

Transfection: Understanding Customer Needs

Executive Summary

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Report Introduction

The 2007 Transfection Report is composed of a market overview and an introduction to the Transfection Survey, which contains questions about transfection reagents and methods that researchers are using. The report also includes a discussion of the survey results and conclusions and recommendations drawn from both the market analysis of transfection experimentation and the survey data. The market overview describes the use of transfection techniques as critical to the understanding of gene function. While 51% of researchers who utilize cell-based methods perform transfection¹, that number will certainly rise with the increased use of novel nucleic acid-based approaches for the modification of cellular function.

The primary hurdle to overcome, however, is the current limitations of the physical and chemical cellular delivery methods available. Many are harmful to cells, precluding in vivo use, while others have low transfection rates that would be unsuitable for use clinically. Once this challenge is met, however, the transfection/gene delivery market will explode. Much work is on-going to continue to grow the line of products designed to safely and successfully transport genetic material into cells of multiple types.

It is difficult to define, at present, what the market share for transfection reagents and equipment actually is, as most companies incorporate these products into the broader category of consumables. When one includes cells and tissue culture products, as well as nucleic acid reagents and supplies, the potential market expands tremendously. Most companies report generalized revenue increases in genomic reagents and instruments, ranging from 9–22% among the larger life science vendors.

Market Overview

Gaining entrance into the cell carries both intellectual and financial rewards. Bearing this out is the size and health of the market that caters to the many categories of interested parties. Basic scientists, manufacturers, drug discoverers and medical researchers are all striving to use cells and genes as therapeutic agents. Nearly all are customers – present and future – for the growing line of products designed to successfully transport genetic material into cells of various types.

Researchers need reliable means of transfection to introduce nucleic acids into the cell. As different forms of RNA or DNA, gene constructs can facilitate gene silencing and knockout experiments that are critical to understanding gene function. Expressed as proteins by the cell's native translation machinery, the transfected gene constructs allow scientists to study protein function, protein-protein interactions and cell signaling. Most researchers who work with cells will eventually execute some type of transfection protocol. According to a recent survey by The Science Advisory Board, 51% of researchers who employ cell-based techniques perform transfection¹.

This number could very well increase as more researchers begin to employ “a fast growing number of nucleic acid-based strategies to modulate a vast variety of cellular functions,” according to a recent paper published in the journal *Nucleic Acids Research*². These strategies embrace the high level of target specificity provided by the “several classes of oligonucleotides like aptamers, transcription factor-binding decoy oligonucleotides, ribozymes, triplex-forming oligonucleotides, immunostimulatory CpG motifs, antisense oligonucleotides, small interfering RNAs (siRNAs) and microRNAs (miRNA).

“However, the bottleneck of any nucleic acid-based strategy remains the cellular delivery of these macromolecules,” according to the paper. Surmounting this obstacle will unleash the market potential for product lines based on the oligonucleotide variants for use as tools and/or therapeutics.

Current physical and chemical methods can provide acceptable rates of transfection, but sometimes with harm to the target cells, precluding *in vivo* use. Viral vector delivery has received substantial attention for its transfection efficiency. Research has yet “to develop suitable and especially safe viral systems”³. With significant potential for toxicity along with low transfection rates, the popular reagents composed of cationic lipids and polymers are also restricted to *in vitro* use.

The continuing challenge of safe and successful delivery means that the already burgeoning market has yet to peak. With a “white spot”⁴ opportunity for new transfection technologies and improvement of existing ones, companies have yet to approach the ceiling of growth.

This includes the exploding RNA interference (RNAi) sector. Largely encompassing the use of siRNA and miRNA to silence genes, researchers have quickly embraced the protocol for its relative ease and economy. Nearly one out of every five researchers currently include RNAi as part of their inventory of protocols, according to the Science Advisory Board's survey⁵. Another 11% said that they planned to use the protocol during the coming year.

Market Overview (continued)

Other scientists could be awaiting better means of transfection, according to a recent Frost & Sullivan report on RNAi⁶. “There is still much room for improvement to delivery technologies,” the report indicated. “The limitations of current delivery technologies – with regard to both *in vitro* delivery to hard-to-transfect cell lines and *in vivo* delivery – are substantial barriers to the development and growth of the overall RNAi market.” However, “RNAi is by far the most widely used gene-silencing technique employed in research,” the report indicated, estimating that the U.S. market for RNAi could reach \$294.9 million in 2012⁷. Consulting and research company Jain PharmaBiotech estimates that the worldwide market for RNAi could hit \$850 million by 2012⁸.

