Nanotechnology in Health Care

US Industry Study with Forecasts to 2011, 2016 & 2021

Study #2168 | February 2007 | $4500 | 350 pages
Nanotechnology in Health Care
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INDUSTRY STRUCTURE

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Order now, click here!
The greatest short-term impact of nanotechnology in the US health care market will be in therapies and diagnostics for cancer and central nervous system disorders.

US demand to grow 17.5% annually through 2011

US demand for nanotechnology medical products will increase over 17 percent per year to $53 billion in 2011. Afterwards, the increasing flow of new nanomedicines, nanodiagnostics, and nanotech-based medical supplies and devices will boost demand to more than $110 billion in 2016.

Nanomedicines market to reach $39 billion in 2011

The US market for nanomedicines will command strong growth over the long term, rising to over $39 billion in 2011 and $82 billion in 2016. Treatments based on humanized monoclonal antibodies, nanopolymers and nanoparticles will drive gains, with compounds for cancer, heart diseases, neurological disorders and viral infections leading new product introductions and growth opportunities. Eventually, pharmaceutical applications of nanotechnology will extend into all major therapeutic classes, encompassing numerous formulations and delivery systems.

Nanodiagnostics to grow 8.8% yearly through 2011

Advances in nanotechnology will also contribute significant improvements to the quality and performance of medical diagnostic products. Nanosized monoclonal antibody labels and DNA probes will greatly enhance the speed, accuracy, capabilities and cost-effectiveness of in vitro diagnostic testing, drug discovery and medical research procedures. Nanoparticle formulations of superparamagnetic iron oxide, gadolinium, perfluorocarbon and specialty polymers will broaden in vivo imaging capabilities by enabling the detection of tumors, plaque, genetic defects and other disease states at much earlier stages and with lower, safer concentrations of injected compounds. Reflecting anticipated performance advantages over existing products and an expanding range of new commercial offerings, demand for nanodiagnostic products is projected to increase 8.8 percent per year to $8.4 billion in 2011 and continue rising at a favorable pace to $12 billion in 2016.

Supplies, devices to be fastest growing segment

Besides pharmaceuticals and diagnostic products, several medical supplies and devices will emerge as key applications for nanotechnology. Nanomaterials are already gaining significant demand as active ingredients of burn dressings, bone cement, bone substitutes, and dental repair and restoration products. In 2011, demand for medical supplies and devices based at least partially on nanomaterials is projected to reach $5.2 billion, up from $400 million in 2006. This amount will expand to $16.2 billion in 2016 as nanotechnology-based orthopedic and cardiac implants and nanocoated medical and surgical instruments are introduced into the marketplace.
NANOTECH MEDICAL SUPPLIES & DEVICES

Wound Closures

Demand for wound closures composed of nanomaterials is projected to reach $180 million in 2011, up from $40 million in 2006. This product group includes absorbable sutures and sealants based on nanopolymers. Traditional absorbable sutures in wound closure applications are composed of absorbable products that were developed in the early 1960s. These products were limited by size and structure. More recently, a number of new sealants and adhesives have been developed for use in skin closure and wound repair and in outpatient care. One of the first products based on nanomaterials is Johnson & Johnson’s DERMABOND, which has been on the market since 1998.

DERMABOND is composed of the polymer octylcyanoacrylate and serves as a substitute for sutures in small diameter wounds. The nanopolymer forms a flexible bond in less than a minute and sets in approximately two and one-half minutes. Complete healing typically occurs in five-to-ten days depending upon the extent of the wound treated. In addition to speed and comfort advantages over sutures, DERMABOND also provides cosmetic benefits, leaving no visible scars. Nanotechnology-based tissue sealants in the developmental stage include a number of autologous cell-derived substances.

Nanoparticle formulations of biodegradable polylactides and polyglycolides are used as absorbable suture materials. The principal advantage of these nanopolymers in wound closure applications is their breakdown by tissue fluids into compounds that are metabolized and exit the body through the regular metabolic pathway. They also cause minimal tissue reaction during the healing process and do not produce any harmful byproducts. Nanotechnology-related product development efforts involving sutures have focused upon improving ease-of-use as well as healing properties. Ethicon and United States Surgical (Tyco International) are the leading US producers of sutures, both offering absorbable types based on nanopolymers.

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Biogen Idec Incorporated
14 Cambridge Center
Cambridge, MA 02142
617-679-2000
http://www.biogenidec.com

Revenues: $2.7 billion (2006)
Employment: 3,340 (2005)

Key Products: therapeutic monoclonal antibodies

Biogen Idec develops and manufactures therapies for human oncology, neurobiology and immunology. The Company manufactures, markets and licenses various products used to treat non-Hodgkin’s lymphoma, multiple sclerosis and psoriasis. Product sales for Biogen Idec in 2005 were $1.6 billion, of which the US accounted for $998 million. The Company competes in the nanotechnology health care industry through the production of the therapeutic monoclonal antibodies ZEVALIN and TYSABRI.

