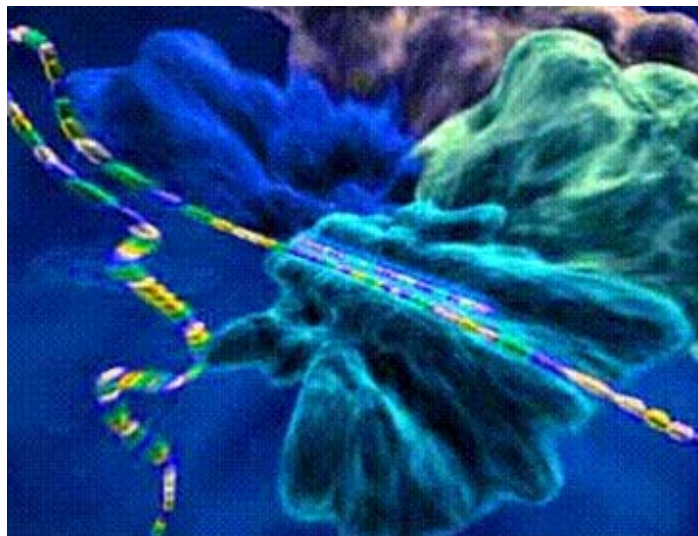


RNAi and siRNA: A Market Update



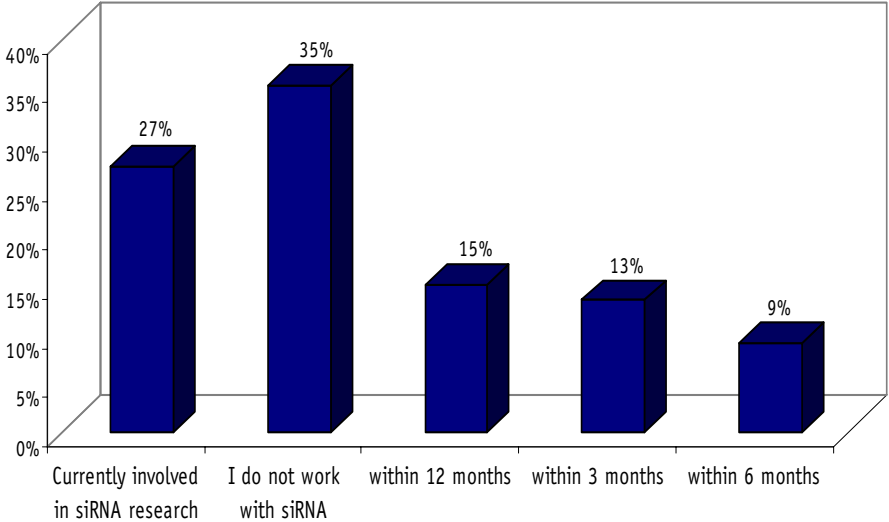
Executive Summary

Introduction

Since exploding into the market place a few short years ago, RNAi has proven to be an invaluable tool in life science research as a way to silence genes without lengthy and complicated gene knockout procedures. Because this new technology allows researchers to investigate protein function relatively quickly and easily, and may prove to be a useful therapeutic for many diseases, RNAi has been readily adopted by life science and biotechnology researchers.

Biocompare’s first report on the RNAi/siRNA market, *siRNA and RNAi: On the Forefront of Discovery*, surveyed 929 life science researchers in July of 2003 regarding their use of RNAi and siRNA. In that survey, 37% of the scientists said they would begin RNAi research within the next 12 months. In addition, two of the top search terms entered into Biocompare’s search engine in 2003 were RNAi related. These facts are indicative of the popularity and growing interest in RNAi technology.

Please Characterize Your siRNA/RNAi Research



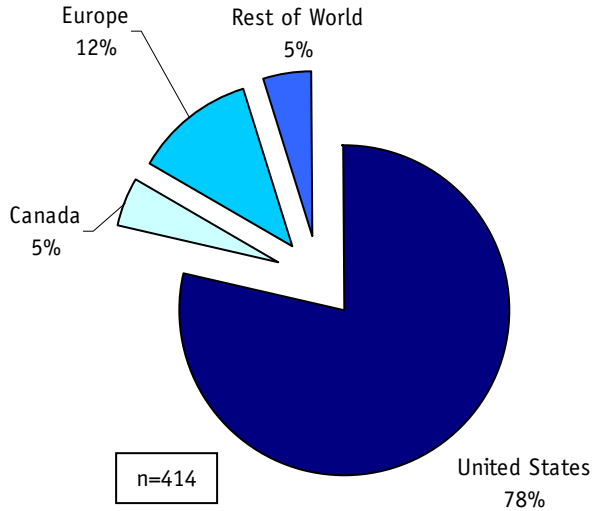
Data from RNAi and siRNA: On the Forefront of Discovery, 2003 Biocompare, Inc.

