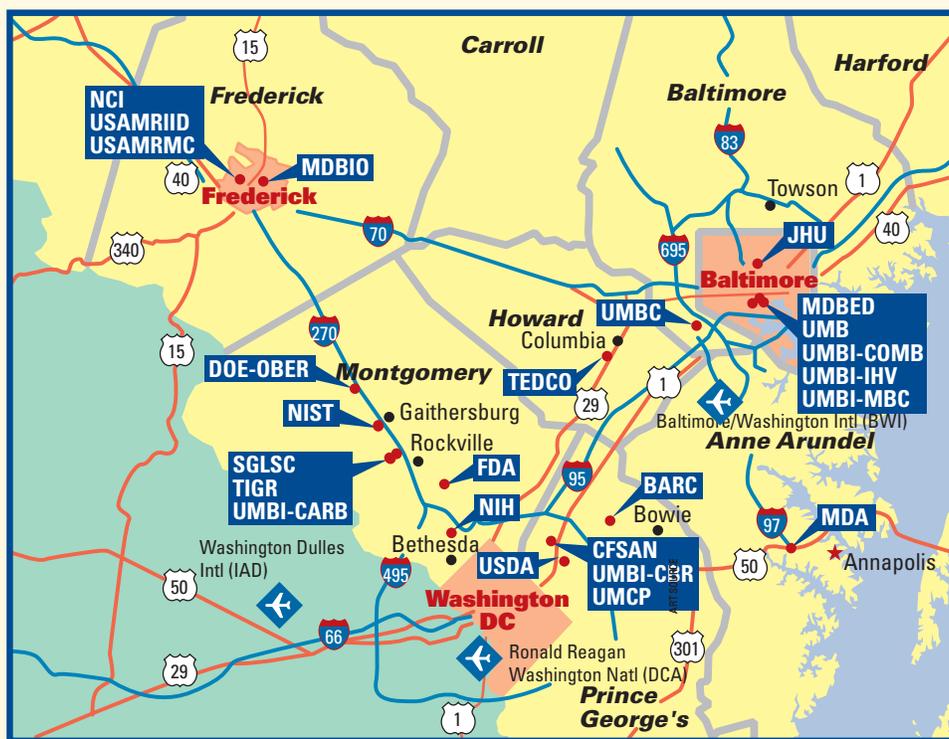


MARYLAND:

“FREE STATE” OR BIO STATE?



First in a series covering the “hot spots” of biotech research and business around the globe.

BY FELICIA M. WILLIS

It is well known that Maryland holds a substantial concentration of pharmaceutical and biotechnology industries. This East Coast state has the third-largest number of biotechnology companies in the country and ranks second in number of biotechnology companies per capita.

Because of their adamant support for scientific research, Luke and Helen Wilson can be credited with Maryland’s initial growth in biotechnology. They donated 92 acres of land in Bethesda to the NIH over the course of seven years, starting in 1935. Since then, the campus has grown to 322 acres and more than 50 buildings. C. Robert Eaton, president of MdBio, a private, nonprofit corporation that offers programs to advance the com-

mercial development of bioscience in Maryland, says, “I think the first sign that the industry in our area was going to grow beyond its traditional group of companies supplying bioscience services to laboratories at NIH was the founding of MedImmune, Human Genome Sciences [HGS], and The Institute for Genomic Research [TIGR] in the late 1980s. This occurred shortly after the passage of the Federal Technology Transfer Act, which was designed to stimulate the commercial development of technologies from federal labs.” He goes on to say, “If I had to point to a single individual, it would probably be Wallace Steinberg, a venture capitalist who was the driving force behind the formation of MedImmune, HGS, and TIGR.”

- BARC** Beltsville Agricultural Research Center, USDA
- DOE-OBBER** Office of Biological and Environmental Research, U.S. Dept. of Energy – Gaithersburg
- FDA** U.S. Food & Drug Administration
- FDA-CFSAN** Center for Food Safety & Applied Nutrition, FDA
- JHU** The Johns Hopkins University
- MDA** Maryland Department of Agriculture
- MDBED** Maryland Department of Business & Economic Development
- MDBIO** MdBio, Inc.
- NCI** National Cancer Institute, NIH
- NIH** National Institutes of Health, U.S. Department of Health and Human Services
- NIST** National Institute of Standards and Technology
- SGLSC** Shady Grove Life Sciences Center
- TEDCO** Maryland Technology Development Corporation
- TIGR** The Institute for Genomic Research
- UMB** UMD, Baltimore
- UMBC** UMD, Baltimore County
- UMBI-CARB** Center for Advanced Research in Biotechnology, UMD Biotechnology Institute
- UMBI-CBR** Center for Biosystems Research, UMD Biotechnology Institute
- UMBI-COMB** Center for Marine Biotechnology, UMD Biotechnology Institute
- UMBI-IHV** Institute for Human Virology, UMD Biotechnology Institute
- UMBI-MBC** Medical Biotechnology Center, UMD Biotechnology Institute
- UMCP** UMD, College Park
- USAMRIID** U.S. Army Medical Research Institute of Infectious Diseases
- USAMRMC** U.S. Army Medical Research and Materiel Command
- USDA** U.S. Department of Agriculture – Riverdale Center

It's academic!