This means the continued health of financial returns for suppliers of transfection reagents and tools. “As much as 20 percent of researchers use more than one type of delivery tool in a single study,” said Jonathan Witonsky, a Frost and Sullivan research analyst. “Therefore, vendors that supply numerous delivery solutions that are optimized to work with each other become a one-stop shop for delivery tools. These ‘one-stop shop’ vendors both enable further RNAi research and also generate greater revenues.”

Applied Biosystems Group’s (Foster City, Calif.) acquisition of Ambion Inc (Austin, Texas) in March 2006 underscored the favorable outlook for reagents, kits and tools that facilitate transfection. Specializing in these products, Ambion’s calendar 2005 revenues were estimated to exceed \$52 million, representing a 22% increase above the previous year⁹. The company’s revenues accounted for 4% of Applied Biosystems’ reported 15% growth for the first quarter of fiscal year 2007, compared to the same quarter for fiscal year 2006¹⁰.

Life science supplier Bio-Rad Laboratories Inc (Hercules, Calif.), which offers a wide variety of transfection reagents and devices, indicated in a recent financial report that “the market for reagents and apparatus remains good while growth rates have slowed due to both public and private grant funding being more measured”¹¹. Pharmaceutical and biotechnology companies have tightened the reins on capital spending, causing growth to slow in 2004 and 2005. With reagents and lower cost devices comprising 70% of Bio-Rad’s product profile, the company reported 9% sales growth in 2005 for its life sciences segment.

European competitor Qiagen Inc, echoes similar results. Qiagen reported a 13% sales growth for its line of consumable products, which includes a broad array of transfection reagents. This was “partially offset by a decrease in our instrument product sales of 2% in 2005 as compared to 2004”, according to one of the company’s recent financial reports¹². Stratagene Corp (La Jolla, Calif.), another major player in supplying reagents and instruments for genomic studies, also reported sales growth, albeit slower than previous years¹³.

While recent results largely reflect research and drug discovery efforts, revenues will increasingly include sales of transfection reagents to support drug manufacturing. The trend toward biologic drugs requires expression systems. These include reagents for both delivery and to support the growth of host cells. Monoclonal antibodies, the vast majority of currently approved biologic

Market Overview (continued)

drugs, are key drivers of the financial resources rushing toward production and the development of therapies for more conditions and diseases. With the success of biologics, Frost and Sullivan estimates that the therapeutic monoclonal antibody market should reach \$13.8 billion by 2011¹⁴.

While other analysts maintain the same bullishness regarding the gene delivery market, the fact remains that researchers have yet to develop “tried and validated delivery methods”, according to analysts at Patent Insights Inc¹⁵. While in vitro methods are relatively sophisticated, safe and reliable vehicles to transport therapeutic nucleic acids have yet to materialize, leaving “predictions of high double-digit growth in pharmaceutical applications are probably overstated”.

1. Bioinformatics, LLC, “The Tools and Techniques of Drug Discovery: Volume 2”, September 2006.
2. Veldhoen S et al, “Cellular Delivery of Small Interfering RNA by a Non-Covalently attached Cell-Penetrating Peptide: Quantitative Analysis of Uptake and Biological Effect”, *Nucleic Acids Research*, 34(12):6561-6573, January 2007..
3. Ibid.
4. Patent Insights Inc, “Gene Silencing with RNA Interference: A New Generation of Pharmaceuticals”, July 2006.
5. Bioinformatics, LLC, “The Tools and Techniques of Drug Discovery: Volume 2”, September 2006.
6. Frost & Sullivan, “U.S. RNAi Markets,” May 30, 2006.
7. Ibid.
8. Jain PharmaBiotech, “RNAi – Technologies, Markets and Companies”, January 2007.
9. Ambion Inc, press release, “Applied Biosystems to Acquire the Research Products Division of Ambion, Inc., a Premium Provider of Innovative RNA-based Consumables”, December 27, 2005.
10. Applied Biosystems Group, press release, “Applied Biosystems Reports Fiscal 2007 First Quarter Results,” October 25, 2006.
11. Bio-Rad Laboratories Inc, Form 10-K, March 3, 2006.
12. Qiagen Inc, Form 20-F, for the fiscal year ended December 31, 2005.
13. Stratagene Corp, Form 10-K, March 20, 2006.
14. Frost & Sullivan, “US Select Cell Culture Markets”, January 16, 2006.
15. Patent Insights Inc, “Gene Silencing with RNA Interference: A New Generation of Pharmaceuticals”, July 2006.

