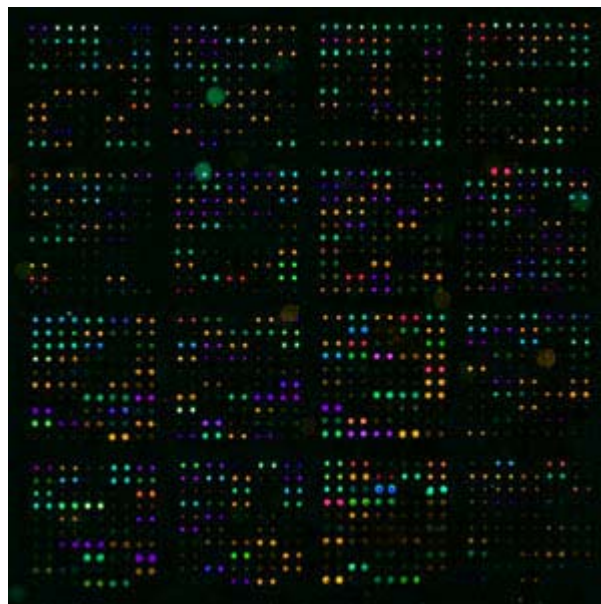


## Protein Arrays: A Market Overview



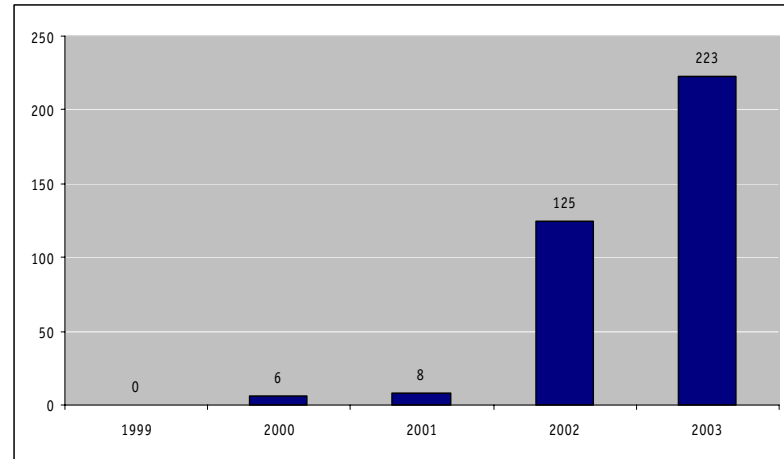
### Executive Summary

In the past few years DNA microarrays have proven to be an invaluable tool for studying gene expression patterns on a genome-wide scale. Building on the success of this technology, protein arrays have been developed to offer the rapid analysis of a proteins' interaction with a variety of compounds (drugs, antibodies, proteins, nucleic acids) quickly and effectively.

In their ideal form, protein arrays could be used for many purposes - diagnostics, basic research, and drug development to name a few. Because of this broad range of applications, protein array technology has the potential to be one of the most widely used tools in life-science research. However, the technical challenges encountered in developing protein arrays have slowed market growth.

Recently, advances in materials science and proteomics have improved techniques to the point where the market is beginning to take off. Additionally, analysis software which was developed for DNA arrays has been borrowed for this emerging technology. In 2002, the protein array market generated revenues of \$87 million and is predicted to reach \$575 million by 2009<sup>1</sup>.

