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GENE EXPRESSION REAGENTS MARKETS

(SAMPLE COPY, NOT FOR RESALE)

Trends, Industry Participants, Product Overviews and Market Drivers

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1. Overview

The area of gene expression reagents is one of the newest and most important sectors of pharmaceutical and bioscience research and development. The term gene expression reagents refers to chemicals that are used in gene expression experiments that are performed to determine whether a particular gene is expressed—*i.e.*, present—and in some cases at what levels, in a biological sample. Experiments are carried out by measuring mRNA in the cells from tissues or other biological fluids. By comparing gene expression patterns between cells from normal tissue and diseased tissue, specific genes or groups of genes can be identified that play a role in disease processes. These studies can involve screening tens of thousands of genes.

As gene expression patterns are correlated with specific diseases, gene expression profiling can become an important diagnostic tool. Diagnostic use of gene expression profiling is expected to grow rapidly as more genes are identified and correlated with disease states and with the availability of more cost effect technology.

1.1 Objectives of the Report

The purpose of this report is to describe the specific segments of the global gene expression reagents market. Within this area, the study covers those segments that are highly active in terms of innovation and growth. Specifically, this review examines the markets for gene expression reagents and small lab equipment all the way up to highly automated platforms. Emphasis is on those companies that are actively developing and marketing gene expression reagents for genomics research in the academic sector and the pharmaceutical, bioscience industry. This study concentrates on the laboratory reagent market segment and the companion gene expression reagents sector in the U.S. and around the world that use materials for genetic research. Particular attention is paid to those areas of the gene expression reagents sector that are showing the greatest growth or the most innovation. The report attempts to answer the following questions:

- What companies are the key players?
- What is the market for gene express reagents?
- What are the opportunities in gene expression reagents markets?
- What are the developing trends?
- Where are the new market growth areas?
- What are the most favored technology platforms?
- Where are the gene expression reagent technologies taking researchers?
- How are gene expression reagent technologies blending with more established laboratory procedures?
- What are the business trends in the industry?

The study surveys some of the leading companies known to be marketing, manufacturing or developing products for the gene expression reagents market for those sectors covered here. Each company is discussed in depth with a section on the history of the company, the product line, business and marketing analysis, and a subjective commentary of the position of the company in its market. The benefits of this report are:

- In-depth analysis of the major sectors of the gene expression reagent sectors, their size, growth rates and major drivers.
- Presentation of some of the emerging technology platforms, elucidating the potential areas that could gain traction in this market.
- Analysis of the partnerships and alliances the various key sector players have forged, as well as describing financings of these market participants, giving insight into potential market collaborations.
- Examination of new technology platforms that seek to dominate this new market, and to identify lead positions and potential future growth areas.
- An overview of the current state of gene expression assays used in drug development and the numerous opportunities that exist to increase the quality of genetic sequences evaluated.
- A profile of the gene expression customer and an analysis of factors influencing the adoption of specific gene exploration technology.
- A five-year projection of spending on new equipment and reagents.
- Impact of commercial gene reagents on genetic R&D.

1.2 Methodology

The information presented here is based on an extensive survey of the gene expression reagents sector, as well as on a detailed examination of published literature and reports obtained from regulatory authorities, medical research institutions, trade associations, and national and world health organizations. Key information from the business literature was used as a basis to conduct dialogue with and obtain expert opinion from market professionals with regard to commercial potential and market sizes.

Analysis is also based upon direct experience with sales and marketing professionals of companies in the gene expression reagents market. People from virtually every company mentioned in this report were considered thoughtfully about their companies' products and marketing strategies as well as their overall thoughts about their industry segment. Information was also obtained from contacts with chief executive officers, vice presidents, marketing and sales people of many of the companies discussed in the report. The structure of the laboratory facilities was derived from familiarity with scientists and technologists working in these areas.

Other sources of information for the report were trade association publications and meetings, product brochures and catalogs and company literature. Where the companies under discussion were publicly held, an examination of the annual reports, 10k filings and financial reports was used as the basis of the data reported. Some of the information obtained for the report was taken from Biotechnology Associates' proprietary databases and from the private data stores of TriMark Publications.

The principal author of this report has over 25 years experience in the life sciences market. She has held senior marketing positions for major life sciences companies and been responsible for a diverse range of products including gene expression reagents, microarray automation systems and cell biology reagents.

Primary Sources

TriMark collects information from hundreds of Database Tables and many comprehensive multi-client research projects and Sector Snapshots that we publish annually. We extract relevant data and analytics from TriMark's research of the past three years as part of this data collection. We also extract qualified data feeds from e-questionnaire responses and primary research responses for this compilation.

Secondary Sources

TriMark uses research publications, journals, magazines, newspapers, news letters, industry reports, investment research reports, trade and industry association reports, government affiliated trade releases, and other published information as part of our secondary research materials.

The information is then analyzed and translated by the Industry Research Group into a TriMark study. The Editorial Group reviews the complete package with product and market forecasts, critical industry trends, threats and opportunities, competitive strategies and market share determinations. The report conclusions are verified through intensive interviewing of top ranking companies in the industry.

TriMark Publications Report Research and Data Acquisition Structure

The general sequence of research and analysis activity prior to the publication of every report includes the following items:

- Completing an extensive secondary research effort on a an important market sector, including gathering all relevant information from corporate reporting, publicly available databases, proprietary databases, direct meetings and personal interviews with key personnel.
- Formulating a study outline with the assigned writer, including important items:
    - Market and product segment grouping and evaluating their relative significance.