Survey Introduction and Methodology

The 2007 Transfection Survey is designed to provide life science vendors of transfection reagents and related supplies with a better understanding of how their products are used in the research environment and how their company specifically rates among the survey participants. Data were gathered from questions regarding *in vivo* versus *in vitro* transfection experiments, what types of transfection experiments are performed, for which applications is transfection used, which specific transfection methods are used, what cell types/species are transfected and a detailed description of the cells (adherent vs. suspension, primary vs. established, supplier), the top vendors that come to mind when thinking of transfection reagents, what type of nucleic acid or protein is primarily transfected into cells, which transfection reagent brands and specific products are used, important transfection reagent features, typical plate sizes for transfection, how many transfections are performed per week and whether that number is expected to increase, decrease, or stay the same, how transfection efficiency is measured, how cytotoxicity is measured, what selectable markers are used for stable transfections, what parameters are adjusted to optimize transfection experiments, what the top 3 factors are that would influence a switch to another vendor's transfection reagent, whether high-throughput transfections are performed, and whether transfection equipment or instrumentation purchases are planned. With this information, vendors will be able to structure marketing campaigns to address consumer needs, as well as focus product development in areas of greatest interest to those involved in transfection experiments

The 2007 Transfection Survey consisted of 30 questions. Of these, 13 included "other" as an answer choice and 1 was open-ended. Four questions were used for demographic information. The survey was administered on-line from December 4th-22nd, 2006, and the data gathered, tabulated, and presented here.

Appendix I: Questionnaire

1. Do you perform or plan to perform in-vitro or in-vivo transfection?

	Currently Perform	Plan to Perform	Do not perform or plan to perform
<i>In-vitro</i> Transfection			
<i>In-vivo</i> Transfection			

2. Which of the following transfection types do you perform?

- Both transient and stable transfection
- Transient transfection only
- Stable transfection only

3. What is the application of your transfection experiments? (Select all that apply)

- Gene-silencing
- Drug discovery
- Protein/antibody production
- Generation of stable cell lines
- Functional studies
- Immunohistochemistry (IHC)
- Other (please specify)

4. Which of the following transfection methods do you use? (Select all that apply)

Chemical

- DEAE-Dextran
- Calcium Phosphate
- Cationic Lipids (Liposomes)
- Cationic Polymers (e.g. PEI (polyethylenimine))
- Activated Dendrimers
- Lipopolyamines (lipid/polymer moiety)
- Magnet-mediated
- Non-liposomal Lipids

Physical

- Direct Microinjection
- Electroporation
- Biolistic Particle Delivery

Other

- Virus-mediated (please specify)
 - Adenovirus
 - Adeno-Associated Virus
 - Lentivirus
 - Nucleofection
- Other (please specify)

- Don't know

5. Which of the following cell types do you use?

- Adherent only
- Suspension only
- Both adherent and suspension

6. How many of your primary and your established cells are adherent cells, how many are suspension cells? (total should each equal 100%)

	Primary	Established
Adherent	____%	____%
Suspension	____%	____%
	100%	100%

7. What are the top companies/suppliers that come to mind when you think of transfection reagents? (Please list as many as you can)

8. Which cell types and species are you using in your transfection experiments? (Select all that apply)

Please indicate if you are using established cell lines or primary cells. For cell lines, please specify the specific cell line name in the box provided.

For all cell types selected, please write in the species and tissue origin in the boxes provided.

Cell Type	Cell line (Please specify cell line name)	Primary Cells	Please specify species	Please specify tissue type
Epithelial-like cells (HeLa, CaCo2, CHO)				
Fibroblast-like cells (HEK 293, Cos-7)				
Endothelial-like cells (HUVEC, BAEC)				
Hepatocyte-like cells (HEPA-1, HepG-2)				
Neuroblastoma (CLB-PEC, SHEP)				
Leukemia cells/Lymphoblasts (Jurkat, K562)				
Melanoma				
Myotubes/myoblasts/muscle cells				
Smooth muscle cells				
Keratinocytes				
Monocytes/macrophages				
Granulocytes				
Erythrocytes				
Adult stem cells				
Embryonic stem cells				
Neuronal cells (SH-SY5Y)				
Insect cells (S2, Sf9)				
Bacteria (E.coli, other)				
Parasites (Trypanosoma, Plasmodium)				
Plant protoplasts				
Whole animal				
Other (please specify)				

9. Below are the cell types you selected in the previous question. For each cell type, which type(s) of biomolecule do you transfect into cells? (Select all that apply)

Only the cell types/animal models chosen in the previous question will appear below.

	Plasmid DNA	Linear DNA	DNA Oligos	RNA Oligos	RNA (in vitro transcribed, viral)	siRNA duplexes	shRNA vectors	Protein or Antibodies	miRNA	Other type
Cell Type(s) listed here										

The next set of questions involves the transfection reagent brands you use.

10. For each cell type you selected, which of the following transfection reagent brands and specific products have you tried or currently use?

