Chapter | 11

Biotechnology

❖ Will Texas create a core competency in biotech and grow biotech jobs?

Introduction

San Antonio won the biotechnology lottery in 2004. That's when, after working for 10 years to bring two cancer drugs to market, the San Antonio–based drug research company ILEX Oncology was bought by international drug maker Genzyme Corp. for $1 billion, the reward for ILEX's work to bring two cancer drugs through many tests and successfully out to market. The windfall of dollars to ILEX investors in Texas was further complemented by jobs as Genzyme decided to keep ILEX's biotech operations — with its more than 200 highly educated, highly compensated, white-collar employees — in San Antonio. The buyout also helped San Antonio gain worldwide recognition in the growing field of biotechnology.

But such biotech success stories are rare. Biotechnology is a discipline within the health sciences that involves the use of living things in fields such as engineering, technology and medicine, including genetic engineering as well as cell- and tissue-culture technologies. Biotech employees create new drugs or medical devices and bring them to the commercial market — a process that involves years of testing with no guarantees for payoff. About 9 of 10 biotech companies fail within the first three years of existence. Yet the occasional success story, such as that of ILEX, is a powerful motivator for investors, scientists and especially community leaders to support this unique industry. By 2010 Texas had more biotech infrastructure and more biotech companies than ever before, yet many of these young companies are still starving for money and struggling to survive.

"I'm having a hard time getting funding just like everybody else," said Ze'ev Shaked, chief executive officer (CEO) of Evestra Inc., a San Antonio–based biotech firm that has had initial testing success with its cancer drugs. Evestra, which has been trying to hire and pay eight workers with specialized Master's and Doctoral degrees in chemistry, was one of more than 1,000 companies that applied for money through the new Texas Emerging Technology Fund (ETF).

Unlike many other businesses, most young biotech companies don't create revenue. Instead, they consume hundreds of millions of dollars for years, and they rely on either federal and state grants or private investors to supply those dollars. In 2009, coinciding with the national recession, private investors began to drastically cut this supply of money, resulting in increased reliance on and more competition for money from the federal and state governments.

Despite this difficult environment, the number of biotech companies in Texas is growing. If these companies can survive and usher products to the marketplace, the potential rewards are huge. Shaked at Evestra knows this: he was an executive at ILEX, and he wants to experience that type of success again.

What's Happening

The Texas legislature and Governor Rick Perry identified the Biotechnology and Life Science cluster as a key target for Texas economic development. The governor's cluster was broadened beyond just biosciences to include many facets relating to the science and commercial application of biotechnology processes within life sciences (see **Figure 11.1**).

No matter how it is measured, the Texas landscape for biotechnology is established

