANS.....</b>	<b>125</b>
#4+. Sales Projections for Isolation/Purification Kits.....	126
<b>VI. SUPPLIER ASSESSMENT .....</b>	<b>137</b>
#5. Reasons Given for Brand Selection .....	138
#6. Rejected Brands & Reasons .....	161
#8. Ranked Suppliers' Performance .....	166
<b>VII. FUTURE EXPECTATIONS .....</b>	<b>173</b>
#7. Desired Improvements in Isolation/Purification Rgts.....	174
#10. Desired Improvements in Molecular Biology Kits.....	181
<b>VIII. QUESTIONNAIRE .....</b>	<b>189</b>

# LIST OF TABLES & FIGURES

<b>I. BACKGROUND .....</b>	<b>9</b>
Survey Objectives .....	10
Survey Methodology.....	13
Survey Response Rates.....	13
<b>II. DEMOGRAPHIC SEGMENTATION.....</b>	<b>17</b>
Geographic Segmentation for Names Used in Survey .....	18
Respondent's Geographic Distribution, All Respondents.....	19
Respondent's Geographic Distribution, Kit Users.....	20
Geographic Segmentation of Responses, All Respondents vs. Kit Users.....	20
Molecular Biology Reagent Use, All Respondents .....	21
Verbatim Comments Regarding Reasons Behind Format Selection.....	22
Distribution by Type of Organization, All Respondents .....	30
Distribution by Type of Organization, Kit Users .....	31
Organizations Represented by Respondents to this Survey.....	31
Mean and Median Years of Experience, All Users .....	38
Years of Experience, Users of Individual Reagents vs. Kit Users .....	38
Mean and Median Years of Experience, Users of Individual Rgts vs. Kit Users.....	39
Years of Experience, Users of Individual Reagents vs. Kit Users .....	39
Level of Experience, Kit Users vs. Users of Individual Reagents .....	40
Level of Experience, According to Organization .....	41
<b>III. MARKET SIZE .....</b>	<b>43</b>
Molecular Biology Reagent Use, All Respondents .....	44
Molecular Biology Usage by Life Scientists, 2000 Global Lab Product Study.....	45
Population Estimate of Far East Life Scientists Using Mol Biology Techniques ...	45
Population Estimate of Far East Life Scientists Using Isolation/Purification Kits .	46
Mean, Median & Mode Group Size, Isolation/Purification Kit Users.....	47
Reported Group Sizes, Isolation/Purification Kit Users.....	47
Mean Annual Isoltn/Purificat'n Kits Consumed per Resp, by Group Size.....	48
Mean Annual Isoltn/Purificat'n Kits Consumed per Researcher, by Group Size...	49
Share of Mentions, Categories of Isolation/Purification Kits .....	51
Frequency of Usage by Category of Isolation/Purification Kits.....	52
Percent of Respondents Using Kits, by Kit Category & Geographic Region .....	52
Extrapolated Population of Far East Life Science Researchers, by Kit Category ...	53
Extrapolated Pop of Far East Life Science Resrchrs, by Kit Category & Region ...	53
Total Consumption & Dollar Spend, Isoltn/Purificat'n Kit Installed Base Audit.	55
Mean Consumption & Dollar Spend, Isoltn/Purificat'n Kit Installed Base Audit	55
Frequency of Usage by Category, Isolation/Purification Kit Audit .....	56
Share of Mentions by Category, Isolation/Purification Kit Audit .....	56
Unit Share Distribution of Kits in Audit, by Isolation/Purification Kit Category.	57
Dollar Share Distribution of Kits in Audit, by Isolation/Purification Kit Category	58
Unit Shares by Geographic Region, Isolation/Purification Kit Audit .....	59
Dollar Share by Geographic Region, Isolation/Purification Kit Audit .....	59
Estimate of Total Dollar Market for Isolation & Purification Kits .....	59
1999 Annual Far East Nucleic Acid Isolation & Purification Sales Estimates.....	60