Only the cell types selected in the previous question will appear

- Active Motif
- Amaxa Biosystems
- Ambion
- B-Bridge International
- Bender MedSystems
- Bio-Rad
- CytoStore, Inc.
- GeneChoice
- Genlantis
- IBA GmbH
- Invitrogen
- InvivoGen
- Mirus
- MobiTec GmbH
- New England Biolabs (NEB)
- Novagen
- OZ Biosciences
- Polyplus Transfection
- Promega
- Qiagen
- Roche Applied Science
- Stratagene
- Wako Chemicals, USA
- Other (please specify)

11. Which specific reagents/methods have you tested or currently use?

Only the suppliers selected in the previous question will appear.

	Currently Use	Used in the Past		Currently Use	Used in the Past
Active Motif			Genlantis (con'td)		
Chariot™			GeneSilencer Reagent		
Amaxa			NeuroFECT Reagent		
HiFect™			NeuroPORTER Reagent		
Nucleofection®			BaculoPORTER Reagent		
Ambion			Cytofectin		
siPORT™ XP-1			IBA GmbH		
siPORT™ Amine			MATra-A Reagent		
siPORT™ Lipid			MATra-si Reagent		
siPORT™ NeoFX™			MATra-S Immobilizer		
siPORT™ siRNA			MA Lipofection Enhancer		
B-Bridge International			IBAFect		
QuickStep			Invitrogen		
SureFECTOR			Lipofectamine™ Reagent		
UniFECTOR			Lipofectamine™ 2000		
SiFECTOR			Lipofectamine™ 2000 CD		
Bender MedSystems			Lipofectamine™ LTX		
Polyethylenimine-Transferrinfection			Lipofectamine™ RNAiMAX		
Bio-Rad			Oligofectamine™		
COSFectin™			Lipofectin®		
HEKFectin™			Cellfectin®		
TransFectin™			Optifect™		
siLentFect™			293fectin™		
CytoStore, Inc.			FreeStyle™ MAX		
TripleXpress™ TR			DMRIE-C Reagent		
GeneChoice			InvivoGen		
Transfectol™			LyoVec™		
Genlantis			LipoGen™		
GenePORTER			Mirus		
GenePORTER 2			TransIT® -Express		
PerFectin Reagent			TransIT®-LT1		
			TransIT®-LT2		

	Currently Use	Used in the Past		Currently Use	Used in the Past
Mirus (cont'd)			Polyplus Transfection (con'td)		
TransIT®-mRNA			jetSI™		
TransIT-Oligo			PULSin™		
TransIT® In Vivo			Promega		
TransIT-QR			Mammalian - Calcium Phosphate		
MobiTec GmbH			ProFection® Mammalian DEAE-Dextran		
GeneTrans II			CodeBreaker™ siRNA		
New England Biolabs			Transfectam® Reagent		
TransPass™ D1			Tfx™ Reagents		
TransPass™ D2			TransFast™		
TransPass™ R1			Qiagen		
TransPass™ R2			Effectene™		
TransPass™ HeLa			PolyFect		
TransPass™ COS/293			SuperFect		
Novagen			HiPerFect		
GeneJuice™			RNAiFect		
Insect GeneJuice™			TransMessenger		
RiboJuice™ siRNA			Roche Applied Science		
ProteoJuice™ Protein			FuGENE® 6		
OZ Biosciences			FuGENE® HD		
EcoTransfect			X-tremeGENE siRNA		
DreamFect™			X-tremeGENE Q2		
Magnetofectin™ - CombiMag			DOTAP		
Magnetofectin™ - ViroMag 100			DOSPER		
Magnetofectin™ - SilenceMag			Stratagene		
Magnetofectin™ - PolyMag			GeneJammer®		
FlyFectin™			LipoTAXI®		
Polyplus Transfection			SatisFection™		
Fecturin™			GeneEraser™ siRNA		
jetPEI™			BioTrek™		
in vivo-jetPEI™			MBS Mammalian		
INTERFERin™			ViraPack™		
			Wako Chemicals, USA		
			Gene Transfer		

12. Please rate the following transfection reagent features in order of importance to your research.

	Very Important (1)	Important (2)	Neutral (3)	Somewhat Important (4)	Not Important (5)
High transfection efficiency for stable transfections					
High transfection efficiency for transient transfections					
Low cytotoxicity					
Compatible with both serum-containing and serum-free media					
Simple protocol (e.g. no need for media changes or wash steps)					
Effective for difficult to transfect cells					
Minimal off-target effects					
Compatible with a broad range of cell types (adherent and suspension)					
Allows transfection with low amounts of biomolecules					
Complex formation in medium (no need for special buffer or special medium)					

13. What plate size do you typically use for transfecting cells? (Select all that apply)

- 100 mm dish
- 160 mm dish
- 16 well
- 112 well
- 124 well
- 148 well
- 196 well
- 1384 well
- Do not use plates
- Other (please specify)

14. Approximately how many transfections do you perform per week?

Transfection is defined by number of wells: Transfection in a 12-well plate is 12 transfections, not 1 transfection.