Texas Biotechnology and Life Sciences Cluster Jobs 2009

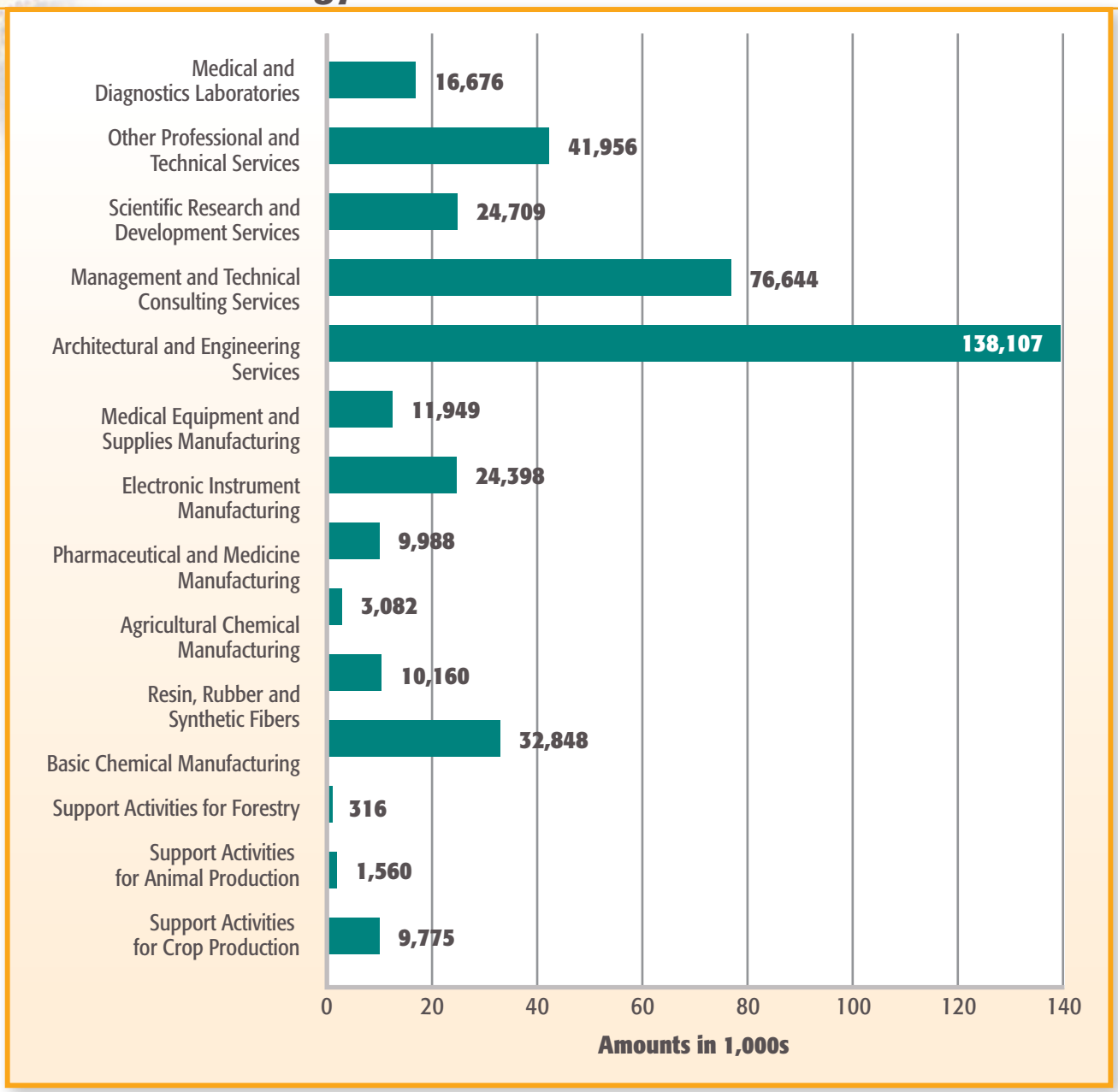

Figure 11.1

and has already developed in varied ways. In general terms, the Texas biotech industry includes the following regional breakdown:

- Medical device development in the Dallas area
- Drug development and diagnostic test development in Houston
- Medical device manufacturing in El Paso
- Diagnostic test products in Austin
- Drug and medical device development in San Antonio
- Medical testing on humans and animals scattered across all of Texas

When it comes to biotech, funding is always a critical issue. Most biotech companies are stand-alone research and development entities that do not make a finished product — and don't earn revenue. Biotech firms also rely on investors, but the pool of money for biotech investing has

Biotech Firm's Road to Market

The road map for developing a biotech company is well established. First, a physician, university professor or graduate student comes up with and documents an idea for a new drug or medical device. After applying and receiving funding, usually through the National Institutes of Health, the person who originated the idea creates the new drug or medical device and tests it in laboratories. If the product shows signs of success, the idea originator applies for more government money and also asks private investors for funding to create a company and start the long regulatory journey to market. Continued funding is critical because drugs and medical devices must be approved by the federal Food and Drug Administration (FDA), a costly process that can take 4–16 years, depending on the product. A recent Tufts University study found that the average price for successfully bringing an FDA-approved drug to market is $802 million.

been shrinking in recent years, hitting a 12-year low in 2009. And federal National Institutes of Health (NIH) funding decreased from $22.9 billion in 2005 to $20.8 billion in 2008, a 9% drop.