### Number of Published Articles Mentioning Protein Arrays by Year

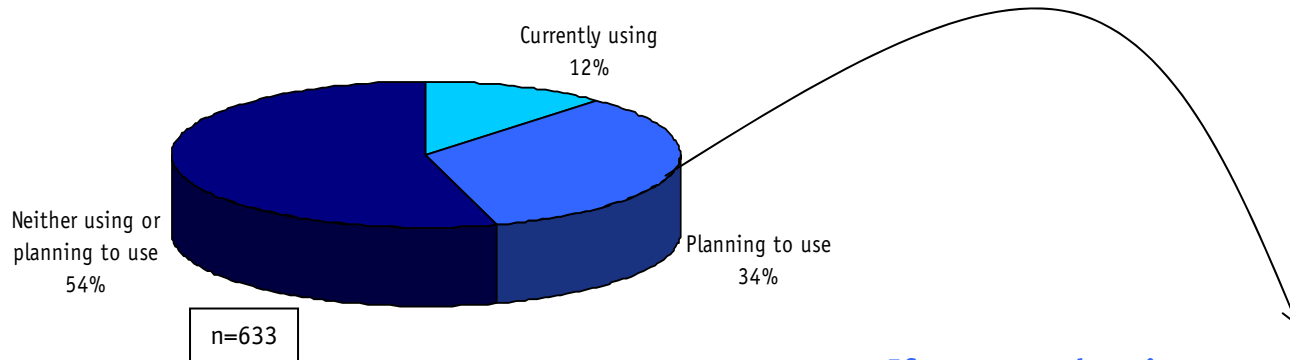


Source: PubMed

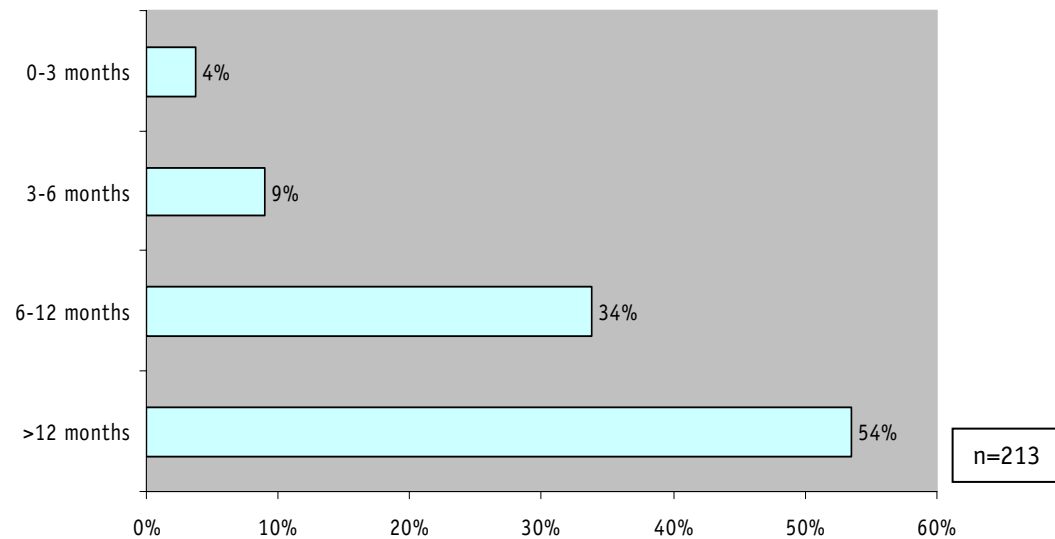
Recently Biocompare has examined the current state of the protein array market as well as the potential for growth in this arena. In this report, *Protein Analysis: A Market Overview*, Biocompare has asked scientists who use protein arrays, as well as those planning to use them, what research they think protein arrays are well suited for, what their opinions of the current products available to them are, and what their purchasing plans for the near future are.

<sup>1</sup>Frost & Sullivan, *World Protein Array Markets*, 2004

### Are you currently using or planning to use protein arrays?



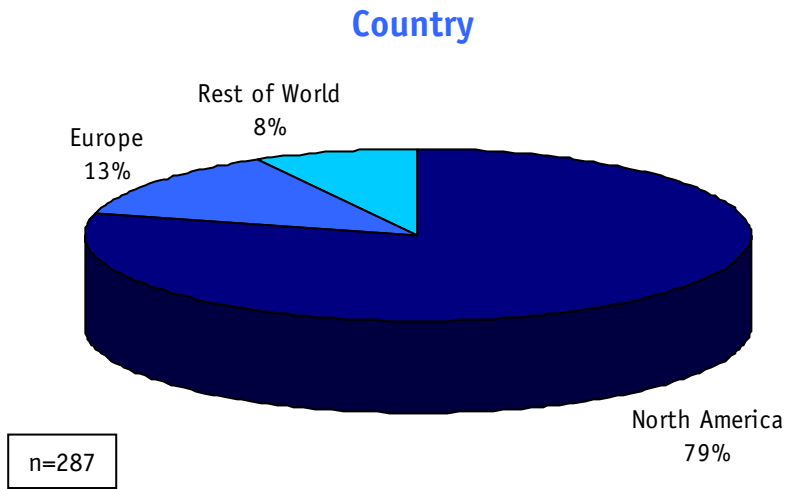
### If you are planning to use protein arrays, when?



Those who are neither currently using nor planning to use protein arrays were not allowed to complete the survey. The remaining 288 survey takers are either currently using or planning to use protein arrays in the next 12 months.