Comparison of Total Dollar Market Estimate with Qiagen's Sales .....	60
<b>IV. MARKET SHARE.....</b>	<b>61</b>
Unit Market Share for Major Suppliers, Isolation & Purification Kits.....	63
Dollar Market Share for Major Suppliers, Isolation & Purification Kits .....	64
Nucleic Acid Isolation/Purification Kit Suppliers in the 'Other' Category.....	64
Dollar Spend on Isolation & Purification Kits, by Geographic Region.....	65
Dollar Market Share for Major Suppliers, Oceania .....	66
Dollar Market Share for Major Suppliers, Japan .....	66
Dollar Market Share for Major Suppliers, Other Asian Countries .....	67
<b>Plasmid DNA Isolation/Purification Analyses .....</b>	<b>68</b>
Mean Annual Consumption and Dollar Spend per Respondent .....	68
Estimate of Annual Unit and Dollar Market Size for 1999 .....	68
Unit Market Share for Major Suppliers, Plasmid DNA Purification Kits .....	68
Dollar Market Share for Major Suppliers, Plasmid DNA Purification Kits.....	69
Plasmid DNA Isolation/Purification Kit Suppliers in the 'Other' Category.....	69
Most Frequently Mentioned Kits for Plasmid DNA Isolation/Purification .....	70
Mode for Preps per Kit, Plasmid DNA Isolation/Purification Kits .....	70
Mean Price per Prep, Plasmid DNA Isolation/Purification Kits .....	70
Preps per Kit, Plasmid DNA Isolation/Purification Kits .....	71
Dollar Market Share for Major Suppliers, Oceania .....	71
Dollar Market Share for Major Suppliers, Japan .....	72
Dollar Market Share for Major Suppliers, Other Asian Countries .....	73
<b>Kits for the Purification of DNA from Gels .....</b>	<b>73</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	73
Mean Annual Consumption and Dollar Spend per Respondent .....	73
Unit Market Share for Major Suppliers, Kits for Purification of DNA from Gels.	74
Dollar Market Share for Major Suppliers, Kits for Purificat'n of DNA from Gels	74
Kits for the Purification of DNA from Gels Suppliers in the 'Other' Category.....	75
Most Frequently Mentioned Kits for Purification of DNA from Gels.....	75
Mode for Preps per Kit, Kits for Purificat'n of DNA from Gels .....	76
Mean Price per Prep, Kits for Purificat'n of DNA from Gels .....	76
Preps per Kit, Kits for Purificat'n of DNA from Gels.....	76
Dollar Market Share for Major Suppliers, Oceania .....	77
Dollar Market Share for Major Suppliers, Other Asian Countries .....	77
Dollar Market Share for Major Suppliers, Japan .....	78
Revised Dollar Market Share for Major Suppliers, Other Asian Countries .....	79
<b>Kits for the Purification of Amplification Products .....</b>	<b>79</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	79
Mean Annual Consumption and Dollar Spend per Respondent .....	79
Unit Market Share for Major Suppliers, Amp Product Purification Kits .....	80
Revised Unit Market Share for Major Suppliers, Amp Product Purification Kits..	81
Dollar Market Share for Major Suppliers, Amp Product Purification Kits.....	81
Revised \$ Market Share for Major Suppliers, Amp Product Purification Kits.....	82
Amp Product Purification Kit Suppliers in the 'Other' Category .....	82
Most Frequently Mentioned Kits for Amp Product Purification Kits.....	83
Mean, Median & Mode for Preps per Kit, Amp Product Purification Kits.....	83
Mean Price per Prep, Amp Product Purification Kits.....	83
Preps per Kit, Amp Product Purification Kits .....	84