In addition to the hundreds of biotechnology companies, undeniably some of the highest-quality academic universities are located in Maryland as well. These institutions have played a critical role in sustaining the growth of the bioscience community. They include Johns Hopkins University (JHU); the University of Maryland, Baltimore (UMB); the University of Maryland, Baltimore County (UMBC); the University of Maryland Biotechnology Institute (UMBI); and the University of Maryland, College Park (UMCP). The philosophies of these schools lie in education coupled with research, and they are considered important to the growth and commercial success of the bioscience companies in Maryland, where there is an extremely strong collaboration between the academic and corporate worlds. Universities are considered by Maryland's biotechnology companies to be the principal training ground for their future workforce.

Johns Hopkins has completed a great deal of research in the biotechnology field that sets it apart. Some of this research includes demonstrating that a specific enzyme is essential to the production of a hallmark of Alzheimer's disease—the amyloid plaques that form and surround brain cells. Hopkins researchers have restored movement to paralyzed rodents by injecting stem cells into their spinal fluid, raising hope for improved treatment of paralyzing motor neuron diseases such as amyotrophic lateral sclerosis. They also have isolated and identified human stem cells and proved them capable of forming the fundamental tissues that give rise to distinct cells such as muscle, bone, and nerve, and have co-developed a DNA vaccine that protects against measles, the most conclusive work to date demonstrating that DNA vaccines may be useful in the fight against disease.

The University of Maryland (UMD) is ranked by *U.S. News & World Report's* "America's Best Colleges" as 18th among national public universities in 2003. UMD also has received a nod from *The Wall Street Journal*, where the business school was positioned 16th in the world; and *Kiplinger's Personal Finance Magazine* cites the school among its top 10 picks for student/faculty ratios of 13 or less.

Location, location, location

An advantage Maryland may have over other areas is its location near the nation's capital and federal laboratories. The Maryland

Technology Development Corp. (TEDCO), for example, fosters the development of a technology-based economy that creates and sustains businesses throughout Maryland. In the *Maryland Bioscience Report 2003*, Phillip Singerman, executive director of TEDCO, says that federal laboratories are the major competitive advantage in Maryland's technology sector. TEDCO's Federal Laboratory Partnership Program (FLPP) is designed to increase the collaboration between Maryland companies and federal research laboratories.

There are six major federal bioscience laboratories in Maryland: the NIH, Walter Reed Army Institute of Research, Naval Medical Research Center, Beltsville Agricultural Research Center, U.S. Army Medical Research Institute of Infectious Diseases, and U.S. Army Medical Research Institute of Chemical Defense. Together, these laboratories

house more bioresearch professionals than any university in the country.

The mid-Atlantic location of Maryland was important to many companies when they chose a place to set up shop. In 1975, Shimadzu Scientific Instruments, the U.S. arm of Shimadzu, established its headquarters in Columbia, where it hoped to provide analytical solutions to a wide range of labs in North, Central, and South America. This is also where the company established its primary educational facility for customers, the Shimadzu Customer Training and Education Center.

Similarly, SPECS, a world-leading European-based supplier of life science screening compounds and research chemicals, has established a center in

Columbia to serve as a commercial beachhead to the North American market.

Recently, officials at Atto BioScience, Inc. (formerly Atto Instruments), announced that they had received a \$600,000 grant from the U.S. Defense Advanced Research Projects Agency (DARPA) to apply the company's proprietary automated microscopy imaging platform to the development of receptor-based biosensors for the real-time detection of agents of interest to the U.S. Department of Defense.

Deal me in

Partnering is the key word to the biotechnology and pharmaceutical companies that make Maryland their home. Increasingly, more bioscience companies are forming partnerships, entering into

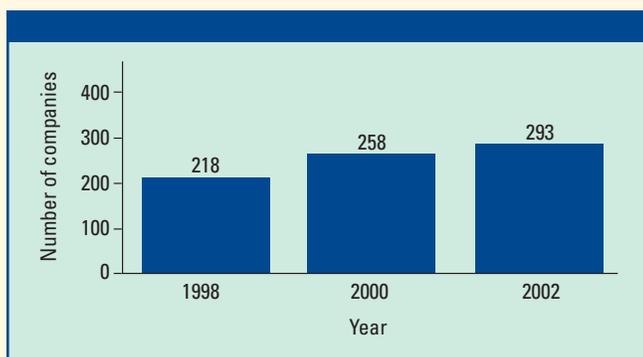


Figure 1. Number of bioscience companies in Maryland. (Courtesy of MdBio, Inc.)