ZEVALIN (ibritumomab tiuxetan) is a murine monoclonal antibody bonded to a linker chelation agent. The compound was approved by the US FDA in February 2002 as the first radioimmunotherapy for the treatment of various forms of B-cell non-Hodgkin’s lymphoma (NHL). More specifically, ZEVALIN is indicated for treating relapsed or refractory low-grade, follicular, or transformed B-cell NHL, in patients with follicular NHL who failed to respond to RITUXAN therapy.

Unlike other anti-cancer monoclonal antibodies, which are administered as long term treatment regimens, ZEVALIN is a short-term therapy that is completed in about a week. Rather than inhibiting tumor formation or disrupting tumor-forming processes, the compound

**Sample Profile, Table & Forecast**

**TABLE VI-8**
DNA TESTING MATERIAL DEMAND BY TYPE
(million dollars)

<table>
<thead>
<tr>
<th>Item</th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
</tr>
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<tbody>
<tr>
<td>Chronic Conditions (million)</td>
<td></td>
<td>160</td>
<td>1773</td>
<td>1900</td>
<td>2070</td>
</tr>
<tr>
<td>$ DNA testing materials/condition</td>
<td></td>
<td>0.4</td>
<td>0.9</td>
<td>1.6</td>
<td>2.6</td>
</tr>
<tr>
<td>DNA Testing Material Demand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplified DNA Probes</td>
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<td></td>
<td>765</td>
<td>1540</td>
<td>2250</td>
</tr>
<tr>
<td>Direct DNA Probes</td>
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<td>270</td>
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<td>DNA Microarrays</td>
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<td>320</td>
<td>485</td>
<td>720</td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
<td>165</td>
<td>690</td>
<td>1900</td>
</tr>
<tr>
<td>% DNA testing materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Nanotech In Vitro Diagnostic Products (million)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3270</td>
</tr>
</tbody>
</table>

**“DNA Microarrays” -- Demand for DNA microarrays will expand 8.7 percent annually to $485 million in 2011. Most gains will reflect the increasing use of gene expression profiling in broad-based epidemiological research and drug discovery applications. The ability to monitor the activity of thousands of genes simultaneously allows for the fast and accurate determination of disease pathways and the identification of in vivo targets for new therapies. Although continuing to expand, demand for DNA microarrays in SNP (single nucleotide polymorphisms) identification and genotyping, in vitro diagnostic testing and disease management will ...”**

--Section VI, pg. 163
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Implantable Medical Devices
US medical implant demand will rise 9.3% yearly through 2011. Cardiac implants will remain the top-selling group, led by stents and defibrillators. Bone cement, tissue and spinal implants will pace gains in the orthopedic segment. Other fast-growing types include neurological stimulators, cochlear devices and gastric bands. This study analyzes the $27.9 billion US medical implant industry, with forecasts for 2011 and 2016 by material and product. It also evaluates market share and profiles major players. 
#225 .................................. 10/2007 ........................... $4500

World Nanomaterials
The global market for nanomaterials will reach $4.2 billion by 2011 and remain concentrated in the US, Western Europe and Japan. Products making the greatest initial commercial impact are nanoscale versions of conventional materials such as silica, titanium dioxide, alumina, iron oxide, and zinc oxide. This study analyzes the $1 billion global nanomaterials industry, with forecasts for 2011, 2016 and 2025 by product, market, world region and for 15 countries. It also discusses R&D and profiles major participants. #2215 .......................... 08/2007 ........................... $5500

In Vitro Diagnostics
US demand for in vitro diagnostic (IVD) products will grow 5.1% annually through 2011. Clinical chemistry and immunoassay methods will remain the top two IVD sciences, while nucleic acid testing products will continue to generate the fastest gains. Hospital labs will stay the largest market while home health care will grow the fastest. This study analyzes the $15.2 billion US IVD industry to 2011 and 2016 by product, application and market. It also evaluates company market share and profiles major players. #2175 .......................... 04/2007 ........................... $4500

Medical Imaging (Equipment, Agents, Consumables)
US demand for medical imaging products will grow 6% annually through 2010 based on technological advances, aging demographics and changing health care approaches. Equipment will outpace consumables, led by CT scanners and by MRI and PET machines. Radiopharmaceuticals will lead gains among consumables. This study analyzes the $16 billion US medical imaging product industry to 2010 and 2015 by type and market. It also evaluates company market share and profiles leading competitors. #2137 .......................... 12/2006 ........................... $4400

Biocompatible Materials
US demand for biocompatible materials will grow 6.6% yearly through 2010. Synthetic polymers will remain dominant based on quality, performance and cost advantages in most applications. Ceramics will grow the fastest, driven by improved properties and processing ease. Hyaluronic acid and collagen will pace the natural polymer segment. This study analyzes the $2.7 billion US biocompatible industry to 2010 and 2015 by material and application. It also evaluates market share and profiles major players. #2111 .................................. 09/2006 ........................... $4400

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