	1 to 10	11 to 25	26 to 50	51 to 100	More than 100	Not applicable
DNA						
RNA						
siRNA						
miRNA						
Protein/Antibodies						

15. Over the next 12 months, how do you expect the number of transfections you perform to change?

- Stay the same
- Do not know
- Increase (Please specify by what %) _____
- Decrease (Please specify by what %) _____

16. How do you measure transfection efficiency? (Select all that apply)

- Selectable markers
- Fluorescent labeled nucleic acid
- Reporter gene
- qRT-PCR or RT-PCR
- Arrays
- Western blot
- Phenotype change
- Northern analysis
- Other (Please specify)

17. How do you measure cytotoxicity? (Select all that apply)

- General culture observation
- Cell proliferation / growth metrics
- Apoptosis assays
- Cell viability stains (flow cytometer based)
- Cell viability stains (non-flow cytometer based)
- Total protein assays
- Trypan Blue
- Other (Please specify)

18. For stable transfections, what selectable marker(s) do you use? (Select all that apply)

- Aminoglycoside phosphotransferase
- Hygromycin B phosphotransferase
- Puromycin Dihydrochloride
- Adenomise deaminase
- Dihydrofolate reductase
- Thymidine kinase
- G418
- Other (Please specify)

19. Assume all commercially available transfection reagents perform with similar success in your particular application (i.e. cell line, biomolecule).

Which of the following three factors would influence you to switch to another supplier's transfection reagent? (Please choose only three)

- Availability of samples
- Breadth of product offering
- Company reputation
- Ease of ordering
- Price
- Product readily available (rarely backorderd)
- Superior phone-based technical support
- Web-based protocols and application notes
- I would not switch

20. Which of the following parameters do you adjust to optimize your transfection experiments? (Select all that apply)

- Cell density
- Amount of DNA
- Transfection reagent to DNA ratio
- Incubation period with DNA to reagent complex
- Incubation time following transfection
- The presence or absence of serum
- Other (please specify)
- Do not optimize

21. The following are different transfection reagent features. For each row, please indicate if you prefer one feature over the other. (Choose only one preference level for each row)

	Strongly Prefer (5)	Somewhat Prefer (4)	Neutral (3)	Somewhat Prefer (2)	Strongly Prefer (1)	
High transfection efficiency						Low cytotoxicity
Low cytotoxicity						Minimal off-target effects
Minimal off-target effects						High transfection efficiency
High transfection efficiency						Compatible with broad range of cell types
Compatible with broad range of cell types						Low cytotoxicity
Minimal off-target effects						Compatible with broad range of cell types
Low cytotoxicity						Effective for difficult to transfect cells
Effective for difficult to transfect cells						High transfection efficiency

22. Do you currently perform or plan to perform high-throughput transfection?

- Currently perform
- Plan to perform
 - Within 3 months
 - Within 3 to 6 months
 - Within 6 to 12 months
 - In more than 12 months
- Do not currently perform or plan to perform

23. Please indicate the degree to which you agree with the following statements by checking the appropriate box.

	Disagree	Neither agree or disagree	Agree
I am planning to use more primary cells in my experiments next year			
I spend too much time optimizing transfection conditions			
I must use multiple transfection methods to carry out my experiments			
I have to redo experiments due to variability in transfection results			
I do not care what cell type I use for transient protein expression			

24. Are you planning to buy equipment or instruments for transfection?

- Yes: Within 3 months
- Within 3-6 months
- Within 6-12 months
- In more than 12 months
- No: Not planning to purchase equipment for transfection

25. Please describe any cell and sample type which you have found challenging to transfect with commercially available transfection reagents. (Optional)

Demographic Questions

1. In which type of institution do you work?

- Academic
- Pharmaceutical
- Private Research
- Other (please specify)
- Biotechnology
- Government
- Clinical Diagnostic Testing

2. Which title best applies?

- Professor/Instructor
- Lab Manager/Supervisor
- Business Development Director/Manager
- Department Head
- Account Manager
- Staff Scientist
- President/CEO/Owner/VP
- Postdoctoral Fellow
- Consultant
- Product Manager
- Process Engineer
- Research Associate
- Research Director/VP of Research
- Technician/Research Assistant
- Graduate Student
- Principal Investigator
- Lab Director/Chief Scientist
- Procurement Manager
- Other