This report, *RNAi and siRNA: A Market Update*, spotlights this growing market by investigating who are the market leaders for RNAi kits and reagents, gauging the growth potential for RNAi products and outlining the current RNAi applications of the scientists.

Methodology

This report, *RNAi and siRNA: A Market Update*, was compiled from the responses of over 600 life science researchers to a survey administered at the American Association of Cancer Researchers (AACR) conference in Orlando, FL and online during March 27th – April 2nd. The survey consisted of 23 closed or partially closed questions designed to investigate the role of RNAi and siRNA in the survey taker's research. In addition, there were several demographic questions designed to define the survey takers overall research goals.

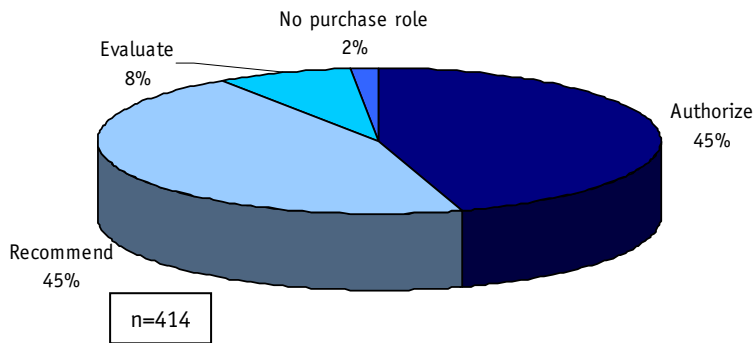
Country



Institution Type	
Academic	71%
Pharmaceutical	4%
Biotech	9%
Government	10%
Private Research	4%
Other	2%

n=414

Purchasing Role



- 83% of survey takers are from North America
- 90% of survey takers either authorize or recommend purchases
- 71% of survey takers are at academic institution
- 13% of survey takers are at biotech or pharmaceutical institutions
- 10% of survey takers are at government institutions (mainly NIH/NCI)

Title		
	# of respondents	%
Other	5	1%
Research Director/VP of Research	11	3%
Lab Director/Chief Scientist	18	4%
Professor/Instructor	25	6%
Technician/Research Assistant	39	9%
Principal Investigator	53	13%
Staff Scientist	67	16%
Graduate Student	76	18%
Postdoctoral Fellow	119	29%

n=413

- 85% of survey takers are at-the-bench
- 20% of survey takers are Lab Directors, Chief - Scientists, Research Directors, VP of Research or Principal Investigators
- The majority of survey takers define their research areas as either molecular biology or cell biology

Research Area or Work		
	# of respondents	%
Administration	4	1%
Biochemistry	31	7%
Bioengineering	3	1%
Bioinformatics	4	1%
Cell Biology	99	24%
Drug Discovery	15	4%
Genomics / Genetics	27	7%
Immunology	26	6%
Microbiology / Virology	12	3%
Molecular Biology	127	31%
Neuroscience	26	6%
Other	12	3%
Pharmacology / Toxicology	13	3%
Proteomics	15	4%

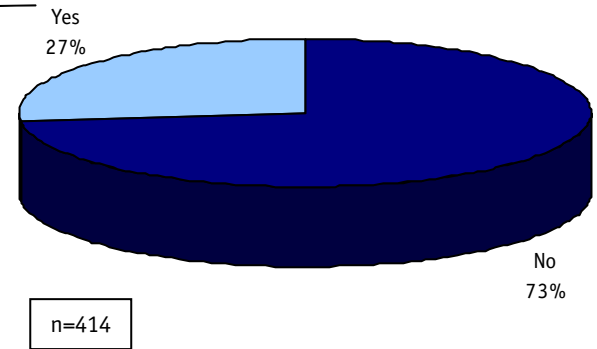
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Techniques/Technologies Used	
PCR/RT-PCR	76%
Cell/Tissue Culture	76%
DNA Isolation & Purification	70%
Electrophoresis	69%
RNA Isolation & Purification	64%
Microscopy	58%
Transfection	57%
RNAi	56%
Gene Expression Analysis	55%
Antibody-Based Technologies	53%
Real-Time PCR	52%
Protein Isolation & Purification	50%
Nucleic Acid Sequence Analysis	40%
Vector Design/Construction	39%
Image Analysis	39%
Nucleic Acid Labeling and Detection	38%
Nucleic Acid Hybridization	38%
Recombinant Protein Expression	37%
Protein-Protein Interaction Analysis	34%

