The Biotechnology and Life Sciences Industry in the Southeast Florida Region:
Meeting the Workforce Challenges

Executive Summary

Commissioned by:

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Introduction

With the decision to locate Scripps Florida in Palm Beach County, the biotechnology and life sciences industry appears ready to grow dramatically both within Palm Beach County and throughout South Florida. Along with growth will come new demands for biotechnology-skilled workers – and thus for biotechnology-focused education and training resources. The Workforce Alliance asked Regional Technology Strategies, Inc. (RTS) to analyze the emerging biotechnology and life sciences industry in Palm Beach and surrounding counties and recommend what types of education and training resources should be in place in order to prepare workers for jobs in this industry and to capitalize on its ability to be a high-wage, high-growth employer.

RTS, with assistance from the Economic Development Research Group, investigated several aspects of the region's biotechnology cluster, including its present economic strength, its potential for growth, the skills and occupations that will be in highest demand and the current state of the region's biotechnology education and training resources. The project team also reviewed best practices in biotechnology workforce education around the country. The research and analysis produced key findings that led to the development of actionable recommendations. RTS examined the cluster in Palm Beach as well as for the larger seven-county region, and where appropriate, analyzed the differences between the two.

For the purposes of this study the narrow definition of "biotechnology" encompasses pharmaceutical and medicine manufacturing, biotech-related research and development, diagnostics, and medical laboratories. This study's broader "life sciences" definition adds an array of medical manufacturing and testing facilities.

KEY FINDINGS

Present economic strength of biotechnology and life science industry

- There does not currently appear to be a significant concentration of biotechnology and life science activity in Palm Beach County, though the larger region shows a roughly average level of activity compared to the nation as a whole.
- While the extended seven-county region experienced biotech / life sciences employment growth between 1998 and 2002 that was three times greater than the nation as a whole, Palm Beach County itself experienced slower growth than the rest of the region.
- Florida Atlantic University is making significant strides toward becoming a research center for biotechnology and life sciences; however, up to this point the absence of a nationally prominent research university in the County has been a deficiency for the biotech cluster.
- Most observers and industry analysts, both within and outside of Florida, agree that Scripps Florida is likely to promote significant new biotechnology and life science growth in Palm Beach and the region.
- Palm Beach and the region both have a relatively high concentration of medical laboratories and diagnostic imaging centers. Marine science and agriculture appear to be areas in which the region excels and are potential areas of biotech specialization for the region.
- The region has a strong set of industry-focused associations and support agencies.

Projected occupational and skills demand

Drawing on federal and state data sources, the project team developed occupational demand projections for 2012 using three different scenarios, outlined below. All three of the projections also explicitly incorporate the estimated Scripps Florida employment in 2012 into the Palm Beach County employment numbers.

- *Baseline Growth*: The first projection assumes that the region will track with the national biotechnology / life sciences industry projection forecast by the US Bureau of Labor Statistics (BLS) for 2002-2012.

- *Growth Trajectory 1:* To compensate for an apparent underestimation of likely biotech employment growth in the Baseline model, this projection adjusts upward the baseline growth rates to reflect the rapid growth in national biotech employment that actually occurred between 1998-2002.

- *Growth Trajectory 2:* This projection is based on two premises: 1) with the arrival of Scripps Florida, the entire Southeast Florida region will continue to outpace national biotech growth as it has in the past few years, and that 2) as a result of Scripps Florida, future employment growth in Palm Beach County will track with the rest of the region.

Projected Biotechnology / Life Sciences Employment in the 7-County Region

	2002	Baseline 2012	Growth Trajectory 1 2012	Growth Trajectory 2 2012
Biotechnology (narrow definition)	10,734	14,680	16,075	24,094
Life sciences (broad definition)	22,614	28,436	31,375	45,770

The occupations expected to see the greatest growth fall into three categories:

- *Biotechnology scientists:* these are expected to see lower growth than the other two categories, which reflects the structure of most biotechnology research and production operations. These positions usually require advanced degrees and highest-order skills and abilities.
- *Biotechnology science technicians:* these are expected to see the highest growth under all scenarios. Most of these positions can be attained with a two-year degree, and those positions that require a bachelor's degree can usually be worked up to from the entry-level.
- *Biomanufacturing production workers:* these are projected to see only slightly more growth than the scientist occupations. Many of these positions can be filled by workers with two-year degrees or even certificates, one-year diplomas, or secondary-level technical training. The skills required track more closely with skills needed in other manufacturing industries than with those required for other biotechnology occupations.