Country	Total	Percent
United States	211	73.52%
Canada	16	5.57%
China	7	2.44%
Italy	7	2.44%
United Kingdom	6	2.09%
Germany	5	1.74%
India	4	1.39%
France	3	1.05%
Taiwan	3	1.05%
Austria	2	0.70%
Finland	2	0.70%
Spain	2	0.70%
Switzerland	2	0.70%
Turkey	2	0.70%
Australia	1	0.35%
Colombia	1	0.35%
Czech Republic	1	0.35%
Denmark	1	0.35%
Georgia	1	0.35%
Hungary	1	0.35%

Country (cont'd.)	Total	Percent
Iran	1	0.35%
Ireland	1	0.35%
Israel	1	0.35%
Korea South	1	0.35%
Netherlands	1	0.35%
Poland	1	0.35%
Russia	1	0.35%
Slovakia	1	0.35%
Sweden	1	0.35%



## Institution Type

	Total	Percent
Academic	204	71%
Biotech	28	10%
Clinical Diagnostic Testing	3	1%
Government	24	8%
Other	11	4%
Pharmaceutical	7	2%
Private Research	10	3%

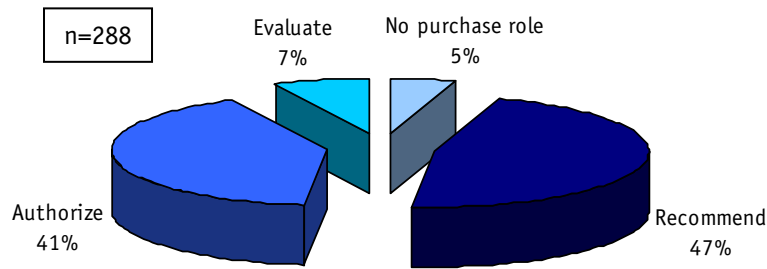
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## Title

	Total	Percent
Business Development Director/Manager	5	2%
Department Head	2	1%
Graduate Student	59	21%
Lab Director/Chief Scientist	13	5%
Postdoctoral Fellow	46	16%
President/CEO/VP/Owner	4	1%
Principal Investigator	48	17%
Process Engineer	1	0%
Professor/Instructor	25	9%
Research Director/VP of Research	5	2%
Staff Scientist	49	17%
Technician/Research Assistant	30	10%

n=287

### Purchasing Role



88% of survey takers either authorize or recommend purchases  
The majority of respondents are conducting research in  
Biochemistry, Cell Biology, Immunology or Molecular Biology.

### Principal Area of Research or Work

	Total	Percent
Administration	6	2%
Biochemistry	31	11%
Bioengineering	6	2%
Bioinformatics	4	1%
Cell Biology	59	20%
Diagnostics / Pathology	4	1%
Drug Discovery	4	1%
Genomics / Genetics	11	4%
Immunology	45	16%
Marketing / Sales	3	1%
Microbiology / Virology	10	3%
Molecular Biology	42	15%
Neuroscience	13	5%
Other	11	4%
Pharmacology / Toxicology	22	8%
Proteomics	17	6%

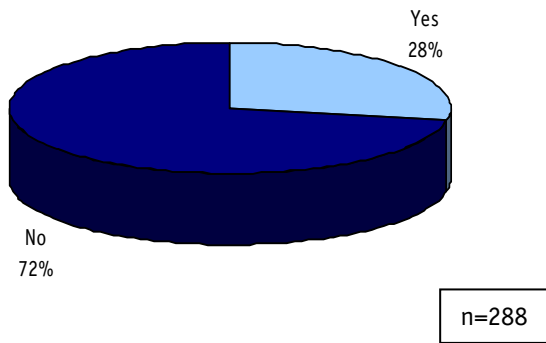
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## Which of the following techniques or technologies do you use in your lab?