Techniques/Technologies Used	
Microarray Analysis	33%
Mutagenesis	30%
DNA Microarrays	25%
Gene Transfer	24%
Chromatography	22%
Protein-DNA interaction Analysis	22%
Gene Targeting	21%
Spectroscopy	19%
2D Electrophoresis	19%
Mass Spectrometry	15%
Protein Sequence Analysis	13%
High-Throughput Screening	12%
Laser Capture Microdissection	12%
Protein Microarrays	10%
SNP Analysis	9%
Robotics/Automation	7%
Capillary Electrophoresis	5%
Crystallization	1%
Other (please specify)	1%

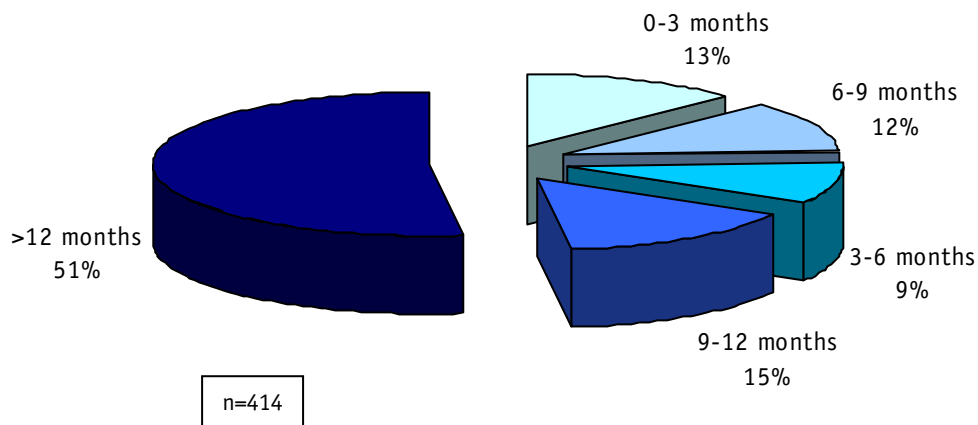
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Are you planning to start a new lab?

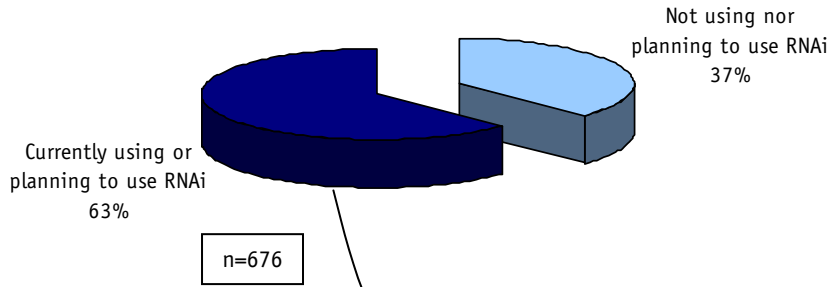


If so, when?