Private funding for biotech companies has also been drying up, in part because the opportunities to profitably cash out are fewer. A decade ago, dozens of companies a month issued initial public offering (IPO) stock and paid off their investors. But the total number of IPOs in 2009 could be counted on one hand. Such a funding decrease has left investors with few strategies to earn a return on their investment, with buyouts by "Big Pharma" conglomerates as one option.

"The IPO window is closed. And most venture capital is sitting on the sideline," said Phil Speros, CEO of Houston-based Halsa Pharmaceuticals. "The pull from Big Pharma is now bigger."

Amid these market pressures, Texas has created a small edge. In 2005, the state government set aside $200 million to create the ETF. From 2005 to 2009, the ETF invested $128 million in 99 early-stage Texas companies. ETF money comes with layers of legal requirements: for example, companies must perform most operations in Texas and the state must own about a 10% stake in the firm. While competition for the funding is fierce, biotech companies have received half of all ETF awards.

"ETF money saved my bacon," said Timothy Sullivan, CEO of Mystic Pharmaceuticals Inc. in Cedar Park. Sullivan's company, which makes drug-delivery devices to treat eye diseases, grew from 2003 through 2008 thanks to $10 million from "angel" and venture capital investors in Pennsylvania and New York. But by 2009 investors weren't as willing to open their wallets. Mystic Pharmaceuticals was awarded $1.5 million in ETF funds in May 2009, money that has kept the company alive, Sullivan said. "That ETF money came when everything else dried up."

Sullivan, who employs 16 full-time workers, hires most of his workers from Texas, but he's had trouble filling three types of key positions: experienced biotech executives, tool-and-die workers and, especially, regulatory employees. "The documentation requirements are insane in an FDA-regulated environment. You have to document everything you do," Sullivan said. "Regulatory training is often all done on the job. And it's risky and expensive. That's a [higher education] curriculum gap."

Not everyone in the biotech industry agrees that the state should expand its funding.

"If you're in biotech, you need buckets and buckets of money," said Curt Bilby, CEO of Terapio, an Austin-based start-up that is developing drugs to treat cells

damaged by radiation. The company received $1.7 million from ETF, one of the fund's largest investments. "Any biotech executive worth his salt is always claiming he needs more money. Good ideas get money. The Emerging Technology Fund is doing what it's supposed to."

In addition to the ETF, Texas will roll out the new Cancer Prevention and Research Institute of Texas (CPRIT). Voters approved the CPRIT fund to invest up to $3 billion in cancer research and biotech companies dedicated to cancer products over the next 10 years. To date, Texas has issued $450 million in general obligation bonds to pay for CPRIT investments, which should begin in 2010. This new pool of money could become a powerful magnet to attract scientists and biotech companies to Texas, said Andrew Nat Jr., executive director of the Texas Life Science Center in Houston.

Texas government is also trying to bolster research at universities to feed the biotech pipeline with scientific ideas and high-skill workers. Recently, the governor and the Texas legislature approved $126 million in state funding for growing research universities. This money will be used to fund research, recruit faculty and provide incentives for universities to graduate more students in scientific research fields. One goal of this funding is to help grow seven key universities: Texas Tech University, UT-Arlington, UT-Dallas, UT-El Paso, UT-San Antonio, the University of Houston and the University of North Texas. These funds are expected to further propel biotech work at these schools.

Regional economic developers hope this state focus and state spending to push biotechnology will pay off.

"The universities are creating biotech companies," said Jessica Hanover, former biosciences director at the Austin Technology Incubator. "Nobody is going to develop a new drug in their garage." The current focus of Texas government on biotechnology and wet-lab space could further grow the biotech sector, Hanover said.