Dollar Market Share for Major Suppliers, Oceania .....	84
Dollar Market Share for Major Suppliers, Japan .....	85
Dollar Market Share for Major Suppliers, Other Asian Countries .....	85
Revised Dollar Market Share for Major Suppliers, Other Asian Countries .....	86
<b>Total RNA Isolation &amp; Purification Kits .....</b>	<b>86</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	86
Mean Annual Consumption and Dollar Spend per Respondent .....	86
Unit Market Share for Major Suppliers, Total RNA Isolation Kits.....	87
Dollar Market Share for Major Suppliers, Total RNA Isolation Kits.....	88
Total RNA Isolation Kit Suppliers in the 'Other' Category.....	88
Most Frequently Mentioned Kits for Isolation of Total RNA .....	89
Preps per Kit, Total RNA Isolation Kits .....	89
Mode for Preps per Kit, Total RNA Isolation Kits.....	90
Mean Price per Prep, Total RNA Isolation Kits.....	90
Dollar Market Share for Major Suppliers, Oceania .....	90
Revised Dollar Market Share for Major Suppliers, Oceania.....	91
Dollar Market Share for Major Suppliers, Japan .....	91
Dollar Market Share for Major Suppliers, Other Asian Countries .....	92
<b>The Isolation and Purification of Genomic DNA.....</b>	<b>92</b>
Mean Annual Consumption and Dollar Spend per Respondent .....	92
Estimate of Annual Unit and Dollar Market Size for 1999 .....	92
Unit Market Share for Major Suppliers, Genomic DNA Purification Kits .....	93
Dollar Market Share for Major Suppliers, Genomic DNA Purification Kits.....	93
Genomic DNA Purification Kit Suppliers in the 'Other' Category .....	94
Most Frequently Mentioned Kits for Purification of Genomic DNA.....	94
Mode for Preps per Kit, Genomic DNA Purification Kits.....	94
Mean Price per Prep, Genomic DNA Purification Kits.....	95
Preps per Kit, Genomic DNA Purification Kits .....	95
Dollar Market Share for Major Suppliers, Oceania .....	96
Dollar Market Share for Major Suppliers, Japan .....	96
Dollar Market Share for Major Suppliers, Other Asian Countries .....	97
Revised \$ Market Share for Major Suppliers, Other Asian Countries .....	97
<b>mRNA Isolation &amp; Purification Kits.....</b>	<b>98</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	98
Mean Annual Consumption and Dollar Spend per Respondent .....	98
Unit Market Share for Major Suppliers, mRNA Isolation/Purification Kits .....	98
Dollar Market Share for Major Suppliers, mRNA Isolation/Purification Kits.....	99
mRNA Isolation/Purification Kit Suppliers in the 'Other' Category .....	99
Most Frequently Mentioned mRNA Isolation/Purification Kits .....	100
Mean and Median Mode for Preps per Kit, mRNA Isolation/Purification Kits ....	100
Mean Price per Prep, mRNA Isolation/Purification Kits.....	100
Preps per Kit, mRNA Isolation/Purification Kits .....	100
Dollar Market Share for Major Suppliers, Oceania .....	101
Dollar Market Share for Major Suppliers, Japan .....	101
Dollar Market Share for Major Suppliers, Other Asian Countries .....	101
<b>Kits for the Purification for Auto-Sequencing Reaction Products .....</b>	<b>102</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	102
Mean Dollar Spend per Respondent.....	102
Unit Market Share for Major Suppliers, Auto-Sequencing Rxn Prod Purificat'n..	103

Dollar Market Share for Major Suppliers, Auto-Sequencing Rxn Prod Purificat'n	103
Auto-Sequencing Rxn Prod Purificat'n Kit Suppliers in the 'Other' Category .....	104
Most Frequently Mentioned Auto-Sequencing Rxn Prod Purificat'n Kits .....	104
Preps per Kit, Auto-Sequencing Rxn Prod Purificat'n Kits.....	104
Mode for Preps per Kit, Auto-Sequencing Rxn Prod Purificat'n Kits .....	105
Dollar Market Share for Major Suppliers, Oceania .....	105
Dollar Market Share for Major Suppliers, Japan .....	105
Dollar Market Share for Major Suppliers, Other Asian Countries .....	106
<b>Lambda DNA Isolation &amp; Purification Kits.....</b>	<b>106</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	106
Mean Annual Consumption and Dollar Spend per Respondent .....	107
Unit Market Share for Major Suppliers, Lambda DNA Isolat'n/Purificat'n Kits ..	107
Dollar Market Share for Major Suppliers, Lambda DNA Isolat'n/Purificat'n Kits	107
Most Frequently Mentioned Lambda DNA Isolat'n/Purificat'n Kits.....	108
Mean, Median & Mode Preps per Kit, Lambda DNA Isolat'n/Purificat'n Kits....	108
Preps per Kit, Lambda DNA Isolat'n/Purificat'n Kits .....	108
Dollar Market Share for Major Suppliers, Oceania .....	109
Dollar Market Share for Major Suppliers, Japan .....	109
Dollar Market Share for Major Suppliers, Other Asian Countries .....	110
<b>Kits for Oligo Purification .....</b>	<b>110</b>
Estimate of Annual Unit and Dollar Market Size for 1999 .....	110
Mean Annual Consumption and Dollar Spend per Respondent .....	110
Unit Market Share for Major Suppliers, Oligo Purification Kits .....	111
Dollar Market Share for Major Suppliers, Oligo Purification Kits.....	111
Oligo Purification Kit Suppliers in the 'Other' Category .....	112
Most Frequently Mentioned Oligo Purification Kits.....	112
Mode Preps per Kit, Oligo Purification Kits .....	112
Preps per Kit, Oligo Purification Kits .....	112
Dollar Market Share for Major Suppliers, Oceania .....	113
Dollar Market Share for Major Suppliers, Japan .....	113
Dollar Market Share for Major Suppliers, Other Asian Countries .....	114
<b>M13 DNA Isolation Kits .....</b>	<b>114</b>
Mean Annual Consumption and Dollar Spend per Respondent .....	114
Estimate of Annual Unit and Dollar Market Size for 1999 .....	114
Unit Market Share for Major Suppliers, M13 DNA Isolation/Purification Kits ...	115
Dollar Market Share for Major Suppliers, M13 DNA Isolation/Purification Kits.	115
Most Frequently Mentioned M13 DNA Isolation/Purification Kit.....	116
Preps per Kit, M13 DNA Isolation/Purification Kits .....	116
Dollar Market Share for Major Suppliers, Other Asian Countries .....	117
<b>Product Mix for Leading Suppliers.....</b>	<b>117</b>
Estimate of Qiagen's Annual Dollar Sales .....	117
Qiagen Dollar Market Share Distribution, By Isolat'n/Purificat'n Application....	118
Estimate of Promega's Annual Dollar Sales .....	118
Promega Dollar Market Share Distribution, By Isolat'n/Purificat'n Application ...	119
Estimate of Life Technologies' Annual Dollar Sales .....	119
Life Technologies Dollar Market Share, By Isolat'n/Purificat'n Application .....	120
Revised Life Technologies \$ Market Share, By Isolat'n/Purificat'n Application ....	120
Revised LTI \$ Market Share as Supplier & Distributor, By Application .....	121
AP Biotech's Dollar Market Share, By Isolat'n/Purificat'n Application .....	121
Estimate of AP Biotech's Annual Dollar Sales .....	122