3. Which of the following are your key areas of research or work?

- Bioinformatics
- Genomics/Genetics
- Drug Discovery
- Marketing/Sales
- Bioengineering
- Biomufacturing /Process Development
- Microbiology/Virology
- Cell Biology
- Administration
- Pharmacology/Toxicology
- Neuroscience
- Purchasing
- Immunology
- Diagnostics/Pathology
- Biochemistry
- Molecular Biology
- Proteomics

4. Which best describes your purchasing authority?

- Authorize
- Recommend
- Evaluate
- No Purchase Role

Appendix II: Presentation of Survey Data

Demographic Survey Data

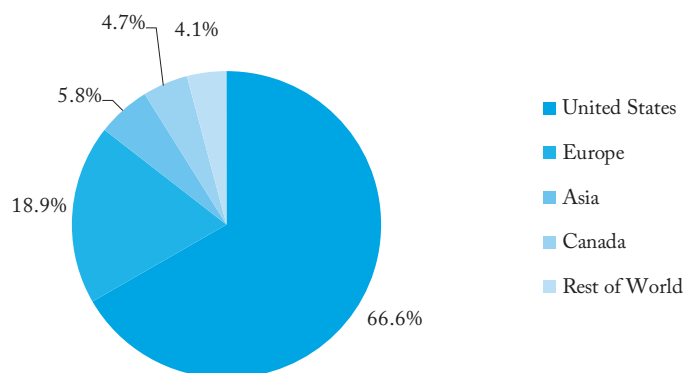
Country

67% of survey participants are from the United States, 19% are from Europe, and nearly 6% are from Asia.

N = 365

Country	Count	%
United States	243	66.6%
Europe	69	18.9%
Asia	21	5.8%
Canada	17	4.7%
Rest of World	15	4.1%

Region



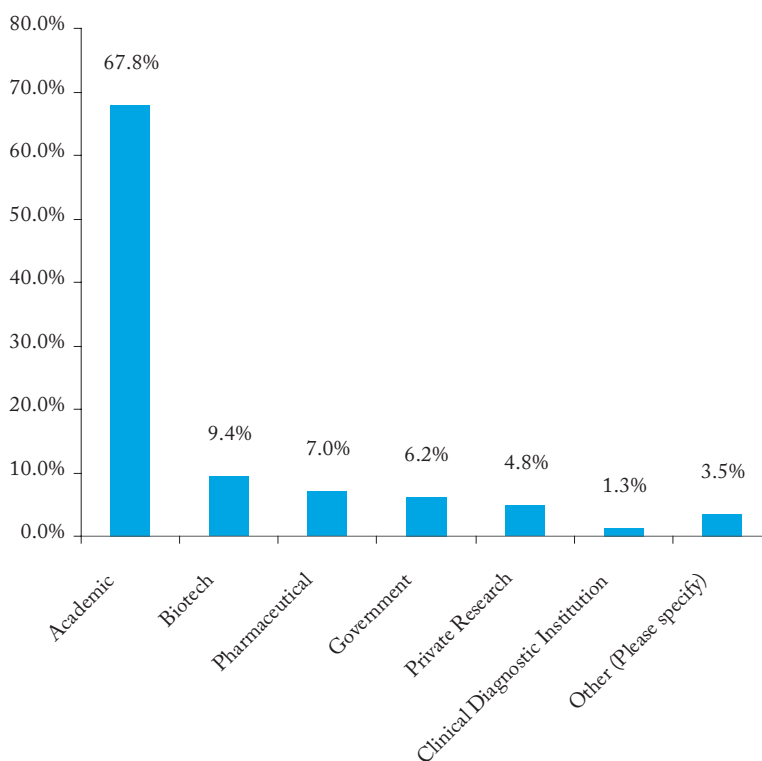
What is your Institution Type?

68% of survey participants are from Academia, 16% are from Biotech and Pharmaceutical institutions, and 6% are from government.

N = 373

Institution Type	Count	%
Academic	253	67.8%
Biotech	35	9.4%
Pharmaceutical	26	7.0%
Government	23	6.2%
Private Research	18	4.8%
Clinical Diagnostic Institution	5	1.3%
Other	13	3.5%

Institution Type



Which title best applies?