Texas Medical Schools

1. Baylor College of Medicine / Houston
2. Texas A&M University System Health Sciences Center / College Station
3. Texas A&M University System Health Sciences Center / Temple*
4. Texas Tech University Health Sciences Center / Lubbock
5. Texas Tech University Foster School of Medicine / El Paso*
6. University of Texas Health Science Center at Houston
7. University of Texas Health Science Center at San Antonio
8. University of Texas Health Science Center at Tyler
9. University of Texas M. D. Anderson Cancer Center
10. University of Texas Medical Branch at Galveston
11. University of Texas Southwestern Medical Center
12. University of North Texas Health Science Center at Fort Worth

** Indicates brand-new medical school*

The Data

According to the Texas Healthcare and Bioscience Institute (THBI), the Texas biosciences industry employs more than 71,000 workers at roughly 3,377 companies. With almost 43,000 bioscience companies nationwide, Texas boasts almost 8% of that total. Many (43%) of the jobs are in support firms involved in research, testing and medical laboratories, with the remaining jobs spread fairly evenly across the medical devices industry, agricultural feed stocks and pharmaceuticals. Data from the Texas Workforce Commission show that approximately 800 companies make up the heart of the Texas bioscience cluster. These companies create new drugs, diagnostic tests and medical devices using biotechnology processes and employ staff who earn on average about $80,000 a year.

San Antonio, like Houston and Dallas, has an established cancer research industry that dates back more than five decades in the city's hospitals, medical schools, medical testing centers and nonprofit

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– Joe Cunningham, Santé Ventures

research institutes. That core infrastructure has helped focus and spawn biotech companies in the community.

"You have to build on your strengths because there are very, very high barriers to entry [in biotech]," said Ann Stevens, president of BioMed San Antonio, an industry advocacy group. "You have to build on your core competencies. And you need a medical school."

The biotechnology field has the potential to grow in Texas, with laboratory space, trained workers and medical testing centers located across the state, as well as the availability of private and state funding. Texas is reaching a point of critical mass in biotechnology. The result: any community within an hour's drive of a medical school can consider developing biotech companies, said Bilby of Terapio.

Biotech in Texas appears resilient. Federal NIH funding declined by 9% nationally from 2005 to 2008 but fell only 7% for Texas scientific research, reaching $1.074 billion in 2008.

So What?

"What Texas has is great science. We've got great medical schools, great universities, great researchers, great graduates," said Joe Cunningham, managing director of Santé Ventures, an Austin venture-capital firm focused on funding health science companies. "Science is not a constraint. Capital is not the constraint in Texas. Good ideas get funded. You can't say that lowering the bar for funding is the issue. If you've got the right idea, and the right CEO, then that company can get money. We don't have enough CEOs."

Venture capitalists such as Cunningham want to see a good idea backed by a winning executive before they invest their money. Santé Ventures is trying to recruit these experienced, winning CEOs from the Northeast and California by pointing out that Texas has biotech infrastructure, established universities and research centers, trained workers and money — particularly with the ETF and CPRIT funds. Cunningham believes that local communities need to focus on growing biotech talent.

"We all — all of us in workforce development, economic development, universities, investing, everybody — should be working to create an environment where these companies stay in Texas," Cunningham said. "You want to develop stickiness with the company when the company is young."

In recent years, Texas communities and universities have moved to bolster an infrastructure for biotech companies. One private company stepped in to assist university faculty. Biotech management firm Emergent Technologies Inc. of Austin is working with science professors across Texas to move their ideas for medical technology to the commercial world. Emergent Technologies helps professors set up companies in their college town, then manages the companies from Austin, handling tasks ranging from fundraising to intellectual property work. For Emergent, the challenge is finding Texas faculty who have both a business mind-set and an idea that can later be sold in the marketplace, said Dale Gannaway, vice president at Emergent Technologies.

"Only 2% of faculty understand entrepreneurship. We've got to find all of

that 2%," said Gannaway. "Technology is going to grow our economy in this globalized world. And we've got to move this technology from [Texas] universities faster. We have much more control over organic growth in our economy than recruiting companies."