High-Growth Occupations in the Three Categories

Biotechnology scientists	Biotechnology science technicians	Biomanufacturing production workers
Medical scientists Chemists Microbiologists Natural sciences managers Biochemists and biophysicists	Medical and clinical laboratory technologists Medical and clinical laboratory technicians Radiologic technologists and technicians Veterinary technologists & technicians Diagnostic medical sonographers Biological technicians Dental laboratory technicians Chemical technicians Nuclear medicine technologists	General and operations managers Packaging & filling machine operators & tenders Maintenance and repair workers First-line supervisors/managers of production & operating workers Chemical equipment operators and tenders

Currently, the county's and region's biotechnology and life science employers are not reporting difficulty in finding qualified employees, but it is clear that even if the County and region do no more than grow at the rate of the country as a whole (a conservative premise), demand for these occupations is on track to increase steadily. The greatest preparations will need to be made for training technicians; biomanufacturing occupations can most likely be filled through short-term training sessions to provide biotechnology context to workers who already have the requisite manufacturing skills.

Current state of the County and region's biotechnology education and training resources:

- The county and region are just beginning to develop biotechnology programs at the high school and community college level, which is not surprising given the relative youth of the biotechnology and life sciences industry in the region and particularly in Palm Beach County.
- Palm Beach and Indian River Community Colleges are developing biotechnology programs, and one high school is starting a biotechnology outreach program.
- Several of the region's institutions of higher learning are developing educational partnerships focused on responding to biotechnology workforce needs.

Though the region's biotechnology and life science firms have shown a tendency to hire primarily four-year graduates, this is likely to change as the industry becomes a larger presence and creates more technician-level positions (this dynamic is confirmed through interviews with the region's biotechnology and life science firms). The region's education and training capacity for biotechnology is sufficient to meet current demand, but providers will need to have plans and tools already developed and in place to meet future demand as it increases.

Benchmark programs in biotechnology workforce education

RTS examined initiatives in biotechnology education and training from around the country. The lessons learned from these fall into three primary categories:

- *Career pathways* allow for incremental delivery of biotechnology training and education, interspersed with opportunities to work in the biotechnology industry. This pathway allows employees to work their way up to increasing levels of responsibility and skills.
- *Partnerships with industry* are critical to the success of any biotechnology education and training plan, but can be one of the most difficult elements of a biotechnology workforce initiative. Using other workforce partners to establish these partners often smooths the path considerably.
- *Dividing and clustering* allows for individual education and training institutions to develop areas of specific expertise within the biotechnology field, often linked to their specific economic context. These institutions then share their resources with other institutions with different specializations.

The partnerships among the region's educational institutions lend themselves to the development of career pathways, just as the strong network of industry-focused organizations and resources provide the potential for strengthening relationships between workforce and industry.

Recommendations

Recommendations in the report are based on the fruition of the Scripps Florida research facility as announced; and on the competitive advantages of the cluster as it stands in mid-2005. Changes in demand may come from factors such as which new companies choose to locate in the area; what types of new companies are started; advances in technology and "convergence" with other industries such as medical devices and nanotechnology; the development paths of other regions' biotechnology clusters; and even regulations and political decisions (e.g., the continuation or lifting of restrictions on stem cell research).

The following recommendations focus primarily on the workforce needs below the graduate degree level because Ph.D. positions are often filled through national or even international searches, whereas other positions are most likely to be filled by residents of the region. As such, the region's ability to produce such workers is very important.

1. Further engage biotechnology companies.

Experience from other U.S. regions with more mature biotechnology and life science clusters has shown that biotechnology companies are often somewhat difficult to engage. However, if the Workforce Alliance and other agencies hope to meet the needs of the industry as it grows, this barrier to information sharing needs to be broken down. Palm Beach County should build on existing workforce efforts to create a coherent, coordinated system responding to demand for biotech education and training region-wide. Fortunately, the region possesses a good infrastructure of industry support agencies to facilitate this associational behavior. The Life Sciences Cluster sponsored by the Business Development Board of Palm Beach County and the South Florida Bioscience Consortium bring together biotech-related firms to discuss specific

workforce issues. Encouraging both groups to develop active workforce committees that could meet on a periodic basis with Workforce Alliance staff would be extremely helpful as the Alliance initiates new programs or improves existing ones to meet the needs of industry. Representatives from local educational institutions who provide the programs should also be closely involved.

In addition to these two local cluster groups, Workforce Alliance staff should also engage two larger industry associations: BioFlorida and the South Florida Manufacturers Association. Both may be a good source of greater engagement with industry. The Workforce Alliance should make sure that it remains closely engaged with Scripps Florida. A successful model for engaging industry that goes beyond workforce issues can be found in San Diego, which used a coordinated approach to support biotechnology needs in multiple arenas.