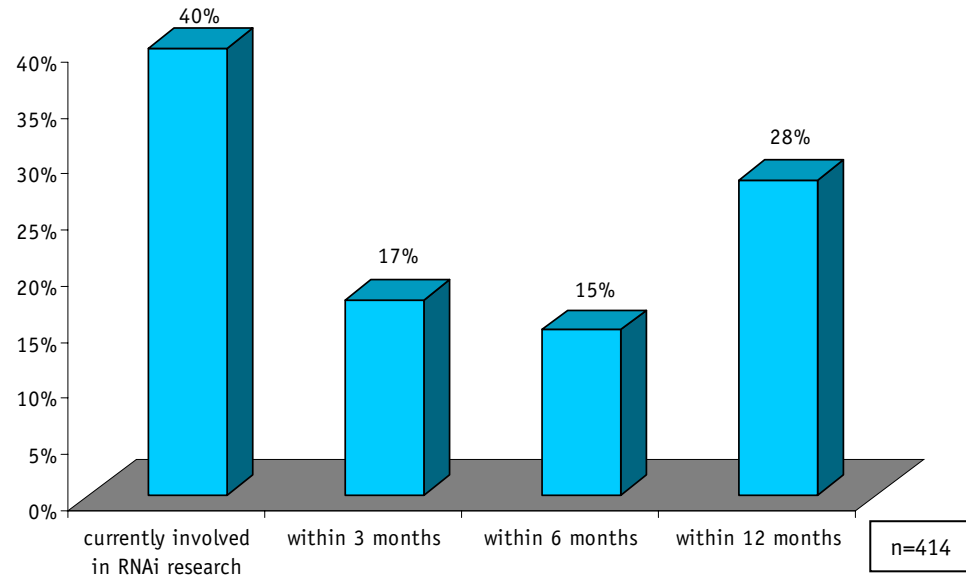
27% of survey takers will start a new lab within 12 months



How would you characterize your RNAi research?



40% of survey takers are currently involved in RNAi research
60% of survey takers plan to begin RNAi experiments within 12 months



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

Fume hoods
Microfluidics equipment
Nucleic Acid Synthesizers
Mass Spectrometers
HTS Plate Handling/Storage
Hybridization Ovens
Incubators
Autoclave/Sterilizers
Nucleic Acid Sequencers
DNA Array Equipment
HPLC/FPLC Systems
Gel Electrophoresis Systems
Water Purification Systems
Imaging/Gel Documentation Systems
Spectrophotometers
Flow Cytometers
HTS Workstations
Microscopes
Peptide Synthesizers
Clean Room Equipment
Heating Blocks
Centrifuges
Real Time Thermal Cyclers
Balances
Thermal Cyclers
Tissue Culture Hoods
Water Baths
2D Electrophoresis Systems
Cell Analyzers

What is the goal of your RNAi research?

Therapeutics
Drug development
Target identification
Target validation
Functional genomics
Basic research
Kit development
Other (please specify)

Which of the following reagents, kits and services do you use in your lab? (Check all that apply)

Custom/pre-designed siRNA synthesis – single tubes
Custom/pre-designed siRNA synthesis – 96-well plates
Transfection optimization kits
siRNA/antibody "starter" or optimization kits
siRNA localization/siRNA labeling kits
Kits for preparing individual siRNAs by in vitro transcription
Kits for preparing siRNA populations by Dicer or RNase III digestion
siRNA Expression Vectors – plasmid
siRNA Expression Vectors – viral
siRNA Expression Template Kits – PCR based
Morpholinos for gene knockdown
Electroporation buffers or kits

What do you use starter kits for?

Optimize siRNA conditions
Validate controls for current experiments
Do not use
Other (please specify)

Which supplier(s) of siRNA starter kits do you use? (Check all that apply)

Dharmacon, Inc.
 Upstate
 None of the above/Other (please specify)

How do you generate your siRNA?

in vitro transcription
 Dicer/RNase III
 Expression in cells from a siRNA expression plasmid or viral vector
 Expression in cells from a PCR-derived siRNA expression cassette
 Synthetic, from a commercial supplier
 Synthetic, made in house

Which supplier(s) of siRNA construction kits do you use? (Check all that apply)

Invitrogen
 IMGENEX
 Ambion
 NEB
 Promega
 None of the above/Other (please specify)

Which supplier(s) of siRNA oligos do you use? (Check all that apply)

Ambion
 Bioneer
 Integrated DNA Technologies
 Dharmacon
 QIAGEN
 Sequitur
 Thermo Electron
 Prologo
 Eurogentec
 None of the above/Other (please specify)

What is the most important feature in siRNA oligos?

Cost
 Purity
 Quality documented by mass spec
 Ready to use (ie, no desalting, deprotecting, or annealing)
 Low level of toxicity
 Silencing effectiveness

How do you prefer to buy your siRNA oligos? (Check all that apply)

duplexed
 single-stranded
 with modifications
 96-well plate
 24-well plate
 single tube
 ready to use
 do not buy

Would it be helpful to have an antibody sold with each siRNA that is specific to the gene being silenced?