Molecular Biology Kit Sales (\$) by Category for Principal Suppliers .....	122
<b>V. PURCHASE PLANS.....</b>	<b>125</b>
Forecast Growth for Kit Use, Plasmid DNA Purification Kits .....	127
Forecast Growth for Kit Use, Purification of DNA from Gels.....	128
Forecast Growth for Kit Use, Amplification Product Purification Kits.....	128
Forecast Growth for Kit Use, Total RNA Purification Kits .....	129
Forecast Growth for Kit Use, Purification of Genomic DNA.....	130
Forecast Growth for Kit Use, mRNA Purification Kits .....	130
Forecast Growth for Kit Use, Auto-Sequencing Rxn Product Purification .....	131
Forecast Growth for Kit Use, Lambda DNA Purification Kits .....	132
Forecast Growth for Kit Use, Oligo Purification Kits.....	132
Forecast Growth Rate, Weighted Average by Isolation/Purification Kit Category.	133
Forecast Growth Rate, Weighted Average for All Isolation/Purification Kits .....	133
2000/2001 Sales Projections for the Far East Isolation/Purification Kit Market ...	134
Forecast Growth Rate By Kit Category & Geographic Region .....	134
Revised Forecast Growth Rate By Kit Category & Geographic Region .....	135
<b>VI. SUPPLIER ASSESSMENT .....</b>	<b>137</b>
Verbatim Comments Regarding Respondent's Choice of Brands .....	138
Reasons for Brand Selection, Frequency of Most Common Themes .....	159
Overall Customer Satisfaction Rate .....	161
Dissatisfied Customers, All Isolation & Purification Kits .....	161
Satisfied Isolation/Purification Kit Users, Sorted by Brand .....	162
Satisfaction Rates & 65% Confidence Levels for Major Kit Suppliers .....	162
Verbatim Reasons for Not Purchasing Specific Brands.....	163
Ranked Suppliers' Performance: Best Value for Money .....	166
Ranked Suppliers' Performance: Most Consistent Quality .....	167
Ranked Suppliers' Performance: Fastest Delivery .....	168
Ranked Suppliers' Performance: Best Application Support .....	169
Ranked Suppliers' Performance: Highest Yield .....	169
Ranked Suppliers' Performance: Greatest Purity .....	170
<b>VII. FUTURE EXPECTATIONS .....</b>	<b>173</b>
Suggested Improvements in Nucleic Acid Isolation & Purification Kits .....	174
Most Frequently Mentioned Improvements, NA Isolation & Purification Kits....	179
Suggested Improvements for All Molecular Biology Reagent Kits .....	181
Most Frequently Mentioned Improvements, All Molecular Biology Reagent Kits	187
<b>VIII. QUESTIONNAIRE.....</b>	<b>189</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 Far East market and of the attitudes of a cross section of researchers who utilize these kits in their work. The most recent report on other molecular biology reagents, which covers consumption of commercial kits for DNA sequencing, amplification, nucleic acid labeling and other applications, was published in 1998.

A random cross-section of more than 7,000 researchers from three independent sources were used for this survey. 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 Far East 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 first 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.

The 2000/2001 series is scheduled to cover the following three reports:

U.S. DNA Amplification  
U.S. Molecular Biology Reagent Systems, Vol. 1  
Molecular Biology Reagent Systems, Vol. 1 in the Far East.