2. ***Support and expand biotechnology educational programs, especially at the technician level.***

RTS' findings show that the core skills and competencies of the fastest-growing biotechnology technician positions are similar, suggesting that there is not a need to create multiple types of biotechnology programs at this time. This finding also applies to four year programs. The new community college programs at Palm Beach and Indian River Community Colleges are, appropriately, general biotech technician preparation programs, and they are being backed by significant investments in high-quality laboratories.

The core curricular content of these biotechnology programs should be kept fairly general in order to prepare technicians for a variety of biotech / life science companies. It would be useful, however, to incorporate the competitive advantages the region offers in marine and agriculture-related aspects of biotech. For example, Palm Beach County's new high school biotechnology academy is a general preparation program, yet it includes a hands-on horticulture lab. Future high school academies could include marine, agricultural, or, as the impact of Scripps Florida impact increases, pharmaceutical emphases.

3. ***Create biotechnology modules or elective courses for non-biotech education programs.***

Many employees in biotech companies do not carry out biotech specific functions; yet it is valuable for these workers to understand the operating context of biotech companies, particularly the strict regulatory environment they face. Workforce Alliance should consider supporting the development of discrete modules or elective courses for these students, both at the two-year and the four-year college level. Modules or courses should be created by faculty teams from different educational institutions with input from industry, and packaged flexibly so they can be delivered through different formats and at different institutions. These modules could become a workforce competitive advantage for the region—a resource the Southeast Florida region has that most other locations do not and something that can be promoted to prospective companies. That being said, it would be wise to start developing these modules on a fairly modest scale

in order not to outpace demand. The best strategy would be to develop a few core modules, while simultaneously establishing an infrastructure that will allow for the quick development of new ones in response to industry demand.

4. Seek additional funding to expand Workforce Alliance-funded one-year Biotechnology Certificate to lower educational levels as the cluster grows.

As the region's biotechnology industry evolves and the number of technician and entry-level workers increases, there are likely to be opportunities to create dislocated worker programs for biotechnology jobs that do not require degrees. The Workforce Alliance should engage Scripps Florida and other large employers in discussions about lab preparation and maintenance functions that might require some short-term training, and which could represent the first rung on career pathways. In addition, if one or more pharmaceutical manufacturing facilities move to Palm Beach County, there could be room to create a bioprocessing-oriented training program for entry-level workers, especially those with manufacturing experience. Another avenue to explore is the cross-over skills shared between life science companies and the health field. It is possible that health-related training programs could be altered to incorporate some of the foundational lab skills required in biotech companies, increasing trainees' marketability for positions in life science companies.

5. ***Develop short courses for incumbent workers.***

Interviews and survey results indicate that most biotech firms do a considerable amount of in-house training and/or use third party vendors for this training. The Workforce Alliance could explore, in partnership with others, offering the modules recommended earlier to companies on a fee-for-service basis to help up-skill their non-biotech specific workers. Additional "short courses" for technical workers could also be developed and offered to incumbent workers, probably at less expense than what companies currently are paying. Making the modules and courses credit bearing by working through colleges would increase the value to employees and could encourage non-degreed workers to matriculate into educational programs.

6. Develop career pathways.

Career pathways are initiatives that help disadvantaged workers gain access to jobs and advance to higher paying positions within an industry through training and support programs. While the cluster has not yet developed sufficient scale to develop a full set of biotechnology career pathways in Palm Beach County, the coming years' growth will produce relatively low-skilled biotechnology jobs that could represent the first rung of a career pathway. Palm Beach County has the pieces in place for an initiative that includes easy entrance/exit career pathways for biotechnology that start at the high school level and include all credentials through the four-year level.

7. Coordinate biotech-related education and training resources across South Florida.

Coordinated efforts that steer industry specialization among educational providers can reduce duplication, while also creating economies of scale and scope by implementing education initiatives region-wide. Creating a "virtual" organization to engage industry

and to create appropriate, flexible education and training resources on a regional basis would build the area's biotech capacity for existing companies and increase its attractiveness to prospective employers. The initiative could be "branded" and marketed under a single name, such as South Florida BioConnect. The important first step, of course, is to find a regional entity that has the legitimacy and ability to manage such an endeavor and to include all the appropriate partners. Potential functions would be: monitoring industry trends and workforce needs; interfacing with industry organizations; coordinating specialization among providers; plugging into national biotech networks; identifying benchmark practices; and implementing ways to improve access and outcomes for disadvantaged populations. The ultimate goals are to facilitate close interaction with companies for the quickest possible response time, and to make it clear to industry that the education and workforce community is speaking to them with one voice.