Yes
 No

Which of the following supplier's software do you use to design your siRNA oligos? (Check all that apply)

Promega
 Mirus Biotech
 Imgenex
 Qiagen
 Ambion
 Invivogen
 Dharmacon
 GenScript
 Sequitur
 None of the Above/Other (please specify)

Which supplier(s) of siRNA expression vectors do you use? (Check all that apply)

Ambion
 BD Biosciences (Clontech)
 IMGENEX
 Invitrogen
 Promega
 Stratagene
 OligoEngine
 InvivoGen
 Genscript
 Gene Therapy Systems
 I use a vector developed in my lab or by a colleague
 Other (please specify)
 I do not use siRNA expression vectors

What is the most important feature in siRNA transfection reagents?

Efficient siRNA delivery in a single cell line (high percentage of transfected cells)
 Efficient siRNA delivery to a variety of different cell lines
 Efficient silencing of endogenous gene (high level of knockdown)
 Reproducible cellular delivery
 Low toxicity
 Ease of use
 Works in the presence of serum
 Price

What cell type are you using for transfection? (Check all that apply)

Epithelial-like cells (HeLa; CaCo2...)
 Fibroblast-like cells (HEK 293; COS-7...)
 Endothelial-like cells (HUVEC; BAEC...)
 Hepatocyte-like cells (HEPA-1; HepG2...)
 Neuroblastoma (CLBPEC; SHEP...)
 Leukemia cells/lymphoblasts (Jurkat; K562...)
 Melanoma
 Monocytes/macrophages
 Myotubes/myoblasts/muscle cells
 Keratinocytes
 Primary cells
 None of the Above/Other (please specify)

Which supplier(s) of transfection kit(s) or reagent(s) do you use? (Check all that apply)

Ambion
 BD Biosciences Clontech
 B-Bridge International
 Bio-Rad
 IMGENEX
 Novagen
 Stratagene
 QIAGEN
 Invitrogen
 Mirus
 Promega
 None of the above/Other (please specify)

How do you measure gene silencing efficiency in your RNA interference experiments? (Check all that apply)

Fluorescence microscopy
 Reporter gene assays (e.g. luciferase)
 Quantitative RT-PCR/real time quantitative PCR
 Northern blot
 Branched DNA (b-DNA)
 Western blotting
 ELISA
 Microarray
 None of the Above/Other (please specify)

Do you track siRNA delivery and localization inside your cells?

Yes
 No

If yes, which methods do you use?

siRNA fluorescent labeling kit
 siRNA tracking kit
 Other (please specify)

Which label(s) do you prefer? (Check all that apply)

Fluorescein
 Biotin
 Rhodamine
 Cy™3
 Cy™5
 FAM
 Other (please specify)

Would you want a reporter-based method for finding an effective target site?

Yes
 No

Where do you think improvements need to be made on the kits and reagents commercially available?

Improve software for identifying siRNA oligos
 Increase transfection efficiency
 Decrease interferon response or other non-specific affects
 Increasing siRNA potency
 Increasing siRNA specificity
 Increasing siRNA stability
 Other (please specify)

What do you look for in an inducible RNAi system? (Select the most important)

Strong induction
 Fast induction
 Ability to turn on and off induction
 Don't need an inducible RNAi system

What do you think are the best methods to measure gene silencing effect? (mark up to three)

mRNA expression by microarray
 mRNA expression by Northern
 mRNA expression by real-time PCR
 mRNA expression by semi-quantitative RT-PCR
 target protein expression by Western
 target protein expression by ELISA
 target protein expression by multiplex bead assay
 target protein expression by fluorescence microscopy
 target protein expression by flow cytometry
 None of the above/Other (please specify)

How many samples do you transfect with each experiment?

Less than 10
 11-20
 21-50
 51-100
 greater than 100

Other surveys and reports available from Biocompare

UPCOMING SURVEYS

Protein Arrays - April 2004

\$3500*

Description: A survey of FASEB attendees regarding protein arrays.

*Purchase by April 14th to get a \$500 discount and the opportunity to include a question of your own design

DNA Microarrays – May 2004

\$3500*

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

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

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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.

Neuroscience, Microscopy, Imaging and Image Analysis: Seeing is Knowing

\$2495

Description: In this survey of over 500 scientists Biocompare answers such questions as: what types of equipment and software are currently being used, what are important factors in the decision to buy a microscope, how much is budgeted for imaging equipment in FY2004.

For more information or to purchase please contact:

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