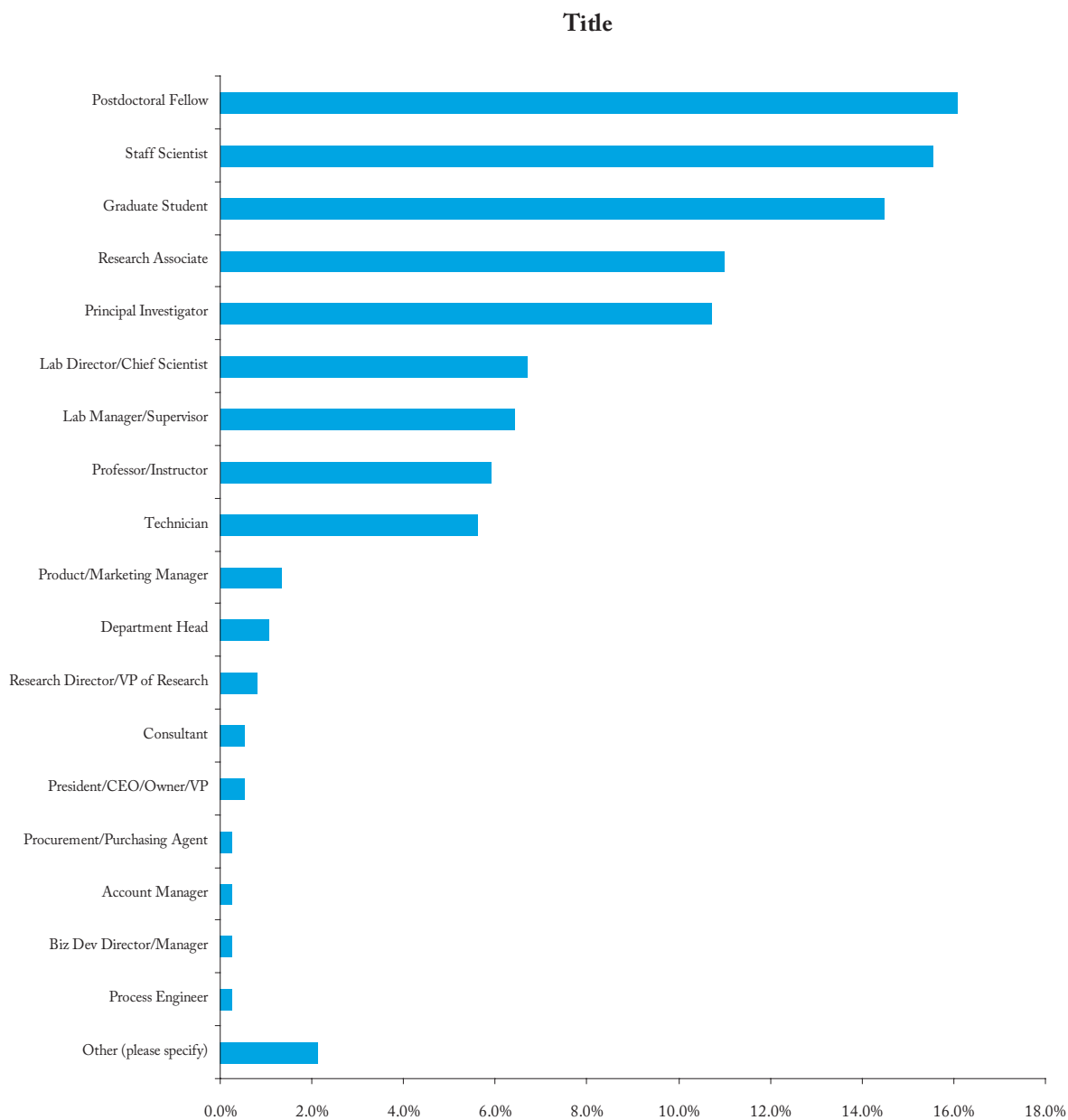
Nearly 74% of survey participants work at the bench.*

N = 373

Institution Type	Count	%
Postdoctoral Fellow	60	16.1%
Staff Scientist	58	15.6%
Graduate Student	54	14.5%
Research Associate	41	11.0%
Principal Investigator	40	10.7%
Lab Director/Chief Scientist	25	6.7%
Lab Manager/Supervisor	24	6.4%
Professor/Instructor	22	5.9%
Technician	21	5.6%
Product/Marketing Manager	5	1.3%
Department Head	4	1.4%
Research Director/VP of Research	3	0.8%
Consultant	2	0.5%
President/CEO/Owner/VP	2	0.5%
Purchasing/Procurement Agent	1	0.3%
Account Manager	1	0.3%
Biz Dev Director/Manager	1	0.3%
Process Engineer	1	0.3%
Other	8	2.1%

*Includes: Postdoctoral Fellow, Staff Scientist, Graduate Student, Research Associate, Principal Investigator, Technician.

Which title best applies?



**Which of the following are your key areas of research or work?
(check all that apply)**

The majority of the survey participants selected Cell or Molecular Biology as their key area of research.