	Total	Percent		Total	Percent
Capillary Electrophoresis	11	4%	Nucleic Acid Sequence Analysis	75	26%
Gene Transfer	55	19%	High-Throughput Screening	27	9%
Real-Time PCR	108	38%	PCR/RT-PCR	183	64%
Nucleic Acid Labeling and Detection	76	26%	Protein Isolation & Purification	142	49%
Protein Sequence Analysis	46	16%	Protein Microarrays	64	22%
RNA Isolation & Purification	140	49%	Crystallization	12	4%
Mass Spectrometry	39	14%	Protein-DNA interaction Analysis	58	20%
Recombinant Protein Expression	98	34%	Protein-Protein Interaction Analysis	95	33%
Chromatography	76	26%	Cell/Tissue Culture	187	65%
Microarray Analysis	92	32%	SNP Analysis	22	8%
Robotics/Automation	17	6%	DNA Microarrays	81	28%
DNA Isolation & Purification	141	49%	Image Analysis	101	35%
Gene Targeting	43	15%	RNAi	96	33%
Electrophoresis	176	61%	Microscopy	151	53%
Vector Design/Construction	68	24%	Spectroscopy	70	24%
Laser Capture Microdissection	21	7%	Antibody-Based Technologies	149	52%
Mutagenesis	70	24%	2D Electrophoresis	62	22%
Nucleic Acid Hybridization	77	27%	Transfection	114	40%
Gene Expression Analysis	121	42%	Other	10	3%

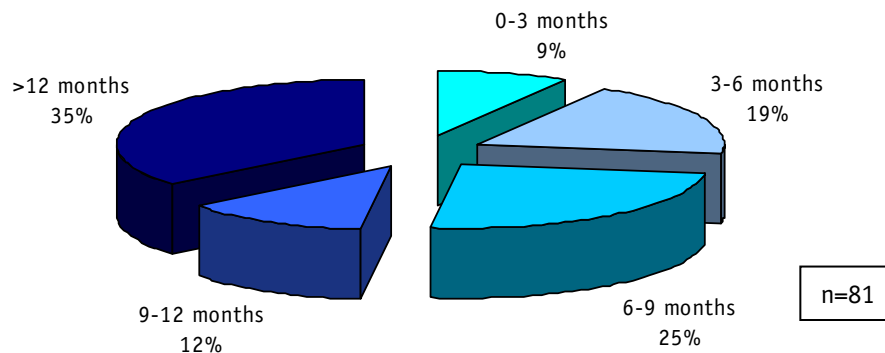
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### Are you planning to start a new lab?



### If so, when?

28% of survey takers plan to start a new lab



**Which of the following instruments/systems do you plan to purchase in the next 3-6 months?**

<b>Instrument</b>	<b>Total</b>	<b>Percent</b>	<b>Instrument</b>	<b>Total</b>	<b>Percent</b>
Gel Electrophoresis Systems	90	31%	DNA Array Equipment	28	10%
Centrifuges	64	22%	Autoclave/Sterilizers	25	9%
Microscopes	60	21%	Hybridization Ovens	24	8%
Incubators	58	20%	HPLC/FPLC Systems	24	8%
Imaging/Gel Documentation Systems	56	19%	Water Purification Systems	23	8%
Tissue Culture Hoods	47	16%	Fume Hoods	21	7%
Water Baths	42	15%	Other	18	6%
Balances	42	15%	None of the Above	18	6%
Thermal Cyclers	40	14%	Clean Room Equipment	18	6%
Real-Time Thermal Cyclers	40	14%	Mass Spectrometers	17	6%
Spectrophotometers	38	13%	Nucleic Acid Sequencers	10	3%
Flow Cytometers	37	13%	Microfluidics equipment	10	3%
2D Electrophoresis Systems	35	12%	Peptide Synthesizers	6	2%
Heating Blocks	33	11%	HTS Workstations	5	2%
Cell Analyzers	29	10%	HTS Plate Handling/Storage	5	2%
			Nucleic Acid Synthesizers	2	1%

n=288

**For which of the following are you using protein arrays?**

Diagnostics  
Proteomics  
Library Screening  
Functional Protein Analysis  
None of the Above/Other (please specify)

**Which of the following are you studying with protein arrays?**

Angiogenesis  
Apoptosis  
CD Markers  
Cell Adhesion  
Cell Cycle  
Cell Signaling / Signal Transduction  
Cytokines and Growth Factors  
Cytoskeleton  
DNA Damage and Repair  
Infectious Disease  
Neurobiology  
Nuclear Function  
Phosphorylation State  
Immunoglobulin Specific  
Transcription Factors / Regulation  
Translational Control  
None of the Above/Other (please specify)

**What type of protein arrays do you use or plan to use?**

Protein-antibody  
Protein-protein  
Receptor-ligand  
Protein-drug  
Enzyme-substrate  
Protein-DNA  
None of the Above/Other (please specify)