In the 1999/2000 series, we have released three reports examining the following markets. These are:

Microplate Equipment in Europe  
DNA Sequencing in the U.S.  
Monoclonal Antibodies in the U.S.

The following nine titles have been released in the series for 1998/1999:

Cell & Tissue Culture in the U.S.  
Cytokines & Growth Factors in the U.S.  
DNA Amplification in the Far East  
DNA Sequencing in Europe  
Electrophoretic Gel Media in Europe  
HPLC in the Life Sciences in the U.S.  
Molecular Biology Reagent Systems, Vol. 1  
Molecular Biology Reagent Systems, Vol. 2 in the Far East  
Protein Expression Systems in the U.S.

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

DNA Sequencing  
Molecular Biology Reagent Systems, Vol. 1  
Molecular Biology Reagent Systems, Vol. 2  
Molecular Diagnostics.

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. Those wishing to know publication dates for any of these reports, or wanting to read summaries of the 72+ reports in this series are invited to visit our Web site at: [www.phortech.com](http://www.phortech.com).

## B. SURVEY METHODOLOGY

The names utilized for this survey were acquired from three sources. The first source was a cross-section of 1,501 researchers who had published papers on DNA extraction was obtained from Sheffield Academic Press (SUBIS). Both users and non-users, who had responded to recent surveys regarding DNA amplification or molecular biology reagents (Volume 2) constituted the second source. After combining the names and removing duplicate entries, 488 received letter invitations making up source two, and a further 364 which included email addresses received invitations to the Web-based survey. Since the response rate was again below expectations, letter invitations were sent to a third source, 5,037 researchers selected on an nth name basis from the most recent list from SUBIS in two batches of 2,519 each.

The questionnaires for the first source were sent by air mail on November 9, 1998. The second mailing to previous respondents was sent on November 23, as were the email invitations. As it became clear that the second mailing was providing a very low return, the third mailing of 2,519 names from the latest SUBIS list was sent on June 24th. Having received a combined total of only 274 returns, letter invitations were sent to the remaining 2,518 on February 24, 2000. The survey was held open until April 2<sup>nd</sup> to allow ample time for responses to be collected.

Each participant received an introductory letter, a double-sided letter-sized survey, and a business reply envelope addressed to PhorTech International. The only exception to this being the researchers receiving email invitations identifying the location of a Web-based survey on our Web site. No reference was made to any of our clients as sponsors of the survey.

To improve response rates, respondents were able to select from a choice of four prizes for completing the survey. These were a box of Jelly Belly jelly beans, a laser pointer, or a mini-Mag lite flashlight.

Apart from the prize, no inducements were employed. The questionnaires were anonymous, using a combination of tabular entry, check-offs, and open-ended probes. 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 during data entry.

Undeliverables to the first mailing were measured at 3, or 0.2%. By the close of the survey, 32 responses had been received for an overall response rate of 2.1%, which was much lower than expected. Undeliverables to the second postal mailing to 488 researchers were measured at 5, or 1.0%, with a response rate of 13.5%, representing 65 responses. Of the 364 email invitations, a whopping 38.5% were returned as undeliverable. Only 29

completed responses were received, translating to a 12.9% response rate for the 224 invitations successfully sent. This was also significantly lower than expected. We received 50 undeliverables (2.0%) to the mailing to the half of the SUBIS sent out first, and 148 responses for an overall response rate of 6.0%. This also did not meet expectations. Undeliverables to the most recent mailing of the remaining SUBIS names, identified as source 3b, were 35, or 1.4% and responses from 111 researchers. All together, we received 385 responses to this survey.

Number of Far East Life Science Researchers Receiving Survey

	Source 1	Source 2 (post)	Source 2 (email)	Source 3a	Source 3b	Total
# Sent	1,501	488	364	2,519	2,518	7,390
# Undeliverable	3	5	140	50	35	233
Total received	1,498	483	224	2,469	2,483	7,157

We felt that respondents spent considerable time explaining their positions on the open-ended questions. In the cover letter, we explained that we would like surveys returned even if the respondent did not use a particular technique. We have no reason not to believe that the survey is representative of the entire Far East population of molecular biology kit users. We have found that, within the limits of experimental error for sample size we have obtained, no demonstrable bias could be detected that could affect our results.

Based upon responses, the overall statistical results presented in this report are accurate to within  $\pm 5.0$  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  $\pm 5.3\%$ . 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  $\pm 2.5\%$  for all respondents and  $\pm 2.6\%$  for 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%	$\pm 13.5\%$	$\pm 9.6\%$	$\pm 6.0\%$	$\pm 4.3\%$	$\pm 3.0\%$	$\pm 1.9\%$	$\pm 1.4\%$