- Key competitors' evaluations, including their relative positions in the business and other relevant facts to prioritize diligence levels and assist in designing a primary research strategy.
- End-user research to evaluate analytical significance in market estimation.
- Supply chain research and analysis to identify any factors affecting the market.
- New technology platforms and cutting edge applications.

- Identifying the key technology and market trends that drive or affect these markets. Assessing the regional significance for each product and market segment for proper emphasis of further regional/national primary and secondary research.

- Launching a combination of primary research activities including two levels of questionnaires, executive-direct focused, company-specific and region-specific communications to qualified and experienced senior executives worldwide.

- Completing a confirmatory primary research assessment of the report's findings with the assistance of Expert Panel Partners from the industry being analyzed.

1.3 Scope of the Report

Gene expression products are used in a wide variety of gene research activities including life sciences research, clinical diagnostics, biodefense, forensics and agriculture. This analysis emphasizes companies that are actively developing and marketing laboratory reagents and supplies for performing genetic tests on deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The reader should consult other TriMark Publications reports at http://www.trimarkpublications.com for detailed discussions of important individual market segments related to the gene reagents market, such as clinical chemistry testing, high-growth diagnostic test markets, blood gas and electrolytes, over-the-counter diagnostic testing markets, and point-of-care testing. TriMark provides a separate market report called *DNA Sequencing and PCR Markets*, which emphasizes the analytical methods and PCR technology platforms used in molecular diagnostics.

The U.S., Japan and Europe—the world's three largest research markets—are the focus of this study. Primary attention is paid to the biotech and bioscience market segment, and, separately, to the instruments, reagents and supplies marketed by major companies in this segment. Market size, growth rates and market components for instruments, reagents, controls and consumables used in this area are also analyzed.

Specialty gene expression testing is examined, and is often part of the overall analytical focus of companies that market general laboratory reagents and automation equipment the bioscience, pharma and academic research community. However, no effort is made to quantify this broader market. In addition, this report does not cover disposable plastic supplies for the research laboratory. These subjects are discussed in other TriMark Publications reports.

1.4 Executive Summary

The gene expression market consists of three technologies:

- Quantitative RT-PCR (qRT-PCR).
- DNA or oligonucleotide microarrays.
- RNA Interference.

RNA sample preparation products are integral with gene expression reagents, providing high purity and quality mRNA required for reliability of these gene expression techniques.

In [redacted], $[redacted] was spent for life sciences chemicals/biologicals and instrumentation. Of this, over $[redacted] was spent for products used in gene expression research. Annual revenue growth of [redacted]% for gene expression products far exceeds the projected annual growth rate of [redacted]% for all life sciences chemicals, biologicals and instrumentation. Spending for gene expression products is expected to reach $[redacted] in [redacted]. Revenues from

real-time qPCR reagents and instruments products will grow at faster rate [calculated annual growth rate (CAGR [redacted]%)] than microarrays and related products (CAGR [redacted]%).

Growth will come from primarily from: 1) new users of qRT-PCR technology as it is decentralized from core laboratories, 2) clinical studies as genes are identified and correlated with disease and diagnostic screening, and 3) increased volume of samples to be screened and validated as more laboratories adopt microarray technology. Growth of commercial microarrays will be strong, but it is expected that it will be several years before microarray technology will be fully implemented for high-throughput applications.

An estimated $[redacted] was spent for RNA sample preparation and related products, growing [redacted]% per year, as researchers switch from chemical methods to spin column kits, and with increased use of qRT-PCR and microarrays. Out of [redacted] life scientists worldwide, [redacted] are using qRT-PCR in their research; far more than the [redacted] are using commercial microarrays. Due to the nature of the gene expression workflow, there is overlap between users of microarrays and qRT-PCR users.

The market for gene expression reagents is highly fragmented. As many as [redacted] suppliers can compete with similar products and little differentiation. Leading companies such as Applied Biosystems and Affymetrix offer a "whole solution" of products that include reagents, protocols and instruments that are optimized and supported by the company. Invitrogen, a leading supplier of gene expression reagents competes with a comprehensive reagent product line and a sophisticated website that educates and directs the customer to the products needed for their experiments. Qiagen dominates the product niche for DNA/RNA sample preparation offering kits that are designed for use with all types of tissue, plant and blood samples. Most vendors provide complementary services such as custom probes and sequencing, microarrays, RNA purification and contract manufacturing.

Drivers and bottlenecks in the gene expression reagent market:

- Improved assay performance.
- Cost reduction.
- Automation.
- Bioinformatics solutions.

Many new vendors are attracted to the gene expression reagents market because of its size and growth. It is challenging to overcome customer loyalty and entrenched suppliers, but there are opportunities for companies that offer:

- Differentiated products.
- Products for market and technology niches.
- Improved customer satisfaction.

Vendors chosen for profiles were based on market leadership and market strength:

- Applied Biosciences, leveraging its strengths in instrumentation, providing products spanning the life sciences markets.
- GE Healthcare, with an established brand and strong customer relationships.
- Affymetrix, a technology driven company dominating the microarray market.
- Invitrogen, one of the largest suppliers of specialized life sciences reagents with innovative website marketing and e-commerce.
- Qiagen, the dominant leader in a specialized niche, offering the widest range of nucleic acid sample preparation products.
- Stratagene, a smaller company with differentiated products serving specialized niches.