**In your opinion, which of the following are the biggest challenges in using protein arrays? (check all that apply)**

Cross-reactivity of antibodies  
Sensitivity  
Photo-bleaching  
Data analysis  
Protein production  
Maintaining protein functionality  
Data storage  
Protein coupling to array support  
Availability of antibodies  
Array stability  
None of the Above/Other (please specify)

**Which of the following do you use or prefer to use as support for protein arrays?**

Glass slides  
Silicon  
Microwells  
Nitrocellulose  
PVDF membranes  
Microbeads  
None of the Above/Other (please specify)

**How much do you have budgeted for protein array equipment for 2004?**

US\$ 0-50,000  
US\$ 50,000-100,000  
US\$ 100,000-500,000  
US\$ 500,000-1,000,000  
US\$ >1,000,000

**How much do you have budgeted for protein array consumables (antibodies, slides, etc.) for 2004?**

US\$ 0-10,000  
 US\$ 10,000-20,000  
 US\$ 20,000-30,000  
 US\$ 30,000-40,000  
 US\$ 40,000-50,000  
 US\$ >50,000

**Do you make your own protein arrays?**

Yes  
 No

**If so, how do you produce protein for your arrays?**

Cell-based expression of recombinant proteins  
 Cell-free *in vitro* translation  
 Purification from natural sources  
 Synthetic peptide methods  
 None of the Above/Other (please specify)

**How much do you have budgeted for protein production reagents (cell media, etc.) for 2004?**

US\$ 0-10,000  
 US\$ 10,000-20,000  
 US\$ 20,000-30,000  
 US\$ 30,000-40,000  
 US\$ 40,000-50,000  
 > US\$ 50,000

**Do you use or plan to use pre-made arrays?**

Use  
 Plan to use  
 Neither

**Do you use or plan to use custom pre-made arrays?**

Use  
 Plan to use  
 Neither

**Which of the following do you own?**

An automatic arrayer  
 A manual arrayer  
 An array reader  
 None of the above

**Which of the following do you plan to purchase in the next 3-6 months?**

An automatic arrayer  
 A manual arrayer  
 An array reader  
 Array image analysis software  
 None of the above

**What influences your decision to purchase protein array equipment?**

Cost  
 Software package  
 Brand name  
 Technical support  
 Colleague suggestions  
 Sales representative  
 None of the Above/Other (please specify)

**What would you like included in a protein array kit? (check all that apply)**

Premade buffers  
 Slides  
 Nylon membranes  
 PVDF membranes  
 Microbeads  
 Antibodies  
 None of the Above/Other (please specify)

**Do you have access to a protein array core lab?**

Yes

No

**Do you use microbeads?**

Yes

No

**If yes, which of the following do you use (check all that apply)?**

Pre-coated beads

Coat-your-own beads

**How many samples will you test by protein array in 2004?**

0-50

51-499

500-999

1000+

**For which of the following do you use or plan to use protein arrays?**

Generating final data on several targets you already follow

Generating preliminary data on several targets that you will refine using more traditional approaches

Explore new targets that you currently do not include in your studies

**What type of information would you expect to obtain from a protein array?**

Biomarker profiling

Quantitative protein concentration

Differential expression analysis

Other, please specify

## Other Surveys and Reports Available From Biocompare

### UPCOMING SURVEYS

#### **DNA Microarrays – May 2004**

**\$3500\***

**Description:** A survey of ASM attendees investigating use of DNA microarrays in their research.

\*Purchase by May 19<sup>th</sup> to get a \$500 discount and the opportunity to include a question of your own design

#### **Chromatography Survey – June 2004**

**\$3500\***

**Description:** A survey of life scientists regarding their use of chromatography products in their research.

\*Purchase by June 9<sup>th</sup> to get a \$500 discount and the opportunity to include a question of your own design

### COMPLETED REPORTS AVAILABLE

#### **RNAi: A Market Update**

**\$3500**

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#### **Mass Spectrometry: Fueling Discovery**

**\$4000**

**Description:** In this report, Biocompare surveyed the mass spectrometry market to determine who the market leaders are, find out what the most challenging aspects of using this technology are and to gauge the growth of the market by identifying the purchasing plans of mass spectrometry users.

#### **Cell Based Assays: A Survey of Cell Biologists**

**\$2495**

**Description:** For this report we surveyed more than 400 Cell Biologists regarding cell based assays including plate based, tissue array based and flow cytometry based assays.

#### **For more information or to purchase please contact:**

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