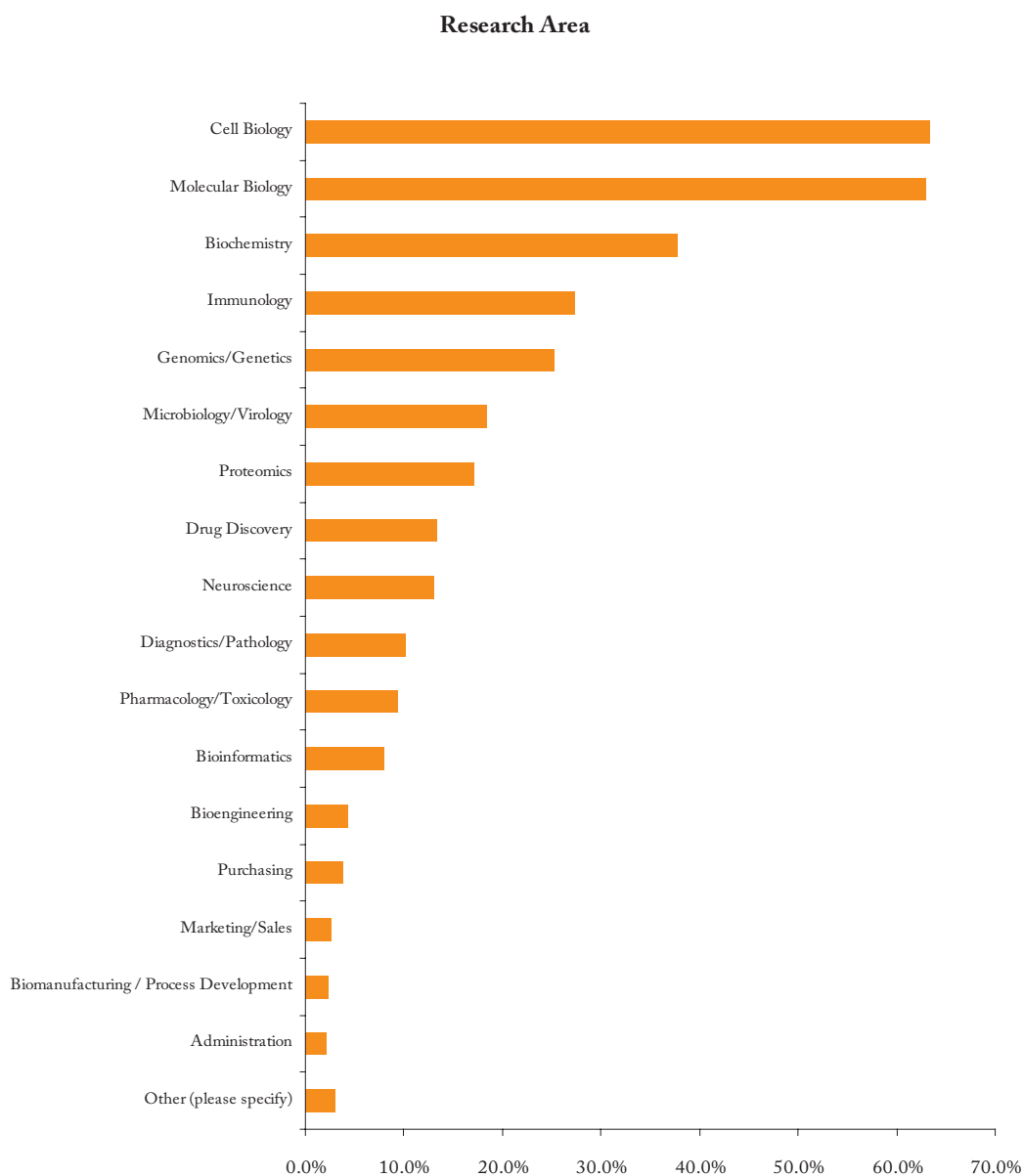
N = 373

Research Area or Work	Count	%
Cell Biology	236	63.3%
Molecular Biology	235	63.0%
Biochemistry	141	37.8%
Immunology	102	27.4%
Genomics/Genetics	94	25.2%
Microbiology/Virology	69	18.5%
Proteomics	64	17.2%
Drug Discovery	50	13.4%
Neuroscience	49	13.1%
Diagnostics/Pathology	38	10.2%
Pharmacology/Toxicology	35	9.4%
Bioinformatics	30	8.0%
Bioengineering	16	4.3%
Purchasing	14	3.8%
Marketing/Sales	10	2.7%
Biomanufacturing/Process Development	9	2.4%
Administration	8	2.1%
Other	11	3.0%

**Which of the following are your key areas of research or work?
(check all that apply)**

The majority of the survey participants selected Cell or Molecular Biology as their key area of research.

N = 373



Which best describes your purchasing authority?

Nearly 90% of the survey respondents either authorize or recommend purchases.
N = 373

Purchasing Authority	Count	%
Authorize	147	39.4%
Recommend	182	48.8%
Evaluate	26	7.0%
No purchase role	18	4.8%

Purchasing Authority