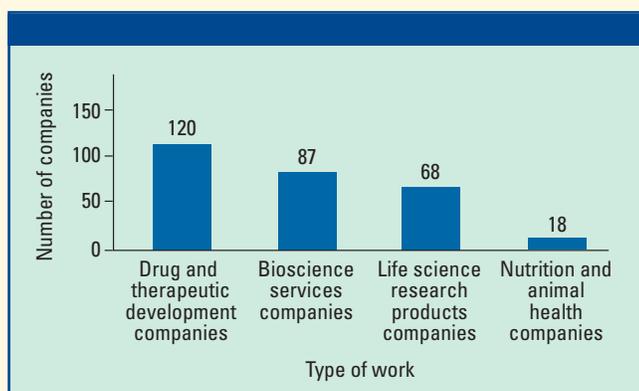


Figure 2. Bioscience companies by sector. (Courtesy of MdBio, Inc.)

agreements, or merging with other companies. Their goal is to increase the number of products in development, shorten the time it takes to bring a product to market, and ensure the financial survival of one or both of the companies involved.

In April, bioinformatics specialist Gene Logic, Inc., acquired the privately held contract research organization TherImmune Research Corp. to expand its efforts in providing preclinical, early-stage clinical, and other drug discovery services. In August, Gene Logic also announced that it had entered into an agreement with the FDA Center for Drug Evaluation and Research (CDER) to use their informatics infrastructure to evaluate RNA performance standards for toxicogenomic data. In July 2001, Gene Logic completed the spin-off of its expertise in fluidics into a subsidiary company called MetriGenix, Inc., which has further developed this technology to take microarrays into a new dimension.

In June, Cambrex Bio Science Baltimore, Inc., announced the opening of its new biopharmaceutical development laboratory and pilot plant in Baltimore. The state-of-the-art bioprocessing facility boasts multiple 10-L fermentors for process development and 100-L fermentors for preclinical and pilot-scale production of materials derived from mammalian, bacterial, and yeast-based expression systems.

In July, Silver Spring-based Media Cybernetics, Inc., a leading analytical image-analysis software firm, announced an agreement with Olympus Optical Co., Ltd., for distribution of its software and digital cameras to the People's Republic of China. Also in July, multinational pharma company Roche Holding, Ltd. (www.roche.com), announced that it had reached an agreement with IGEN International, Inc., to purchase the Gaithersburg-based biological detection specialists and fold them into their Roche Diagnostics business unit.

MedImmune, Inc., located in Gaithersburg and the maker of the popular product Synagis, recently acquired Aviron, a Mountain View, CA-based company. Other Maryland-based partnerships include that between Avalon Pharmaceuticals (Gaithersburg), which makes

Some Maryland-based organizations

Artesian Therapeutics	www.artesianrx.com
Atto Bioscience	www.atto.com
Baxter Bioscience	www.baxter.com
Bioanalytical Systems	www.bioanalytical.com
BioReliance	www.bioreliance.com
Cambrex Bio Science	www.cambrex.com
CDER	www.fda.gov/cder
Celera Genomics	www.celera.com
Chesapeake PERL	www.mtech.umd.edu/TAP/Chesapeake_PERL
Compugen	www.cgen.com
Covance	www.covance.com
DARPA	www.darpa.mil
Gene Logic	www.genelogic.com
GenVec	www.genvec.com
IGEN International	www.igen.com/home.htm
In Vitro Technologies	www.invitrotech.com
InforMax	www.informaxinc.com
Invitrogen, Life Technologies	www.invitrogen.com
Media Cybernetics Inc.	www.mediacy.com
MetriGenix	www.metriGenix.com
Novascreen Biosciences	www.novascreen.com
Nutramax Laboratories	www.nutramaxlabs.com
OriGene Technologies	www.origene.com
QIAGEN Sciences	www1.qiagen.com
Quintiles Transnational	www.quintiles.com
Shimadzu North America	www.ssi.shimadzu.com
Shire Pharmaceuticals Group	www.shire.com
SPECS	www.specs.net

antibody-based products and other technologies, Phyllos, Inc., of Lexington, MA, and ImmunoGen, Inc., of Cambridge, MA. In Vitro Technologies, Inc. (Baltimore), has formed a joint partnership and will provide technical support to NeuralStem, Inc. (Gaithersburg), which produces and characterizes human neural stem cell-derived neurons. MacroGenetics, Inc., in Rockville, has teamed up with Eliance Biotechnology in Dallas to obtain technology to screen for human disease-causing bacteria and viruses using animal models. The protein-producing company Chesapeake PERL in College Park has acquired Agrivirion in New York for expansion purposes.

The presence of the NIH in Maryland is a major reason for such exaggerated growth of commercial bioscience. Many of the companies located in Maryland started off by contributing different scientific services to NIH laboratories. Several of these companies have been in business for more than 30 years, long before the dawn of biotechnology as an up-and-coming industry. Roughly 40% of the bioscience companies in Maryland are not developing products but rather are tendering services ranging from basic research to product development, clinical trials, and GMP (Good Manufacturing Practices) manufacturing. In a special section of *The Washington Post* (June 17, 2003), C. Robert Eaton commented, "Although many of these companies [in Maryland] once derived 90% or more of their revenue from government laboratories, the growth in outsourcing by biotechnology and pharmaceutical companies over the last 15–20 years has enabled many of these services companies to broaden their customer bases. Most now see more than half their revenue coming from private-sector clients, including most of the world's largest pharmaceutical companies."

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