Emergent Technologies manages 12 biotech startups in Abilene, Arlington, Austin and Lubbock. In exchange for its role in the companies, Emergent takes a 25% stake.

The issue at hand for many current Texas biotech companies isn't job creation, however; it is survival, which means money. Biotech leaders are calling for more funding to keep their industry from stalling further. Although NIH funding of scientific research shrank during the past decade, the Obama administration and Congress recently increased funding for research through the NIH and other federal agencies. Despite added funds, the potential for large job growth is limited, and time is an issue.

"The problem with biotech employment is that most biotech companies don't make money for 15 years, and they survive on government grants. So they don't employ a lot of people," said Ann Stevens with BioMed San Antonio.

"If you look over the next 10 years, biotech is the place to be. But I don't know if a big boom will happen in 5 years or 10 years," said Cunningham at Santé Ventures. "In the next five years in Texas you're mainly going to see a lot of small biotech companies come up that don't need a lot of employees — and a lot of those companies will go out of business. But it is still a growth industry."

Another issue is collaboration, or lack thereof. Several biotech CEOs point out that Texas lacks a cohesive industry support organization to bring together executives, scientists, professors, attorneys, economic developers, lobbyists and investors from across the state. The nonprofit BioHouston Inc. hosts events for biotech companies that later end up collaborating and even introduce scientists to investors. With BioHouston in mind, several in the industry say the time is right for establishing a statewide organization to tackle the layered needs of Texas biotech firms.

"Collaboration in this industry is critical if you're a small biotech company and want to become competitive nationally, much less compete in this globalized world," said Sullivan of Mystic Pharmaceuticals.

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Chapter 11 | Suggested Strategies

Think Globally, Plan Regionally

Many communities have taken steps to attract biotech companies. To bolster young companies in other industries, cities can offer tax abatements, but such offers are not of much use to pre-revenue biotech firms. Edward Teitel, CEO of ThromboVision Inc. of Houston, said he hopes Texas and community leaders will consider tax abatement for landlords who rent to a pre-revenue company or perhaps give companies a sales-tax break on research equipment. Such practices support the supply chain of biotech companies and help the funding last longer. In addition to tax strategies, some cities are taking further measures to promote the biotech industry in Texas:

- **Temple** residents in 2008 agreed to a tax hike to build a 500-acre health and bioscience industrial park. A 500,000-square-foot renovated industrial building, which Scott & White Memorial Hospital uses for medical research, anchors the site. The building also includes wet-lab space and a new $3 million business incubator for biotech companies. Temple voters narrowly approved a tax of 15 cents per $100 property value — or $25 annually on a house valued at $100,000 — to help pay for development of the "BioPark."
- **Georgetown, Abilene and Athens** are each building wet-lab space to create biotech incubators. The Abilene city council pitched in $3 million to begin construction of the Abilene Life Sciences Accelerator, a biotech incubator that opened in late 2009.
- **El Paso** is looking to leverage its brand new medical school to become a biotech player. The new Texas Tech University Foster School of Medicine opened in July 2009 and will focus research on infectious diseases, degenerative brain disorders, pancreatic cancer, diabetes and obesity. Community leaders hope graduates and researchers will partner with the 40 medical-device manufacturing companies that operate in the city and in neighboring Juarez, said Samantha Chagra Wood, director of life science business development for the El Paso Regional Economic Development Corp. These companies include Johnson & Johnson, GE Medical, 3M and Cardinal Health.

Biotech is an attractive industry for creating wealth, yet the industry provides limited job growth, mainly for highly educated, white-collar professions. Those in the biotech field say Texas should continue promoting the industry. "Life sciences and biotechnology [are] growth areas nationally and worldwide," said Sullivan of Mystic Pharmaceuticals. "It's really opening up new frontiers for mankind. Technology that prolongs life — with the vanity of the Baby Boomers — will continue to drive this industry. And the growing middle class in India and China will want better health and is going to further fuel demand for this industry."

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